OFA04.02.01 (Integrated Surface Management) Final OSED

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Abstract

This Final OSED details the operational concept for Integrated Surface Management, as defined by OFA04.02.01 and validated in SESAR Release 5.

Five operational services are described, associated to the Route planning and Guidance functions of A-SMGCS defined in ICAO's A-SMGCS Manual (Doc. 9830):

- The automatic generation of routes on the movement area for mobiles.
- The transmission by voice of cleared routes to Flight Crews and Vehicle Drivers (which also includes start-up and pushback clearances).
- The transmission by data link of planned routes to Flight Crews and Vehicle Drivers prior to their ground movement, as well as ground clearances.
- The development of an additional means of guidance on the ground with an increased level of automation of Airfield Ground Lighting (AGL).
- The use of virtual stop bars to perform Virtual Block Control in low visibility conditions.

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Executive summary

This document is the Final Operational Service and Environment Description (OSED) corresponding to the Integrated Surface Management operational concept defined by OFA04.02.01 as part of the overall SESAR Step 1 CONOPS (Concept of Operations). It has been developed jointly by operational projects 06.07.02 and 06.07.03, building on the second OFA04.02.01 Interim OSED ([43]) produced by these two projects and updating the various operational concepts it describes after V3 validation activities conducted in the framework of SESAR Release 5.

This document is a top-down refinement of the SESAR Airport Step 1 DOD ([11]) produced by project 06.02. It also contains additional information which should be consolidated back into the higher level SESAR concepts using a “bottom up” approach.

This OSED defines the operational environment, procedures, use cases and requirements for the five operational services composing the Integrated Surface Management operational concept, which is mainly built on the A-SMGCS Route planning and Guidance primary functions defined in the ICAO A-SMGCS Manual ([5]) and on an increased use of data link communications:

- **Route generation integrating planning information** – This service’s objective is to calculate the most suitable route on the movement area (runways, taxiways and aprons) for an aircraft or a vehicle, before it starts taxiing, taking into account Air Traffic Controller inputs and known constraints (taxiway closures, aircraft type etc.). Routes can be accessed by all Tower Controllers for an increased awareness of planned movements on the aerodrome surface. The unimpeded (unrestricted) time it will take for a mobile to taxi/drive on a given route is also calculated, typically by assessing the length of this route and the number of turns, and supplied to interested actors and systems.
- **Provision of Cleared Route to Mobiles by Voice (R/T)** – This service is used when no data link service is available and in times of critical or emergency situations. The Tower Controller verifies that the planned route generated automatically is suitable and then transmits instructions to the Flight Crew or Vehicle Driver, and makes an input to the system to indicate the route has now been cleared. The A-SMGCS then displays the cleared route and any further part of the route not yet cleared (pending route). On board the aircraft, the Flight Crew can enter the cleared route in the aircraft systems using the Manual taxi routing function and have a graphical depiction of this clearance on the Airport Moving Map.
- **Provision of Planned and Cleared Route to Mobiles by Data Link** – This service aims at reducing R/T occupancy by exchanging non-time critical messages between ATC and mobiles (Contact, Monitor, Expected Taxi Route, Start Up, Push back, Taxi-In, Taxi-Out and Taxi Revision[1]) by data link. R/T is still used on first contact with the Tower Controller and is available at any time in case the Flight Crew, Vehicle Driver or Tower Controller needs to revert to voice communication.
- **Airfield Ground Lighting (AGL) –** This service correlates the cleared route with the taxi instructions provided by the Tower Controller and automatically switches on and off taxiway centreline lights and stop bars according to the position of the mobile. The function provides individual guidance along the assigned taxi route by illuminating the AGL a specified distance in front of the mobile whilst taking into account other traffic and timing constraints.. A full-fledged AGL automatically establishes safe spacing between mobiles on the aerodrome surface, including between converging mobiles, and in all weather conditions.
- **Virtual Block Control** – This service is based on the introduction of Virtual Stop Bars to support Tower Controllers in implementing enhanced block control procedures in low visibility conditions. Tower Controllers enter the clearance limit, corresponding to a VSB position. VSBs can be linked to an already existing intermediate holding position (IHP), in which case they can apply to any aircraft. They can also be linked to any other point, but only for aircraft equipped with an Airport Moving Map (AMM) as well as a data link

[1] Validation results have shown that data link communications can slow down exchanges between ATC and Flight Crews. At airports where this would create an operational issue, R/T should be preferred to data link for the provision of taxi-in, taxi-out and revised taxi clearances.

application that communicates VSB positions and states. The intention is to ensure that both Tower Controller and Flight Crew have the same level of situation awareness.

The following table indicates which SESAR Solutions enable implementing each of the above operational services, as well as the corresponding Operational Improvement steps.

Operational Service	SESAR Solution involved	SESAR Solution id	Corresponding OI step(s)	Maturity level
Route generation integrating planning information	Automated assistance to controller for surface movement planning and routing	#22	AO-0205	V3
Provision of Cleared Route to Mobiles by Voice (R/T)	Manual taxi routing function	#26	AUO-0603-A	V2
Provision of Planned and Cleared Route to Mobiles by Data Link	D-TAXI service for CPDLC application	#23	AUO-0308-A	Partial V3[2]
	Improved vehicle guidance[3]	N/A	AO-0206	V2
			AO-0215	V2
Airfield Ground Lighting	Guidance assistance through airfield ground lighting	#47	AO-0222-A	V3
Virtual Block Control	Virtual block control in LVPs	#48	AO-0223	V3

Table 1: Operational services, SESAR Solutions and OI steps in OFA04.02.01 scope

The current document builds on the second Interim OSED for OFA04.02.01 ([43]), which had been developed after Releases 2 and 3, as well as complementary V2 validation activities. Compared to this interim version, this document includes the outcome of the validation activities performed in Release 5 ([41], [42]). Validation results obtained in 6 different exercises are thus reflected in this Final OSED of OFA04.02.01, through clarification of the exact scope of the operational services (e.g. potential limitations on the provision of taxi clearances by data link), updated Use Cases and conclusion on the status (i.e. confirmed through validation or still to be validated) of operational requirements.

Therefore, this Final OSED describes the new operational services defined and validated by OFA04.02.01, and proposed to be delivered as SESAR Solutions by the SESAR 1 Programme. It also documents the work on additional features or functionalities which have eventually not been retained in these SESAR Solutions, but which can be considered for future research activities.

In some instances, SESAR Solutions developed by OFA04.02.01 are pre-requisites for Solutions developed by other OFAs. This is particularly the case of SESAR Solution #22 (Automated assistance to controller for surface movement planning and routing), as cleared taxi routes are needed by OFA01.02.01 (Airport Safety Nets) for the Solution alerting to Tower Controllers in case of a mobile deviating from its cleared route (Solution #02: airport safety nets for controllers: conformance monitoring alerts and conflict detection). Similarly, the unimpeded taxi time associated to each taxi route is exploited by OFA04.01.01 (Integrated arrival/departure management at airports) for the Solution improving the sequencing of departing aircraft (Solution #14: departure management integrating surface management constraints). Therefore, the role of this OSED is also to describe the interactions between these different Solutions.

[2] SESAR Solution #23 is indicated as having partially achieved the V3 maturity level, as validation activities have identified operational issues in busy airports. In other airports, V3 maturity level has been achieved.
[3] Improved vehicle guidance was identified as SESAR Solution #24 at one stage, but was eventually removed from the portfolio of SESAR Solutions when it was concluded it would not reach a sufficient maturity level to envisage its industrialisation at the end of the SESAR 1 programme.

Finally, the European Commission's Pilot Common Project (Commission Implementing Regulation (EU) No 716/2014) requires SESAR Solution #22 to be implemented by 2024 at 24 major European airports, as part of the Airport Integration and Throughput ATM functionality. OFA04.02.01 Final OSED is thus a key input for the future deployment of this Solution, detailing its definition as well as its integration in in the future airport environment.

1 Introduction

1.1 Purpose of the document

The Operational Service and Environment Definition (OSED) describes the operational concept defined in the Detailed Operational Description (DOD) in the scope of its Operational Focus Area (OFA).

It defines the operational services, their environment, use cases and requirements.

The OSED is used as the basis for assessing and establishing operational, safety, performance and interoperability requirements for the related systems further detailed in the Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) documents. The OSED identifies the operational services supported by several entities within the Air Traffic Management (ATM) community and includes the operational expectations of the related systems.

This OSED is a "top-down" refinement of the Airport DOD Step 1 – 2014 Update ([11]) produced by the federating operational 06.02 project (Coordination and consolidation of operational concept definition and validation). It also contains additional information which should be consolidated back into the higher level concepts of the Single European Sky ATM Research (SESAR) programme, using a "bottom-up" approach.

The figure below presents the location of the OSED within the hierarchy of SESAR concept documents, together with the SESAR Work Package or Project responsible for their maintenance.

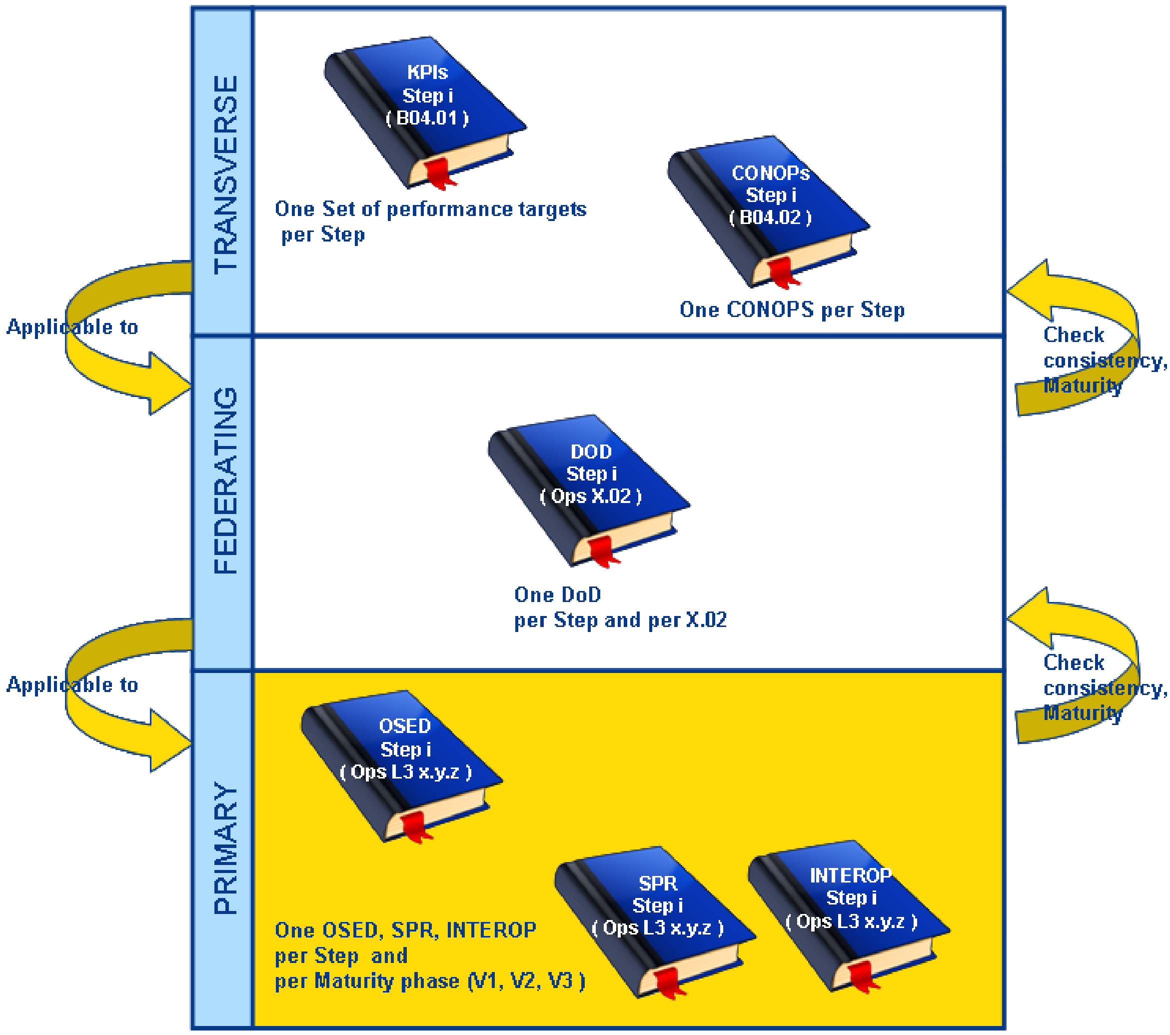

Figure 1: OSED document with regards to other SESAR deliverables

In Figure 1, the Steps are driven by the Operational Improvement (OI) Steps addressed by the project in the Integrated Roadmap document ([10]).

Following the conclusion of V3 validation activities in Release 5 by operational project 06.03.01, this document updates and finalises the description of the different operational services by taking into account these validation results, and brings the maturity of the corresponding SESAR Solutions (cf. 3.2.7) and OI steps (cf. 2.1) to a V3 maturity level, using the European Operational Concept Validation Methodology (E-OCVM) scale.

1.2 Scope

This OSED details the operational concept for OFA04.02.01 (Integrated Surface Management), dealing with the development and validation of the advanced Route planning and Guidance primary functions of Advanced Surface Movement Guidance and Control Systems (A-SMGCS), as defined in the International Civil Aviation Organization's (ICAO) A-SMGCS Manual ([5]), the use of data link communication on the aerodrome, on-board means to improve the situational awareness of Flight Crews and Vehicle Drivers, and the improvement of block control procedures.

This document defines the operational environment, procedures, use cases and requirements for the five operational services composing Integrated Surface Management and which described through six OIs, allowing implementing the SESAR Solutions delivered by OFA04.02.01.

Operational Service	SESAR Solution involved	SESAR Solution id	Corresponding OI step(s)
Route generation integrating planning information	Automated assistance to controller for surface movement planning and routing	#22	AO-0205
Provision of cleared route to mobiles by radio/telephony (R/T)	Manual taxi routing function	#26	AUO-0603-A
Provision of planned and cleared route to mobiles by data link	D-TAXI service for CPDLC application	#23	AUO-0308-A
	Improved vehicle guidance[3]	N/A	AO-0206
			AO-0215
Airfield ground lighting	Guidance assistance through airfield ground lighting	#47	AO-0222-A
Virtual block control	Virtual block control in LVPs	#48	AO-0223

Table 2: Operational services, SESAR Solutions and OI steps in OFA04.02.01 scope

1.3 Intended readership

The intended audience for this OSED is the core projects of OFA04.02.01, including operational projects as well as the corresponding technical projects, which develop system prototypes following the operational concept and aligned with the operational requirements described in this OSED:

- 06.07.02 (A-SMGCS Routing and planning function) in charge of defining and validating the A-SMGCS Routing function and the provision of route information to mobiles by data link;
- 06.07.03 (A-SMGCS Guidance function) in charge of defining and validating the A-SMGCS Guidance function which includes such means as communication of route clearances by voice and data link, as well as AGL;
- 09.13 (Airport Surface Taxi Clearances) responsible for the cockpit side of the A-SMGCS Routing and Guidance functions;
- 09.31 (Aeronautical databases) notably in charge of developing Airport Mapping Data Bases (AMDB) providing a digital description of the aerodrome layout in a standardised format;

- 12.03.01 (Improved surveillance for surface management) responsible for defining improvements to the aerodrome core surveillance function, by enhancing the data fusion of multiple sensors, both existing and new.
- 12.03.03 (Enhanced Surface Routing) developing and verifying the surface route generator which calculates routes for mobiles on the aerodrome surface;
- 12.03.04 (Enhanced Surface Guidance) developing and verifying the surface guidance prototype; and
- 12.04.03 (Enhanced FDPs at airports) developing the Flight Data Processing System (FDPS) for the airport, notably in charge of managing the taxi routes and distributing them to interested systems.

This OSED is also of interest for the coordinating federating projects and integrated validation projects whose work is directly linked with this OFA:

- 06.02 (Coordination and consolidation of operational concept definition and validation) is interested in the operational concepts defined within OFA04.02.01 to ensure consistency with the rest of the projects in Work Package 06 (WP06). 06.02 is also in charge of consolidating WP06 project's OSEDs into the Step 1 Airport DOD;
- 06.09.02 (Advanced CWP (A-CWP)) collects and consolidates all requirements from airport operational projects related to the Human-Machine Interface (HMI) and will thus find in this document the requirements on the integration of the different operational services it covers into the Controller Working Position (CWP).
- 09.49 (Global Interoperability - Airborne Architecture and Avionics Interoperability Roadmap) is interested in the cockpit side of surface management operations, in particular for the definition of the target architecture of aircraft systems supporting data link and the Airport Moving Map (AMM);
- 12.01.07 (Airport Systems Specification drafting and maintenance) is interested in the ground side of surface management operations, notably those aspects related to the architecture of the systems implementing the operational services described in this OSED; and
- 06.03.01 (The Airport in the ATM environment) is responsible for the V3 integrated validations of several WP06 primary projects including 06.07.02 and 06.07.03.

Other OFAs that are directly linked to OFA04.02.01 may also be considered as part of the intended audience for this OSED:

- OFA01.02.01 (Airport safety nets) is interested in the new operating methods described in this OSED, which have to be taken into account when designing new safety support tools and particularly the A-SMGCS Control primary function;
- OFA04.01.01 (Integrated Arrival/Departure Management at Airports) is developing the concept for coupling AMAN and DMAN, two systems that have to work in coordination with the A-SMGCS;
- OFA05.01.01 (Airport Operations Management) is interested in the integration of the route planning into the Airport Collaborative Decision Making (A-CDM) process as well as into de-icing operations; and
- OFA06.01.01 (CWP Airport) is interested in the HMI operational requirements stated in this OSED.

Lastly, a number of information modelling and services identification projects may also be interested in this OSED to identify the information exchange needs for surface management data link messages and interactions between different airport systems:

- 08.01.03 (AIRM Deliverable) in charge of defining the ATM Information Reference Model (AIRM).

1.4 Structure of the document

This document consists of the following chapters:

- **Section 1 – Introduction:** introduces the document;
- **Section 2 – Summary of Operational Concept from DOD:** describes what is to be developed and provides the traceability to the relevant DOD. It details in simple terms and plain language the operational concept and scope;
- **Section 3 – Detailed Operating Method:** this section develops further the Operational Concept described in the DOD and summarised in the previous chapter;
- **Section 4 – Detailed Operational Environment:** this chapter describes the environment for the Operational Services described above, in order to get knowledge of the fundamental operational and technical characteristics that govern ATM, Communication, Navigation and Surveillance (CNS) performance and safety;
- **Section 5 – Use Cases:** defines the Operational Scenarios outlining the key Use Cases;
- **Section 6 – Requirements:** defines the requirements (Operational, Functional and Human Machine Interface, Information Exchange);
- **Section 7 – References:** provides the references to the documents mentioned.
- **Appendix A – D-TAXI Operating Methods** describes the data link exchanges between the Tower Controller and the Flight Crew that helped build the Use Cases;
- **Appendix B – New Information Elements** describes the information elements associated to the Information Exchange Requirements.

1.5 Background

The work conducted in OFA04.02.01 is a follow-up on previous operational and technical research conducted in two projects from the European Commission 6th Framework Programme (FP6): European airport Movement Management by A-SMGCS (EMMA) and European airport Movement Management by A-SMGCS, part 2 (EMMA2), the latter being completed in 2009. These projects addressed initial elements, i.e. A-SMGCS Surveillance and initial Control functions, but also more advanced functions such as Routing, Planning and Guidance. Positive results and lessons learned from these projects have provided valuable input for OFA04.02.01.

In parallel to these activities, EUROCONTROL was conducting the Integrated Tower Working Position (ITWP) project. ITWP studied the integration of the main existing system components used by a Tower Controller into a simplified more efficient working environment. In the scope of ITWP, the A-SMGCS Routing and Guidance functions were studied. The EUROCONTROL Vehicle Driver Guidance project developed an initial concept for operational procedures and defined systems requirements for Vehicle Driver Guidance related to the A-SMGCS Vehicle Driver guidance service. Outcomes of these projects have also provided valuable input for OFA04.02.01.

A German Government funded Aviation Research Project “WFF – The Competitive Airport” with its sub-cluster “Surface Traffic Management & Operations” provided an additional basis for extracting technical and operational requirements, procedural information and lessons learned regarding the A-SMGCS Routing and Guidance functions in the SESAR context: the project had the goal to develop and validate tools and procedures for terminal airspace, Ground Movement and turnaround with the overall goal to improve efficiency at airports, increase operational safety and reach operations with environmental sustainability. A field trial at Frankfurt Airport proved the feasibility of the theoretical and simulated outcome from earlier steps of that project.

Past research, but also on-going SESAR activities addressing A-SMGCS, are basing their developments on the ICAO A-SMGCS Manual Doc. 9830 ([5]).

The progressive development of OFA04.02.01 OSED is illustrated by Figure 2 below. Pre-SESAR inputs served as the starting point for operational projects 06.07.02 and 06.07.03 to develop their respective lines of OSEDs at project level, which concluded prior to the V3 validation activities conducted within Release 2 in a 06.07.02 Updated OSED ([13]) and a 06.07.03 Final OSED ([16]). These two documents were the main inputs for the first OFA04.02.01 Interim OSED ([33]), which merged and consolidated them, but also took into account the outcome of Release 2 validation of surface management conducted by 06.03.02 and documented in the corresponding Validation Report ([12]).

This first Interim OSED also took into consideration the integration of A-SMGCS with DMAN, de-icing and the Enhanced Braking Systems (EBS) operational concepts, respectively developed by projects 06.08.04 (Preliminary OSED – [20]) in OFA04.01.01 (Integrated AMAN DMAN), 06.06.02 (OSED – [18]) in OFA05.01.01 (Airport Operations Management) and 06.08.02 (Enhanced runway management through optimised braking systems OSED – [19]), when developing the Use Cases, and Operational Requirements.

After this initial OFA OSED, 06.07.02 progressed on its Phase 2 work, which defined advanced features for the A-SMGCS Routing function such as route optimisation and de-confliction in the planning phase of the flight ([34]). Similarly, 06.07.03 defined new operational services related to guidance of mobiles on the airport, through the Airfield Ground Lighting ([35]) and Virtual Stop Bars ([36]). Lastly, project 09.13 developed the manual taxi routing function, allowing the Flight Crew to directly input a taxi route into the avionics systems ([37]).

All these advanced features and new operational services have been validated in V2 by projects 06.07.02, 06.07.03 and 06.08.07 ([30], [31], [32] and [38]). Initial V3 validation of the advanced A-SMGCS Routing function, and its integration with the A-SMGCS Control function, was also performed in Release 3 in EXE-06.03.02-VP-614 ([29]). At this stage of OFA04.02.01 validation activities, the description of the operational services was updated in a second Interim OFA04.02.01 OSED ([43]).

Finally, the new operational services described in this document have been validated in V3 by project 06.03.01 through Release 5 exercises ([42]). Some specific aspects had previously been validated in V2 by project 06.07.03.

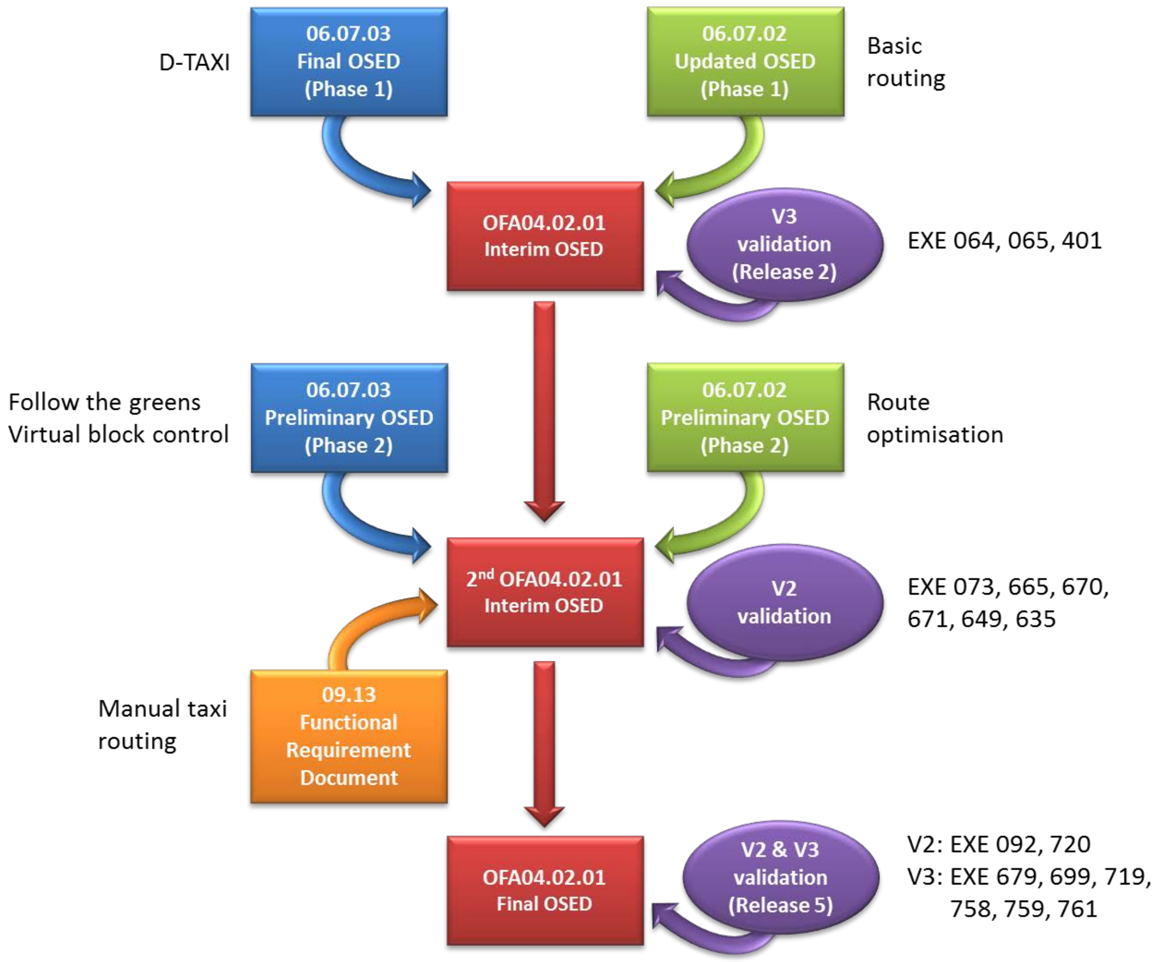

Figure 2: OFA04.02.01 OSED development

The present document thus describes the final outcome of the work performed on the definition and validation of the operational services in the scope of OFA04.02.01. Following V3 validation activities, it thus provides the complete SESAR operational concept for surface management, which is proposed as the basis for deployment for those services that have reached a sufficient maturity level and as the baseline for the future research work to further improve the management of surface operations.

1.6 Glossary of terms

Advanced-Surface Movement Guidance and Control Systems (A-SMGCS): A system providing Surveillance, Airport Safety Support, Routing and Guidance to aircraft and vehicles in order to maintain the airport throughput under all local weather conditions whilst maintaining the required level of safety (note: definition based on ICAO Doc. 9830 ([5]), modified to take into account the newly defined services).

Airport Moving Map (AMM): Base Layer

- Ground Traffic Display (GTD) Layer,
- Data Link Clearance Layer,
- Guidance Instruction Layer,
- Alerting Layer,

The number of layers implemented on an AMM depends on the environment that the mobile is destined to operate in e.g. commercial aircraft using major airports may have all layers available whilst smaller aircraft may use just the AMM with GTD (source: SESAR 06.07.03).

Cleared route: The part of a route that has been approved by a Tower Controller for a mobile in his/her area of responsibility (source: SESAR 06.07.02).

Cockpit Display System (CDS) and Vehicle Display System (VDS): Throughout this document references to CDS and VDS are at a generic level and do not refer to one specific manufacturer or product. It is foreseen that these display systems have different graphical layers of visual information which can be individually displayed on top of the base layer which is the Airport Moving Map. It is assumed that in the future when reliability and data accuracy are assured that these systems are able to be used legally as a replacement for paper maps/charts (source: SESAR 06.07.03).

Conflict: A situation where there is a risk for collision between aircraft and/or vehicles (source ICAO Doc. 9830 [5]).

Cooperative aircraft / vehicle: An aircraft / vehicle which is equipped with systems capable of automatically and continuously providing information including its Identity to the A-SMGCS (source EUROCAE ED-87C [7]).

De-icing area / de-icing bay: A distinction is made between “de-icing area” and “de-icing bay”. A “de-icing area” can contain several “de-icing bays”. A flight is first directed towards a particular “de-icing area” before it is cleared to enter one “de-icing bay” in that “de-icing area” (source: SESAR 06.07.02).

Mobile: A mobile is either an aircraft, aircraft being towed or a vehicle (source EUROCONTROL A-SMGCS Specification [9]).

Movement Area: Part of an aerodrome used for take-off, landing, and taxiing of aircraft. Consisting on the manoeuvring area and the apron(s) (source ICAO Doc. 9830 [5]).

Pending route: That part of the route assigned to a mobile that has not yet been cleared by a Tower Controller (typically, in the next area of responsibility than where the mobile is) (source: SESAR 06.07.02).

Planned route: Route assigned to a mobile that is not yet operating on the movement area of the aerodrome (source: SESAR 06.07.02).

Route: A track from a defined start point to a defined endpoint on the movement area (source ICAO Doc. 9830 [5]).

1.7 Acronyms and Terminology

Term	Definition
A-CDM	Airport Collaborative Decision Making
A-SMGCS	Advanced Surface Movement Guidance and Control Systems
A-CWP	Advanced Controller Working Position
ACARS	Aircraft Communications Addressing and Reporting System
ACM	ATC Communications Management Service
AGL	Airfield Ground Lighting
AIBT	Actual In-Block Time
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation And Control
AIRM	ATM Information Reference Model
AMAN	Arrival MANager
AMDB	Aerodrome Map Data Base
AMM	Airport Moving Map
ANSP	Air Navigation Service Provider
AO	Airport Operations
AOBT	Actual Off-Block Time
AOC	Airline Operations Centre
AODB	Airport Operational Data Base
AOP	Airport Operations Plan
AoR	Area of Responsibility
APTR	Alternative Parallel Taxiway Routing
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATOT	Actual Take-Off Time
ATS	Air Traffic Service(s)
ATSU	Air Traffic Service Unit
AUO	Airspace User Operations
BT	Business Trajectory
CAVOK	Ceiling And Visibility OK
CDS	Cockpit Display System
CDTI	Cockpit Display of Traffic Information
CNS	Communication, Navigation, Surveillance

Term	Definition
CONOPS	Concept of Operations
CPDLC	Controller Pilot Data-Link Communication
CWP	Controller Working Position
D-OTIS	Data link Operational Terminal Information Service
D-TAXI	Data link Taxi service
DCDU	Data Link Cockpit Display Unit
DCL	Departure Clearance
DLIC	Data Link Initiation Capability Service
DM	Downlink Message
DMAN	Departure MANager
DOD	Detailed Operational Description
E-OCVM	European Operational Concept Validation Methodology
EASA	European Aviation Safety Agency
EBS	Enhanced Braking Systems
EFB	Electronic Flight Bag
EFS	Electronic Flight Strip
EIBT	Estimated In-Block Time
ELDT	Estimated Landing Time
EMMA	European airport Movement Management by A-SMGCS
EMMA2	European airport Movement Management by A-SMGCS, Part 2
EVS	Enhanced Vision System
FDPS	Flight Data Processing System
FP6	6^{th} Framework Programme
FL	Flight Level
FtG	Follow The Greens
GTD	Ground Traffic Display
HMI	Human Machine Interface
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IHP	Intermediate Holding Position
INTEROP	Interoperability Requirements
ITWP	Integrated Tower Working Position
KPA	Key Performance Area
LED	Light-Emitting Diode
LVC	Low Visibility Conditions
LVP	Low Visibility Procedures
MCDU	Multifunction Control Display Unit

Term	Definition
METAR	METeorological Aerodrome Report
NOTAM	NOtice To AirMen
OANS	On-board Airport Navigation System
OFA	Operational Focus Areas
OI	Operational Improvement
OSED	Operational Services and Environmental Description
PCP	Pilot Common Project
PF	Pilot Flying
PM	Pilot Monitoring
R/T	Radio/Telephony
RMCA	Runway Monitoring and Conflict Alerting
RVR	Runway Visual Range
SESAR	Single European Sky ATM Research Programme
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SOPs	Standard Operating Procedures
SPR	Safety and Performance Requirements
SWP	Sub-Work Package
TA	Transversal Area
TAF	Terminal Aerodrome Forecast
TCL	Taxiway Centre line Lights
TLDT	Target Landing Time
TMA	Terminal Manoeuvring Areas
TOBT	Target Off-Block Time
TSAT	Target Start Up Approval Time
TTOT	Target Take Off Time
UDPP	User Defined Prioritisation Process
UM	Uplink Message
VBC	Virtual Block Control
VDGS	Visual Docking Guidance System
VDS	Vehicle Display System
VSB	Virtual Stop Bar
VSB_{IHP}	Virtual Stop Bar linked to an already existing intermediate holding point
VSB_{NIHP}	Virtual Stop Bar not linked to an already existing intermediate holding point
WFF	Wettbewerbsfähiger Flughafen (Competitive airport)
WP	Work Package

2 Summary of Operational Concept from DOD

2.1 Mapping tables

Table 3 lists the Operational Improvement steps (OIs from the Integrated Roadmap, Dataset 16 [10]), within the associated Operational Focus Area addressed by the OSED.

Relevant OI Steps ref. (coming from the Integrated Roadmap)	Operational Focus Area name / identifier	Story Board Step	Master or Contributing (M or C)	Contribution to the OIs short description
AO-0205	OFA04.02.01 – Integrated Surface Management	Step 1	M	The System provides the Tower Controllers with the most suitable taxi route calculated by minimising the delay according to planning, ground rules, and potential conflicting situations with other mobiles Work performed in SESAR 1 has concluded that the part on the detection and resolution of potential conflicting situations was not mature yet, but that it was not required for future deployments. A revision of AO-0205 has been requested by OFA04.02.01, which is currently under assessment for a future Dataset.
AO-0206	OFA04.02.01 – Integrated Surface Management	Step 1	M	The system provides to the Vehicle Drivers the display of dynamic traffic context information including status of runway and taxiways, obstacles, route (potentially by application of an airport moving map)
AO-0215	OFA04.02.01 – Integrated Surface Management	Step 1	M	Improved efficiency of surface operations thanks to automated exchange between Vehicle Drivers and Tower Controllers using datalink for ground-related clearances and information
AO-0222-A	OFA04.02.01 – Integrated Surface Management	Step 1	M	Using Airfield Ground Lighting, mobiles will be guided along their cleared route, taking into account tactical decisions (made by the Apron Manager and Tower Ground Controller) and known constraints from the surface management system. The Airfield Ground Lighting infrastructure will switch automatically the taxiway centreline lights and stop bars accordingly for each mobile individually. The operational service is capable of automatically supporting a safe longitudinal spacing between mobiles on the aerodrome surface in all weather conditions

Relevant OI Steps ref. (coming from the Integrated Roadmap)	Operational Focus Area name / identifier	Story Board Step	Master or Contributing (M or C)	Contribution to the OIs short description
AO-0223	OFA04.02.01 – Integrated Surface Management	Step 1	M	In low visibility conditions, the Tower Controller working positions are provided with Virtual Stop Bars (VSB) to improve low visibility operations and enhance Tower Controllers' situational awareness. Virtual Stop Bars can be used by the Tower Controller to reduce block-sizes once procedural control applies. Additional Tower Controller safety nets will be available to indicate violations of Stop Bars (including Virtual Stop Bars) and to monitor aircraft for any kind of unauthorised movement (Watch Dog).
AUO-0308-A	OFA04.02.01 – Integrated Surface Management	Step 1	M	Exchange between Flight Crew and Controller using datalink for start-up/pushback/taxi (i.e. the Digital Taxi, or D-TAXI, service), supported on the airborne side by the provision of the departure clearance (DCL) by data link over the Aeronautical Telecommunication Network (ATN), and the Controller Pilot Data Link Communication (CPDLC) application.
AUO-0603-A	OFA04.02.01 – Integrated Surface Management	Step 1	M	The system provides to the Flight Crew the display of the airport layout (showing taxiways, runways, fixed obstacles), the own aircraft position, the route (to runway or stand), the taxi clearances (as issued by Air Traffic Control, or ATC) and the status of runways and taxiways

Table 3: List of relevant OIs within the OFA

Table 4 identifies the link with the applicable scenarios and use cases of the DOD.

Scenario identification	Use Case Identification	Reference to DOD section where it is described
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 99 – General	4.2.5.2.1 Preparation of the landing phase
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 15 – General	4.2.5.2.2 Landing
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 18 – Aircraft not leaving the runway as expected	4.2.5.2.2 Landing *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 19 – Exit not available	4.2.5.2.2 Landing *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 20 – Unplanned blockage of assigned exit	4.2.5.2.2 Landing *Violation*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 21 – General	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 22 – Cooling Time	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 23 – Remote Holding	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 24 – Return to stand	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 25 – Alternative Parallel Taxi Routing	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 26 – Towing	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 27 – Low visibility procedures	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Optional*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 28 – Deviation from taxi route	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Violation*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 29 – Deadlock situation on taxiway	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Violation*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 30 – Holding position overrun	4.2.5.2.3 Plan and provide taxi-in routing for an inbound flight *Violation*
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 45 – Aircraft blocking a taxiway due to technical reasons	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 46 – Aircraft blocking a taxiway with an emergency	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 47 – Major accident on a taxiway	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 48 – Unplanned closure of part of the airport infrastructure	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 49 - “Follow-me” requested by Flight Crew (not for parking)	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 50 – Winter conditions with on-going winter operations (snow/ice removal)	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario	UC 6 51 – Apron Control	4.2.5.3 Use Cases Identified

Scenario identification	Use Case Identification	Reference to DOD section where it is described
Execution Phase: Arrival		
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 52 – Aircraft arrives at wrong parking stand	4.2.5.3 Use Cases Identified
4.2.5 Operational Scenario Execution Phase: Arrival	UC 6 53 – Aircraft arrives at engaged parking stand	4.2.5.3 Use Cases Identified
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 54 – General	4.2.6.2.1.1 In-block
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 58 – General	4.2.6.2.1.3 Pre-departure
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 62 – General	4.2.6.2.1.4 Off-blocks
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 69 – Delayed start-up approval	4.2.6.3 Use Cases Identified
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 70 – Change in allocated parking position	4.2.6.3 Use Cases Identified
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 73 – De-icing on parking position	4.2.6.3 Use Cases Identified
4.2.6 Operational Scenario Execution Phase: Turn-round	UC 6 75 – Early arrival	4.2.6.3 Use Cases Identified
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 76 – General	4.2.7.2.1 Pushback
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 77 – Deviation from pushback route	4.2.7.2.1 Pushback *Violations*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 78 – Deviation from expected pushback moment	4.2.7.2.1 Pushback *Violations*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 79 – General Procedures	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 80 – Remote de-icing	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Optional*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 24 – Return to stand	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Optional*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 25 – Alternative Parallel Taxi Routing	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Optional*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 27 – Low visibility procedures	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Optional*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 28 – Resolve deviation from taxi route	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Resolution of Procedural Violations*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 29 – Resolve deadlock situation on taxiway	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Resolution of Procedural Violations*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 30 – Resolve holding position overrun	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Resolution of Procedural Violations*
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 85 – Resolve aircraft blocking a taxiway	4.2.7.2.1.1 Plan and provide taxi-out routing for an outbound flight *Resolution of Procedural Violations*

Scenario identification	Use Case Identification	Reference to DOD section where it is described
4.2.7 Operational Scenario Execution Phase: Departure	UC 6 103 – Provision of Guidance for an Aircraft Towing manoeuvre	4.2.7.3 Use Cases Identified

Table 4: List of relevant DOD Scenarios and Use Cases

Table 5 identifies the link with the applicable environments of the DOD.

Operational Environment	Class of environment	Reference to DOD section where it is described
Network Function	1: Intercontinental Hub 2: European Hub 3: Primary Node 4: Secondary Node	
Layout & Basic Operational Criteria	1: Multiple Independent Runways, complex surface layout 2: Multiple Dependent Runways, complex surface layout 3: Single Runway, complex surface layout 4. Multiple Independent Runways, non-complex surface layout 5: Multiple Dependent Runways, non-complex surface layout 6: Single Runway, non-complex surface layout	
Capacity Utilisation	1: Highly utilised airports/runways, traffic mix of heavy, medium and light aircraft. More than 90% load during 3 or more peak periods a day. 2: Highly utilised airports/runways, homogeneous traffic (dominant heavy or medium or light). More than 90% load during 3 or more peak periods a day 3: Normally utilised airports/runways. 70 – 90% load during 1 or 2 peak periods a day 4: Low utilised airports/runways less than 70% load during peak periods	

Table 5: List of relevant DOD Environments

Table 6 identifies the link with the applicable Operational Processes and Services defined in the DOD.

DOD Process / Service Title	Process/ Service identification	Process/ Service short description	Reference to DOD section where it is described
Prepare and execute off-block	PCS-06.02-DOD-Prepare-and-execute-off-block	Aerodrome Air Traffic Services (ATS) manage pre-departure. Flight Deck plans departure and exits from the stand	5.2.3 Manage Movement on Airport Surface
Prepare and execute taxi-in routing	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	Flight Deck prepares taxi-in routing, executes taxi-in and executes runway crossing. En-route ATS provides taxi-in route. Aerodrome ATS plans taxi-in route, provides taxi-in routing guidance and provides runway crossing	5.2.3 Manage Movement on Airport Surface
Prepare and execute taxi-out routing	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	Flight Deck prepares taxi-out routing, executes taxi-out and executes runway crossing. Aerodrome ATS plans and provides taxi-out route, provides taxi-out routing guidance and provides runway crossing	5.2.3 Manage Movement on Airport Surface
Plan and provide routing for a vehicle	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	Airport Vehicle executes runway crossing, executes vehicle route, plans ground movement and executes ground movement. Aerodrome ATS plans vehicle route, provides vehicle routing guidance and provides runway crossing clearance	5.2.3 Manage Movement on Airport Surface

Table 6: List of the relevant DOD Processes and Services

Table 7 summarizes the Requirements including Performance (related to Key Performance Areas (KPA)) requirements relevant of the OSED.

DOD Requirement Identification	DOD requirement title	Reference to DOD section where it is described
REQ-06.02-DOD-6200.0009	The Tower Clearance Delivery, Ground Runway Controllers shall be provided with the most operationally relevant surface route available for any aircraft.	6.2
REQ-06.02-DOD-6200.0011	The Vehicle Driver shall have the awareness of traffic context information including at least the status of runways and taxiways, obstacles, and an airport moving map displayed on a vehicle's driver cockpit.	6.2
REQ-06.02-DOD-6200.0038	The Tower Clearance Delivery, Ground and Runway Controllers shall be able to send information to aircraft through data link on expected route and clearances related to DCL, start-up, push back and taxi (D-TAXI service).	6.2
REQ-06.02-DOD-6200.0039	The Flight Crew shall be able to send requests for information on expected route and for clearances related to DCL, start-up, push back and taxi (D-TAXI service) to controllers through data link.	6.2
REQ-06.02-DOD-6200.0044	The pilots shall be provided with (dynamic) traffic context information including status of runways and taxiways, obstacles, route to runway or stand according to the route issued by Tower Runway/Ground/Delivery Controller.	6.2
REQ-06.02-DOD-6200.0069	The Tower Runway/Ground/Delivery Controllers shall be able to send the ground-related clearances and information to vehicles through datalink.	6.2
REQ-06.02-DOD-6200.0070	The vehicle driver shall be able to send the ground-related clearance requests to Tower Runway Controllers and Tower Ground Controllers though datalink.	6.2
REQ-06.02-DOD-6200.0088	The vehicle driver shall be guided by AGL along their cleared route taking into account tactical decisions made by the Air Traffic Control Officer (ATCO) and known constraints from the surface management system	6.2
REQ-06.02-DOD-6200.0089	Virtual Stop Bars (VSB) shall be provided to the Tower Ground Controller working positions to improve low visibility operations and enhance controllers' situational awareness	6.2
REQ-06.02-DOD-SAF1.0421	Improve Safety in OFA04.02.01 by 1.37%	6.3.2
REQ-06.02-DOD-SEC1.0001	The security of airport operations shall be maintained at or above the current level	6.3.3
REQ-06.02-DOD-ENV1.0001	Airports shall respect both the local and European standards set for noise, local air quality, emissions and contaminants at and around airports	6.3.4
REQ-06.02-DOD-EFF1.0421	Improve the Fuel Efficiency in OFA04.02.01 by 0.25%	6.3.7
REQ-06.02-DOD-FLX1.0001	Airspace Users shall maintain the ability to make	6.3.8

	amendments to filed requests without suffering excess delays or route changes	
REQ-06.02-DOD-PRE1.0421	Improve the operational predictability in OFA04.02.01 by 7.00%	6.3.9
REQ-06.02-DOD-ANE1.0001	Shared use of airports by different classes of airspace users will be significantly improved	6.3.10
REQ-06.02-DOD-ANE1.0002	Where shared use is conflicting with other performance expectations, viable airport alternatives will be provided to satisfy the airspace users' needs, in consultation with all affected stakeholders.	6.3.10
REQ-06.02-DOD-ANE1.0003	Priority management will be based on the User Defined Prioritisation Process (UDPP) rules.	6.3.10
REQ-06.02-DOD-ANE1.0004	Priority rules will always be applied in a transparent, correct manner.	6.3.10
REQ-06.02-DOD-PRT1.0001	Participation by the ATM community shall be improved during all ATM phases.	6.3.11
REQ-06.02-DOD-PRT1.0002	Participation by the ATM community shall be improved through collaborative decision-making and consensus building.	6.3.11
REQ-06.02-DOD-INT1.0001	Interoperability of airport systems shall be increased through the application of standards and uniform principles, together with improved technical and operational interoperability of aircraft and ATM Systems.	6.3.12

Table 7: List of the relevant DOD Requirements

2.2 Operational Concept Description

The System **generates routes, taking into account planning information**, and provides the Tower Controllers with the most operationally relevant route calculated by minimising the distance[4] according to planning and ground rules. The Tower Controller verifies that the planned route provided by the A-SMGCS Routing function is acceptable, potentially modifying the route through his/her HMI in case an unplanned constraint has arisen. The A-SMGCS then displays the cleared route and any further part of the route not yet cleared (pending route). He/she then transmits instructions to the Flight Crew and makes an immediate input to the System to indicate the route has now been cleared, potentially putting a limit to the clearance. The **provision of the cleared route to mobiles by voice (R/T)** is used when no data link or AGL service is available or, in data link environment, to address time critical or emergency situations, or to clarify a data link exchange. On-board the aircraft, the Flight Crew can manually input the cleared route in the aircraft systems to have it displayed on the airport moving map. In case a revision to the initial taxi clearance is required, the Tower Controller modifies the route accordingly and can be supported by the System when doing so.

The **D-TAXI (for aircraft) and Data Link for Vehicles** services aim to reduce R/T by exchanging non-time critical messages between ATC and mobiles (Contact, Monitor, Expected Taxi, Start Up, Push back, De-Icing instructions, and, on airports with lower traffic and/or simple taxiway layouts, Taxi-In, Taxi-Out, Revised Taxi) by data link. R/T is still used on first contact with the Tower Controller for radio check and remains available at any time in case the Flight Crew, Vehicle Driver or Tower Controller need to revert to voice communication.

The **Airfield Ground Lighting (AGL)** service correlates the cleared route with the taxi instructions provided by the Tower Controller and illuminates the taxiway lights and stop bars a specified distance

[4] Local implementations may use other criteria to define the most operationally relevant routes.

ahead of the mobile in question, switching them on and off automatically to guide the mobile as it progresses along its assigned route.

An enhancement in efficiency and flexibility of the current block control operating method during low visibility conditions is expected to be achieved through the introduction of the **Virtual Stop Bars (VSB)**. From safety perspective, both Flight Crews' and Tower Controllers' situational awareness are envisaged to be increased by displaying the VSBs on ground HMI and in the on-board AMM. In this way it is possible to gain the maximum flexibility, capacity and infrastructure cost reduction because VSB may not be linked to any already existing intermediate holding positions on ground (i.e. $VSB_{N\ HP}$). This is a solution to make blocks size dynamic with a potential positive impact on airport capacity and on its resilience to adverse weather conditions. The introduction of this concept is also associated to alerting functionalities notifying violations of Stop Bars and/or Virtual Stop Bars

2.3 Processes and Services (P&S)

2.3.1 Plan and provide taxi-in routing process

The following logical diagram present the high level activities of the "Plan and provide taxi-in routing" process as described in the "Arrival" operational scenario.

The high level process model tries to synthesize all recurrent activities related to surface management that are performed by involved stakeholders during the "Arrival" operational scenario. It has been established by project B.04.01 as part of the European ATM Architecture effort that aims at providing a means to bring together key elements of European ATM that are the subject of the Research & Development activities of the SESAR programme and to ensure that the programme is as consistent as possible in its approach. The outcome of this architecting work is a database that contains a description of elements, and relationships between elements, from the different SESAR deliverables. Using all the elements and relationships, a model of the European ATM is created that can be viewed and analysed from many different perspectives.

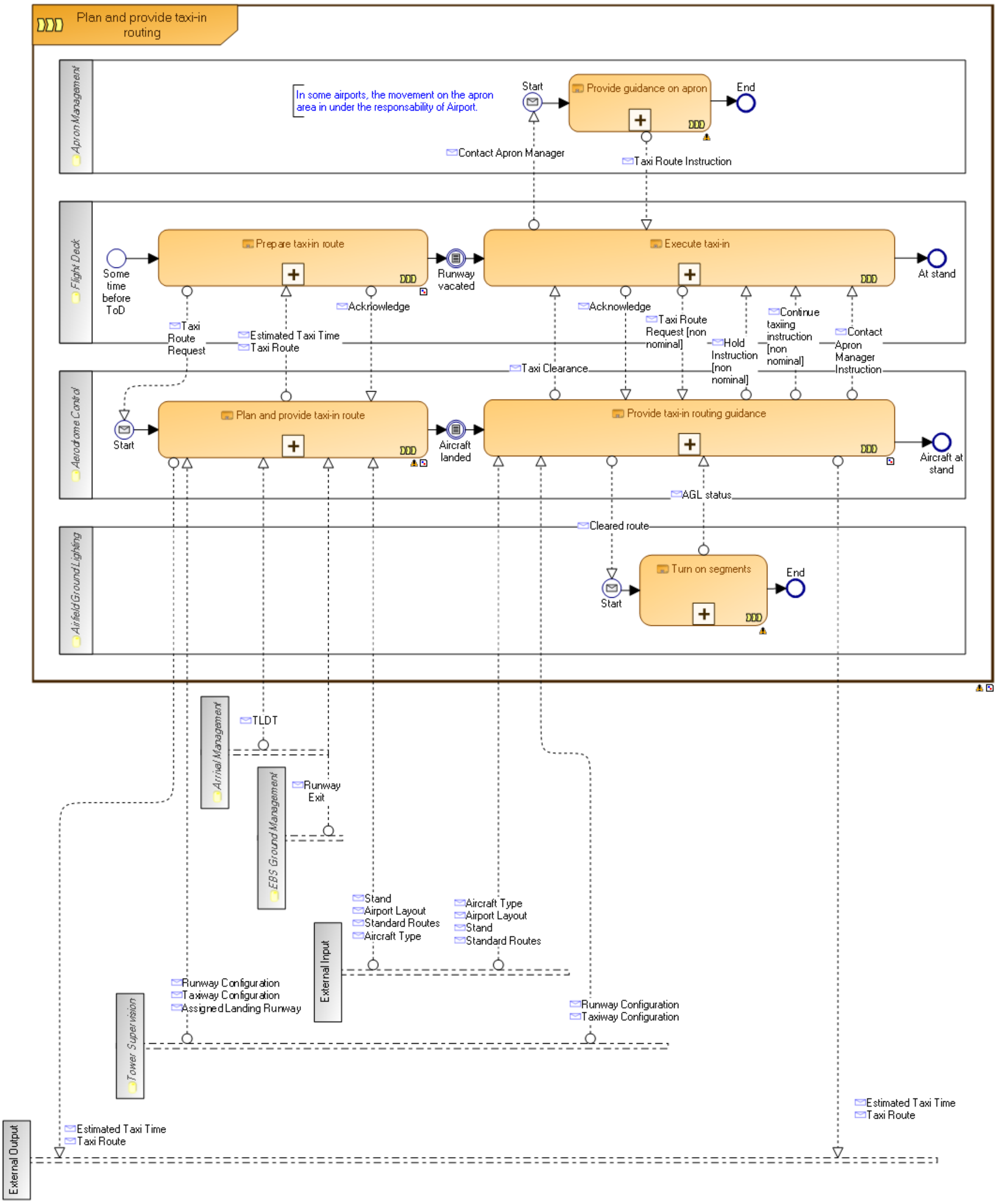

Figure 3: Plan and provide taxi-in routing high-level process

2.3.2 Plan and provide taxi-out routing process

The following logical diagram present the high level activities of the "Plan and provide taxi-out routing" process as described in the "Departure" operational scenario.

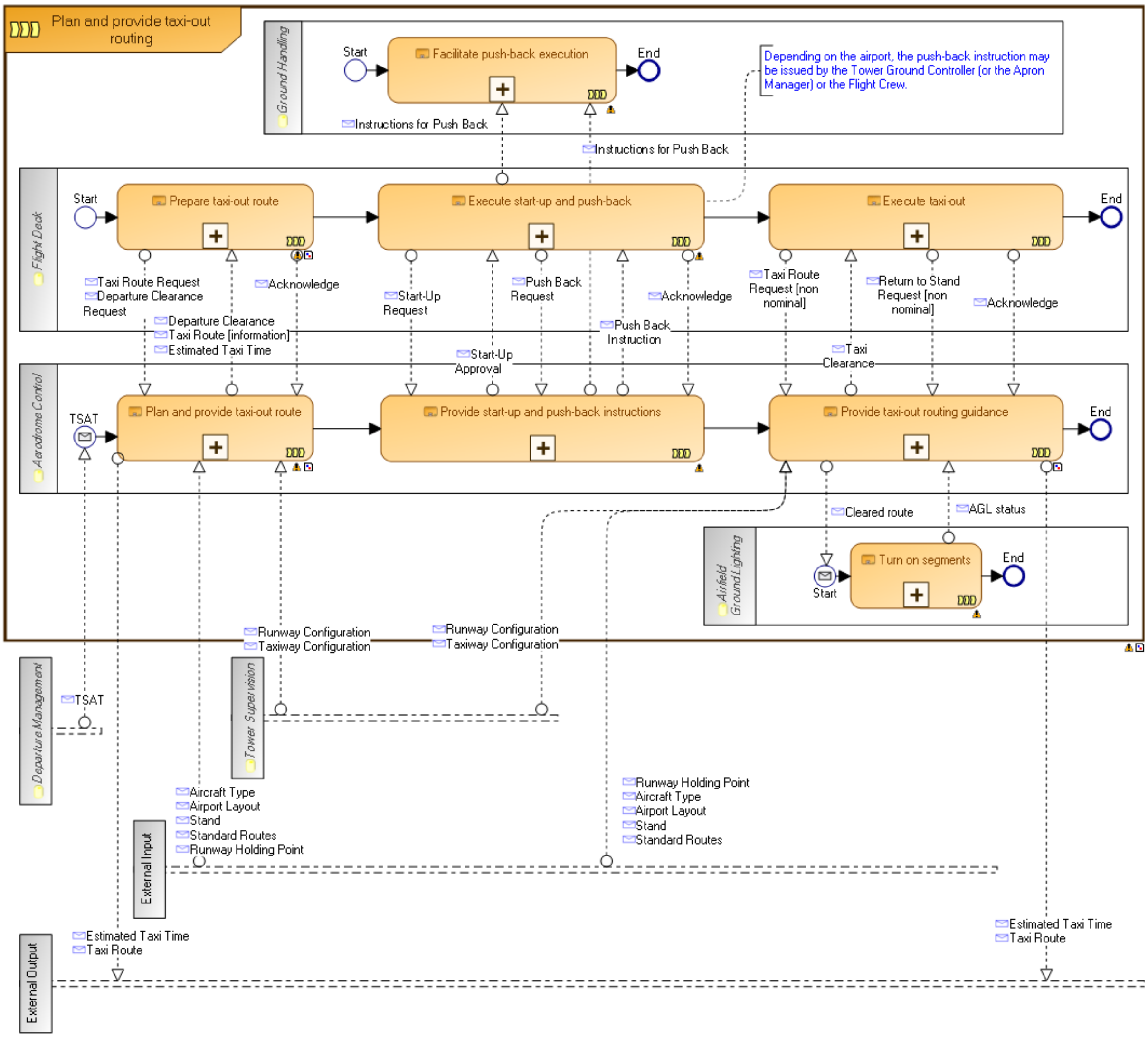

Figure 4: Plan and provide taxi-out routing high level process

2.3.3 Provide vehicle guidance process

The following logical diagram presents the high level activities of the “Provide vehicle guidance” process. As it is not an aircraft-related process, it cannot be attached to a given operational scenario from the 06.02 Step 1 DOD as this document uses an aircraft-centred view of operations and considers vehicle movements as part of both the “Arrival” and “Departure” operational scenarios.

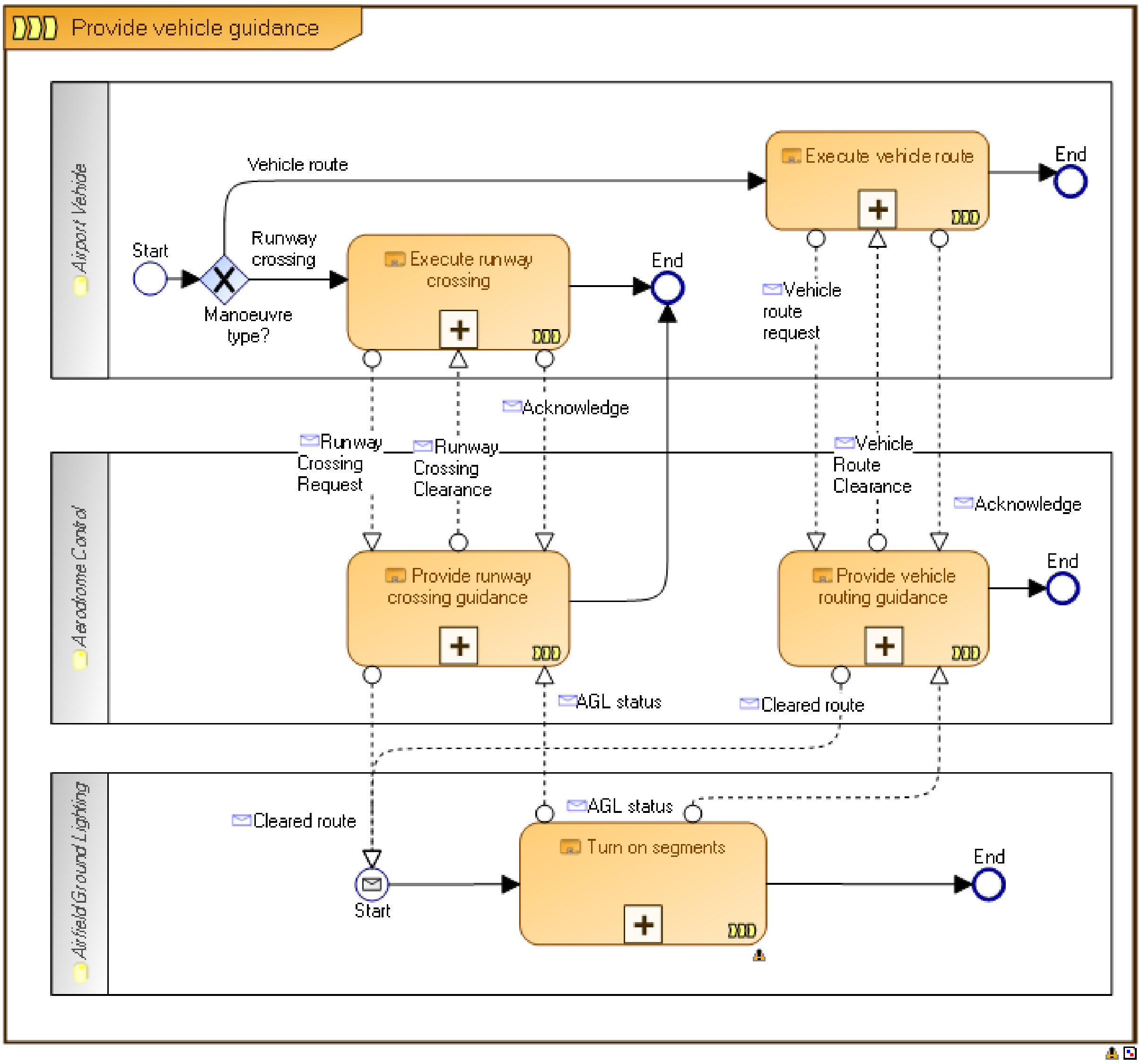

Figure 5: Provide vehicle guidance high-level process

2.3.4 Plan and provide routing for a ground movement process

The following logical diagram presents the high level activities of the “Plan and provide routing for a ground movement” process. As it is not an aircraft-related process, it cannot be attached to a given operational scenario from the 06.02 Step 1 DOD as this document uses an aircraft-centred view of operations and considers vehicle movements as part of both the “Arrival” and “Departure” operational scenarios.

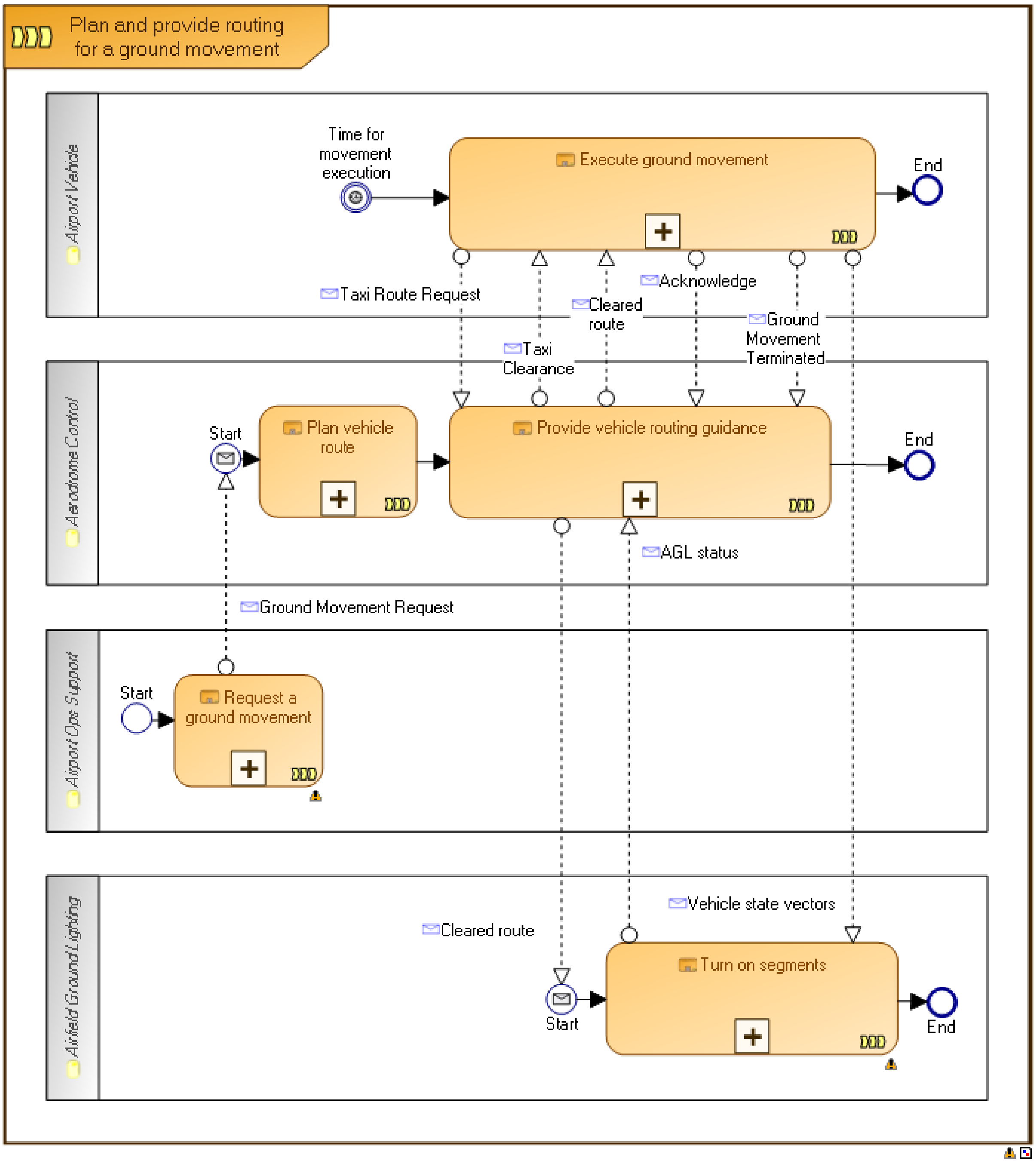

Figure 6: Plan and provide routing for a ground movement high-level process

2.3.5 Services

As there are no services currently listed in the 06.02 DOD the following operational services have been defined by the OFA04.02.01

- **Route generation integrated with planning information**
- **Provision of cleared route to mobiles by voice (R/T)**
- **Provision of planned and cleared route to mobiles by data link**
- **Airfield Ground Lighting (AGL) Service**
- **Virtual Block Control**

2.3.6 Mapping to Service portfolio and Systems (optional for V1 and V2)

No services currently listed in the 06.02 DOD

3 Detailed Operating Method

The future surface management environment on the airport level comprises the following operational services which will be described in more detail in this section:

- route generation integrated with planning information;
- provision of cleared route to mobiles by voice (R/T);
- provision of planned and cleared route to mobiles by data link;
- guidance through airfield ground lighting;
- virtual block control.

It is not necessary to implement all of these services at the same time, but it is possible to do it. However, these services have strong inter-dependencies, especially with the route generation service generating the information to be provided to mobiles. Therefore, the exchange of information between all installed services has to be well structured and organized, especially if more than one guidance service is provided at an airport. In this case the A-SMGCS Guidance function has to guarantee that individual guidance information as provided to a user appears synchronous and represents identical instructions on all available guidance means.

In order to guarantee these basic requirements, it is necessary to set up a central repository for the information to be distributed and which will represent the overall interface between all services, including those not in the scope of this document (e.g. DMAN, airport safety nets). In SESAR's Integrated Surface Management concept of operation, this role is ensured by an upgraded airport flight data processing system, which interfaces with all the systems allowing implementing the different operational services defined by OFA04.02.01, and acts as a provider of information for other services out of the scope of OFA04.02.01 (airport safety nets, DMAN, A-CDM).

Figure 7 illustrates the main interactions between the different operational services defined by OFA04.02.01, as well as those in the scope of other OFAs. These interactions are further detailed in OFA04.02.01 INTEROP ([17]).

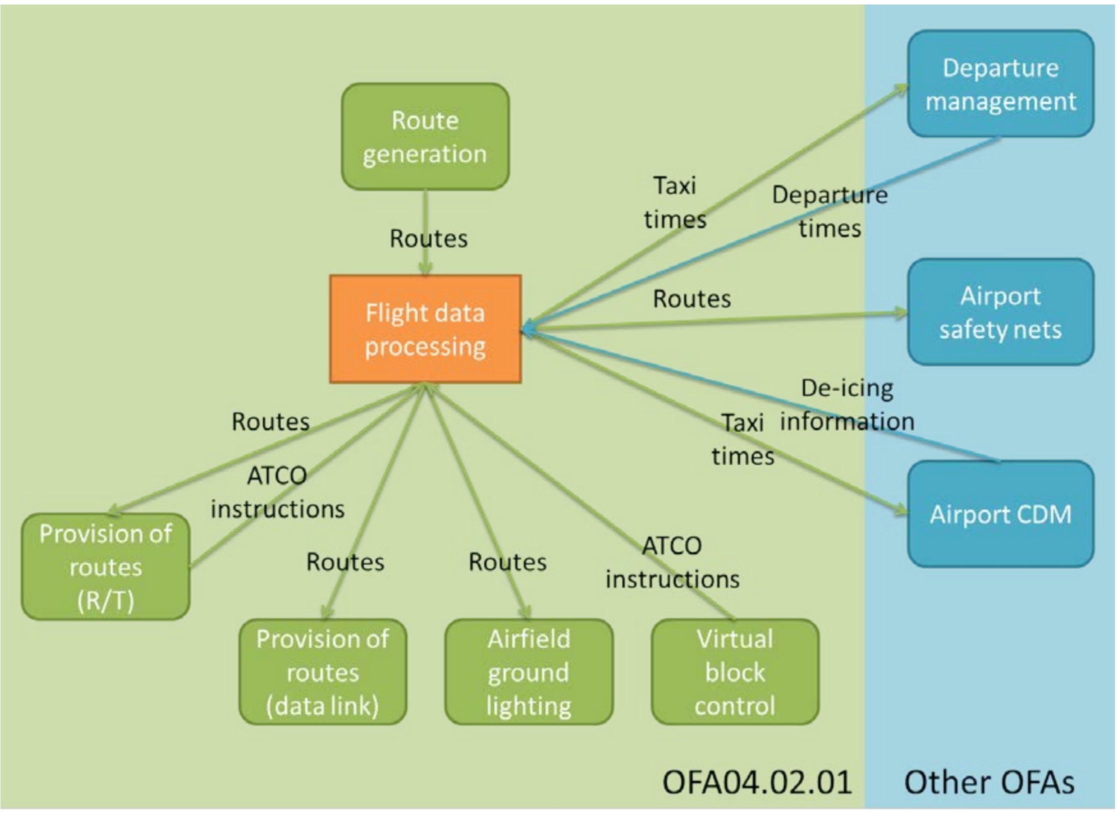

Figure 7: Interactions (internal and external) between operational services

3.1 Previous Operating Method

3.1.1 Route generation integrated with planning information

A-SMGCS Surveillance and Runway Monitoring and Conflict Alerting (RMCA) functions are in operation at most major European airports. This allows the Tower Controller to see the position of aircraft and vehicles on the movement area (especially useful during low visibility operations, at night and at large airports) and the system will raise alerts if mobiles are considered to be in restricted areas or in conflicting situations on or near the runway.

The routing of mobiles is decided by the Tower Controller (typically the Tower Ground Controller) and given by R/T. The route chosen is based on the Tower Controller's skill and knowledge of the aerodrome and will take into account any constraints that they are aware of at the time. The Tower Ground Controller can be one of the busiest positions in a tower and generally the Tower Controller will not record the route on the paper or Electronic Flight Strips (EFS). The information of the detailed route allocated to a mobile is not captured in the Air Traffic Control (ATC) system.

Default taxi times are used at most airports except A-CDM airports where variable taxi times are used, mainly based on look up tables.

3.1.2 Provision of cleared route to mobiles by voice (R/T)

Start-up, pushback, and taxi instructions as well as special airport operations such as taxiing to/from a de-icing area are provided by voice by the Tower Clearance Delivery and Ground Controller to the Flight Crew and Vehicle Driver, using standard phraseology. The Tower Controllers also manage several operations performed by Vehicle Drivers in different parts of the movement area (e.g. towing/taxi instructions, runway crossing). Tower Controllers require read backs and other responses from the Flight Crew and Vehicle Driver in order to ensure that taxi clearances and instructions are understood.

The taxi instructions (which include start-up, pushback and route clearances) are provided by R/T based on the decision of the Tower Controller taking into account the operational situation at the time. The cleared route is not displayed on the A-SMGCS or in the cockpit and is usually not even recorded on the paper or the EFS. Flight crew and Vehicle Drivers will generally write down the route in order to correctly read back the clearance and then follow the route using aerodrome maps and surface signage.

Furthermore, delivering guidance instructions verbally via R/T requires a lot of attention from the Tower Controller leading to an increase in workload during times of high traffic. From the Flight Crew's point of view, receiving guidance information via a shared radio frequency requires a continuous monitoring of the radio calls in order to filter out relevant information which may increase workload, thus distracting attention from the primary task.

Two roles are identified in the cockpit: Pilot Flying (PF) and Pilot Monitoring (PM). The PF is in charge of taxiing the aircraft; the PM is in charge of communication, surveillance and navigation tasks. Since the Commander is responsible for the aircraft he/she can perform the taxi even if he/she is not in fact PF for the particular flight.

The primary means of navigation are the airport charts published by commercial sources, either on paper or electronically, and derived from information provided by Air Navigation Service Providers (ANSP) in their Aeronautical Information Publications (AIP). Some aircraft are equipped with AMM on Electronic Flight Bags (EFBs) or in the avionics (On-board Airport Navigation System-OANS application on A380) increasing the situation awareness of the Flight Crew during the taxiing operation[5]. The Flight Crew shall consult Notices to Airmen (NOTAM) and Automatic Terminal Information Service (ATIS) information before taxiing on an airport (departure or arrival airports).

[5]AMM is not considered as an on-board primary means of navigation but as a navigation assistance tool aiming at improving flight crew's situation awareness by giving them a graphical representation of the ATC clearance. The taxi route graphically displayed on the AMM is legally not the taxi route clearance given by the Tower Controllers. In the future, we don't know the status of the AMM, but it

Currently, the departure and arrival expected routes are not provided by the ATC but anticipated by the Flight Crew with respect of:

- Previous experience at that airport;
- ATIS (runway in use and wind condition can change the airport configuration);
- NOTAM information (mainly closed taxiways); and
- Standard taxi routes and review of airport chart contained in the AIP, if so created and published in the AIP.

Finally, the Flight Crew may use the AMM as a support to analyse the expected taxi route, if equipped.

Procedures for each phase of surface operation impacted by this service, that is, pre-departure and approach are detailed below.

3.1.2.1 Pre-departure

The pre-departure briefing shall deal with the following points: fuel, air traffic control clearance, expected taxi route, Standard Instrument Departure or Instrument flight rule procedure, and any applicable special consideration (such as unique airport advisory information, significant weather consideration, etc.…).

Particularly, on the expected taxi route, the Flight Crew shall discuss where the aircraft is located (stand) and the runway anticipated for departure, as well as emergency procedures (for engine failure e.g.) and how to navigate out from the airport with an engine failure. Then, the Flight Crew shall discuss the probable plan to get to the runway and brief on any planned crossing of an active runway, complex taxi intersections, and hot spots etc.

3.1.2.2 Approach and landing

Normally before beginning the descent, the Flight Crew will obtain the latest airport information via ATIS, Aircraft Communications Addressing and Reporting System (ACARS) and their Airline Operations Centre (AOC) (stand for instance). Once they have this information they will discuss the assigned runway and available runway exit points and what the expected taxi route from runway to stand might be including any crossing of an active runway, complex taxi intersections and hot spots etc.

3.1.2.3 Vehicles

Vehicles normally operate on taxiways by monitoring the Ground Controller’s frequency but not necessarily under control. Vehicles will require a specific clearance in conditions such as low visibility or at night time or when required to cross or enter an active runway. Before obtaining a clearance a driver will normally check their current position against a chart in the vehicle and then call the appropriate Tower Controller for clearance to proceed to their destination.

Similarly, tugs towing aircraft need a clearance from the Ground Controller before initiating their movement. Drivers then rely on their knowledge of the aerodrome, on ground markings and maps to drive along their assigned route.

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could change if it is demonstrated that it is equivalent to the published chart and its graphical representation (clearance or not). This would avoid an additional check.

3.1.3 Provision of planned and cleared route to mobiles by data link

3.1.3.1 Provision of planned route to mobiles by datalink

There is currently no exchange of planned route information via data link between Tower Controllers and Flight Crew or Vehicle Drivers.

3.1.3.2 Provision of cleared route to mobiles by data link

The D-TAXI service is not implemented.

Start-up, push-back, and taxi instructions as well as special airport operations such as taxiing to/from a de-icing area are provided by voice by the Tower Ground Controller to the Flight Crew. The Tower Controller also manages several operations performed by Vehicle Drivers in different parts of the movement area (e.g. taxi/towing instructions, runway crossing).

On large airports, the frequency can be overloaded,

Understanding Tower Controller clearances can be difficult and lead to errors, the Flight Crew usually write the taxi instructions down and then read them back verbally.

Pre-departure information such as the ATC Clearance is provided by data link at some airports.

Pre-arrival information is not provided.

3.1.4 Airfield Ground Lighting

A cleared taxi route is currently transmitted (usually by the Tower Ground Controller) to either the Flight Crew or a Vehicle Driver via R/T. They then have to find their way along this route by looking outside. Both Flight Crew and Vehicle Driver are being supported by visual guidance like markings and signs, several elements of permanently illuminated lights (like taxiway centreline lights and Runway Guard Lights) and a ground movement chart. In case they are unsure about their current position, the Tower Controller can support them verbally via R/T (taking into account e.g. A-SMGCS position information). Depending on the number of traffic movements, frequency congestions may occur which can make it difficult to establish ad-hoc communications. Also, as mentioned in 3.1.2, provision of guidance instruction using R/T can lead to increased workload for all actors during times of high traffic.

Today, the use of AGL for individual guidance is not very common, and where applied, the degree of automation, phraseology and the operational philosophy vary. In some places, Taxiway Centreline Lights (TCL) and stop bars are switched manually without any alerting, system planning, routing, or guidance logic provided by a system to assist the Tower Controller (e.g. London Heathrow). On other airports, the AGL system provides the Tower Controller already with a limited function to establish route visualization on the aerodrome surface between manually selected starting and end points via TCL while stop bars are switched accordingly by the system. Many tasks such as traffic planning or safeguarding the longitudinal spacing between two mobiles during Low Visibility Procedures (LVP) still have to be performed by the Tower Controller (used e.g. in Munich or Zurich). Outside of Europe, three airports already have established A-SMGCS systems capable of automatically providing individual guidance based on traffic planning, individual routing and safeguarded by a conformance monitoring function to mobiles via the AGL.

3.1.5 Virtual Block Control

This section describes the current operating method related to the block control procedures applied during reduced visibility conditions.

As defined in the ICAO EUR Doc 013, "*Reduced Aerodrome Visibility Conditions exist when all or part of the manoeuvring area cannot be visually monitored from the control tower and consequently the personnel of the control units are unable to exercise visual control over the traffic in the area*". With regard to that, four ICAO Visibility Conditions have been defined as well illustrated in the Figure 8.

Note 1: For taxiing, the value used to distinguish between visibility conditions 2 and 3 is normally taken as visibilities equivalent to a Runway Visual Range (RVR) less than 400m but more than 75m.

The value of 400m is provided as an example in Doc 7030. Criteria for determining the transition between visibility conditions are a function of local aerodrome and traffic characteristics.

Note 2: This value is normally taken as an RVR of 75m or less.

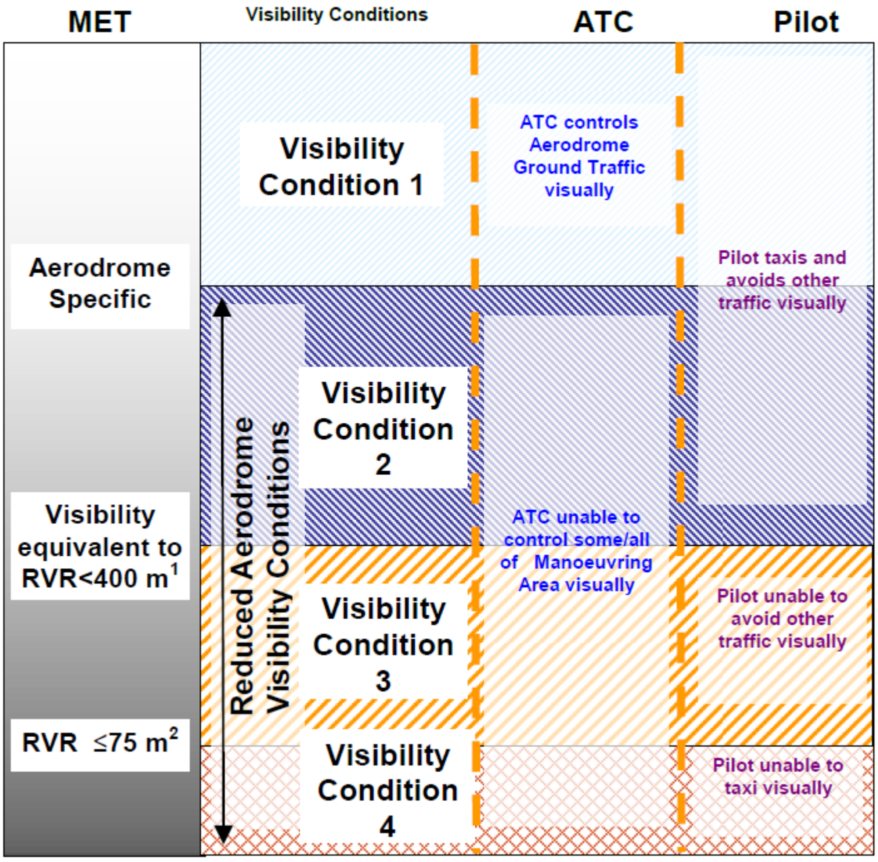


Figure 8: Relationship between ICAO Visibility Conditions

Ad hoc LVPs are defined to guarantee the safety, efficiency of ground surface operations, including the protection of the runway(s) in use for take-off and landing. Implementation of LVPs varies from one aerodrome to another depending on local conditions, facilities available as well as on the time required to prepare the aerodrome. Typically an RVR < 550m or a height of cloud base < 200ft triggers LVPs.

Currently, as stated in the ICAO Doc. 9476 SMGCS Manual, during VIS 3 conditions, block spacing control is applied to ensure adequate spacing between succeeding aircraft. Taxiways are divided into blocks or segments which are occupied by only one aircraft at a time. Aircraft are allowed to enter one block when they are issued a specific clearance limit. Those clearance limits correspond to the intermediate holding positions on taxiways which ensure adequate spacing between taxiing aircraft during VIS 2/3 conditions.

The Flight Crew's situational awareness is supported by ground surface markings and visual aids (as illustrated in Figure 9) while the responsibility of providing adequate spacing among aircraft is assumed by the ATC.

Figure 9: Today Block Spacing Control

3.2 New SESAR Operating Method

3.2.1 Route generation integrated with planning information

The objective of **route generation integrating planning information** is to calculate the most suitable route on the movement area (runways, taxiways and aprons) for an aircraft or a vehicle, before it starts taxiing, taking into account Tower Controller inputs and known constraints such as taxiway closures, aircraft type etc. This route calculation corresponds to the Automatic, Semi-Automatic and Manual modes as defined in the A-SMGCS Manual ([5]). According to ICAO a route describes "*A track from a defined starting point to a defined end point on the movement area"*. This service also aims at capturing the detailed taxi routes allocated to mobiles into the ATC system. Routes can be accessed by all Tower Controllers for an increased awareness of planned movements on the aerodrome surface. The unimpeded (unrestricted) time it will take for a mobile to taxi/drive on a given route is also calculated, typically by assessing the length of this route and the number of turns.

In SESAR Integrated Roadmap Dataset 16 ([10]), this is supported by the following Operational Improvement step:

- **AO-0205**: Automated Assistance to Controller for Surface Movement Planning and Routing.

This Operational Improvement step is described as "The System provides the controller with the most suitable taxi route calculated by minimising the delay according to planning, ground rules, and potential conflicting situations with other mobiles". The first criteria in the route generation process are intended to automatically generate operationally realistic routes.

One of the considerations mentioned in the ICAO A-SMGCS Manual ([5]) is "*When assigning routes, an A-SMGCS should be interactive with the control function to minimize crossing conflicts*". As there are no defined separation minima for the taxiways and apron areas or mandatory speed limits for the aircraft to taxi, calculation / detection of a conflict free route (a conflict being defined by ICAO as "*a situation where there is a risk for collision between aircraft and/or vehicles*") has only been investigated for the planning phase (i.e. before the actual movement of mobiles) in the scope of this OFA.

OFA04.02.01 has investigated different options, relying on various levels of automation and look-ahead times. Indeed, conflicting situations can be avoided in different ways, ranging from the definition of traffic flows which limit the occurrence of conflicting situations in a strategic manner up to the implementation of a trajectory prediction function which monitors the traffic situation, predicts any potential conflict and advises the Tower Controller in the resolution of such situations.

Rather than simply minimising the number of conflicts, which is not necessarily a good objective in terms of performance, the approach used by OFA04.02.01 was to classify conflicts, evaluate their impact and determine the ones the A-SMGCS Routing function could reliably detect and solve before they actually happen. V2 validation activities have shown that, without some form of control over the aircraft taxi speeds, an automated conflict detection function may perform unreliably and offers limited additional benefits, in terms of predictability, over what a routing function without this conflict detection feature would already achieve.

Therefore, OFA04.02.01 has interpreted the generation of routes calculated according to potential conflicting situations with other mobiles as the ability to configure default routes, which serve as the basis for automatically generated routes, and the possibility for the Tower Controller to change the routes assigned to mobiles at any time (e.g. in case of a conflict between two mobiles or due to a new operational constraints affecting routes already allocated to mobiles). This operational concept has been validated in V3 in the framework of SESAR Release 5 and therefore corresponds to the SESAR Solution #22 delivered by OFA04.02.01 for potential implementation.

The description of the future operating method is proposed for every key element of this service.

Lastly, the taxi routes and the corresponding estimated taxi times calculated by the A-SMGCS Routing function are key enablers for SESAR Solutions developed by other OFAs. Airport safety support tools in OFA01.02.01 (Airport Safety Nets) cover the issuance of alerts to Tower Controllers, Flight Crews and Vehicle Drivers, which are part of the primary A-SMGCS Control function, the fourth A-SMGCS function defined by ICAO ([5]). The routes entered into the ATC system, coupled to surveillance data, enable monitoring conformance of mobile movements to cleared routes (i.e. SESAR Solution #02). The Coupled Arrival Manager/Departure Manager (AMAN/DMAN) (i.e. SESAR Solution #14) defined by OFA04.01.01 (Integrated Arrival/Departure Management at Airports) benefits from more accurate taxi time estimates to sequence departure flights at the runway, rather than at the gates as in current operations, and can monitor the progress of departures against the initial plan thanks to the continuous update of these estimates.

3.2.1.1 Route generation for SESAR Solution #22

This section is intended to clarify the route assignment process at the heart of SESAR Solution #22 and which has been validated at V3 maturity level during SESAR Release 5.

Following the implementation of the systems such as A-SMGCS and A-CDM, the data required to calculate routes (e.g. assigned runway, aircraft type, restricted/closed areas, parking stand) is available electronically. However, large busy airports normally have very complex taxi routes and there will often be several different taxi route options for mobiles depending on the traffic situation at the time.

The principal information that is required to calculate/generate a taxi route is as follows:

- Current position (for airborne arrivals this will be the assigned landing runway);
- Intended position (destination); and
- Constraints (runway configuration, standard taxi routes, type of aircraft, pushback direction, priorities, time constraints, blocked taxiways, visibility conditions, de-icing procedures and requirements, downlinked runway exits from aircraft equipped with Enhanced Braking System (EBS)[6] etc.).

This information required by the A-SMGCS Routing function can typically be provided by[7]:

- A-SMGCS (surveillance function);
- Airport FDPS;
- A-CDM platform;
- Stand and Gate Management;
- In the case of vehicles by the driver via R/T;
- De-icing Manager;
- Enhanced Braking System via data link, if fitted on board the aircraft;
- Airport Operations Plan (AOP); and
- DMAN.

In the majority of cases a route will be automatically planned in advance, in the case of arriving traffic prior to the landing or in the case of departing traffic before it leaves its stand.

Advisory information of semi-automatic or automatic routing should indicate the planned **most suitable taxi route from Tower Controller perspective** that includes the **shortest taxi distance** and **current constraints** that are known to the function. In case a **new constraint** arises and affects cleared routes already allocated to mobiles, it is the Tower Controller’s responsibility to resolve the conflict by editing the routes of these mobiles and providing the new routes to the mobiles through revised taxi clearances. The A-SMGCS Routing function must thus have access to the surveillance function or/and to the flight plan data processing system to get information about the:

i. Start point (Stand, runway exit).
   The runway exit for arrivals can be pre-programmed based on experience. An exit can be predicted by studying over a period of time and during different conditions which exit certain types of aircraft most frequently use. Although the same exit will not be 100% predictable a

[6] Although EBS is considered in SESAR operational concept, any other means to downlink the expected runway exit is acceptable for the routing function.
[7] The exact source of information depends on the architecture in which the A-SMGCS Routing and Planning functions are deployed.

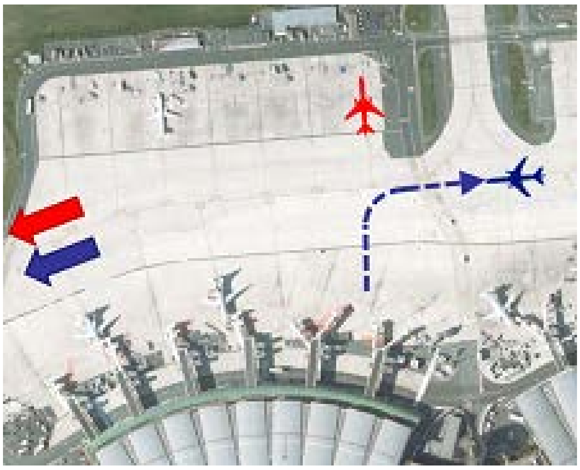
high degree of certainty can be planned either by the Tower Controller or, using the surveillance function, the system can then update the route when it differs. For aircraft equipped with the capability to communicate and negotiate their nominal runway exit (Enhanced Braking System in 06.08.02 - Enhanced Runway Management Through Optimised Braking Systems), the runway exit will be downlinked to the ATC system prior to landing and this will either verify the ATC system predicted exit or if it is different, override it with the aircraft predicted exit.

ii. End point (Final parking position, assigned runway entry point).

Except when the system is operated in manual mode, the information to operate with standard taxi routes, announcement of LVPs, closed taxiways, restricted areas, obstacles, temporary hazards, de-icing, downlinked runway exits or temporary parking positions requirements should be provided by an interface to the A-SMGCS in order to avoid manual Tower Controller inputs.

If the Tower Controller considers that the generated taxi route is not suitable because of additional information/constraints that are not known to the A-SMGCS Routing function, the Tower Controller shall be able to easily select an alternative route (see also ICAO Doc. 9830 §3.5.13.8 [5]). If no suitable route proposal is available, the Tower Controller will input a route by manual means. The manual input of the route has to enable a number of performance-enhancing procedures which are widely used at major airport for pushing back or taxiing. These procedures are summarised below and more precisely described in project 06.07.02's Preliminary Operational Procedures document ([14]).

- Push/pull operation: when two aircraft need to be pushed "simultaneously" (within a short time frame) from stands that are either opposite of or next to each other. In this case, the aircraft is pushed on the taxiway centreline behind the stand and then pulled forward to a specific point on the taxiway (currently, always the same point for each stand is considered).

	
(1) Blue and red aircraft need to push back at same time and to take same exit	(2) Blue aircraft pushes back to usual position

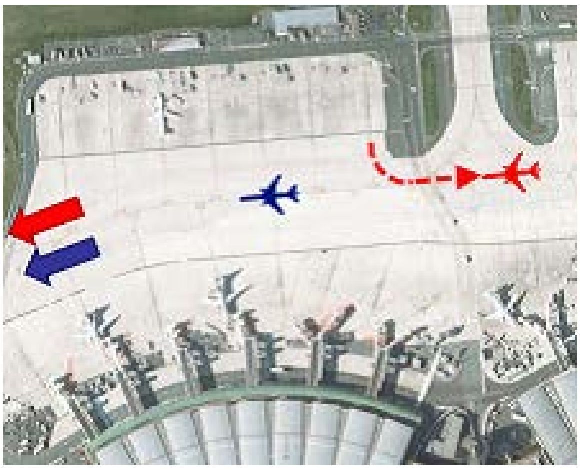
	
(3) Blue aircraft pulls clear of red aircraft	(4) Red aircraft pushes back to usual position

Figure 10: Steps of a push/pull operation

- Deep or long pushback: when a standard pushback would not permit an incoming traffic to reach its destination for e.g., the Tower Controller can instruct the aircraft to perform a long pushback. This consists in pushing back farther than the usual position, so as to clear the way for the other aircraft.

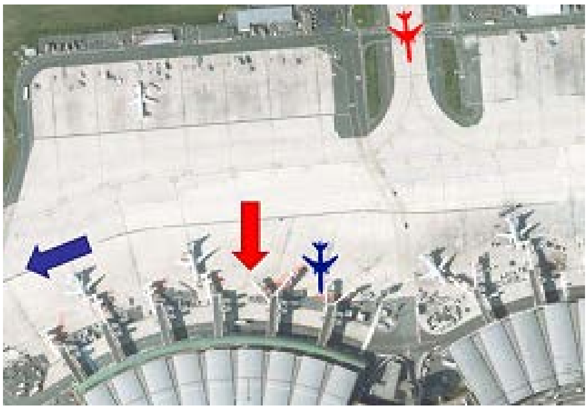
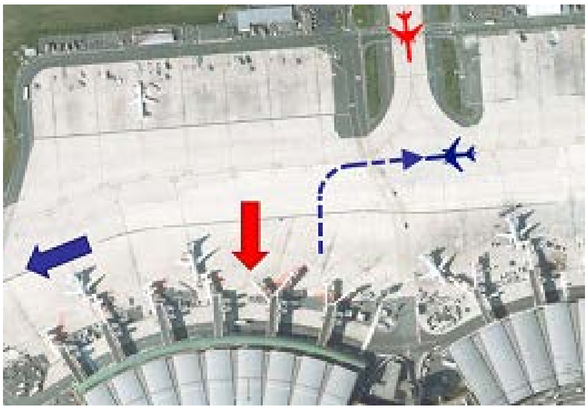
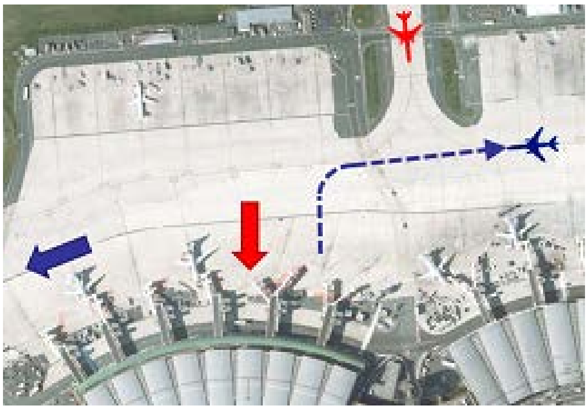
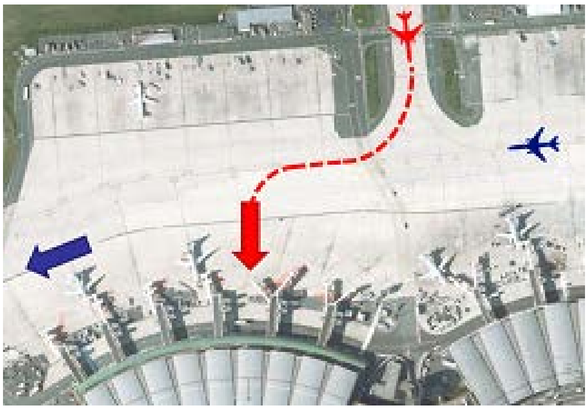
	
(1) Red aircraft taxiing in into parking area while blue aircraft about to push back	(2) Blue aircraft starts pushback (usual position)
	
(3) Blue aircraft continues pushback clear of entrance of parking area	(4) Red aircraft taxies to stand

Figure 11: Steps of a long pushback

- Alternative Parallel Taxiway Routing (APTR): this procedure is based on a specific layout feature of some airports; the availability of multiple taxiway centrelines (usually one additional blue line and one additional orange line) on the same taxiway. These additional centrelines enable the movement of two aircraft in parallel (usually up to Code C) on the same taxiway, no matter if they move in the same direction or not.

Figure 12: APTR at Frankfurt airport

Re-routing of movements also occurs frequently (e.g. after a route deviation, change of operational conditions, etc.). When the Tower Controller needs to assign a new route to a mobile, he/she edits the existing route to change it to the desired one. As long as the route being built conforms to the rules known to the A-SMGCS Routing function, the system assists the Tower Controller by automatically completing the route to the destination point (semi-automatic mode). Otherwise, the A-SMGCS Routing function stops assisting the Tower Controller who can create any route (manual mode).

3.2.1.2 Clarification of SESAR and ICAO concept definitions

3.2.1.2.1 Manual routing mode

The ICAO A-SMGCS Manual Doc 9830 defines the Routing function as a Primary function with different levels of automation depending on the available technology and environment. Text taken from the ICAO Doc 9830 ([5]) is shown in brown.

ICAO Routing (ICAO Doc 9830 §2.5.2)

Either manually or automatically, the routing function of an A-SMGCS should:

a) *Be able to designate a route for each aircraft or vehicle within the movement area;*
b) *Allow for a change of destination at any time;*
c) *Allow for a change of route;*
d) *Be capable of meeting the needs of dense traffic at complex aerodromes; and*
e) *Not constrain the pilot's choice of a runway exit following the landing.*

In the context of SESAR, the manual mode is considered to be where the Tower Controller can designate a route by manually creating, either through the HMI or by typing text, a route for a mobile or by modifying an existing route. Due to the workload associated with inputting a manual route it is not foreseen that this form of route calculation will be the standard way of working for all movements at an aerodrome. However, there will always be a need for Tower Controllers to input a manual route, or override a current route, especially in the following situations:

- For a freely operating vehicle that requests a route which requires a specific ATC clearance (e.g. runway crossings, runway inspections); or

- When a flight needs to take a non-standard taxi route e.g. following a deviation from cleared route the Tower Controller might have to route the flight the wrong way down a taxiway.

The system does not assist this process by any additional logic, i.e. if the Tower Controller constructs a route that is not foreseen or actually not plausible, the A-SMGCS Routing function does not intervene. However, in case the route under construction overrides an existing operational constraint, the A-SMGCS Routing function informs the Tower Controller about it through the HMI.

Once the route construction is completed in manual mode or an adjustment of an existing route is finalised, this route is automatically sent to the mobile.

3.2.1.2.2 Semi-automatic routing mode

In a semi-automatic mode, the routing function should also provide the control authority with advisory information on designated routes (note: In a semi-automatic mode assignment of routes is carried out by the control authority).

In the context of SESAR the semi-automatic mode is considered to be an advanced version of the manual mode, providing the Tower Controller with a function that will help to predict the completion of the route based on the known taxiway rules and where the system knows the destination. The advantage of this being that the designation of the route is quicker than having to manually select every portion of the route. An example of this is:

The Tower Controller is doing a manual input to the system following a route deviation by an aircraft down a one way taxiway in the wrong direction. The system knows the destination (e.g. runway 27) but cannot find a standard taxi route due to the current position of the flight. The Tower Controller starts to input manually a route to get the aircraft back on to the correct taxiway and as soon as the system detects that the route is on the normal path again then it will show the remainder of the predicted route to the Tower Controller, who can then simply accept the whole route without having to manually input all of the remaining route to runway 27.

The system assists this process by automatically adding missing segments to routes and by interpreting inputs. Contrary to the manual mode, the semi-automatic mode thus relies on automatic routing to provide the Tower Controller assistance in constructing the desired route by finding a path conforming to the operational constraints known to the A-SMGCS and using the input from the Tower Controller. In the semi-automatic mode, the HMI has to minimise the number of actions required from the Tower Controller to perform a route modification. For example, if the Tower Controller drags the route from one parallel taxiway to another one, the whole route is moved onto the new taxiway and not just the route until the next intersection.

3.2.1.2.3 Automatic routing mode

In an automatic mode the routing function should also:

a) assign routes; and

b) provide adequate information to enable manual intervention in event of failure or at the discretion of control authority.

In the context of SESAR it is **assumed that most major airports will use the automatic mode** where the assignment[8] of routes will be done by the system using known data such as assigned runway, stand, standard taxi routes when defined and taxiway rules. The Tower Controller will be also able to input a manual route in the case of failure of the automatic calculation or when it is necessary to assign a mobile a manual route e.g. following a deviation from the cleared route. An example of this is:

The system knows the aircraft is parked on stand 123 and is going to runway 27. The system will automatically generate a planned route taking into account taxiway rules, aircraft type and local procedures and when the flight is selected the route will be displayed to the Tower Controller. The

[8] In the context of SESAR, the assignment of a route to a mobile has to be understood as the fact that the route is associated to the mobile in the ATC system, not that clearances are provided by the ATC system.

Tower Controller can either accept this planned route or manually input the route he/she desires using the same logic as described in the manual/semi-automatic mode above.

The Tower Controller still has the possibility to modify an automatically generated route, either before it is sent to the corresponding mobile (i.e. initial planned or cleared route) or after it has been sent (i.e. revision of a route). In the context of SESAR, the route modification is performed through the HMI in manual and/or semi-automatic mode, depending on whether the new route conforms to the operational constraints known to the A-SMGCS.

When assigning routes an A-SMGCS should (ICAO Doc 9830 §2.5.2.4)

- *a) Minimise taxi distance in accordance with the most efficient operational configuration;*
- *b) Be interactive with the control function to minimise crossing conflict;*
- *c) Be responsive to operational changes (e.g. runway changes, routes closed for maintenance, and temporary hazards or obstacles);*
- *d) Use standardized terminology or symbology;*
- *e) Be capable of providing routes as and when required by all authorised users; and*
- *f) Provide a means of validating routes.*

Route changes due to sudden new restrictions (e.g. taxiway closure), the A-SMGCS Routing function acts as a safety net and generates (in the automatic mode) updates for all existing routes (cf. §2.3.5 of 06.07.02 Preliminary Operational Procedures document – [14]).

3.2.1.3 Planning

The Planning function of the A-SMGCS Manual is associated with supplementary requirements as follows (*ICAO Manual 9830 Para 2.6.7*):

In order to support the primary functions (surveillance, routing, guidance and control), the planning facilities of an A-SMGCS should provide for:

- *a) Strategic planning which will indicate the predicted traffic situation for chosen times in excess of 20 minutes in advance;*
- *b) Pre-tactical planning which will indicate the predicted traffic situation at a chosen time up to 20 minutes in advance; and*
- *c) Tactical planning which will indicate the present traffic situation.*

Planning facilities should include methods of predicting an aerodrome capacity and indication of start-up times for traffic to meet this capacity.

Note 1.– The capacity assessment is to be based on factors such as weather conditions, serviceability of equipment, and closure of sections of the movement area.

Note 2.– Additional elements to be included in the capacity assessment are the operational activity needs of the movement area, such as surface inspections, friction measurement, and snow clearance.

Note 3.– The implementation of an A-SMGCS requires the designation of routes that ensure the safe and efficient movement of aircraft and vehicles. The route issued for any movement will be dependent on strategic, pre-tactical and tactical considerations that will be addressed within the overall planning function.

In the context of SESAR, it is considered that the above requirements are more related to DMAN functionality and hence project 06.08.04. DMAN will indeed provide the forecasted traffic planning on the runway for the different time frames mentioned. DMAN will however not provide a traffic forecast for different areas of the surface movement area. Therefore, **the planning part is limited to providing a planned route on the airport surface, together with taxi time duration based on fixed parameters per taxiway segments**. However, certain traffic optimisation procedures (e.g. push-pull operations, long pushback) will already be considered.

The route generation function shall calculate the unimpeded (unrestricted) time it will take for the mobile to taxi/drive on a given route, typically by assessing the length of this route and the number of turns,. This time will then be used by the A-CDM platform in order to calculate the following:

- For outbound flights,
  In conjunction with the DMAN, the A-CDM platform is able to provide a **Target Take-Off time (TTOT)** taking into account the taxi time, the parking stand, the Target Off Block Time (TOBT) / Target Start Up Approval Time (TSAT) and the assigned runway. If remote de-icing is planned for an aircraft, then the taxi time needs to take into account a route through a de-icing bay and time for de-icing.
- For inbound flights,
  The A-CDM platform will calculate an **Estimated In Block time (EIBT)** taking into account the taxi time, the expected runway / runway exit point, the Estimated/Target Landing Times (ELDT/TLDT) and parking stand.
- For Ground Movements
  A route generated for a ground movement provides an associated time for the movement to complete the route. In the case of a towed movement to a stand, this time can be used by the A-CDM platform to calculate an **EIBT** taking into account the towing time, the start point and destination parking stand.

As the speed of mobiles on the surface is very unpredictable (Flight Crews taxi at different speeds, large aircraft turn more slowly, etc.), it is not foreseen to calculate the taxi time to a precise second, therefore the taxi times will be calculated in ‘whole’ minutes and rounded up to the next minute.

The need for re-planning can arise due to different (changing) situations at an airport: One of the most common is the change of an operational configuration (e.g. from westerly flow to easterly flow). At most airports, the operational direction of the runway system needs to be changed depending on the application of noise abatement procedures, the wind direction and its speed or factors like ground systems availability. Additionally, some airports have to change the runway configuration at specific times due to e.g. noise related or political reasons.

When the operational direction needs to be changed on the day of operations, either the system (rather for planned changes) or the Tower Runway Controller (depending on local implementation it can also be the tower supervisor) will trigger this process on the Tower Controller HMI. The A-SMGCS Routing function must thus allow implementing the local procedures for the management of routes for aircraft which are taxiing at the time of the configuration change.

3.2.1.4 Impact on performance and transversal areas

Before a mobile initiates its movement, the route generator computes the unimpeded taxi time corresponding to individual planned routes. This estimate is more accurate than the static tables used in current operations, which typically provide a flat value between a parking area and a runway holding point. In addition, once mobiles have started moving along their cleared route, the route generator computes the remaining unimpeded taxi time and constantly updates this estimate based on surveillance data. The variability between the planned and actual taxi time is thus reduced, improving the **Predictability** of taxi operations.

The effective use of the routing function requires the Tower Controllers to constantly keep the routes assigned to mobiles in accordance with the clearances they give them via R/T and to do this in a timely manner. Inconsistent routes in the ATC system and provided to mobiles can indeed result in inappropriate guidance through AGL, erroneous data link messages or, if the A-SMGCS Routing function is linked to the A-SMGCS Control function, undesirable route deviation alerts. Therefore, the use of the A-SMGCS Routing function by Tower Controllers is a new task assigned to them, which increases their workload.

However, planned routes assigned to mobiles can be graphically displayed on the Tower Controllers working positions, supporting them in planning the movements inside their areas of responsibility by providing them with an initial route for those flights they are assuming or about to assume. In addition, the A-SMGCS Routing function provides Tower Controllers with a visual aid that can ease their understanding of the traffic situation in their area of responsibility.

The A-SMGCS Routing function is thus affecting the **Human Performance** of Tower Controllers, through an increased workload and improved situation awareness. Validation activities performed so far in OFA04.02.01 have demonstrated that the increase in Tower Controller workload remained at an acceptable level and the improvement in situation awareness outweighs the workload drawback. Another key result of these validation activities is that this impact on Tower Controller workload is highly dependent on the implementation of the A-SMGCS Routing function HMI, which needs to be designed to be efficient and streamlined so as to reduce the time needed for the Tower Controllers to interact with the system.

With the Tower Controller's performance improved with the A-SMGCS Routing function, they will have additional mental resources available and it is expected this will translate into increased **Safety** as they will be less prone to errors and more focused on the traffic situation. In addition, the visual display of taxi routes on his working position will support the Tower Controller in identifying conflicting situations which he has to solve.

The following table shows which KPAs and Transversal Areas (TAs), among those currently identified by WP B and Sub-Work Package (SWP) 16.06 as impacted by OFA04.02.01, are impacted by the routing operational service.

KPA/TA	Environmental Impact	Human Performance	Predictability	Safety
Routing		✓	✓	✓

Table 8: KPAs and TAs impacted by the routing operational service

3.2.1.5 Related stakeholder expectations

Stakeholders	Stakeholder Expectations
ANSP	To improve the management of unexpected traffic demand or events such as runway closure, airport configurations change... To improve the safety of operations, especially during adverse weather conditions To improve the predictability of surface movements To implement the baseline for deploying the ATM Functionalities planned in the Pilot Common Project (PCP)
ANSP (Tower Controllers)	To have their situational awareness improved due to the assistance in surface management To have their workload maintained at an acceptable level, even during peaks of traffic, despite having the additional task to update routes in the ATC system To have a smooth transition to new ways of working with a full validation of all aspects before deployment. They expect that their working conditions will be enhanced by the deployment of new technologies and new techniques and that safety will never be compromised
Airspace User	To improve taxi efficiency in all weather conditions
Airspace User (Flight Crew)	N/A
Airport Operator	To improve the predictability of surface movements
Airport Operator (Apron Manager)	See ANSP (Tower Controllers) above
Airport Operator (Vehicle Driver)	N/A

Table 9: Stakeholder expectations for the routing operational service

3.2.2 Provision of cleared route to mobiles by voice (R/T)

3.2.2.1 Continuation of voice communications

Provision of cleared route to mobiles by voice (R/T), which is part of a control service and guidance service, is used when no data link service is available or, in data link environment, to address time critical or emergency situations, or to clarify a data link exchange. In the future, data link (for e.g. the D-TAXI service, for aircraft) and AGL may become additional means of communicating taxi instructions to Flight Crews and Vehicle Drivers, but R/T communications shall remain for:

- establishing first contact with the Flight Crew or Vehicle Driver for radio check;
- issuing runway clearances;
- issuing safety/time-critical communication;
- issuing emergency communication;
- mobiles not data link equipped; and
- data link failure.

In this context, Flight Crews can benefits from increased situational awareness during the taxi phase of the flight through the Manual taxi routing function, which enables inputting taxi clearances received by R/T into the cockpit systems and have them displayed as a graphical path on the AMM.

In SESAR Integrated Roadmap Dataset 16 ([10]), this is supported by the following Operational Improvement step:

- **AUO-0603-A**: Enhanced Guidance Assistance to Aircraft on the Airport Surface Combined with Routing in Step 1.

The Tower Controller will give taxi instructions by R/T having checked on the HMI that the **'planned route'** generated by the A-SMGCS is correct.

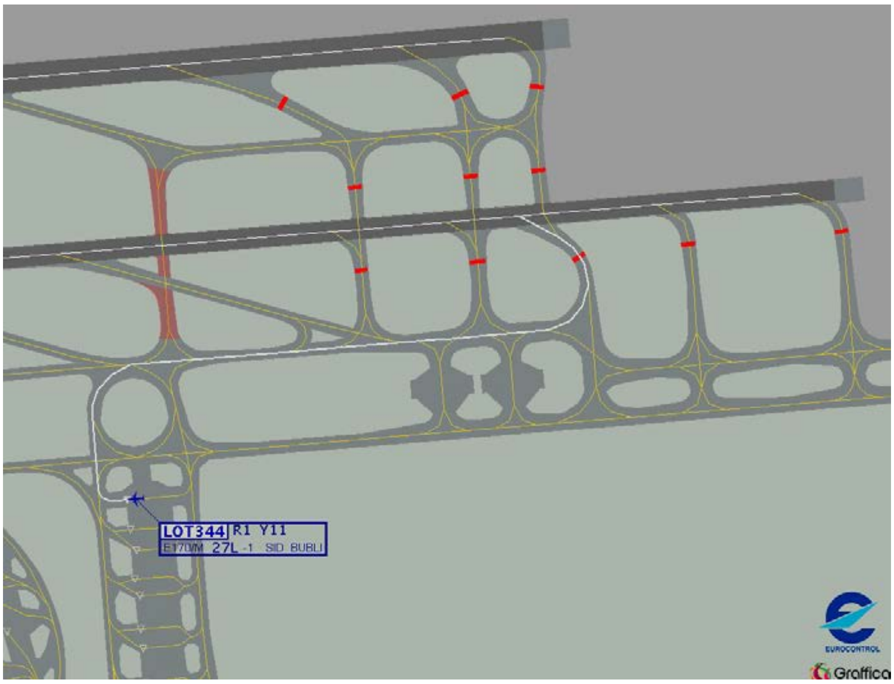


Figure 13: Example of a planned route (shown in white)

The Tower Controllers have to input all routing instructions (e.g. push back and taxi clearances) into the ATC system. This enables the A-SMGCS to know and show the portion of the route that has been cleared (i.e. the '**cleared route'**), as well as the portion of the route yet to be cleared (i.e. the '**pending route**').

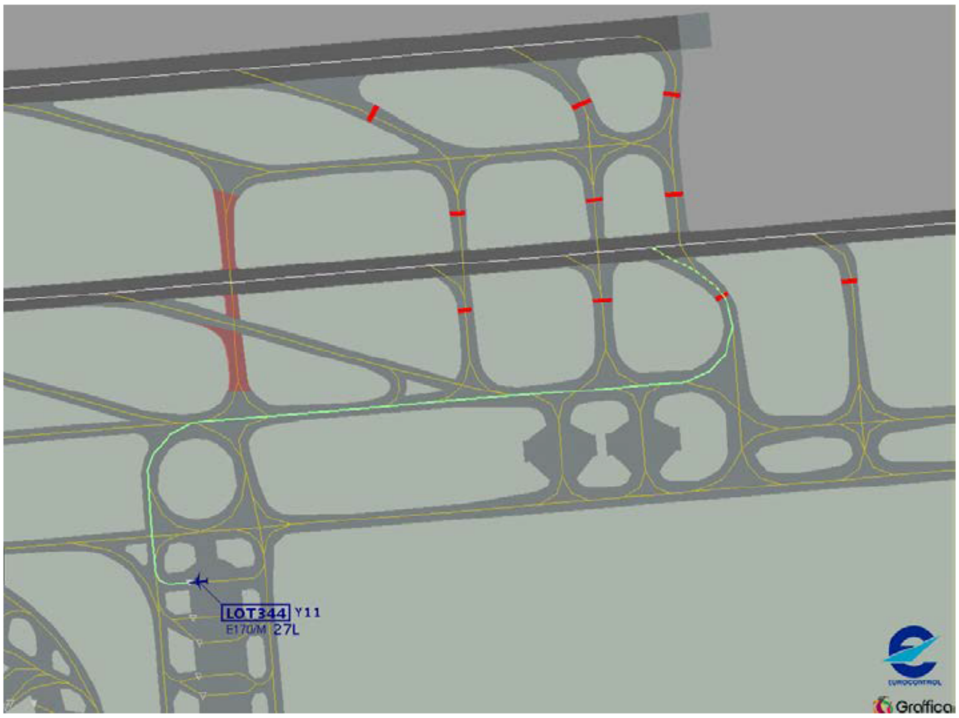


Figure 14: Example of a Cleared route (shown in solid green) and Pending route (shown in dashed green)

On-board the aircraft, the Flight Crew can manually input in the aircraft systems the cleared taxi route received by R/T, so that it is graphically depicted in the AMM. This Manual taxi routing function supports the Flight Crew during taxi operations with enhanced awareness by providing a graphical taxi route presentation on the AMM after they have entered their taxi clearance in the cockpit systems via a Multifunction Control Display Unit (MCDU).

Any update of taxi instructions or revision of routing will be passed to the Flight Crew or Vehicle Driver by R/T and also updated via the A-SMGCS HMI.

3.2.2.2 Impact on performance and transversal areas

With the provision of clearances via R/T, the Tower Controllers are required to input the clearances they provide to mobiles into their working positions and to do this in a timely manner. An inconsistency between the state of a mobile in the system and its actual behaviour can indeed lead to undesirable alerts being triggered by the conflicting ATC clearances tool defined in OFA01.02.01. Therefore, the provision of clearances via R/T by Tower Controllers requires them to use part of their mental resources to feed the ATC system and to manage this consistency. The provision of clearances via R/T is thus affecting the **Human Performance** of Tower Controllers.

The following table shows which KPAs and TAs, among those currently identified by WP B and SWP 16.06 as impacted by OFA04.02.01, are impacted by the clearances via R/T operational service.

KPA/TA	Environmental Impact	Human Performance	Predictability	Safety
Clearances via R/T		✓		

Table 10: KPAs and TAs impacted by the clearances via R/T operational service

3.2.2.3 Related stakeholder expectations

Stakeholders	Stakeholder Expectations
ANSP	N/A
ANSP (Tower Controllers)	To have their workload maintained at an acceptable level, when R/T is used in a mixed way with data link
Airspace User	N/A
Airspace User (Flight Crew)	To have their workload maintained at an acceptable level, when R/T is used in a mixed way with data link
Airport Operator	N/A
Airport Operator (Apron Manager)	See ANSP (Tower Controllers) above
Airport Operator (Vehicle Driver)	To have their workload maintained at an acceptable level, when R/T is used in a mixed way with data link

Table 11: Stakeholder expectations for the clearances via R/T operational service

3.2.3 Provision of planned and cleared route to mobiles by data link

Having the airport and mobiles equipped with data link communication means enables the **Provision of planned and cleared route to mobiles by data link.** The taxi route is transmitted to the aircraft by an upload using the D-TAXI service. Also any clearance requests from Flight Crews and negotiations between ATC and Flight Crews are part of the D-TAXI service. Similarly, a taxi route can be provided to vehicles via a dedicated data link application. This service aims at reducing R/T occupancy by exchanging non-time critical messages between ATC and mobiles (Expected Taxi Route, Start Up, Push back, and, on airports with lower traffic and/or simple taxiway layouts, Taxi-In, Taxi-Out and Taxi Revision) by data link. R/T is still used on first contact[9] with the Tower Controller for radio check and remains available at any time in case the Flight Crew, Vehicle Driver or Tower Controller need to revert to voice communication.

Enhanced Guidance Assistance to aircraft and vehicles on the airport surface combined with routing provides the Flight Crew and Vehicle Drivers with a Cockpit Display System/Vehicle Display System (CDS/VDS) which provides guidance instructions as a layer on top of the AMM. On board aircraft equipped with the Manual Taxi Routing function, the information about the taxi route assigned to the aircraft can be entered manually by the Flight Crew, if the taxi clearance has been received by R/T for e.g. The CDS/VDS is also able to show taxiways, runways, fixed obstacles, own aircraft position and surrounding traffic.

In the context of SESAR, the use of data link communications to exchange, between Tower Controllers and Flight Crew, clearances / instructions concerning the management of routine operations on the airport movement area has been confirmed to have achieved the V3 maturity level. This service is supported by the following Operational Improvement Step as described in the SESAR Integrated Roadmap Dataset 16 ([10]):

- **AUO-0308-A**: Datalink services used for provision of ground-related clearances and information.
- Optionally, AUO-0603-A (cf. 3.2.2) can be part of this service in order to automatically display taxi routes on the aircraft's AMM.

In detail, for the aircraft, the provision of surface ground clearances / instructions via data link corresponds to the D-TAXI service of the CPDLC application, currently under definition by the joint standardisation group RTCA SC-214 / EUROCAE WG-78.

Furthermore, the document includes also preliminary information about the implementation of data link service for managing vehicles' aerodrome operations as described by the following OIs:

- **AO-0206**: Enhanced guidance assistance to airport vehicle driver combined with routing.
- **AO-0215**: Airport ATC provision of ground-related clearances and information to Vehicle Drivers via datalink.

However, it is important to highlight that the definition of data link service for vehicles has not achieved the same maturity level as the one used for aircraft. Therefore, data link service for vehicles is recommended to be further investigated during SESAR 2020 horizon.

3.2.3.1 D-TAXI service

Data link communications have been proved to be valid additional communication means to exchange routine surface clearances and expected routing information between Tower Controllers and Flight Crew. In detail, those communications are represented by the D-TAXI service of the CPDLC application according to the standard format defined on the work performed jointly by the RTCA SC-214 with EUROCAE WG-78 to develop standards to define the safety, performance and interoperability requirements for Air Traffic Services supported by data communications. From Flight Crew's perspective, the added values are represented by:

[9] The first contact may be at Flight Crew's (or Vehicle Driver's) initiative if they have been instructed to contact a specific ATC unit on a given radio frequency or at Tower Controller's initiative if the Flight Crew or Vehicle Driver have been instructed to monitor a given radio frequency.

- the on-board presentation of textual clearances / instructions to prevent misunderstandings of the clearance content and addressee;
- optionally, the availability of an on-board Airport Moving Map to ensure the graphical display of planned and cleared taxi routes supporting surface navigation.

This enhancement will ease taxi operations and limit potential deviations from Tower Controller's instructions / clearances. On the other hand, aircraft not equipped with data link will not receive planned route information and will receive their taxi clearances via R/T, as through previous operating method.

A prerequisite for D-TAXI to be used at an airport is that the following services are in place:

- **Data Link Initiation Capabilities** (DLIC) enabling data link communication between ATC Ground and aircraft. DLIC is initiated when the aircraft wants to use ATN for communication purposes.
  The DLIC service provides the log-on procedure to the ATN and exchanges the required application information. The DLIC process supports addressing requirements for Air Traffic Service Communication applications such as Controller Pilot Data Link Communications (CPDLC).

  The DLIC supports the update of application information.

  The DLIC service propagates application information, implementing the contact procedure a given time before the centre exit.
- **ATC Communications Management** (ACM) service provides automated assistance to the Flight Crew, current and next Controllers for conducting the transfer of ATC communications. *Note: Only required if transfer of communication will be performed by data link.*

The D-TAXI service for aircraft consists of the following sub-services:

- **Departure Taxi Route Information** – information provided prior to departure on the expected taxi-out route as well as other departure information. In the future, Departure Taxi Route Information could be part of the DCL as well.
- **Start-Up** – Approval for aircraft engine start-up as well as departure information.
- **Push-back** – Approval for aircraft push-back from a stand as well as departure information.
- **Taxi-Out** – Taxi route instructions for aircraft to taxi from a point on the airport to another point on the airport surface.
- **Arrival Taxi Route Information** – The expected arrival taxi route as well as other arrival information provided to Flight Crews while still in flight.
- **Taxi-In** – Taxi route instruction for aircraft to taxi from landing runway exit to another point on the airport, provided after clearing the landing runway.
- **Taxi Revision** – Change to any previously delivered taxi route.

The use of D-TAXI messages should not affect the operations at an airport especially concerning response times for taxi and revised taxi dialogue. In cases where this could be a factor the use of R/T should be preferred. At certain airports a limited set of messages could be implemented if other forms of guidance are in use (e.g. R/T or Follow the Greens). Detailed conclusions on the maturity level achieved by this SESAR Solution, notably for the different messages under validation in various environments, are provided in 06.03.01 Release 5 Validation Report ([42]).

When the D-TAXI service is implemented the Flight Crew will still be required to make first contact on each frequency by R/T to ensure that two-way contact is available by R/T in case it is required for operational purposes

In addition to the messages related to the D-TAXI service, the use of the Contact message (of the ACM service) has been shown to be at V3 maturity level as instruction to Flight Crew to establish voice contact with the specified ATS unit on the specified frequency.

3.2.3.1.1 Operating Method and Diagrams

This chapter details the tasks to be performed by each actor (Tower Controller and Flight Crews) and the dialogs that take place between them for each of the seven D-TAXI sub-services mentioned above. These dialogs are illustrated by typical message exchanges going on when these sub-services are used.

3.2.3.1.1.1 Departure Taxi Route Information[10]

The Flight Crew receives the pre-flight information folder including relevant data such as meteorological file, NOTAM, Aeronautical Information Circular (AIC). Once on board, they establish a Data link Operational Terminal Information Service (D-OTIS) contract to receive ATIS, Terminal Aerodrome Forecast (TAF)/ Meteorological Aerodrome Report (METAR) and NOTAM updates.

The planned (expected taxi out) route will be automatically sent by the ground ATC system upon request by Flight Crew (1), potentially with the DCL and it is loaded in to the aircraft system, together with latest weather data and some aircraft parameters (gross weight, cost index, etc.). The Flight Crew is notified that the planned route has been received (2).

The Flight Crew may respond with STANDBY (3). Upon Air Traffic Service Unit's (ATSU) system receipt of STANDBY, the Tower Controller may be notified (4).

The Flight Crew will acknowledge (or reject) the concatenated DCL and planned taxi out route with a WILCO[11] (or UNABLE[12]) message (5). Upon ATSU system receipt of WILCO (or UNABLE), the Tower Controller is notified (6).

Figure 15 provides an operating method diagram illustrating the messages used for providing Flight Crew initiated D-TAXI expect taxi-out route (the red dotted line indicates optional messages).

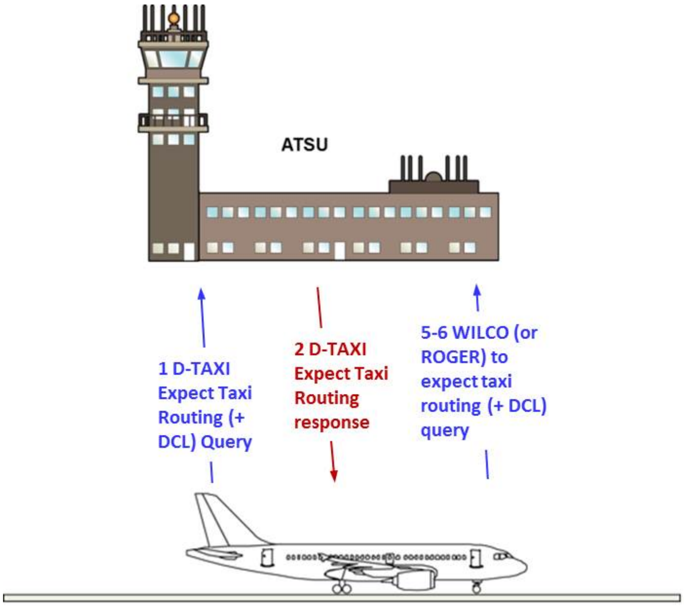


Figure 15: Flight Crew Initiated D-TAXI expect taxi-out route Operating Method Diagram

In the cockpit the planned route will be presented on the on-board display in a textual and, if the aircraft is fitted, in a graphical way. However, at this stage the route has not been cleared by the Tower Controller. The planned route transmitted by the ground ATC system announces the route that is expected to be cleared by Tower Ground and Tower Runway Controllers. In automatic mode,

[10] More detailed descriptions can be found in section 3.2.2 of D13 of 06.07.02 ([14])
[11] In case the Departure Taxi Route Information is sent as single message not concatenated with Departure Clearance, the affirmative flight crew reply is ROGER.
[12] In case the flight crew is unable to comply with the Tower Controller's instruction, the dialog may carry on by voice.

adjustments to the planned route can also be made by the system due to short-term taxiway closures or changes in the operational direction (cf. ch.3.2.1.3). If the initial taxi route information has been modified, an UPDATE message should be accompanied with the new planned route to make the Flight Crew aware of this modification.

Once the flight is off-blocks (i.e. when the start-up clearance has been received), no further planned route is provided. All segments of the route for which no clearance has yet been received constitute the pending route.

3.2.3.1.1.2 Start-Up

The D-TAXI start-up is designed to allow the Flight Crew to start up and, optionally, start moving the aircraft. The start-up may indeed be combined with other D-TAXI operations such as push-back or taxi-out.

The D-TAXI start-up can either be requested by the Flight Crew (e.g. Request start-up or Ready for start-up at), or ATSU/Tower Controller initiated. In case the request is initiated by the Flight Crew (1), the Tower Controller is notified upon receipt of the request by the ATSU system (2).

The Tower Controller may answer with STANDBY (3). Upon aircraft system receipt of STANDBY, the Flight Crew is notified (4).

The ATSU system / Tower Controller respond with an UNABLE[12] (5U) or with a clearance, or expect information or a combined clearance and expect information (5C). Upon aircraft system receipt of the response message, the Flight Crew is notified (6).

The Flight Crew may answer with STANDBY (7). Upon ATSU system receipt of STANDBY, the Tower Controller is notified (8).

When the Flight Crew receives a start-up clearance (may include concatenated expect information), and the Flight Crew cannot comply, or an expect message that the Flight Crew cannot understand, the Flight Crew responds with an UNABLE[12] (9U) or by R/T to clarify the issue. Upon ATSU system receipt of UNABLE, the Tower Controller is notified (10U).

When the Flight Crew receives a start-up clearance (may include concatenated expect information), and the Flight Crew can comply, the Flight Crew responds with a WILCO (9W). Upon ATSU receipt of WILCO, the Tower Controller may be notified (10W).

When the Flight Crew receives an expect message (not including a clearance), and the Flight Crew understands the message, the Flight Crew responds with a ROGER (9R). Upon ATSU receipt of ROGER, the Tower Controller may be notified (10R).

The figure below provides an operating method diagram illustrating the messages used for D-TAXI start-up approval requests (the red dotted line indicates optional messages).

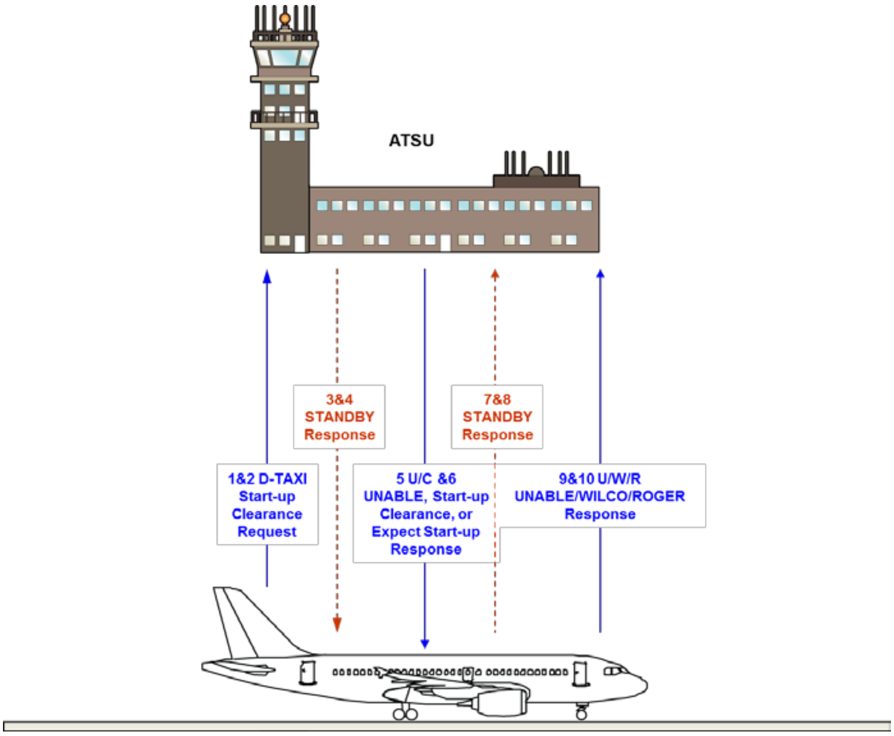


Figure 16: D-TAXI start-up approval Request Operating Method Diagram

The figure below provides an operating method diagram illustrating the messages used for providing ATSU/Tower Controller initiated D-TAXI start-up.

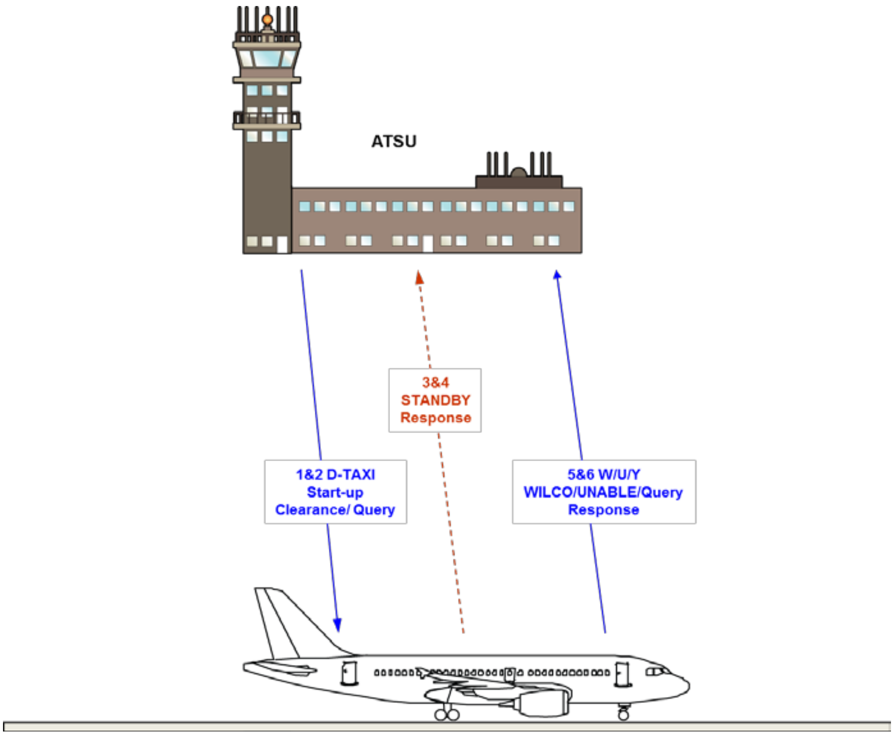


Figure 17: ATSU/Tower Controller Initiated D-TAXI Start-up Approval Operating Method Diagram

3.2.3.1.1.3 Push-Back

The D-TAXI push-back is designed to allow the Flight Crew to initiate the push-back. The push-back may be combined with other D-TAXI operations such as taxi-out.

The D-TAXI push-back can either be requested by the Flight Crew (e.g. Request Push-back or ready for Push-back at), or ATSU/Tower Controller initiated, such as When can you accept Push-back?

The figure below provides an operating method diagram illustrating the messages used for providing D-TAXI push-back clearance requests (the red dotted line indicates optional messages).

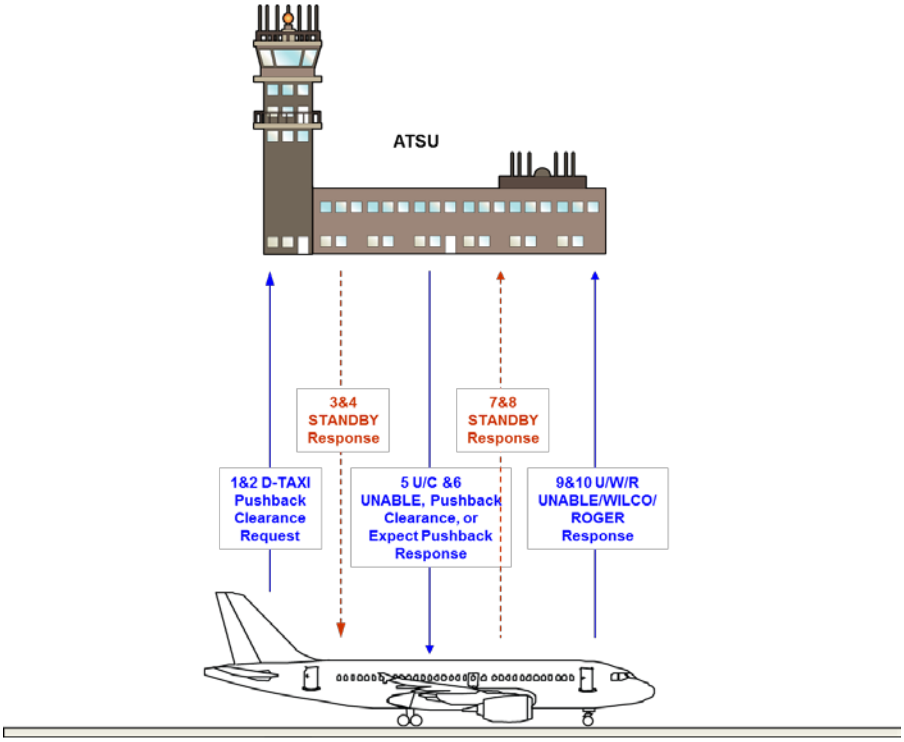


Figure 18: D-TAXI Push-Back Request Operating Method Diagram

The figure below provides an operating method diagram illustrating the messages used for providing Tower Controller initiated D-TAXI push-back.

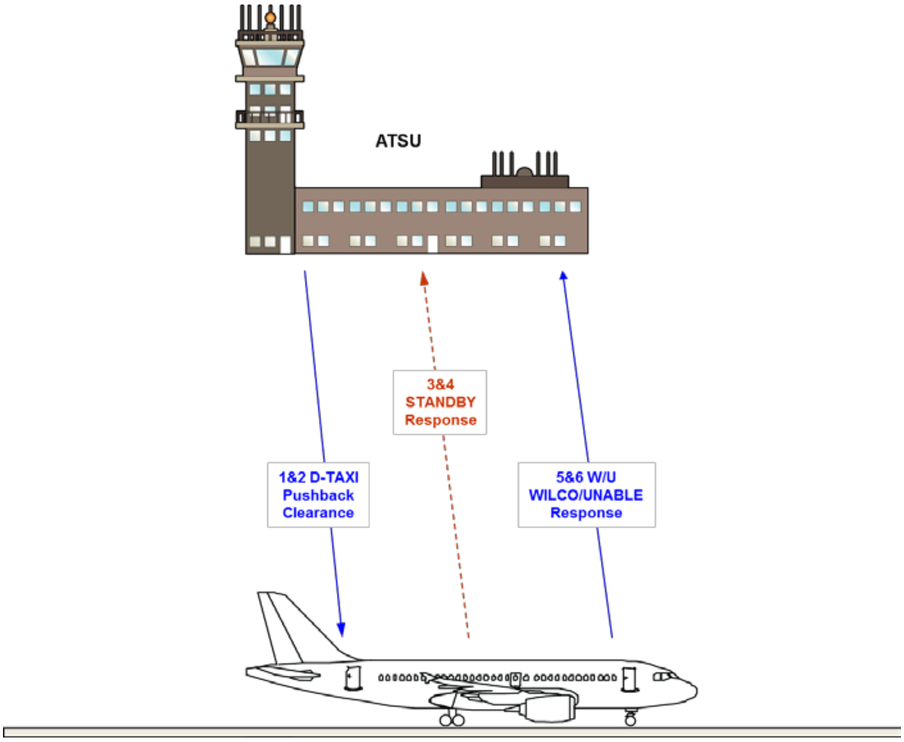


Figure 19: Tower Controller Initiated D-TAXI Push-Back Operating Method Diagram

3.2.3.1.1.4 Taxi-Out

The D-TAXI taxi-out is designed to allow the Flight Crew to taxi-out on a specified cleared taxi-route.

The D-TAXI taxi-out can either be requested by the Flight Crew, or in rare cases Tower Controller initiated.

Taxi-Out clearances can either be provided to the Flight Crew in their entirety (i.e. from current position to runway holding point) or in several portions, using intermediate clearance limits. These limits can be set in the current sector or at the coordination point between two sectors.

If an aircraft has received a partial taxi-out clearance, it will then receive a clearance extension, which is a new clearance transmitted with a new TAXI message.

On-board the aircraft, the taxi-out clearance can be automatically, or manually through the manual taxi routing function, translated in a graphical depiction on the AMM.

The figure below provides an operating method diagram illustrating the messages used for D-TAXI taxi-out requests (the red dotted line indicates optional messages).

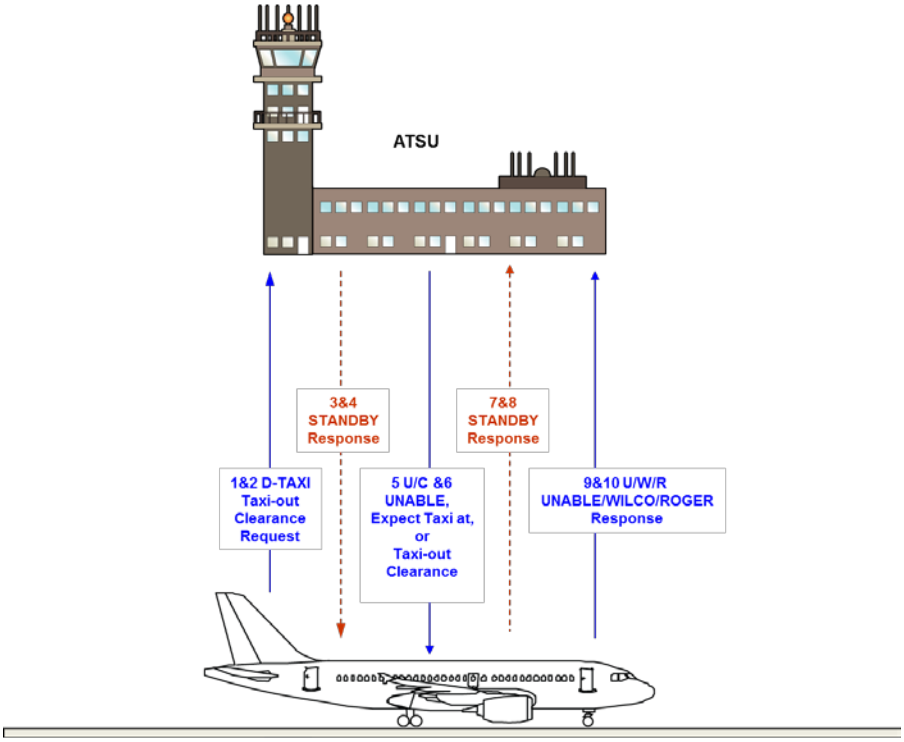


Figure 20 : D-TAXI Taxi-Out Request Operating Method Diagram

The figure below provides an operating method diagram illustrating the messages used for providing Tower Controller initiated D-TAXI taxi-out.

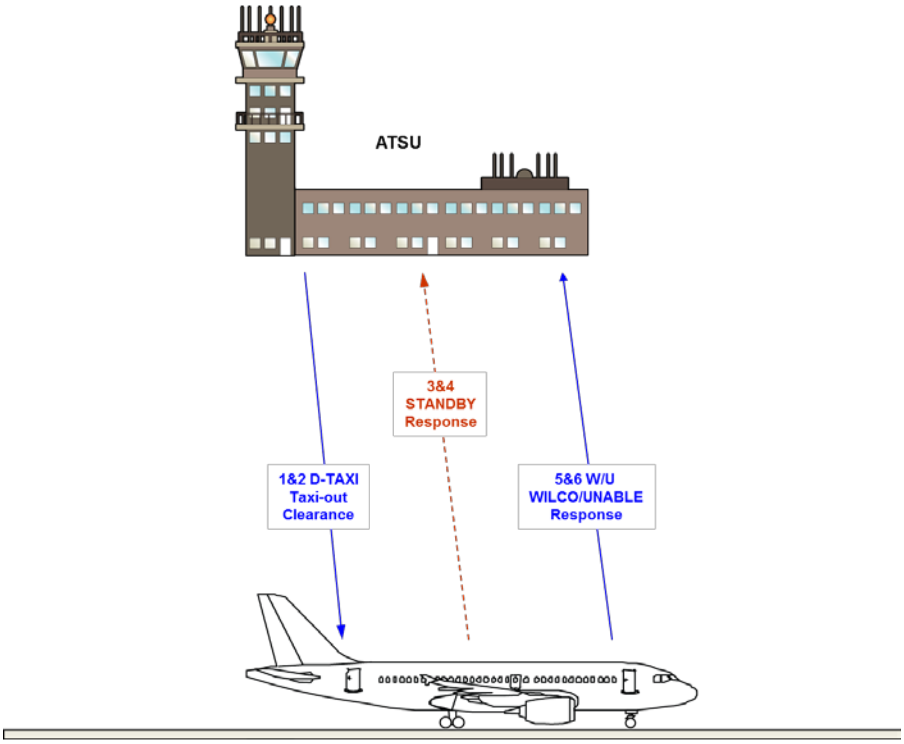


Figure 21: Tower Controller Initiated D-TAXI Taxi-Out Operating Method Diagram

3.2.3.1.1.5 Arrival Taxi Route Information[13]

The expected taxi-in route will be automatically transmitted by the ground ATC system upon Flight Crew request. The route will be based on the predicted runway exit considering the aircraft type and runway exit position. Some airlines have Standard Operating Procedures (SOPs) implementing the sterile cockpit concept, which restricts communication to safety of the flight and operation of the aircraft once the aircraft has reached the established altitude. In order to be compatible with these SOPs, the provision of planned routes will be prevented below a given altitude or below a given distance from runway or below a given time before landing. For the Flight Crew, the expected taxi route should be received before top of descent for long-haul flight and above Flight Level (FL) 100 for short and medium haul flights. Any revision to this initial planned route will be automatically transmitted, except if the aircraft is too close to the airport.

In a busy operational environment, having a planned route which is frequently different from the cleared route can be a source of confusion and loss of confidence for the Flight Crew. Therefore, changes to the planned route should be minimised to also avoid Flight Crew confusion and workload.

If the aircraft is equipped EBS, the Flight Crew have the capability to communicate and negotiate their nominal runway exit[14]:

- In case the EBS computes and downlinks a runway exit before the A-SMGCS Routing function plans a route, the A-SMGCS Routing function uses the downlinked runway exit for the calculation of a planned taxi-in route. This planned taxi-in route is made available for uplink to the Flight Crew on request.
- In case the A-SMGCS Routing function plans a route before the EBS computes and downlinks a runway exit, the aircraft automatically requests the planned taxi route. If the default runway exit used by the A-SMGCS Routing function is compatible with the one computed by the EBS, the EBS downlinks a confirmation. If not, the ATC system receives a request from the aircraft to use a specific runway exit. The ATC system will check the availability of the requested runway exit before it replies with an EXPECT TAXI indicating a revised planned taxi-in route, or UNABLE[12].
- If the runway exit becomes unavailable then the A-SMGCS Routing function recalculates a planned taxi-in route without waiting for an update of the downlinked runway exit. In parallel, the ATC system is expected to alert the Flight Crew of the runway exit unavailability, which could lead to a new negotiation of the runway exit with the ATC system.

Note: The definition of the messages to request a specific runway exit (together with the Runway Occupancy Time) and to alert the Flight Crew of the runway exit unavailability are out of the scope of this OFA, but rather in the scope of the project 06.08.02 and its associated OFA.

[13] More detailed descriptions can be found in section 3.2.1 of D13 of 06.07.02 ([14])
[14] This description is based on the 06.08.02 OSED ([19]).

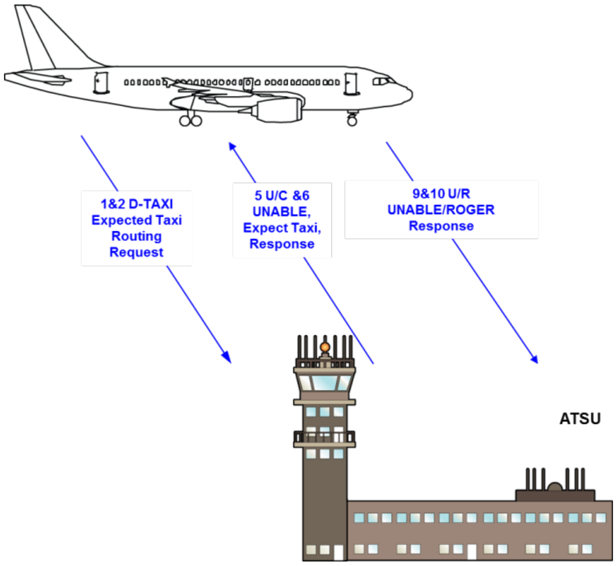


Figure 22: D-TAXI Expected Taxi Route Request Operating Method Diagram

ATC clears the aircraft to land. Flight crew has situational awareness through visual observation assisted by Cockpit Display of Traffic Information (CDTI) information.

After landing, the Flight Crew will endeavour to leave the runway at the agreed exit. Once the flight has landed, no further planned route is provided. All segments of the route for which no clearance has yet been received constitute the pending route.

3.2.3.1.1.6 Taxi-In

The D-TAXI Taxi-In is designed to allow the Flight Crew to taxi-in on the specified taxi-route received after landing and cleared of the runway. The use of data link to transfer arriving aircraft vacating the runway from the Tower Runway Controller to the Tower Ground Controller is not appropriate as it is imperative that aircraft clear the runway protection area as quickly as possible. To ensure this happens, the use of R/T is maintained as it is quicker than using data link. In addition, using R/T for initial contact with the Tower Ground Controller after vacating the runway allows the Flight Crew to be sure they are on the correct frequency. The Tower Ground Controller uses this opportunity to provide the first part of the taxi clearance by R/T.

In other cases, the D-TAXI taxi-in can either be requested by the Flight Crew or Tower Controller initiated. For aircraft entering a ground sector after having vacated the runway, taxi clearances should preferably be provided by ATC without prior request from the Flight Crew in order to avoid confusion and improve efficiency of taxiing.

Taxi-In clearances can either be provided to the Flight Crew in their entirety (i.e. from current position to stand) or in several portions, using intermediate clearance limits. These limits can be set in the current sector or at the coordination point between two sectors.

If an aircraft has received a partial taxi-in clearance, it will then receive a clearance extension, which is a new clearance transmitted with a new TAXI message.

On-board the aircraft, the taxi-in clearance can be automatically, or manually through the manual taxi routing function, translated in a graphical depiction on the AMM.

The figure below provides an operating method diagram illustrating the messages used for D-TAXI taxi-in instruction requests (the red dotted line indicates optional messages).

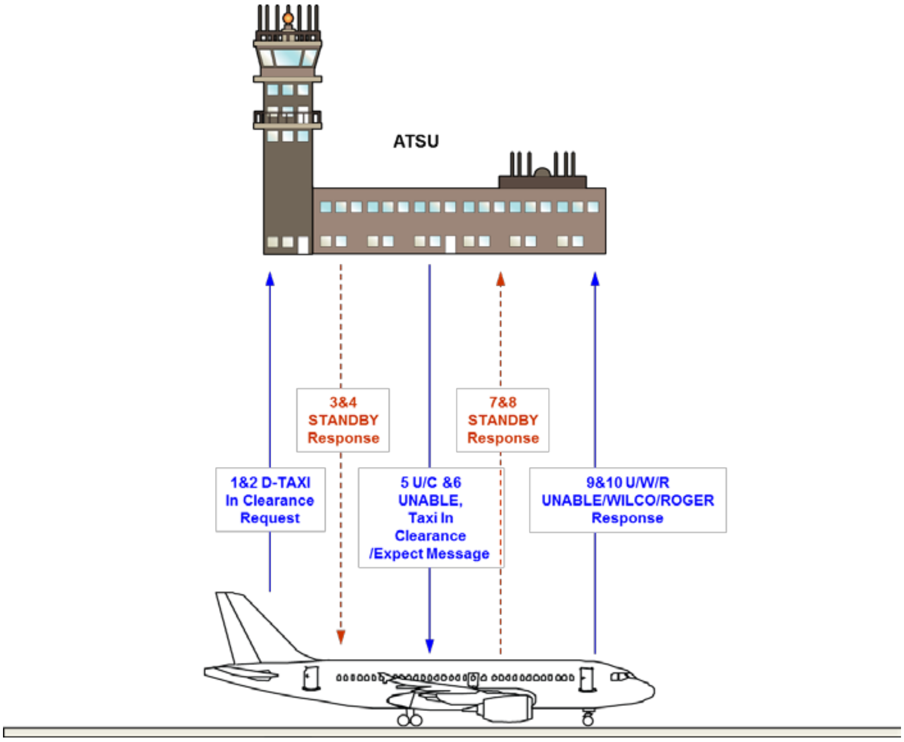


Figure 23: D-TAXI Taxi-In Request Operating Method Diagram

The figure below provides an operating method diagram illustrating the messages used for providing D-TAXI taxi-in instructions.

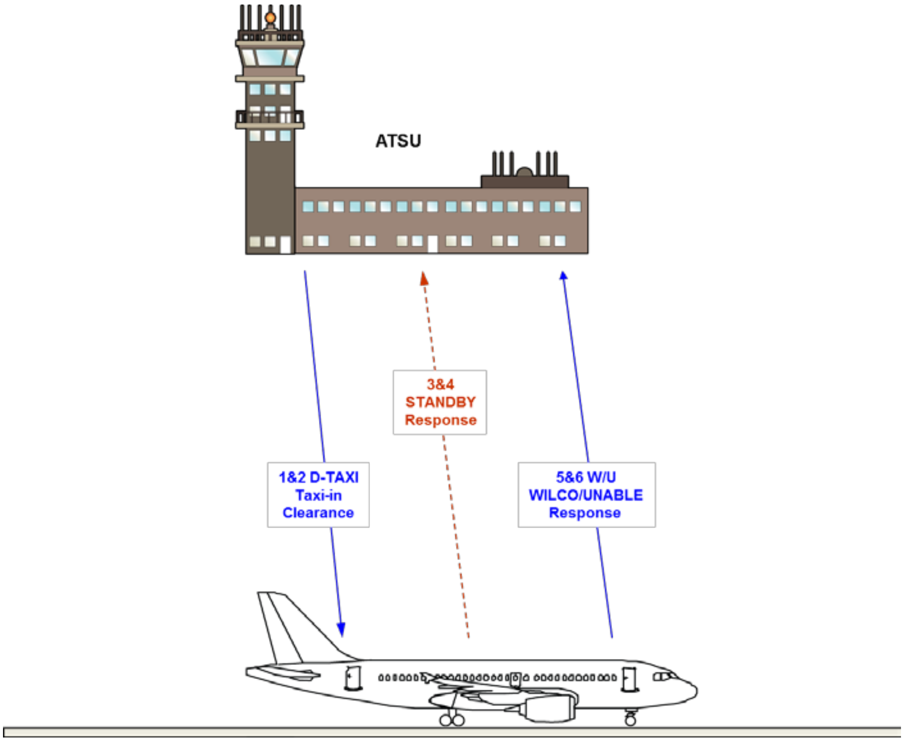


Figure 24: Tower Controller Initiated D-TAXI Taxi-In Operating Method Diagram

3.2.3.1.1.7 Taxi Route Update

The D-TAXI taxi route update is designed to allow a change to a previously sent taxi route. Any instructions for continuation of a taxi clearance according to agreed or expected routing will use the D-TAXI taxi in/out message.

A D-TAXI taxi update should always be given from the aircraft position since it replaces the previous taxi instructions. Taxi updates should be distinguished from clearance extensions, which are new clearances provided to an aircraft having been initially cleared to a point different from a runway holding point (typically, after entering a new ground sector on an airport with multiple ground sectors). A clearance extension will thus be provided through a TAXI message, and not a REVISED TAXI message.

On-board the aircraft, the updated taxi clearance can be automatically, or manually through the manual taxi routing function, translated in a graphical depiction on the AMM.

The D-TAXI taxi update can be requested by the Flight Crew but will normally be initiated by the Tower Controller.

The figure below provides an operating method diagram illustrating the messages used for D-TAXI taxi update requests (the red dotted line indicates optional messages).

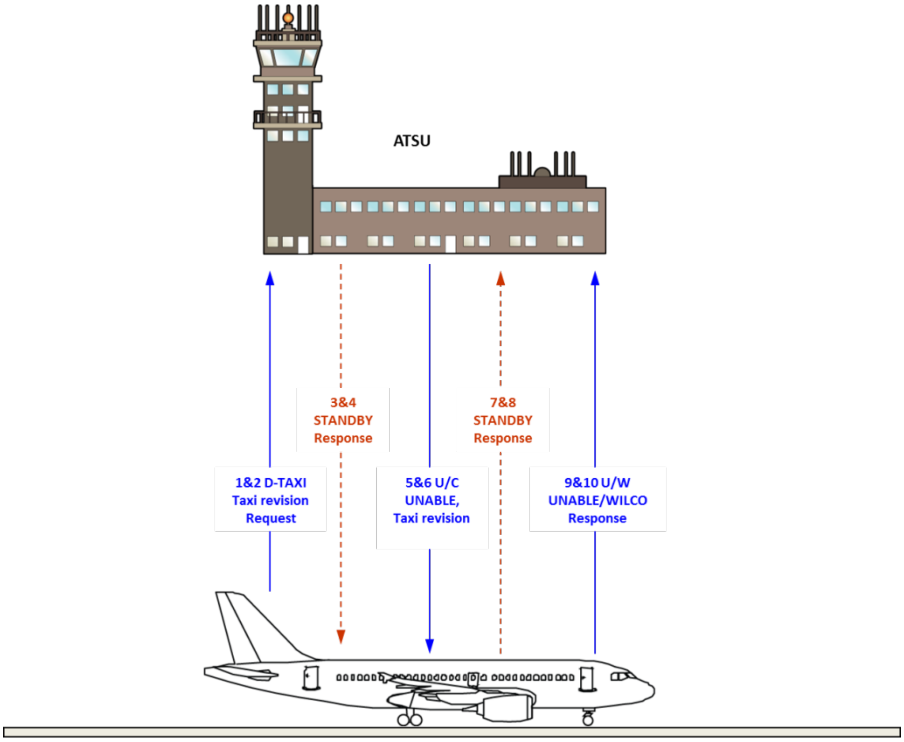


Figure 25: D-TAXI Taxi Update Request Operating Method Diagram

The figure below provides an operating method diagram illustrating the messages used for providing D-TAXI taxi update.

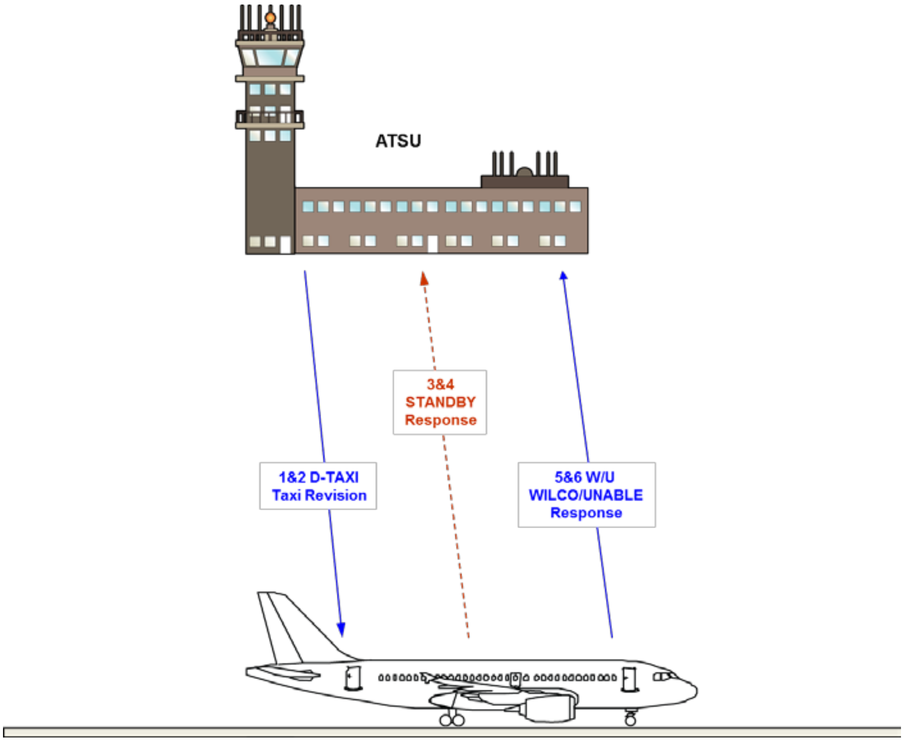


Figure 26: D-TAXI Taxi Update Operating Method Diagram

3.2.3.1.1.8 Contact

Contact message is used to instruct Flight Crew to establish voice contact with the specified ATS unit on the specified frequency. Upon receipt of a CPDLC voice frequency change instruction, the Flight Crew acknowledges the instruction to transfer voice communications and CPDLC. The acknowledgement is a CPDLC WILCO or UNABLE[12] message to the concerned ATSU system / Tower Controller. Upon receipt of the CPDLC WILCO response, CPDLC with the concerned ATSU is terminated and any open messages are cancelled.

3.2.3.1.2 D-TAXI messages

The list of data link messages mentioned in this Final OFA04.02.01 OSED is based on the outcomes of R5 validation activities ([42]. In detail, that list includes only the messages that have achieved the V3 maturity level at the end of SESAR Programme. Those messages are part of D-TAXI service of the CPDLC application in accordance to the standard format defined by the joint standardisation group RTCA SC-214 / EUROCAE WG-78. OFA04.02.01 has contributed to the definition of this message set by using early draft material from SC-214/WG-78 for validation activities and by coordinating with the standardisation group to report validation results. The outcome of this coordination has been taken into account in the published standard (ED-228: SPR for Baseline 2 ATS Data Communications – [8]).

3.2.3.1.2.1 Uplink messages

Table 12 provides the list of D-TAXI uplink (i.e. from ATC to aircraft) messages (UM) elements from the SPR for Baseline 2 ATS Data Communications (ED-228 – [8]) which are relevant for the A-SMGCS Routing and Guidance functions, as defined within SESAR.

The CPDLC service allows concatenating several message elements into a single message. In the case of D-TAXI uplink messages related to the provision of the planned route, it is only possible for sending a planned route (UM264+UM315: [departure clearance] EXPECT TAXI), a revision of a previously provided planned route (UM325+UM315: REVISED EXPECT TAXI).

Msg ID	Message element	Message intent/use
UM0	UNABLE	Indication that the message cannot be complied with.
UM1	STANDBY	Indication that the message will be responded to shortly.
UM73R	[*departure clearance*]	Instruction to proceed via the specified departure clearance.
UM117R	CONTACT *[unit name] [frequency]*	Instruction to establish voice contact with the specified ATS unit on the specified frequency.
UM120R	MONITOR *[unit name] [frequency]*	Instruction to monitor the specified ATS unit on the specified frequency. The flight crew is not required to establish voice contact on the frequency
UM159R	ERROR [*error information*]	System-generated notification of an error.
UM227	LOGICAL ACKNOWLEDGMENT	System generated notification that the received message is acceptable for display.
UM249	REVISED *[revision reason]*	Indication that the associated instruction is either a revision to a previously issued instruction or is different from the requested clearance.
UM270	EXPECT *[clearance type] [assigned time]*	Notification that the specified clearance type may be issued at the time required to meet the specified time.
UM283	WHEN CAN YOU ACCEPT *[clearance type]*	Request for the earliest time or position at which the specified clearance can be accepted.
UM302	START UP APPROVED *[assigned time]*	Instruction that engine startup is approved. A time for start-up may be specified.
UM304	PUSH BACK APPROVED [*pushback position*] *[assigned time]*	Instruction to commence pushback. A pushback position(s) and direction, and/or time may be specified.
UM305	EXPECT TAXI [*taxi route*] *[taxi duration]*	Notification that a taxi clearance may be issued for the specified taxi route. The estimated taxi duration may be specified.
UM306	RESUME TAXI *[taxi resume condition]*	Instruction to resume a previously issued taxi. The conditions for resuming the taxi may be specified
UM308	[*runway*] TAXI [*taxi route*]	Instruction to taxi to the specified location; may include a hold short position
UM309	DE-ICING APPROVED	Indication the de-icing is approved
UM311	HOLD POSITION	Instruction to hold the current position
UM312	FOR DE-ICING	Indication that the associated instruction is issued in order to perform de-icing.
UM313	CAN YOU ACCEPT INTERSECTION [*intersection*] FOR DEPARTURE RUNWAY [*runway*] (*[distance ground available]* AVAILABLE)	Request to indicate whether or not the specified intersection can be accepted on the specified departure runway and may include the remaining length of the runway.
UM317	[*runway*] INTERSECTION DEPARTURE [*intersection*] (*[distance ground available]* AVAILABLE)	Indication of the intersection departure for the associated taxi instruction or taxi route information and may include the remaining length of the runway.
UM318	HOLD SHORT *[ground location]*	Instruction to hold short of the specified ground location.

Table 12: Relevant Uplink Messages for the D-TAXI service

The UM305 message element is used to convey planned routes, and use the *[taxi route]* parameter type to describe the route assigned to a mobile. As described in ED-228 ([8]), the *[taxi route]* parameter type is itself composed of several subtypes and keywords that allow describing any route on any airport, whatever the local working methods or taxiway naming conventions. The following examples illustrate how the *[taxi route]* sub-parameters and keywords can be combined to form strings of alphanumeric characters that convey whole planned or cleared routes.

- Route for departing aircraft: TO HOLDING POINT <string 1> RWY <string 2> VIA TWY <string 3>

  Ex: TO HOLDING POINT Y11 RWY 27L VIA TWY A N B BD20

- Route for departing aircraft under Cat. III: TO HOLDING POINT <string 1> CAT3 RWY <string 2> VIA TWY <string 3>

  Ex: TO HOLDING POINT Y11 CAT3 RWY 27L VIA TWY A N B BD20

- Route for arriving aircraft: TO STAND <string 1> VIA TWY <string 2>

  Ex: TO STAND A10 VIA TWY A N B BD20

3.2.3.1.2.2 Downlink messages

Table 13 provides the list of D-TAXI downlink (i.e. from aircraft to ATM) messages (DM) elements from the ED-228 ([8]) which are relevant for the in the context of the OFA04.02.01 as confirmed through the whole validation lifecycle.

As for uplink messages, downlink message elements can be concatenated to clarify an answer or a request, such as:

- DM1+DM65R: UNABLE DUE TO
- DM135+DM127: REQUEST TAXI FOR DE-ICING

Msg ID	Message element	Message intent/usage
DM0	WILCO	Indication that the instruction will be complied with.
DM1	UNABLE	Indication that the instruction cannot be complied with.
DM2	STANDBY	Indication that the message will be responded to shortly.
DM3	ROGER	Indication that the message is understood.
DM4	AFFIRM	Indication of a positive response to a message.
DM5	NEGATIVE	Indication of a negative response to a message.
DM62R	ERROR *[error information]*	System-generated notification of an error
DM65R	DUE TO *[due to reason downlink]*	Indication of the reason for the associated message.
DM100	LOGICAL ACKNOWLEDGMENT	System-generated notification that the received message is acceptable for display.
DM108	DE-ICING COMPLETE	Notification that de-icing is complete.
DM125	REQUEST DEPARTURE CLEARANCE *[departure clearance request]*	Request for the specified departure clearance.
DM127	FOR DE-ICING	Indication that the associated request is issued in order to perform de-icing.
DM128	ABLE INTERSECTION *[intersection]* FOR DEPARTURE RUNWAY *[runway]*	Specifies the intersection for the specified departure runway in a taxi request
DM129	READY FOR *[clearance type] [assigned time]*	Indication that the aircraft will be ready for the specified clearance at the time required to meet the specified time.
DM130	CANCELLING STARTUP	Indication the aircraft is cancelling startup
DM131	REQUEST PUSHBACK *[pushback position]*	Request to pushback. The pushback position and direction may be specified.
DM132	REQUEST DE-ICING *[ground location]*	Request for de-icing at the current position or at the specified position
DM134	REQUEST STARTUP	Request to start up
DM135	REQUEST TAXI *[taxi request]*	Request for taxi clearance. May specify to/from taxi position(s) and/or the ATIS code.
DM136	REQUEST EXPECTED	Request for taxi routing information; may specify the taxi

Msg ID	Message element	Message intent/usage
	TAXI ROUTING [*ground location*]	start position.
DM137	WE CAN ACCEPT [*clearance type*] [*assigned time*]	Indication that the specified clearance type can be accepted at the time required to meet the specified time
DM138	WE CANNOT ACCEPT [*clearance type*]	Indication that the specified clearance type cannot accepted

Table 13: Relevant Downlink Messages for the D-TAXI Service

3.2.3.2 Data link for vehicles

The Data Link for Vehicles is a new service and is not mature like the CPDLC D-TAXI service for aircraft. The related operational concept described in this document is based mainly on V2 validation activities and, therefore, it is recommended to be further investigated during SESAR 2020 horizon. It will be necessary to define the data link messages to be used when communicating with vehicles and similar to aircraft, the instructions to be exchanged via voice. In line with the ICAO Doc. 9432 Manual of Radiotelephony Chap 5 ([6]), vehicles should request to PROCEED (if not towing) or request to TOW if they are connected to an aircraft. The following paragraphs detail the potential procedures for the exchange of a PROCEED request.

The Data Link for Vehicles service is intended to cover the following two sub-services:

- **Proceed / Tow** –instructions for Vehicle Drivers to proceed/tow from a point on the airport to another point on the airport surface.
- **Proceed / Tow Revision** – Change to any previously delivered route.

It is worthwhile to highlight that vehicles can move freely on the movement area, but access to some areas (e.g. runway, specific taxi) needs authorisation from the Tower Controller. To have access to the limited areas, all vehicles must respect some specific points referred to the local procedures. For that reason the Data Link messages cited above will be used only in the limited areas.

3.2.3.2.1 Operating Method and Diagrams

This chapter details the tasks to be performed by each actor (Tower Controller and Vehicle Drivers) and the dialogs that take place between them for each of the different procedures mentioned above. These dialogs are illustrated by typical message exchanges going on when these procedures are used.

3.2.3.2.1.1 Data Link PROCEED Operating Method and Diagrams

The Data Link PROCEED is designed to allow the Vehicle drivers to drive on a specified cleared route. This message is used for vehicles to move from one point on the airport to another point (note: at many airports non-towing vehicles operate on taxiways without specific ATC instructions, they simply listen out on the ATC frequency and give way to aircraft).

The Data Link PROCEED can either be requested by the Vehicle Drivers or, in rare cases, Tower Controller initiated.

Figure 27 provides an operating method diagram illustrating the messages used for Data Link PROCEED requests (the red dotted line indicates optional messages).

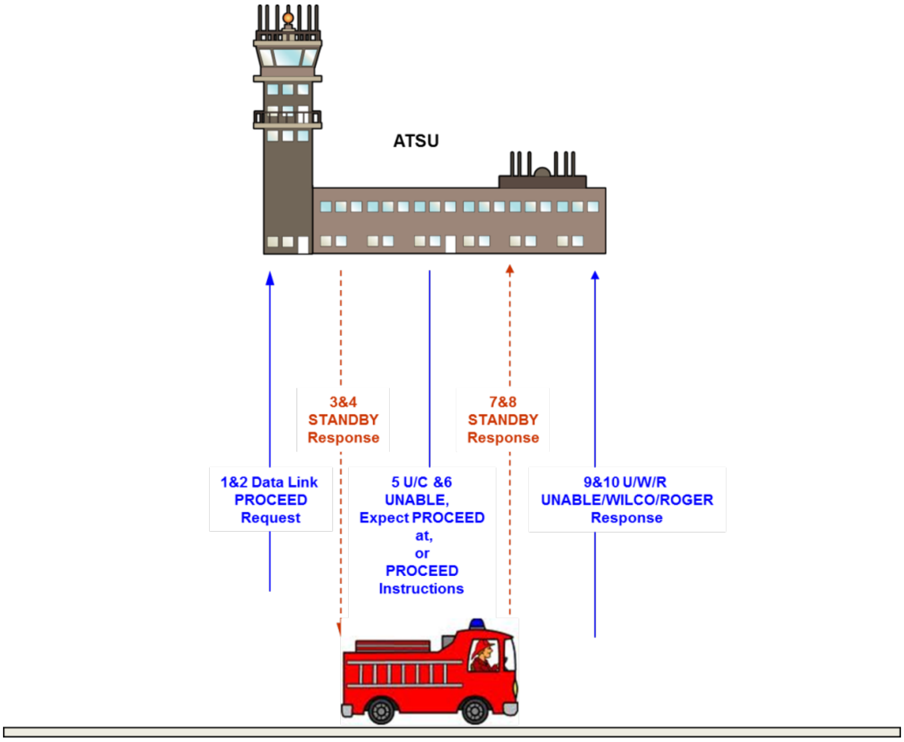


Figure 27 : Data Link PROCEED Request Operating Method Diagram

Figure 28 provides an operating method diagram illustrating the messages used for providing Tower Controller initiated Data Link PROCEED.

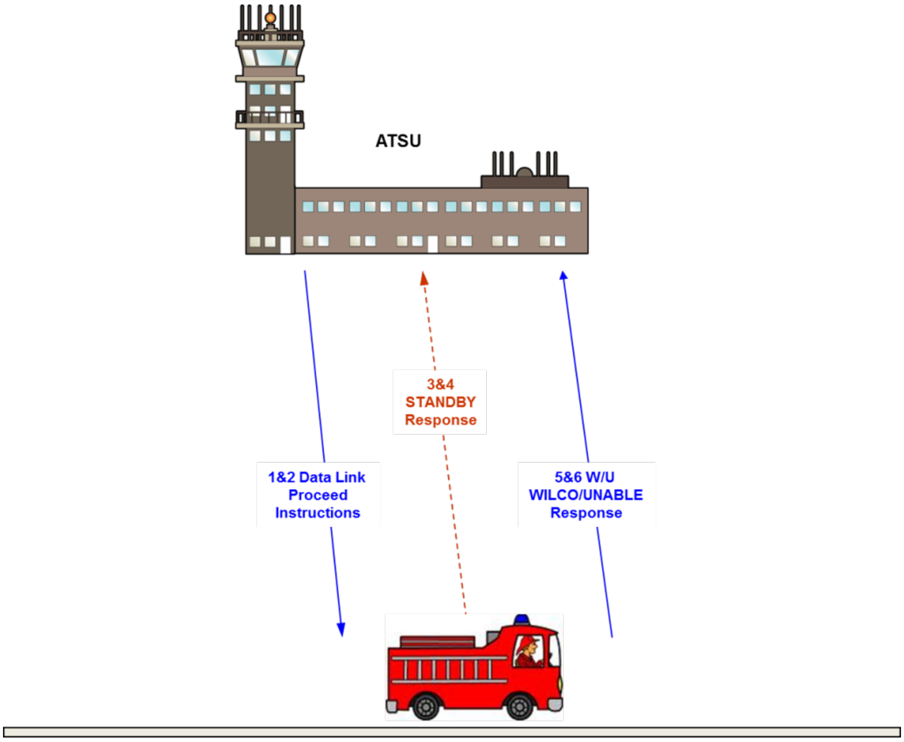


Figure 28: Tower Controller Initiated Data Link PROCEED Operating Method Diagram

3.2.3.2.1.2 Data Link PROCEED Revision Operating Method and Diagrams

The Data Link PROCEED revision is designed to allow a change to a previously sent route. Any instructions for continuation of PROCEED instructions according to agreed or expected routing will use the Data Link PROCEED message (note: the Vehicle Driver will use the request PROCEED message if they have received a revised route and not yet received the subsequent PROCEED instructions).

A Data Link PROCEED revision should always be given from the vehicle position since it replaces the previous taxi instructions

The Data Link PROCEED revision can be requested by the Vehicle Driver but will normally be initiated by the Tower Controller.

Figure 29 provides an operating method diagram illustrating the messages used for Data Link PROCEED revision requests (the red dotted line indicates optional messages).

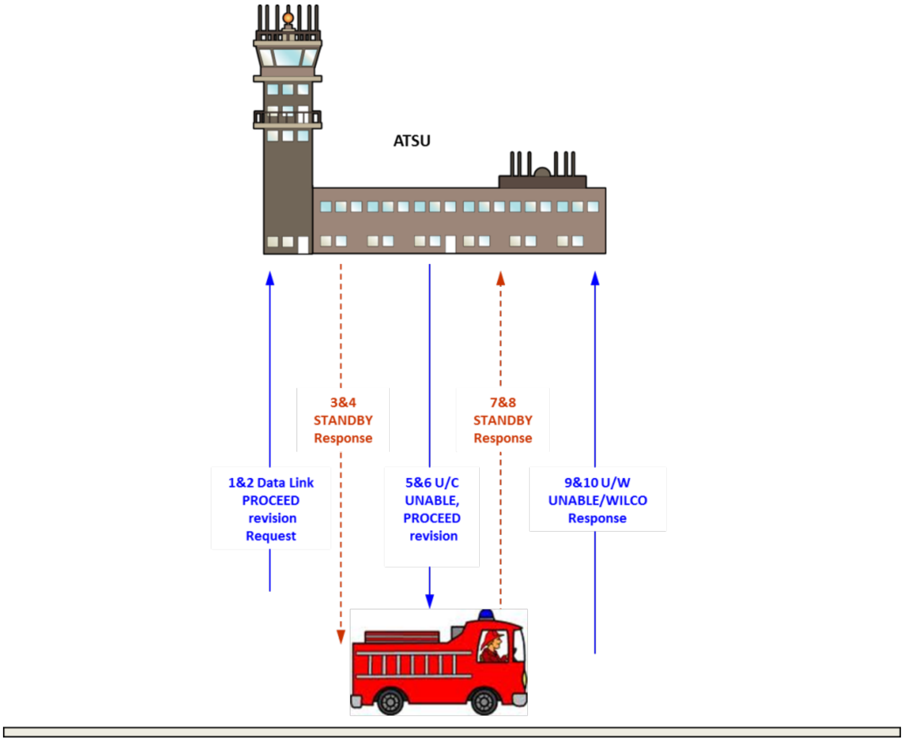


Figure 29: Data Link PROCEED revision Request Operating Method Diagram

Figure 30 provides an operating method diagram illustrating the messages used for providing Data Link PROCEED revision.

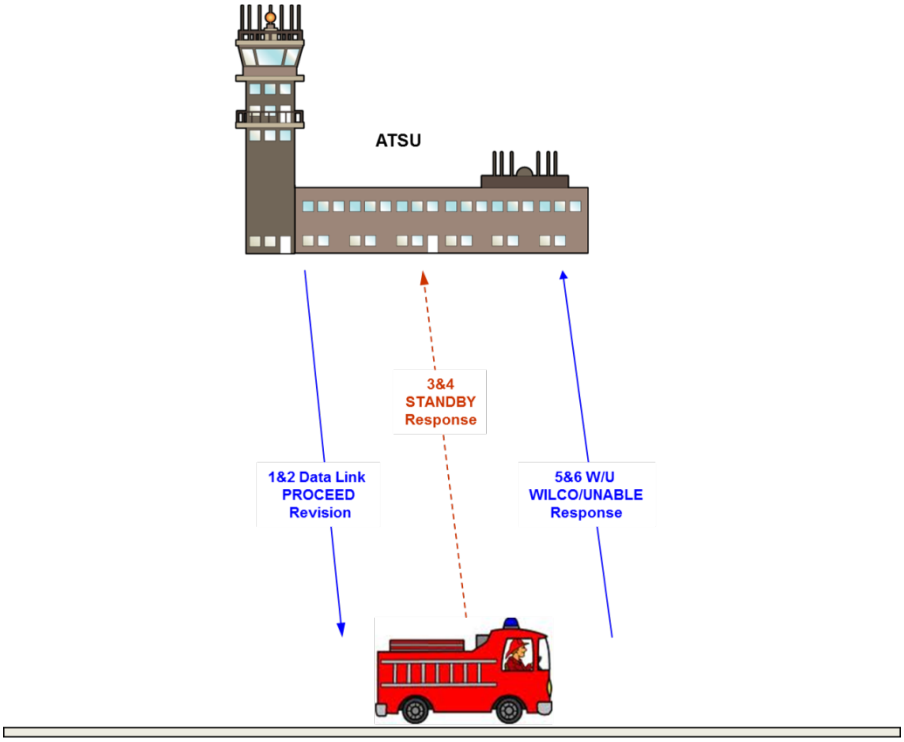


Figure 30: Data Link PROCEED Revision Operating Method Diagram

3.2.3.2.1.3 Data Link TOW Operating Method and Diagram

The Data Link TOW is designed to allow the tow tug drivers to drive on a specified cleared route. This message is used for vehicles to move from one point on the airport to another point. Ground vehicles are less manoeuvrable when towing an aircraft and this needs to be taken into account when issuing instructions to these vehicles. To avoid confusion and help the Tower Controller to identify the correct aircraft to be towed, drivers should state the aircraft type, the aircraft registration as part of the first message.

The Data Link TOW can either be requested by the tow tug drivers, or in rare cases Tower Controller initiated.

Movement instructions (local rules and regulations may lead to a different sequence of events or to the omission of different steps):

- Tow tug drivers on first-message should identify themselves by their vehicle call-sign, state their position and intended destination; moreover tow tug drivers should state the aircraft type and, where appropriate, the company operating the aircraft (REQUEST TOW)
    - The Tower Controller, if too busy to give instructions, will reply “STANDBY”. The tow tug driver shall not tow until permission is given.
    - When there is the possibility of conflicting traffic and the tow tug driver was already cleared to tow, the Tower Controller gives instructions (using R/T) such as “HOLD POSITION”, “STOP TOWING”. In this case the tow tug driver shall not tow until the Tower Controller sends another message with the permission
- When the Tower Controller replies with TOW approval, the tow tug driver can tow. The Tower Controller’s reply should contain clearance limit (which can be or not be the intended destinations), including, where necessary, instructions regarding other traffic (e.g. GIVE WAY TO, FOLLOW…) to ensure safe operations. If it is not the intended destination tow tug drivers must stop at this point end request permission before proceeding further

Figure 31 provides an operating method diagram illustrating the messages used for Data Link TOW requests (the red dotted line indicates optional messages).

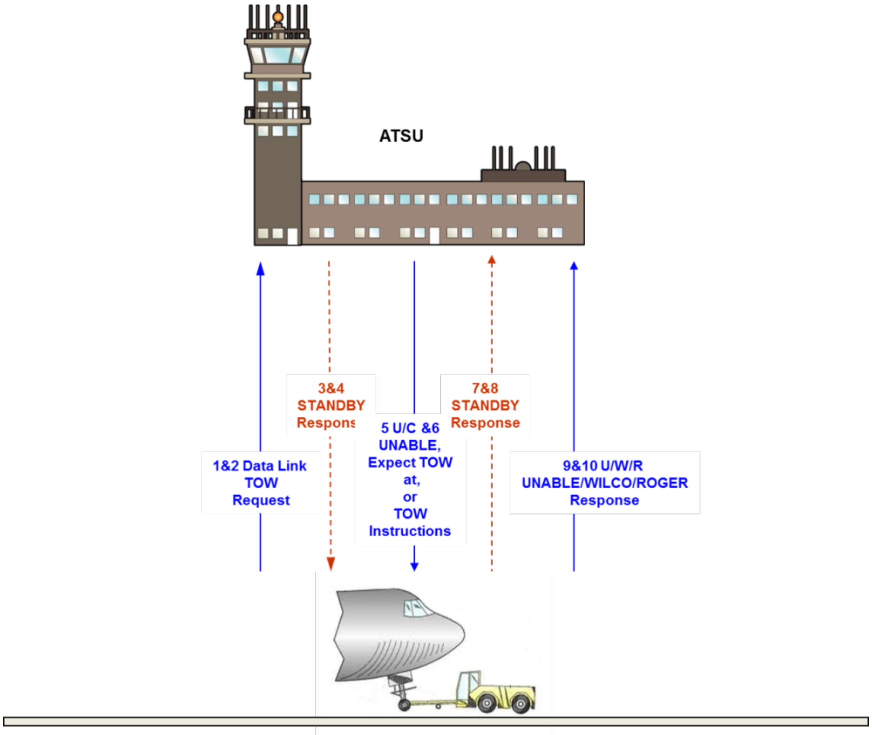


Figure 31: Data Link TOW Request Operating Method Diagram

Figure 32 provides an operating method diagram illustrating the messages used for providing Tower Controller initiated Data Link TOW.

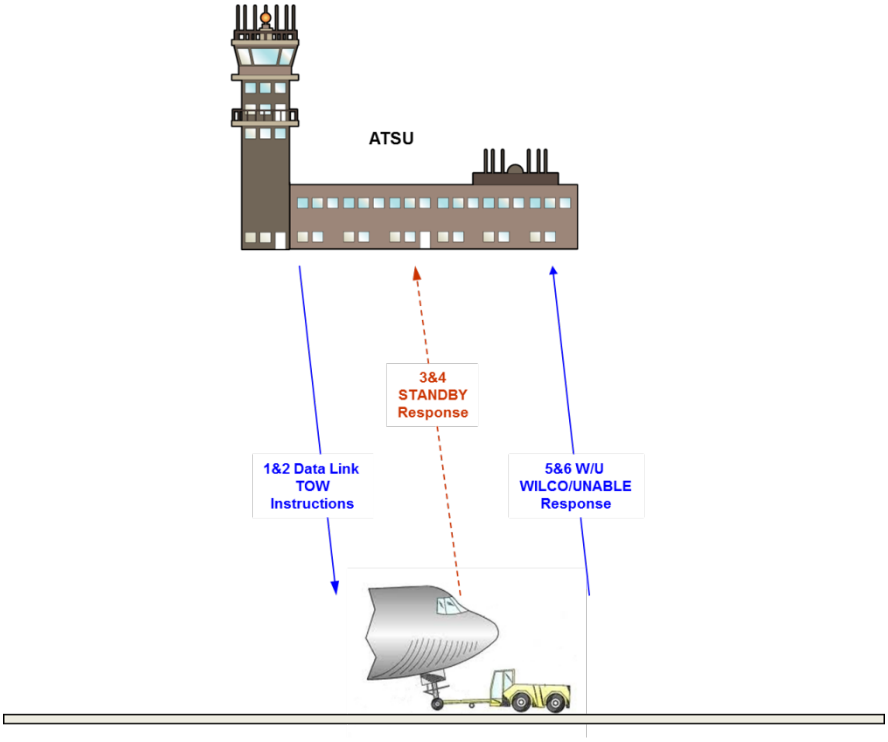


Figure 32: Tower Controller Initiated Data Link TOW Operating Method Diagram

3.2.3.2.1.4 Data Link TOW Revision Operating Method and Diagram

The Data Link TOW revision is designed to allow a change to a previously sent route. Any instructions for continuation of TOW instructions according to agreed or expected routing will use the Data Link TOW message (note: the Vehicle Driver will use the request TOW message if they have received a revised route and not yet received the subsequent TOW instructions).

A Data Link TOW revision should always be given from the vehicle position since it replaces the previous taxi instructions.

The Data Link TOW revision can be requested by the Vehicle Driver but will normally be initiated by the Tower Controller. Figure 33 provides an operating method diagram illustrating the messages used for Data Link TOW revision requests (the red dotted line indicates optional messages).

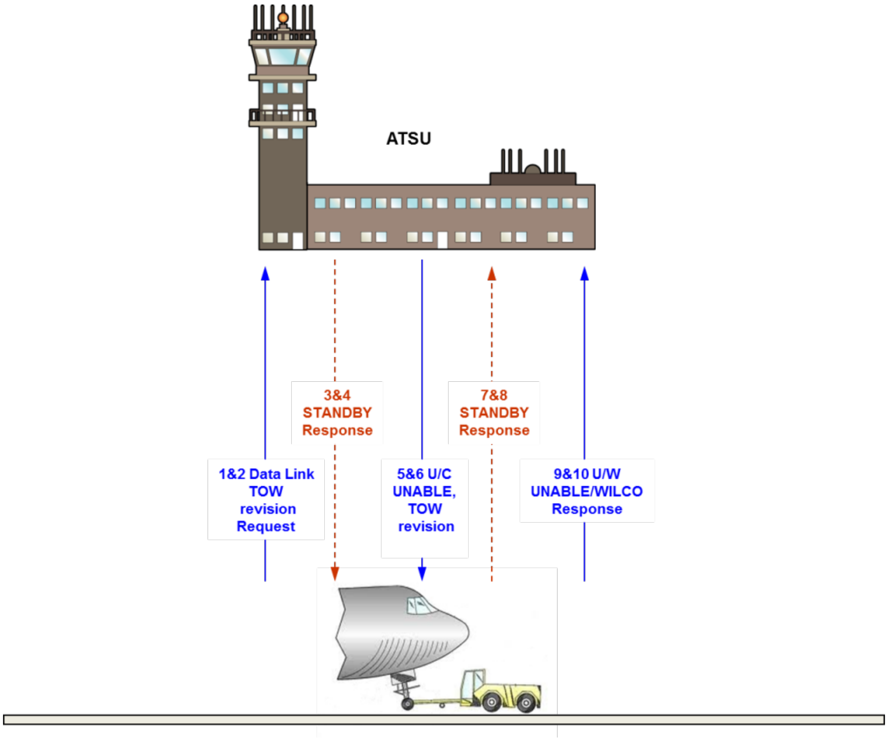


Figure 33: Data Link TOW revision Request Operating Method Diagram

Figure 34 provides an operating method diagram illustrating the messages used for providing Data Link TOW revision.

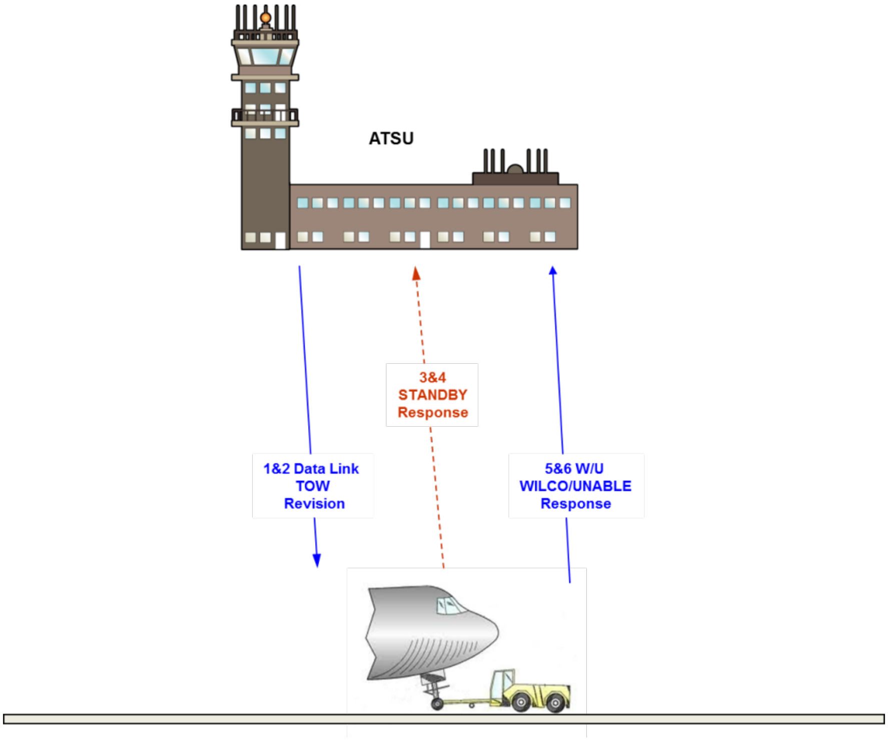


Figure 34: Data Link TOW Revision Operating Method Diagram

3.2.3.3 Impact on performance and transversal areas

The implementation of the provision of planned and cleared route to mobiles via data link service is expected to impact mainly on **Human Performance** and as a consequence on **Safety** by avoiding low speed conflicts between mobiles on taxiways.

From safety perspective, data link communications between Tower Controllers, Flight Crews and Vehicle Drivers enable displaying the messages exchanged as a text on HMIs and storing these messages as data into the ATC system. Therefore, it is expected a reduction of potential misunderstandings occurring via voice.

At the same time, it is important to mention that a specificity of data link communications is the loss of the “party line” effect (aircraft on a common frequency can monitor all transmissions on that frequency with the opportunity to hear instructions to other Flight Crews), which removes an important source of information for Flight Crews about ATC environment. On the other hand, monitoring a frequency on congested airports consumes a lot of mental energy from Flight Crews. However, the party line could also be a source of errors by Flight Crews who act on instructions directed to other aircraft. Validation results have not indicated there was an issue with the loss of the “party-line” effect.

Therefore, the implementation of data link communications offers an additional channel and thus reduces the strain on busy airport frequencies. Information is delivered directly to its addressee and having it displayed on an HMI allows for more time to read and process it than with R/T, reducing the potential number of misunderstandings and errors.

In terms of Human Performance, the use of the D-TAXI service should not adversely affect the operations at an airport especially the workload of the Tower Controllers and Flight Crews. At airports with complex layouts or procedures the use of R/T might be the preferred option for guidance.

In a busy operational environment, having a planned route which is frequently different from the cleared route can be a source of confusion and loss of confidence for the Flight Crew. Therefore, changes to the planned route should be minimised to also avoid Flight Crew confusion and workload.

The following table shows which KPAs and TAs, among those currently identified by WP B and SWP 16.06 as impacted by OFA04.02.01, are impacted by the clearances via data link operational service.

KPA/TA	Environmental Impact	Human Performance	Predictability	Safety
Clearances via data link		✓		✓

Table 14: KPAs and TAs impacted by the clearances via data link operational service

3.2.3.4 Related stakeholder expectations

Stakeholders	Stakeholder Expectations
ANSP	To improve the safety of surface operations by avoiding low speed conflicts between mobiles on taxiways and reducing the risk of misunderstanding between actors, even though the loss of the 'party line' effect will reduce their situation awareness
ANSP (Tower Controllers)	To have their situational awareness improved due to the assistance in communication management To have their workload maintained at an acceptable level, when data link is used in a mixed way with R/T
Airspace User	To lower costs (fuel, airport services in case the aircraft is blocked on an incorrect taxiway) thanks to a reduced risk of aircraft navigation error.
Airspace User (Flight Crew)	To have their workload maintained at the current level or lower, when data link is used in a mixed way with R/T To have their situation awareness enhanced thanks to the textual exchanges (as they are clearly addressed to them and misunderstandings due to voice phraseology, foreign language or accents are reduced)
Airport Operator	N/A
Airport Operator (Apron Manager)	See ANSP (Tower Controllers) above
Airport Operator (Vehicle Driver)	To have their workload maintained at an acceptable level, when data link is used in a mixed way with R/T

Table 15: Stakeholder expectations for the clearances via data link operational service

3.2.4 Airfield Ground Lighting

The automated switching of the **Airfield Ground Lighting (AGL)** can provide individual guidance information to any mobile which has a cleared taxi route (the concept is known as ''Follow the Greens''). Whilst other guidance services are partly or fully depending on on-board installations, guidance via AGL is purely a ground-based service which works in conjunction with the A-SMGCS Routing function and electronically input clearances given by the Tower Controller.

In SESAR Integrated Roadmap Dataset 16 ([10]), this is supported by the following Operational Improvement Steps:

- **AO-0222-A**: Enhanced Guidance Assistance to mobiles based on the automated switching of Taxiway lights and Stop bars according to the "Airfield Ground Lighting" operational service.

By correlating the cleared route with the taxi instructions provided by the Tower Controller, AGL illuminates the taxiway lights and stop bars a specified distance ahead of the mobile in question, switching them on and off automatically, taking into account other traffic and timing constraints, in order to guide the mobile as it progresses along its assigned route. A full-fledged AGL automatically establishes safe spacing between mobiles on the aerodrome surface, including between converging mobiles, and in all weather conditions. However, all services need to be synchronised to give either the Flight Crew or the Vehicle Driver the same route indication from any service. If the AGL Guidance Service is implemented at an airport, it can be available 24/7 and under all operating conditions.

AGL can provide guidance with the TCLs switched either in segments of several lights or every single lamp separately. In case of segmented switching of the AGL, this can be done with 2-6 lights per segment (depending on local installations and sections of a taxiway, cf. ch. 3.2.4.1.1 below).

AGL automatically establishes safe spacing on the aerodrome surface, including between converging mobiles, and in all weather conditions. Therefore, the quality of surveillance data is crucial for the AGL service to operate efficiently, with an increased performance compared to many current systems likely to be required for specific areas (near stop bars, at intersections, on aprons), and Airport Operators and ANSPs will have to constantly monitor and improve the quality.

The provision of visual alerts to Flight Crews or Vehicle Drivers via AGL (e.g. in case of a route deviation) has not been considered in SESAR1 and would need to be addressed in SESAR2020.

The AGL Guidance Service comprises three sub-services called Centralised Service, Communication Service, and Ground Service. The Centralised Service is shared with all other means of guidance relying on centralised data, especially the CDS and VDS. In the following paragraphs the Centralised Service will be mainly described as it takes into account the AGL operational aspects. The other services (Communication and Ground Service) will be only cited because they are referring to the AGL technical part (cf. OFA04.02.1 Final INTEROP – [17]).

3.2.4.1 Sub-Service: Centralised Service

The Centralised Service will automatically control the switchable AGL infrastructure in the field along the assigned route in order to guide each mobile based on

- **the route as defined by the A-SMGCS Routing function; and**
- **the cleared route (taxi instructions) issued by the Tower Controller via the HMI.**

In situations where two or more mobiles are predicted to come into a conflicting situation the Centralised Service is expected to make individual guidance decisions by itself with the Tower Controller in the loop thanks to the CWP HMI. Unless other specific rule apply or are defined, aircraft have priority over vehicles and, among the same group, it will be "first come first served". The decision which mobile has priority may be based on the following influencing factors:

- Target times (A-CDM)
- Sequencing Information (e.g. De-icing)
- Airport layout including taxiway and APTR-lane limitations and fixed obstacles
- Aerodrome rules
- Current position of the mobile

- Speed of the mobile
- Combination and split-up of moving entities

The Tower Controller will monitor all the traffic in his/her Area of Responsibility via the CWP HMI. He/she will be responsible that all mobiles comply with the guidance provided via the AGL. **The Tower Controller will be able to override the guidance decisions via the CWP HMI when it is deemed that there is an operational reason to do so.** Besides the automated guidance decisions by the centralised service, there should still be the possibility of a centralized service with a reduced level of functionalities. Detailed information on these aspects is described in OFA04.02.01 Final INTEROP ([17]).

In cases of non-compliance by the Flight Crew specific procedures will be established such as revert to R/T instructions.

3.2.4.1.1 Guidance with Taxiway Centreline Lights (TCL)

Guidance information via AGL consists of the following elements:

- A single light or a group of lights in a segment of 2-6 lights. All lights in the segment can only be activated or deactivated together.
- Individual Route Indication: Entity of all taxiway centre line lights currently activated in order to visualize a route for one particular mobile.

According to the ICAO Doc 9830 A-SMGCS Manual ([5]), visual aid instructions can be provided using taxiway centre line lights. The following encoding of information is defined there:

- Green lights in front of the mobile represent the instruction to follow.
- The absence of activated green lights; or activated red lights; indicate the instruction to stop the mobile.
- Yellow or flashing lights mean caution.

The individual route is indicated by a locally configurable number of TCL segments or amount of lights in the field (cf. Figure 35). SESAR validations EXE-06.07.03-VP-649 ([32]) and EXE-06.03.01-VP-759 ([41]) showed that the indicated distance as well as the type of lamp switching (segments or single lamp) has barely any influence on the performance of the surface traffic. They also concluded that the length of the route indication may vary with numerous external factors such as visibility conditions, kind of mobile, type of aircraft, topographical influences, airport layout, desired velocity of the mobile, and others. The final decision on the length of the indication for a specific movement shall be taken according to local conditions.

Figure 35: Individual Guidance via TCL Segments

According to the overall situation derived from all these sources, the Centralised Service activates segments or single lights accordingly. The major part of the route indication is always placed in front of the mobile. Sometimes, it cannot be avoided to have a number of activated lights under a mobile.

In case of segmented switching: When the nose of the mobile closes in on the last light of the first activated segment of the route indication, the Centralised Service activates a further segment in front of the route indication and deactivates the last segment already under or even behind the mobile.

In case of single lamp control: The Centralised Service activates further lights as the mobile moves along the taxiway while assuring unambiguous guidance for every mobile. Additionally, it switches off lights underneath or just behind the mobile.

Beyond ICAO Doc 9830 ([5]), the centreline lights will be used as a building block in establishing the concept of 'separation bubbles'. The TCLs are then used to indicate the minimum distance to other traffic by intentionally limiting the individual route indication to a safe size.

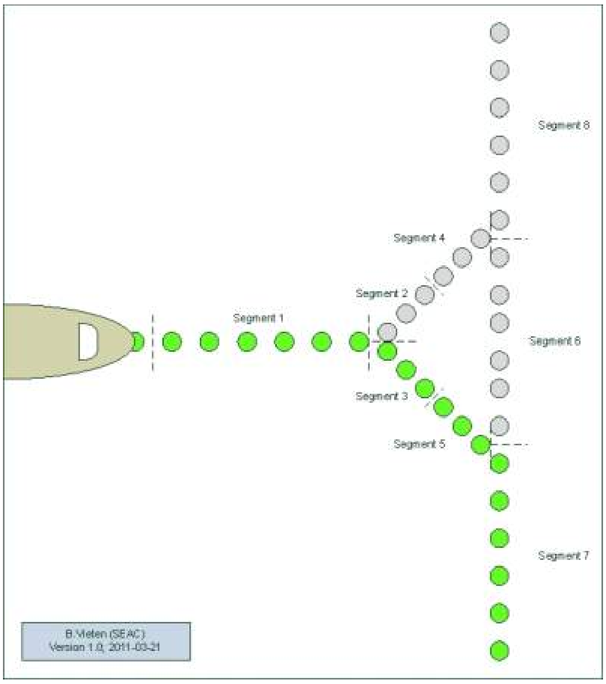


Figure 36: Example for AGL Segments in Phase 1

The example above shows a little more than ¾ of the route indication for an example aircraft. The visible route indication comprises one light in front of the aircraft's nose together with:

- Segment 1 (straight segment comprising six lights)
- Segment 3 (turn segment comprising three lights)
- Segment 5 (turn segment comprising three lights)
- Segment 7 (straight segment comprising six lights)

Some airports could use Alternative Parallel Taxi Routing (APTR) procedures in order to increase taxiway throughput and to decrease the negative impact of push back procedures on the traffic flow (e.g. Paris-Charles de Gaulle, Frankfurt, Munich). In case of APTR in use, the centre taxiway is surrounded by two additional (generally wingspan restricted) taxiways (one on either side). Whilst the centre taxiway has the regular yellow markings and green TCL the outer two lines have different colours (e.g. orange and blue).They may either have no lights, green lights or alternating green lights / other colours (e.g. orange and blue). Follow-the-Greens (FtG) takes APTR into account, the TCLs and the outer two lines will be used for route instructions in the same way as the yellow markings.

3.2.4.1.2 Calculation and Visualisation of Longitudinal Spacing

Longitudinal separation between mobiles is usually the responsibility of the Flight Crew or Vehicle Driver in non-LVP weather situations. Hence, the AGL doesn't necessarily need to provide this spacing in good weather.

The calculation of safe separations for airport surface movements is one possible solution for a specific method of providing guidance to mobiles in low visibility conditions via AGL and 'Follow-the-Greens'.

With visibility reduced due to fog or heavy precipitation, Flight Crews and Vehicle Drivers are no more able to establish safe separations by themselves. Thus, low visibility procedures have to make sure that the minimum distances between mobiles operating on the airport surface are kept at all times. With AGL and FtG, two different ways of establishing safe separations are possible.

First, the classical approach of 'block separation' can be combined with FtG. This procedure requires stop bars or intermediate holding points, preferably at all intersections and in all directions. The centralized A-SMGCS service activates the green lights in front of the aircraft as well as stop bars whenever necessary. By doing so, it guarantees that only one aircraft moves between two stop bars at a time. A calculation of safe separations is not necessary for this procedure. As documented in the Validation Report for exercise EXE-06.07.03-VP-649 ([32]) and EXE-06.03.01-VP-759 ([41]), the combination of FtG with block separation is beneficial compared to today's procedures without FtG, but less beneficial in terms of taxi times, traffic fluency, fuel burn, and emissions, compared to a different and newer approach, the so called 'floating separation'.

Floating separation is a completely different approach to ensuring safe separations on the airport surface. It does not necessarily require stop bars at intersections and it leads to further improvement in all major KPAs on airport surface traffic performance. Floating separation "attaches" a segment of de-activated lights, the so called 'black hole' to all mobiles. While the movement of the mobile 'pushes' the activated green lights in front of the mobile towards the destination point of the cleared route, the black hole is trailed behind the aircraft. If another aircraft comes closer to preceding traffic, the green line in front of this mobile will never extend into the black hole, i.e. the route indication of the second aircraft will become shorter and the Flight Crew or driver will consequently reduce speed as the distance to the current clearance decreases. This floating separation seems less relevant in good weather conditions on straight sections since it's the Flight Crews or Vehicle Drivers responsibility to maintain enough spacing. However, where two paths would cross or converge, it needs to be clearly indicated who has priority (the one with continued indication of TCL).

In principle, the size of the black hole can be based on:

- A single standard value for all mobiles, e.g. 150m
- A table of values for different mobiles and aircraft sizes, e.g. 225m between two B747-800
- The calculation of safe separations between mobiles as explained in ICAO doc 9830 (cf. Figure 37).

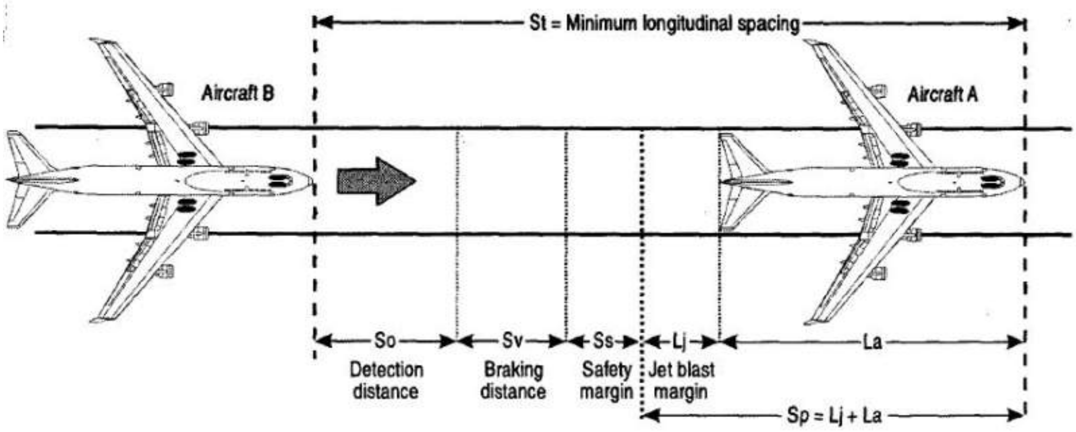


Figure 37: Longitudinal Spacing Parameters (ICAO Doc 9830, p. 3-10)

For EXE-06.07.03-VP-649, a standard value of 150m for all mobiles was used, with very good feedback from the 20 pilots involved. Future studies could be based on floating separation with the size of the black hole behind mobiles calculated according to ICAO doc 9830, i.e. that it is dependent on the speed of the following mobile.

3.2.4.1.3 Stop bars

If available, the Centralised Service will also have the capability to automatically switch red stop bars according to the clearance input by the Tower Controller and the position of the mobile provided by the A-SMGCS Surveillance function. They can either be placed at a runway holding position (as already in use at many airports) or across a taxiway on the manoeuvring area (used only at a few airports). In the latter case, they can support spacing between crossing or converging ground trajectories by clearly indicating where to stop (cf. Figure 38). Additionally, stop bars can be used to maintain block spacing in LVP. The TCL segments may in any case not be activated beyond a lit stop bar (cf. European Aviation Safety Agency's (EASA) Certification Specifications ADR-DSN.M.730). Guidance with stop bars on the manoeuvring area should show positive effects on taxi capacity (especially during LVP) as well as safety.

Figure 38: Activated stop bar with TCLs used for individual guidance in the foreground

3.2.4.1.4 Guidance for pushback or push-pull

OFA04.02.01 considers pushbacks or push-pulls as a part of the route. In the future, the push-back or push and pull instruction could be provided to the Flight Crew and the tug driver via the AGL and possibly via the Visual Docking Guidance System (VDGS) display system.

3.2.4.1.5 Synchronization with other means of guidance

If individual routing via AGL is not the sole means of providing guidance to mobiles at a specific airport, the Centralised Service needs a sub-service capable of analysing the running times of guidance instructions (incl. switching times and illumination delays) to all receivers. The sub-service then needs to delay all information sent according to slowest guidance means. Via the OFA04.02.01 Final INTEROP ([17]), the compatibility of the selected data link solutions to this approach needs to be secured.

Previous projects (WFF and iPORT) analysed that the maximum delay until a switching command from the Centralised Service is translated into illuminated lights (generally the slower process compared to switching lights off) takes a maximum of 1.5 seconds in a very complex environment. Adding another 1.5 s (to be verified) for surveillance data fusion and delivery to the Centralised Function and also the calculation of a switching command, leads to a maximum total delay of three seconds, which seems operationally acceptable.

Further details, especially in terms of interoperability, can be found in the OFA04.02.01 Final INTEROP ([17]).

3.2.4.2 Sub-Service: Ground Service

The Ground Service consists primarily of the switchable light infrastructure on the airport surface. For this operational document, the detailed description of the Ground Service in technical terms is out of scope. Further details on the technical issues, especially in terms of interoperability, can be found in the OFA04.02.01 Final INTEROP ([17]).

3.2.4.3 Sub-Service: Communication Service

The sub-service Communication Service links the Centralised Service to the Ground Service. It provides a data link between the system components merging information and generating instructions and the lights in the field. With only a few operational aspects and respective requirements, the technical definition is subject the OFA04.02.01 Final INTEROP ([17]) and therefore out of scope for this deliverable.

3.2.4.4 AGL Information on HMIs

For the Tower Controller to stay in the loop of guidance information being provided to Flight Crews and Vehicle Drivers, some information regarding the current status of the AGL for each movement in his/her Area of Responsibility (AoR) needs to be available on the HMI of the CWP. As the HMI has limited space, and too much information on one screen may distract the Tower Controller from the information that is currently important, the AGL information presented there shall be minimized to what is operationally relevant.

Should more information than available on the HMI of the CWP be requested, a dedicated AGL information screen could be used to provide more detailed information on the AGL such as:

- TCL status (on/off, failure, maintenance, taxiway closed);
- Stop bar light status (on/off, failure, maintenance);
- Routing Information Display Status (indication, failure, maintenance).

The Centralised Service needs to be able to compile a data set containing this information and present it on such a screen. Nevertheless, critical malfunctions of the AGL elements (e.g. the failure of a critical number of lights or segments on a taxiway) need to be indicated as well on the CWP to enable the Tower Controller to take appropriate actions.

The HMI will also need to provide the Tower Controller with:

- an alert in cases where the mobile does not respect its route or clearance limit (the description of these alerts is covered in 06.07.01),
- a means for the Tower Controller to prioritise one mobile over the other at crossing or converging taxiways including the respective indication once it’s entered; and
- a means to enter a clearance limit that could be linked to a stop bar or a IHP.

3.2.4.5 AGL phraseology

The implementation of the AGL as a guidance means will require the standardisation of several related issues, especially the phraseology. Currently, no standardised wording exists for the guidance via AGL and at those few airports that already use AGL to provide individual guidance to mobiles different phraseology is used. The phraseology adopted during the SESAR validations and proposed to be used in nominal cases is “*Callsign Follow the Greens to Holding Point xx Runway YY (or Stand ZZ)*”. Appropriate standardisation bodies should also address non-nominal cases in addition to colour issues (e.g. where APTR are in use, cf. 3.2.4.1.1).

3.2.4.6 Impact on performance and transversal areas

As the Flight Crew or the Vehicle Driver can rely on the visual cues in front of the mobile, the workload associated to the navigation of the aircraft or driving the vehicle is reduced, especially so at night or in low visibility conditions, and no additional head-down time is induced. In addition, fewer instructions are required to provide guidance to mobiles as this task is largely handled by the AGL function and the time spent on communication is reduced for all actors, freeing mental resources for other tasks. Therefore, the AGL operational service affects the **Human Performance** of all the actors involved.

Because Flight Crews and Vehicle Drivers will be provided a direct and visual indication of their path to destination, there is thus no need for them to interpret the route that has been provided by the Tower Controller. Language issues and lack of familiarity with the aerodrome will become lesser issues as the complexity of clearances is greatly reduced and as there is no need to interpret those, using maps as references. Misunderstandings and route deviations are thus expected to be reduced, resulting in increased **Safety** during surface operations.

Lastly, Flight Crews and Vehicle Drivers will taxi/drive with more confidence along their routes, with fewer hesitations at intersections. This will lead to a reduction of speed changes and to more smoothness of the traffic flow, resulting in less fuel burn and corresponding emissions during the taxi phase. The AGL operational service will thus positively affect the **Environment**. Having mobiles operating at more constant speeds will also improve the **Predictability** of surface movements.

The following table shows which KPAs and TAs, among those currently identified by WP B and WP 16.06 as impacted by OFA04.02.01, are impacted by the AGL operational service.

KPA/TA	Environmental Impact	Human Performance	Predictability	Safety
Guidance via AGL	✓	✓	✓	✓

Table 16: KPAs and TAs impacted by the AGL operational service

3.2.4.7 Related stakeholder expectations

Stakeholders	Stakeholder Expectations
ANSP	To improve the safety of surface operations, especially during low visibility conditions, through a reduction of runway incursions, taxi route deviations and holding position overruns To improve the predictability of surface movements through a reduced variability of taxi times
ANSP (Tower Controllers)	To increase their situational awareness, especially in low visibility conditions To reduce their workload through a reduced need for guidance instructions and the use of the simpler FOLLOW THE GREENS clearance
Airspace User	To improve the predictability of surface movements through a reduced variability of taxi times To reduce fuel consumption thanks to less taxi speed changes and smoother traffic flows
Airspace User (Flight Crew)	To increase their situational awareness, especially in low visibility conditions To reduce their workload through a reduced need for guidance instructions and the use of the simpler FOLLOW THE GREENS clearance

Stakeholders	Stakeholder Expectations
Airport Operator	To improve the predictability of surface movements through a reduced variability of taxi times and hence improving the predictability of operations as a whole To reduce environmental impact of noise and emissions during surface operations thanks to less taxi speed changes and smoother traffic flows
Airport Operator (Apron Manager)	See ANSP (Tower Controllers) above
Airport Operator (Vehicle Driver) [15]	To increase their situational awareness, especially in low visibility conditions To reduce their workload through a reduced need for guidance instructions and the use of the simpler FOLLOW THE GREENS clearance

Table 17: Stakeholder expectations for the AGL operational service

[15] This can also concern tow tug drivers which are often employed by a handling agent.

3.2.5 Virtual Block Control

The **Virtual Block Control (VBC)** service aims to enhance the current block control operating methods when low visibility procedures are in place. The idea is to support Tower Controllers and Flight Crews by introducing the so called virtual stop bars which can be linked to both an already existing intermediate holding position (VSB_{IHP}) or to a point not linked to any physical object / marking on the airport surface ($VSB_{N\ HP}$). In both cases, Tower Controllers will be notified through ad hoc alarm in case of infringement. On the airborne side, Flight Crew will mainly benefit by the display of the $VSB_{N\ HP}$ on the on-board AMM.

Currently VBC is not part of any ICAO-based set of rules related to LVP procedures. However, when brought further into the ICAO working group on standardisation of activities it would impact ICAO Doc 4444 ([25]).

Main limitations of the current block control operating method are the following:

- Blocks size, as today defined using intermediate holding positions along taxiways, is fixed with a clear impact on the airport capacity and costs;
- Tower Controllers have less flexibility in applying the appropriate spacing;
- Flight Crews can only rely on their visual observations of surface markings / lights while there is no on-board equipment supporting them during ground surface operations.

The new SESAR operating method envisages the introduction of the so called Virtual Stop Bars (VSBs) to support Tower Controllers in implementing enhanced block control procedures in low visibility conditions (referring mainly to VIS 3). In SESAR Integrated Roadmap Dataset 16 ([10]), this is supported by the following Operational Improvement step:

- **AO-0223**: Enhanced safety in LVP through use of virtual block control.

However, the implementation of a full Dynamic Virtual Block Control envisages two steps:

1. **Implementation of Virtual Block Control by means of Virtual Stop Bars** at pre-defined positions. This basic capability of the Virtual Block Control has been investigated during SESAR 1 timeframe and has achieved V3 maturity level.
   - Tower Controllers input the clearance limit, corresponding to a VSB indication, directly on his/her HMI.
   - The concept deals with the so called VSB_{HP} referring to a Virtual Stop Bar positioned, on the surveillance HMI, in correspondence of an Intermediate Holding Position (IHP) already existing on the airport surface but not equipped with a stop bar (so without an alarm in case of infringement).
   - In terms of operational procedures, no changes are expected as the Tower Controller will apply the same block control procedures as today.
   - The main benefit is on safety level which is expected to increase thanks to the notification to the Tower Controllers of VSBs infringement. At the same time, it is important to highlight the great gain in flexibility and costs of ground infrastructures.
   - From on-board perspective, in case the aircraft is not equipped with an AMM, no significant improvement is expected as the Flight Crew will still rely on visual observations of surface markings/lights. On the other hand, in case an AMM is available, the Flight Crew will benefit from the display of VSB position and status (as well as of the surrounding traffic) resulting in an increase of the Flight Crew's situation awareness and safety level as well as of the traffic flow smoothness. What is required is the uplink of VSB status and of the related identifier.
   - No direct impact on capacity is envisaged.
2. **Implementation of Dynamic Virtual Block Control by means of Virtual Stop Bars** also NOT linked to any existing intermediate holding positions. This advanced capability of the Dynamic Virtual Block Control has not achieved V3 maturity level during SESAR 1 timeframe and, therefore, will be further investigated during SESAR 2020 horizon.
   - The operational concept deals with the so called VSB_{NIHP} referring to the Virtual Stop Bars NOT related to any physical object / marking on the airport surface. Therefore, they can be used and assigned only to aircraft equipped with AMM.

- $VSB_{N HP}$ can be dynamically edited by the Tower Controllers during the taxiing execution and the associated positions could be shared with the airborne part by coordinates (latitude and longitude). Otherwise, ANSPs can allocate them optimally on the movement area (depending on local needs). It could be useful to publish this type of VSBs on AIPs and/or airport chart. Publication of $VSB_{N HP}$ on AIPs and / or airport charts is intended to support Flight Crews during navigation by giving them the opportunity to cross check Tower Controllers clearances.
- The introduction of VSB_{NIHP} allows Tower Controllers to dynamically change block sizes, through the HMI, with a direct impact on airport capacity. The concept associated with enhanced block control also includes alerting functionalities to indicate violations of Stop Bars and/or Virtual Stop Bars. Those alerts shall be provided to both Flight Crew and Tower Controllers with a direct benefit on the safety level.
- A more dynamic management of movements allows for operations with less stop-and-go traffic and is particularly useful in situations where block operations are building up. However, to avoid any degradation in safety, this kind of flexibility could require the implementation a specific functionality performing a sort of “taxiway conflict monitoring / alerting” (e.g. “bubble separation” or “spacing tool”. In such a way, the same block could be occupied also by two aircraft at the same time. Any “spacing reduction” will be notified to the Tower Controllers. Generally speaking, as the occupancy of the same block by two aircraft is what is strongly required is the availability of accurate surveillance data.
- From on-board perspective, the display of VSB position and status will ensure an increase of the Flight Crew’s situation awareness as well à that will have an impact on safety as well as on the smoothness of traffic flow.
- In addition to the benefit expected for the safety level, the more flexible and dynamic management of traffic flow is envisaged to have a positive impact on capacity (i.e. mainly in terms of capacity resilience during low visibility conditions).

VSBs shall be displayed on the Flight Crew and Tower Controller HMI with a different colour depending on their status. Anyway, as each virtual stop bar could be associated to two or more aircraft, it is recommended to display its status only once the aircraft is hooked in order to avoid any ambiguity for the Tower Controllers:

- Lit status (e.g. RED colour);
- When a specific VSB is assigned to an aircraft as a clearance limit it will lit red on the Flight Crew / Tower Controller HMI, once the aircraft is cleared to a next position, the Tower Controller will switch the VSB off (unlit status);
- Unlit status (e.g. GREEN colour). After aircraft has crossed a VSB, the VSB may, automatically or not, lit again depending on local procedures, traffic situation;

The whole process is shown in Figure 39.

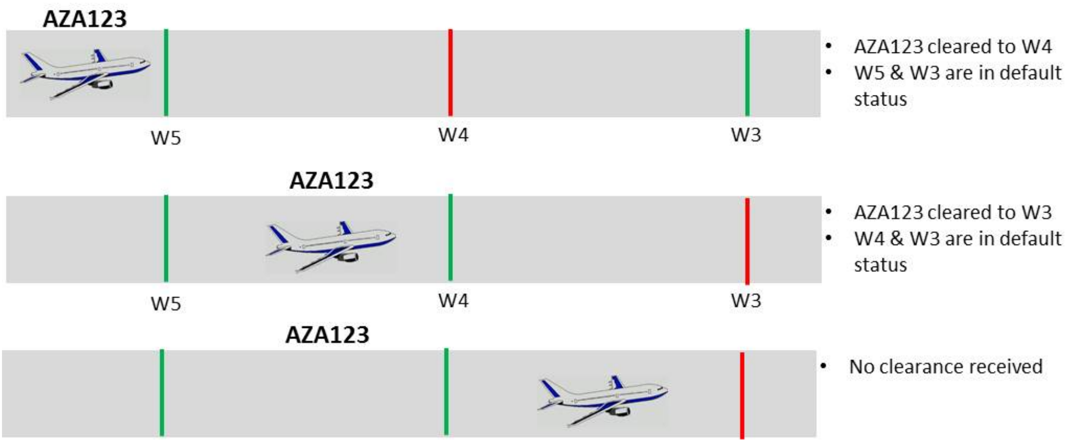


Figure 39: VSB status

In addition, a Watch Dog alerting functionality could be introduced with the scope of monitoring the compliance of aircraft to the instruction to hold position (e.g. after a stop bar violation). The Watch Dog is an ATC tool that places a rather small circular area around a particular aircraft on the movement area and as soon as the aircraft leaves the circular area the Tower Controller will be alerted (visually and/or aurally).

This tool is expected to help Tower Controllers in monitoring the traffic in congested situations and receiving an immediate alarm in case of non-compliance with the received instruction.

3.2.5.1 Impact on performance and transversal areas

Generally speaking, the operational service associated to the implementation of Virtual Block Control by means of Virtual Stop Bars supports the Tower Controllers in managing traffic in low visibility conditions by providing them with a display on the CWP of the different stop bars (both physical and virtual), their status and an alerting function in case of stop bar violation by a mobile. Therefore, the situation awareness of the Tower Ground Controller is improved thanks to the visual display that supports the block control task and his workload is reduced as the monitoring of the mobiles positions compared to the control blocks is also made easier with the display. The Virtual Block Control operational service is thus affecting the **Human Performance** of Tower Ground Controllers.

Furthermore, the notification of virtual stop bar infringement will allow Tower Controllers to timely understand what is happening, recognize hazardous situations and make any recovery decision. This will result in a reduced risk of taxiway collision and runway incursion and, consequently, in the **Safety** of surface operations.

The following implementation of full Dynamic Virtual Block Control is expected to have a positive effect on airport capacity when low visibility procedures are applied because it will allow the Tower Ground Controller to work with additional blocks than the physical infrastructure of the aerodrome allows. In detail, the more flexible and dynamic management of traffic flow is expected to increase the ability to withstand and recover from planned and unplanned events and conditions (including low visibility conditions) causing a loss of nominal capacity. This is linked to the definition of the **Resilience** performance area proposed by SESAR B.04.01 project ([28]).

Table 18 shows which KPAs and TAs, among those currently identified by WP B and SWP 16.06 as impacted by OFA04.02.01, are impacted by the VBC operational service.

KPA/TA	Environmental Impact	Human Performance	Predictability	Safety
VBC by means of VSB		✓		✓

Table 18: KPAs and TAs impacted by the VBC operational service

3.2.5.2 Related stakeholder expectations

Stakeholders	Stakeholder Expectations
ANSP	To improve the safety of surface operations during low visibility conditions by means of alerting function notifying virtual stop bars infringements.
ANSP (Tower Controllers)	To increase their situational awareness in low visibility conditions
Airspace User	To improve the safety of surface operations during low visibility conditions
Airspace User (Flight Crew)	To increase their situational awareness in low visibility conditions by means of an AMM display VSB statuses and related identifier

Stakeholders	Stakeholder Expectations
Airport Operator	Maintain the airport capacity under low visibility conditions with limited additional infrastructure costs
Airport Operator (Apron Manager)	See ANSP (Tower Controllers) above
Airport Operator (Vehicle Driver)	N/A

Table 19: Stakeholder expectations for the VBC operational service

3.2.6 Adaptability of new SESAR Operating Method

The new SESAR Operating Method described in the above sections is a complete operational concept for the integrated management of surface movements relying on advanced functions of A-SMGCS, data link communication between ATC systems and mobiles, and guidance through the airfield ground lighting. This SESAR Operating Method relies on three new operational services (and on an existing one: the provision of clearances by voice) to enable tailoring the operational concept to the specific needs and constraints of a given airport.

The key new feature introduced by the Integrated Surface Management operational concept is the A-SMGCS Routing function thanks to which taxi routes and the associated estimated taxi times become known to the ATC system. D-TAXI and AGL can then use this new information to provide additional guidance means to the mobiles operating on the aerodrome.

Nonetheless, it is foreseen that a given operational service can be implemented partially or without the other services. Indeed, for medium airports or those large airports with a simple taxiway layout, an A-SMGCS Routing function operating only in manual mode can be a cost effective solution to enter taxi routes into the ATC system and accrue the corresponding benefits or enable the implementation of services (airport safety nets, coupling with DMAN …). Similarly, a subset of D-TAXI instructions can be implemented for those sectors on the airport where frequency occupation is an issue so as to reduce congestion. In the case of start-up and push-back clearances, an A-SMGCS Routing function would not be required.

Lastly, it is likely that the complete SESAR operational concept for surface management will be implemented gradually, as it requires the deployment of several technologies (A-SMGCS, AGL, CPDLC) which will happen with different schedules. Consequently, transition periods and partial implementations have to be considered, including e.g. the provision of routing information by data link with subsequent clearances provided by voice.

3.2.7 Relationship to SESAR Solutions

The SESAR JU has recently introduced the concept of SESAR Solutions, which correspond to operational and technological improvements that are validated through the Release process. SESAR Solutions loosely correspond to OI steps although in some instances a Solution can be a group of OI steps or only a part of an OI step. SESAR Solutions are split over six areas, including Airport Integration and Throughput, to which OFA04.02.01 contributes.

The SESAR Solutions defined and validated by OFA04.02.01 are:

- Automated assistance to controller for surface movement planning and routing (#22);
- D-TAXI service for CPDLC application (#23);
- Improved vehicle guidance[1];
- Manual taxi routing (#26);
- Guidance assistance through airfield ground lighting (#47); and
- Virtual block control in LVPs (#48).

Table 20 provides the traceability between the operational services described in this document and the SESAR Solutions from OFA04.02.01, as well as the corresponding OI steps.

Operational Service	SESAR Solution involved	SESAR Solution id	Corresponding OI step(s)
Route generation integrating planning information	Automated assistance to controller for surface movement planning and routing	#22	AO-0205
Provision of Cleared Route to Mobiles by Voice (R/T)	Manual taxi routing function	#26	AUO-0603-A
Provision of Planned and Cleared Route to Mobiles by Data Link	D-TAXI service for CPDLC application	#23	AUO-0308-A
	Improved vehicle guidance[16]	N/A	AO-0206
			AO-0215
Airfield Ground Lighting	Guidance assistance through airfield ground lighting	#47	AO-0222-A
Virtual Block Control	Virtual block control in LVPs	#48	AO-0223

Table 20: Traceability between OFA04.02.01 operational services and SESAR Solutions

[16] Improved vehicle guidance was identified as SESAR Solution #24 at one stage, but was eventually removed from the portfolio of SESAR Solutions when it was concluded it would not reach a sufficient maturity level to envisage its industrialisation at the end of the SESAR 1 programme.

3.3 Differences between new and previous Operating Methods

3.3.1 Route generation integrated with planning information system

In the new method, planned taxi routes will be integrated in the system enabling a more accurate calculation of the taxi time which can be used to give precise estimates of in-block or take-off times.

The generation of a route is an enabler for other projects dealing with the:

- delivery of the cleared route to the Flight Crew by data link (06.07.03 and 09.13);
- use by the Surface Safety Nets function for conformance monitoring whilst taxiing, which will lead to a reduction of route deviations (06.07.01);
- automated operation of Airfield Ground Lighting systems (06.07.03); and
- provision of more accurate and updated taxi times to DMAN (06.08.04).

3.3.2 Provision of cleared route to mobiles by voice (R/T)

The previous operating method takes into account a single way of communication represented by voice while in the future there will be two communication means that are R/T or data link services. This will mainly impact on the Flight Crews through Start-up, Push-back, Taxi-in, Taxi-Out and Taxi revision messages but it will also affect the Vehicle Drivers through Proceed and Tow instructions while aircraft will have priority before vehicles.

Furthermore, the cleared route will be known within the A-SMGCS allowing for the detection of non-conformance to ATC instructions and procedures, and an increased predictability of taxi times which will link to the A-CDM process for sequencing departures and providing more accurate arrival estimates. The cleared route will also be a key enabler for the automated switching of the AGL.

Through the manual taxi routing function, the Flight Crew can benefit from having a graphical depiction of the taxi clearance they have received, thus improving their situational awareness and providing them with an overall guidance regarding their intended route.

3.3.3 Provision of planned and cleared route to mobiles by data link

3.3.3.1 Provision of planned route to mobiles by data link

In today's operations, the Flight Crew normally do not receive an expected taxi route by R/T, the cleared taxi route is transmitted after start up or landing. Similarly, Vehicle Drivers do not receive an expected taxi route before initiating their movement.

The display of the expected route as text, and the possible use of a graphical tool based on a moving map, as an assistance to localise and to guide the mobile to taxi on the taxiways and aprons, participates in:

- Supporting the reduction in misunderstandings by providing the Flight Crew or driver with a textual, and possibly graphical, translation of the information;
- Balancing the crew or driver workload by providing them the aircraft location and the planned/cleared taxi route thus increasing their comfort;
- Improving the global situational awareness and safety.

On airports with low complexity and low flexibility needs, where the planned route almost always matches the cleared route, sending the planned route to the cockpit will provide more significant benefits as the planned route is more likely to correspond to the cleared route.

3.3.3.2 Provision of cleared route to mobiles by data link

Data link exchanges are reducing voice communications between Flight Crew or Vehicle Driver and Tower Controllers as well as reducing the risk of the Flight Crew or Vehicle Driver misunderstanding a route as R/T quality can often be poor, making it difficult to hear precise instructions, additionally the level of the English language for the Tower Controller, Flight Crew or Vehicle Driver can be a factor that leads to wrong route information. **Whilst it is foreseen that initial taxi route information is given by data link, it is also a requirement to keep the option for using R/T in time critical or emergency situations (especially the taxi revision which often happens following a route deviation), in cases where data link is not serviceable and for giving clearances that concern entering a runway protection area (e.g. line up, take off, cross and enter).**

On airports with dense traffic and/or a complex taxiway layout, the taxi clearances and revisions to taxi clearances are considered as time-critical messages and should thus be sent by R/T rather than by D-TAXI. Indeed, D-TAXI has been shown to slow exchanges between Tower Controllers and Flight Crews, and thus to prevent the Flight Crew's responsiveness expect by Tower Controllers at larger and busier airports

3.3.4 Airfield Ground Lighting

In the previous operating method, guidance instructions were mainly created mentally by the Tower Controllers which had only minor support from display systems providing a labelled situation on the aerodrome surface map based on Surveillance data fusion, or from Electronic Flight Strip systems. The overall image of the current and planned traffic situation including the individual routes of the mobiles was a mental construction in the head of Tower Controller, Flight Crew and Vehicle Driver with the potential for stress, misunderstandings and unexpected behaviour or reactions on the aerodrome surface. There was no system or service available with full awareness of the positions, clearances and previous instructions for all mobiles, knowing as well details of the aerodrome layout and possible constraints, and turning this knowledge into proposals or directly into guidance instructions automatically taking care of safety issues such as longitudinal spacing.

Not only the generation of guidance instructions was a mentally challenging task, but also the provision of the instructions to the staff operating on the aerodrome surface such as Flight Crews and Vehicle Drivers: guidance instructions are provided by Tower Controllers via R/T with no individual dynamic visualization in the field or in the cockpit as a surrogate or replacement. With radio frequencies congested at many airports, the language capabilities of some Flight Crews still questionable, and the number of aircraft on the same frequency rapidly growing, there is a need to define solutions to gradually move away from R/T as the standard method for providing guidance information. In addition, Flight Crews mostly still require paper maps in the cockpit in order to establish a mental image of the cleared route to the destination point.

Using individually switched AGL is one way to automate guidance instructions to mobiles which reduces R/T communication and thereby the stress level of Tower Controllers and the danger of misunderstandings and misinterpretations. With the new operating method, dubbed the "Ground Service" of the AGL Service, segments of TCL are switched automatically and individually for each mobile along its cleared route. The availability of the intuitive out-of-the-window individual guidance via AGL has a number of positive effects on the Flight Crews, such as:

- Increased awareness of the cleared route and guidance instructions;
- Reduced possibility of misunderstanding;
- Increased free mental capacity for more important issues, (e.g. the safety of the movement).

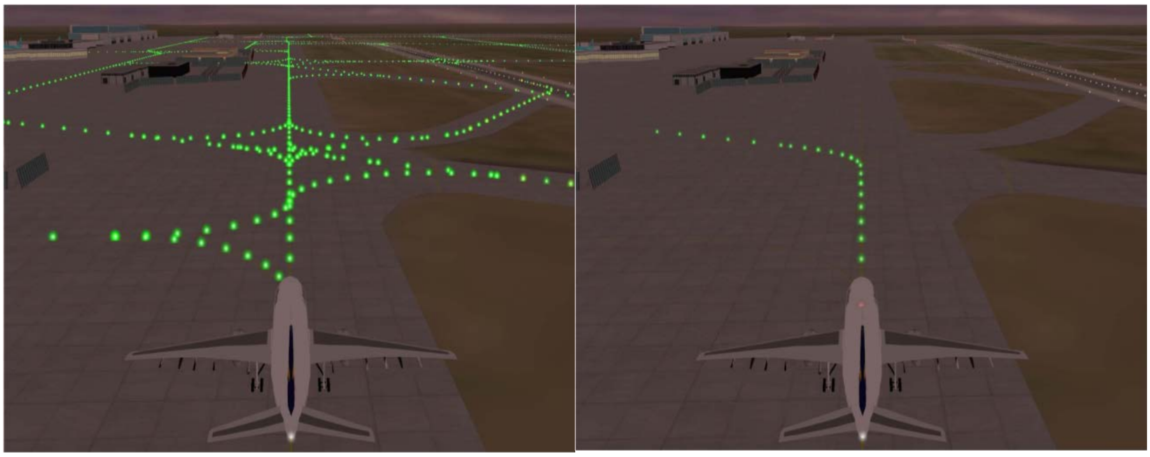


Figure 40: Static and Dynamic AGL

The provision of individual guidance instructions via AGL will be accompanied by the capability of the Centralised Service, a sub-service of the AGL Service, to instruct mobiles automatically, fully taking care of safety issues such as longitudinal spacing. The Centralised Service will be provided with all relevant information in order to be able to manage switching commands, such as awareness of the positions, clearances and previous instructions for all mobiles, as well as details on the aerodrome layout and possible constraints (among others).

It is expected that the new SESAR Operating Method will help in managing the expected increase in traffic by guaranteeing the required guidance quality.

3.3.5 Virtual Block Control

This section summarizes the main differences between the operating method associated to the current block control and the one related to the implementation of Virtual Block Control by means of Virtual Stop Bars.

Regarding Tower Controller procedures, no significant changes are expected, as the current block control procedures are similar to the procedures applied for the VBC by means of VSBs. However, the alerting function related to the implementation of the Virtual Block Control will notify the Tower Controllers in case of VSB infringement with a positive impact on situational awareness and, therefore, on safety without increasing infrastructure costs.

From Flight Crew perspectives, the differences between new and previous operating methods are strictly dependent on the availability of the on-board Airport Moving Map:

- Aircraft not equipped with an AMM – no significant difference respect to the current procedures, as the visual observations of surface markings / lights will still be considered as primary navigation support.
- Aircraft equipped with an AMM – the Flight Crew will benefit from the display of VSB position and status (as well as of the surrounding traffic) resulting in an increase of the Flight Crew's situation awareness and safety level as well as of the traffic flow smoothness. The availability of a data link application for communicating VSB statuses and related identifier is required.

Additional significant differences will occur with the introduction of $VSB_{N\ HP}$ and of a Dynamic Virtual Block Control which is, however, planned to be further investigated during SESAR 2020 horizon.

4 Detailed Operational Environment

To enable routing and guidance, it is necessary to have A-SMGCS Surveillance and RMCA operational at the airport. This means that the Tower Controller has a safety function for all runways available which triggers an information alert or an alarm in case of a runway incursion or a potential conflict.

The A-SMGCS Routing function will benefit from EBS if it is deployed in the aircraft fleet, as the runway exits will be more predictable.

The following three different modes of routing automation will be applied:

1. Manual Mode: free route planning, without any assisting functionalities from the system;
2. Semi-Automatic Mode: free route planning, with assisting functionalities from the system to complete the route taking into account constraints such as restricted and construction areas; and
3. Automatic Mode: route proposal by the system taking into account information about aircraft type, taxiway rules, restricted and construction areas. Confirmation or modification by the Tower Controller will be possible. This will be the default mode, reverting to one of the others only when necessary.

The airport's ANSP is also expected to provide the technical means supporting at least one guidance system, individually controlled lamps on aprons and taxiways for AGL and/or a VHF link for data link communications covering the aerodrome. The airport should also be connected to the approach centre, and possibly to the regional ACC above it, in order to allow providing planned routes to arriving aircraft via CPDLC.

4.1 Operational Characteristics

4.1.1 Route generation integrated with planning information

Operational characteristics with regard to the three routing and planning modes are detailed below.

Manual Mode: In this mode the Tower Controller takes into account the whole traffic situation at the airport and decides on a route without the help of the system. After the Tower Controller has decided for an appropriate route it is assigned by the Tower Controller using the system. The system supports the Tower Controller to input the route, taking into account this quite static stock information:

- Starting point for mobiles on the ground;
- Airport layout (taxiway infrastructure); and
- Position of intersections, holding bars and stop bars.

Semi-automatic Mode: In this mode the system works predominantly automatically but the Tower Controller takes major decisions. The Tower Controller will initially need the information defined above in the manual mode, and then the system will assist the Tower Controller to complete the route taking into account the same information as defined below for the automatic mode.

Route definition will be based on the following:

- manual input in segments, starting point & end point from the Airport Operational Data Base (AODB) or the FDPS;
- multiple nodes at one time (A to Z via F, K and Y);
- straight lines between nodes filled by the System;
- automatic check against limitations, constraints, etc.;
- no optimisation of routes or resolution of conflicts; and
- no routing/planning for vehicles (as they are handled manually).

Automatic Mode: In this mode the route proposal is provided by the system. Therefore the information as for manual mode and semi-manual mode needs to be considered as well as the following very dynamic information:

- weather (i.e. Low Visibility Procedures (LVP) in use or not, depending on local procedures; it must be discussed if LVP can be adjusted if an A-SMGCS with additional control, routing and guidance functionalities as defined in 06.07.xx is in operational use);
- runway in use;
- continuously up-to-date information about the position and identity of each mobile on the movement area and aircraft approaching to land;
- prioritisation rules for individual aircraft (State aircraft, emergency flight) and time restrictions (TSATs from A-CDM);
- areas of responsibility (AoRs) and intermediate/holding points[17] corresponding to the clearance limits where jurisdiction is to be handed over from one Tower Controller to another;
- stands requiring push-back and those which do not, as well as possible push-back or push-pull points for each stand (which may depend on aircraft type);
- engine run-up time and procedure;
- de-icing type (on position or remote) and allocated de-icing area in case of remote de-icing;
- taxi procedures (remote holding);
- constraints (e.g. taxiways/segments unsuitable for certain types of aircraft, one-way usage); and
- downlinked runway exits for EBS-equipped aircraft

A predicted taxi time is calculated based on taxi distance and speed taking into account variety in taxi speeds (different speeds can be assigned to individual portions of taxiway for calculation purposes). It cannot be neglected that there is a different taxi speed for each moving vehicle (which can even be zero). That results in variability where a mobile is at a given time compared to its position on the surface. Also, when de-icing conditions prevail, the predicted taxi time considers the expected de-icing time (in the case de-icing is required) provided by the De-icing Manager.

The A-SMGCS Routing function is a key component of airport systems that enables reaching a high level of predictability of operations on the airport surface. More generally, it is also a key component of SESAR ATM operations as a whole, because routes and taxi times calculated by the A-SMGCS Routing function contribute to establishing the Business Trajectories by providing their ground segments.

In addition, the A-SMGCS Routing function is an enabler for other services, including conformance monitoring alerts in case of route deviation (06.07.01), guidance of mobiles on their assigned routes, display of routes on board aircraft for improved Flight Crew situational awareness (09.13), and calculation of accurate departure sequences on the runway through coupling with DMAN (06.08.04).

For these reasons, it is foreseen that SESAR operations will rely significantly on the A-SMGCS Routing function, inducing continuity constraints on the systems implementing this service, which may imply redundancy and an architecture based on sub-services (route generator, interfaces with other systems) working independently of each other. Such a service-oriented architecture would enable ensuring the overall A-SMGCS Routing function in degraded mode in case of failure one sub-service.

Notes:

Negotiation between routing system/ground Tower Controller and Flight Crew/airline needs to be checked/refined.

Routing can roughly be planned ahead, but needs to be updated very shortly before actual usage and eventually during taxi manoeuvre (e.g. in case of route deviation, cf. 06.07.01).

[17] A handover point between two Areas of Responsibility can be in the form of an Intermediate Holding Point or it can be a more loosely defined area.

4.1.2 Provision of cleared route to mobiles by voice (R/T)

A flight due to depart from an airport, or an aircraft that has just landed, must obtain instructions from ATC in order to proceed from/to its stand to/from the runway or between any two points on the airport surface.

R/T communications will be used for establishing first contact with the Flight Crew or Vehicle Driver and in other cases such as: mobiles not data linked equipped, data link failure, runway clearances, time-critical communication or emergency situations. R/T should also be preferred to D-TAXI for the provision of taxi-in, taxi-out and revised taxi clearances at airports where slower exchanges between Tower Controllers and Flight Crews would create an operational issue.

4.1.3 Provision of planned and cleared route to mobiles by data link

The guidance service supported by data link provides electronic communications between the Flight Crew, Vehicle Driver and Air Traffic Service Operations during ground operations, and before the aircraft is approaching the airport.

The list of the basic taxi operations doesn't include any operation occurring close / on runways as they have been confirmed to be handled via voice.

The taxi route received by D-TAXI is automatically displayed as text on the cockpit's Data Link Cockpit Display Unit (DCDU) and as a graphical path on the AMM. Through the manual taxi routing function, the Flight Crew can still input a taxi route received by R/T into the aircraft system and have it graphically displayed on the AMM, typically at larger airports where such clearances are recommended to be provided by R/T.

Regarding vehicles operations, it is important to highlight that the provision of instructions / clearances via data link (PROCEED/TOW instructions and revised PROCEED/TOW are the ones investigated so far) is not standardized yet as for aircraft. Therefore, the implementation of data link for vehicles requires further investigations which are recommended to be carried out during SESAR 2020 horizon.

4.1.4 Airfield Ground Lighting

In the future, individual guidance via AGL is expected to be used on a 24/7 basis in all weather conditions. Since the AGL technology is still quite expensive and the change management process accompanying the technical investments is complicated, it can be assumed that individual guidance via AGL will be implemented predominantly on larger airports.

In any case, the implementation of individual guidance via AGL will have an impact on the roles and responsibilities involved in providing guidance as well as on the roles receiving the instructions.

In principle, wherever individual guidance via AGL will be implemented, the standard operational procedures for taxi-in and taxi-out will be based on controlled lighting systems. Therefore, the whole integrated guidance network needs to be constructed with sufficient technical and procedural redundancy that guarantees high availability and reliability.

In order to avoid operational limitations due to the use of AGL, the selection process of the end devices, e.g. the TCLs, shall always take the climatologic environment and typical lighting conditions of the specific aerodrome into account. It can be assumed that accumulating AGL guidance service degradations will not be acceptable in terms of business case calculation and future resource planning.

In principle, individual guidance via AGL reduces Tower Controller workload, but increases the dependence of the airport process on the availability of a complex operational and technical system.

4.1.5 Virtual Block Control

Virtual Block Control by means of VSBs is expected to be performed during Visibility Condition 3.

Regarding the airport surface, no great changes are envisaged as:

- the VBS_{IHP} are linked to intermediate holding positions which are already reported (through surface markings and visual aids) on the airport surface;
- the $VSB_{N\ HP}$ are NOT linked to any intermediate holding positions already existing on the airport surface. With regard to them, no extra ground infrastructures / equipment is needed.

The introduction of the $VSB_{N\ HP}$ has an impact on the airborne side, as they could only be used as clearance limits when the aircraft is data link equipped with an application for communication of VSB statuses and positions and with an AMM available on board. However, the availability of an on-board Airport Moving Map is considered useful also when only VBS_{IHP} are used as it will allow an increase of Flight Crew's situational awareness.

4.2 Roles and Responsibilities

4.2.1 Route generation integrated with planning information

The main human actors (as defined by B.04.02 in its Actors and Responsibilities document – [21]) involved in the route generation process are the various Tower Controllers working on an airport (Tower Clearance Delivery Controller, Apron Manager, Tower Ground Controller and Tower Runway Controller) and the operators of mobiles on this airport (Flight Crew and Vehicle Drivers). However, the exact share of tasks between these human actors and the A-SMGCS Routing function depends on the amount of automation implemented in this function.

The process of automatically generating a route relies on a significant amount of input data being available (cf. 4.1.1). As an automatic (or semi-automatic) A-SMGCS Routing function is expected to be operated in an electronic environment, this section assumes this information is provided to the A-SMGCS by external systems such as airport FDPS, de-icing manager or AOP. The role of human actors, Tower Controllers in this case, is consequently limited.

However, in the case of a route being created manually, the process is mostly conducted by Tower Controllers, using the airport layout and the mobile positions displayed on their CWP (cf. 4.1.1).

4.2.1.1 Tower Controller (Tower Clearance Delivery, Tower Ground and Tower Runway Controllers, Apron Manager)

Route planning and modification of the planned route by a Tower Controller is possible regardless of the areas of responsibility. Nevertheless, when the modification of the planned route is made outside of his area of responsibility, some coordination may be required with the affected Tower Controllers.

Route clearance and modification of the cleared route is only possible in the area of responsibility of the concerned Tower Controller. It implies that handover points (which can be a more loosely defined area than a point) and adequate coordination procedures are necessary to manage the cleared route when it goes through several areas of responsibility.

A defined route (manually or a confirmation of a route proposal generated by a more sophisticated route generator) different from defined standard taxi routes or handover points may lead to increased workload and inefficient traffic flow. Nevertheless, it could be necessary for one Tower Controller to contact his counterpart for work process optimisation.

The Tower Controller also assigns routes for vehicles or towed aircraft if necessary (depending on local procedures). Upon receiving a request from a vehicle or a tug towing an aircraft, the Tower Controller responsible for the area in which the vehicle manually or semi-automatically creates a route for this vehicle if the request can be granted.

4.2.1.2 Flight Crew

A Flight Crew operating an arriving aircraft equipped with EBS will have activated this on-board function before the top of descent. This enables the aircraft to downlink a predicted runway exit to the A-SMGCS Routing function, which uses this information as the starting point for the automatically generated planned route.

4.2.1.3 Vehicle Driver

Depending on the local procedures, Vehicle Drivers have to request a route in certain situations, such as to obtain a clearance before crossing a runway. Similarly, drivers of tugs towing an aircraft need to request a clearance from ATC before initiating their movement. These requests prompt the Tower Controller to create a route for this movement.

4.2.1.4 Other actors

Most data required by the A-SMGCS Routing function to generate planned routes are provided automatically by external systems, but are entered into the overall ATC and managed by human actors who therefore have a remote role in routing. These notably include:

- The airport layout used for building taxi paths on AMMs, and potentially by the route generator and the Tower Controller CWP, rely on AMDBs which are constructed by AMDB providers using data published in the respective AIP;
- The taxiway preferred directions and the standard taxi routes, which are the basic rules, used by the route generator are defined by the Airport Air Traffic Services;
- The runway and taxiway configuration in use for the time the planned route is generated, as well as any runway or taxiway closures, are decided by the Airport Tower Supervisor;
- The aircraft type, which can restrict the taxiways usable for the aircraft, is provided by the Aircraft Operator in the flight plan;
- The allocated stand corresponding to the end point of the route for arriving aircraft and to the starting point of the route for departing aircraft is defined by the airport Stand Planner;
- When de-icing is required, the time needed to de-ice the aircraft and the bay allocated to the aircraft (in case of remote de-icing) are provided by the De-icing Agent;
- The timing information related to a flight is provided by the A-CDM platform, which is under the responsibility of the CDM Project Manager.

4.2.2 Provision of cleared route to mobiles by voice (R/T)

4.2.2.1 Tower Controller (Apron Manager, Tower Ground Controller and Runway Controller)

When a mobile is ready to start its movement on the aerodrome surface, the Tower Controller checks on his CWP whether the planned route defined for this mobile corresponds to the movement he intends for this mobile.

In case a change to this planned route is required, the Tower Controller inputs a new route using the A-SMGCS Routing function on his CWP.

Once the correct route is entered into the A-SMGCS, the Tower Controller provides the corresponding clearance to the Flight Crew or Vehicle Driver via R/T, and updates the electronic flight strip of this mobile to indicate it has received a taxi clearance. It is the Tower Controller's responsibility to maintain the status of the flight strips consistent with the clearances given via R/T, as inconsistencies may lead to undesired alerts triggered by the Surface Safety Nets Conformance Monitoring function.

4.2.2.2 Flight Crew

After having read back the taxi instruction received from ATC, if needed, the Flight Crew can verify the route and crosscheck it against airport maps (either on paper or in electronic format) they have on board. If the aircraft is equipped with a manual taxi route function, the Flight Crew inputs the taxi clearance into the aircraft system.

In case they cannot comply with the route provided by the Tower Controller (e.g. for technical reasons), they inform the Tower Controller via R/T and request a new taxi route.

After having received a clearance they can comply with, the Flight Crew steers their aircraft along the route provided by the Tower Controller.

4.2.2.3 Vehicle Driver

After having read back the proceed or tow instruction received from ATC, if needed the Vehicle Driver can verify the route and crosscheck it against airport maps (either on paper or in electronic format) he has on board.

In case he cannot comply with the route provided by the Tower Controller (e.g. for technical reasons), he informs the Tower Controller via R/T and requests a new taxi route.

After having received a clearance he can comply with, the Vehicle Driver steers his vehicle along the route provided by the Tower Controller.

4.2.3 Provision of planned and cleared route to mobiles by data link

4.2.3.1 Tower Controller (Apron Manager, Tower Clearance Delivery / Ground Controller)

From ATC side, the provision of planned and cleared route to mobiles by data link requires that the Tower Controller shall issue all the implemented messages by making an input on the CWP. About the taxi instruction, when a mobile is ready to start its movement on the aerodrome surface, the Tower Controller checks on his CWP whether the planned route defined for this mobile corresponds to the movement he intends for this mobile. Once the correct route is entered into the A-SMGCS, the Tower Controller inputs a taxi clearance on the electronic flight strip associated to the concerned mobile. This automatically generates a data link message that is uplinked to the mobile.

For all the issued instructions / clearances, the Tower Controller shall, then, monitor the status of that communication to check the reply provided from Flight Crew.

It is important to highlight that the implementation of data link service is not expected to impact on the responsibilities of the Tower Runway Controller who will manage the traffic via voice based on the current procedures. All the time critical instructions including the ones concerning surface movements close to runways shall be handled via R/T.

4.2.3.2 Flight Crew

The Flight Crew is responsible for verifying the route and crosschecking it against airport maps (either on paper or in electronic format) they have on board.

For a planned route, no answer is required as the emitter is the ATC system and not a Tower Controller.

For a cleared route, the Flight Crew responsibility is to follow the clearance they have received. A WILCO answer is required (usually right after receiving the clearance). If needed, the Flight Crew can verify the route and crosscheck it against airport maps (either on paper or in electronic format) they have on board.

If there is an issue with the taxi clearance they have received, the Flight Crew resolve it with the Tower Controller in a second time. In case they cannot comply with the route provided by the Tower Controller (e.g. for technical reasons), they inform the Tower Controller by composing an UNABLE message, possibly specifying the reason, and sending it to the Tower Controller, or by reverting to R/T.

4.2.3.3 Vehicle Driver

The Vehicle Driver responsibility is to follow the clearance he has received. A WILCO answer is required (usually right after receiving the clearance). If needed, the Vehicle Driver can verify the route and crosscheck it against airport maps (either on paper or in electronic format) he has on board.

In case he cannot comply with the route provided by the Tower Controller (e.g. for technical reasons), he informs the Tower Controller by composing an UNABLE message and sending it to the Tower Controller, or by reverting to R/T.

After having received a clearance he can comply with, the Vehicle Driver steers his vehicle along the route provided by the Tower Controller.

4.2.4 Airfield Ground Lighting

4.2.4.1 Tower Controller (Tower Ground Controller, Tower Runway Controller)

The Tower Ground and Tower Runway Controllers are responsible for monitoring that all movements on the manoeuvring area comply with the clearances issued.

In case an aircraft deviates from the route indicated by the AGL, the Tower Controller has to inform the Flight Crew immediately by R/T communication as an additional safety net accompanying the reaction of the guidance network. Related information may also be provided to the other mobiles involved, if applicable.

Depending on the selected decision-making mode available in the Centralised Service (cf. ch. 3.2.4.1), the Tower Controller will have to enter, accept, or monitor guidance instructions with the ultimate possibility to intervene whenever needed. This includes the prioritisation of one mobile over another at crossing or converging taxiways.

In case of AGL service degradation, the Tower Controller is responsible for taking appropriate action.

4.2.4.2 Flight Crew

Flight crews are responsible to follow the cleared taxi route indicated by the AGL and the guidance function shall provide reliable and intuitive information to the Flight Crew to support their navigation accordingly.

Previous research projects have identified switchable TCLs to be a very effective way to provide guidance on the airport surface. Whenever AGL is used in combination with other guidance means (e.g. CDS), Flight Crews identified coherence and synchronisation of the information major requirements.

4.2.4.3 Vehicle drivers

For the description of the role and responsibilities of Vehicle Drivers, a differentiation between different vehicle classes is inevitable:

- **TOW TUG DRIVERS:**

  Tow tug drivers will be guided via AGL when they are actively towing an aircraft or when they are moving together with an aircraft on the airport surface. In short, they are guided via AGL whenever they are moving on a taxiway centre line.

  The tow tug driver is responsible to follow the guidance information provided via AGL. They are also responsible for indicating any inability to act according to received AGL instructions.

- **FOLLOW-ME CAR DRIVERS:**

  Follow-me car drivers will be guided via AGL when guiding an aircraft or a vehicle on the taxiway centre line.

  The driver is responsible to follow the guidance information provided via AGL. Drivers are also responsible for indicating any inability to act according to received AGL instructions.

- **AIRPORT OPERATIONS SERVICE VEHICLES**

  Service vehicles will only be guided via AGL in LVP and when intentionally and unavoidably (for their specific task) operating on the taxiway centre line.

  The driver is responsible to follow the guidance information provided via AGL. Drivers are also responsible for indicating any inability to act according to received AGL instruction.

- **FIRE SERVICE VEHICLES**

  In LVP and in complex traffic situations, individual guidance via AGL may help the fire service to identify the shortest way to the incident area. The use of AGL for this purpose is subject to local procedures.

4.2.5 Virtual Block Control

4.2.5.1 Tower Controller (Tower Ground Controller)

During visibility condition 3, a virtual procedural block control is implemented under the main responsibility of the Tower Ground Controller who issues a taxi clearance including a clearance limit corresponding to a specific VSB. In detail:

- VSB_{HP} – Tower Ground Controller can change the status of the VSB directly on the HMI. The corresponding clearance limit is communicated to the Flight Crew via voice;
- VSB_{NIHP} – Tower Ground Controller enters the clearance limit into the ground HMI. Position and current status of the VSB (in accordance with the Tower Controller clearance) is automatically sent to the on-board AMM. The clearance limit may also be communicated to the Flight Crew via voice.

The Tower Ground Controller is responsible for providing the appropriate spacing by clearing aircraft to the appropriate clearance limits, so that each block is occupied by only one aircraft. The Tower Controller needs to particularly monitor those aircraft that are still taxiing in one control block at the same time, but are still moving to eventually be separated by the correct clearance limits in separate control blocks.

4.2.5.2 Flight Crew

Flight crews are responsible to adhere to the assigned taxi clearances. In particular, referring to aircraft equipped with an AMM, Flight Crews shall check the coherence of the received instructions and the VSBs status on AMM.

4.3 Constraints

4.3.1 Route generation integrated with planning information

For all three automation modes links to an AODB and to available surveillance data (including airport map information e.g. constraints, restricted, construction area) are necessary. The quantity of information used for the three modes is different and depends on the level of automation and how to assist the Tower Controller in an appropriate way. The A-SMCSG Routing function needs the input information from the systems or services identified in section 3.2.1.1, meaning that the necessary infrastructure is put in place.

Routes generated automatically and entered into the ATC system by the Tower Controller (either created manually or edited in semi-automatic mode) need to be stored in a central repository to be accessed by all interested functions (A-SMGCS Guidance function, airport safety nets, DMAN,). As the routes and their status are associated to clearances and states of the flights (or ground movements), this repository is an upgraded Airport FDPS, which provides the A-SMGCS Routing function will all required information on the flights to generate routes. The Airport FDPS also stores routes allocated to mobiles and manages their status based on the clearances issued by the Tower Controllers.

The overall system must be capable to analyse all processes/modules, e.g. interface to the surveillance data or AODB to warn the Tower Controller/technical support if a technical failure leads to a loss of functions. In such a case it might be necessary to downgrade the system/initiate fall back procedures.

A surveillance data integrity monitoring has to check the quality of the A-SMGCS surveillance functionality, e.g. coverage, accuracy and compare it to defined quality boundaries, so the Tower Controller may be warned of system corruption which might be more critical than a module breakdown when the trust of the Tower Controller to the system is high.

Due to the need of routing updates according to the actual traffic situation at the airport (for automatic routing), an interface to the multi-sensor data fusion is needed.

4.3.2 Provision of cleared route to mobiles by voice (R/T)

The provision of cleared route to mobiles by R/T is identical to today operations in electronic environment and no new constraint results from its use in SESAR surface management concept.

4.3.3 Provision of planned and cleared route to mobiles by data link

The constraints mentioned in this section refer to the elements composing both Ground and On-board domains.

The D-TAXI ground domain includes the D-TAXI ATSU system, the Tower Clearance and Ground Controllers (and Apron at some airports) and associated HMIs, a processing function for D-TAXI messages, and a connection with the ground communication network.

The D-TAXI Aircraft domain includes Flight Crew, HMI and aircraft system, consisting of a connection with the air-ground communications network, various aircraft subsystems and a processing function for the messages exchanges, requests, and responses.

The same considerations can be done also for the implementation of data link service for vehicles. In detail, that data link for vehicles domain includes Vehicle Driver, HMI and vehicle system, consisting of a connection with the ground communications network, various vehicle subsystems, and a processing function for the message exchanges, requests, and responses.

In order for D-TAXI to provide benefits to Tower Controllers, a significant part of the fleet needs to be equipped. Similarly, a significant number of airports needs to be equipped for D-TAXI to provide benefits to Flight Crews. Partial equipage will result in an environment with mixed communication means, which could be a source of operational issues.

In case the aircraft is equipped with an AMM able to display the taxi route received by D-TAXI, interoperability of ground and aircraft systems is required to prevent the risk of incorrect translation of the Tower Controller's clearance onto the aircraft's AMM. Even though the taxi path displayed on the AMM is only intended to improve the Flight Crew's situational awareness and is not legally the taxi clearance provided by the Tower Controller, any discrepancy between the taxi path on the AMM and the taxi clearance would be a source of confusion, if not a safety issue. This can be mitigated by the use of AMDBs by both ground and cockpit systems, which will ensure that the information they exchanged is structured in the same manner, even though it would not guarantee it is identical. Another option, which has not been investigated in SESAR 1, would be to uplink map information from a ground system, using a high-performance physical data link, such as 4G mobile telecommunication.

4.3.4 Airfield Ground Lighting

No general technical constraints potentially rendering the AGL unavailable or inoperable are currently known. Some problems known in the past are now solved, e.g. the issue of snow coverage of TCLs.

Operational constraints may arise from the absence of official phraseology and standardization.

Depending on the lamp technology used at a specific airport (LEDs or halogen lights), an incompatibility of the TCLs with Enhanced Vision Systems (EVS) equipping aircraft may occur: LEDs emit cold light, while the EVS technology needs high temperature lights for the vision sensors. This constraint can be solved with the additional installation of an infrared emitter.

4.3.5 Virtual Block Control

The main technical constraint that is impacting the full implementation and efficiency gain of the virtual block control is the availability of an on-board moving map displaying both VSB_{HP} and VSB_{NIHP} .

The future possibility to have the majority of the aircraft suitably equipped together with the use of A-SMGCS surveillance to replace Tower Controller visual observation will provide the maximum benefit.

5 Use Cases

5.1 Operational Scenario 1: "Arrival"

Note: the description of the scenario has been taken from the Step 1 Airport DOD - 2014 Update ([11]) made by Project 06.02. Additions or modifications (if any) will be made using italic font.

This Arrival scenario describes the processes and interactions that a flight encounters from the preparation of the landing phase (some 10-15 minutes before Top of Descent) until the aircraft arrives in-block at the parking stand (CDM milestone: AIBT – *Actual In-Block Time*), for SESAR Concept Story Board Step 1.

The scenario assumes a generic airport configuration; scenarios concerning specific configurations, e.g. single runway mixed mode operations, may be developed as an alternative flow.

The Scenario covers all nominal and non-nominal procedures and is applicable from CAVOK *(Ceiling And Visibility OK)* to Low Visibility Conditions (LVC).

IMPORTANT: In this 6.2 DOD, all processes and interactions described between the start of the arrival scenario (some 10-15 minutes before Top of Descent) until touch down will only focus on airport-related operations. All other processes and interactions occurring at the same time but relating purely to En-Route or Terminal Manoeuvring Areas (TMA) operations are not described (as it is assumed that those will be covered by the 5.2 DOD).

5.1.1 Use case 1.1: "Plan and Provide Taxi-In Routing for an inbound flight" – Datalink Environment (no AGL)

General Assumption

In the case where the airport ATC unit is unable to establish a CPDLC connection, the Flight Crew will inform ATC by R/T and continue to follow normal non-CPDLC procedures. Similarly, in case of emergency, of a time critical situation or to clarify any ambiguity, any actor involved in this Use Case can revert to voice and follow non-CPDLC procedures. In nominal conditions, dialogs initiated by data link shall be completed by data link and dialogs initiated by voice shall be completed by voice.

It is assumed that most airports will use the automatic mode as the principal mode to generate routes. The semi-automatic and manual modes will be used to modify the automatically generated route.

5.1.1.1 General Conditions (Scope and Summary)

This Use Case describes how the ATC system calculates in automatic mode a planned taxi route for an inbound flight, how the planned taxi route will be transmitted to the Flight Crew and how the Flight Crew will exploit the planned taxi route information. This Use Case also describes the guidance provided for an inbound flight, how the cleared taxi route is presented to the Tower Controller, how the cleared taxi route will be transmitted to the Flight Crew and how the Flight Crew will exploit the taxi route clearance.

This Use Case takes place in the Surface-in Phase (pre-surface-in activities) of the flight.

The airport in this Use Case is equipped with an Arrival Manager (AMAN) and A-CDM.

The tower is equipped with A-SMGCS, EFS and data link communication.

The aircraft is equipped with data link communication and an airport moving map.

The airport in this Use Case is equipped with an ATC communication system, which has the capability to receive and negotiate, through data link, the runway exit with any aircraft equipped with an Enhanced Braking System.

Text in blue shows examples of the Uplink (UM) or Downlink (DM) data link messages, built using the latest set of D-TAXI message elements (as defined in EUROCAE SPR for Baseline 2 ATS data communication (ED-228 – [8]) detailed in 3.2.3.1.2.

5.1.1.2 Pre-Conditions

The assigned landing runway, allocated stand and TLDT are known in the ATC system.

A CPDLC connection is established between the ATC unit and the aircraft.

The Use Case is applicable in all weather conditions.

5.1.1.3 Post-Conditions

The Flight Crew arrives at the assigned stand.

5.1.1.4 Actors

- Tower Runway Controller
- Tower Ground Controller
- Apron Manager
- Flight Crew

5.1.1.5 Trigger

Availability of assigned landing runway, stand and TLDT in the ATC system.

5.1.1.6 Nominal Flow

1. The A-SMGCS Routing function is informed by the ATC system that the assigned landing runway, stand and TLDT for the flight are available.
2. The A-SMGCS Routing function calculates the planned taxi-in route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways and standard taxi routes, as well as allocated stand and anticipated runway exit (possibly provided by the aircraft when it is equipped with EBS).
3. The planned taxi-in route is used by the ATC system to calculate an accurate taxi time. This taxi time is used by the ATC system to refine the EIBT.
4. The Flight Crew requests the planned taxi-in route (DM136 – REQUEST EXPECTED TAXI ROUTING).
5. The planned taxi-in route is automatically uplinked (UM305 – EXPECT TAXI TO STAND Y5 VIA TWY Z3 K3 D MD3 A ESTIMATED TAXI TIME 15MIN) and loaded into the aircraft system. The corresponding estimated taxi time is sent at the same time.
6. The planned taxi-in route is displayed to the Flight Crew as text information, and as a graphical path on the Airport Moving Map display.
7. The Flight Crew verifies the planned taxi-in route and informs the system, via CPDLC, that they have received it by sending a reply (DM3 – ROGER).
8. The ATC system displays to the Tower Controller that the Flight Crew has received the planned taxi-in route.
9. The Flight Crew lands the aircraft and vacates the runway using the planned exit.
10. The Tower Runway Controller instructs the Flight Crew by R/T to contact the Tower Ground Controller.
11. The Flight Crew acknowledges and contacts the Tower Ground Controller via R/T.
12. The Tower Ground Controller issues the taxi instruction via data link (UM308 – TAXI TO STAND Y5 VIA TWY Z3 K3 D MD3 A) by making an input to the HMI.

    Note: The Tower Ground Controller might issue the first part of the taxi clearance by R/T in order to keep the aircraft rolling, avoiding unnecessary stops while the datalink message is sent.
13. The Flight Crew receives the taxi clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).
14. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).

15. The Flight Crew commence to taxi the aircraft along the cleared taxi route. Guidance information is provided to the Flight Crew by the AMM.
16. The aircraft enters the stand.
17. The use case ends.

5.1.1.7 Alternative Flows

[2] – A CPDLC connection has been established and a Downlinked Runway Exit has been provided by the aircraft

18. The A-SMGCS Routing function calculates the planned taxi-in route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways, standard taxi routes and the Downlinked Runway Exit.
19. The flow continues at step 3.

[3] – A revised planned taxi-in route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration/stand change, taxiway closure,…) before the uplink of the planned taxi-in route

20. The A-SMGCS Routing function re-calculates the planned taxi-in route in automatic mode, based on the new information available in the ATC system.
21. The ATC system re-calculates the corresponding estimated taxi time, and if necessary updates the EIBT.
22. The flow continues at step 4.

Note: the downlinked runway exit becoming available at this stage, or any update of this exit, are considered as a change to a known constraint.

[8] – A revised planned taxi-in route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration/stand change, taxiway closure,…) after the uplink of the planned taxi-in route

23. The A-SMGCS Routing function re-calculates the planned taxi-in route in automatic mode, based on the new information available in the ATC system.
24. The ATC system recalculates the corresponding estimated taxi time, and if necessary updates the EIBT.
25. If the aircraft is not below the altitude/time from landing/distance from runway chosen to limit the provision of planned routes (ideally, before top of descent), the system sends the revised planned taxi-in route to the Flight Crew (UM249 – REVISED + UM305 – EXPECT TAXI TO STAND Y5 VIA TWY Z3 K3 D MD3 A ESTIMATED TAXI TIME 17MIN). The corresponding estimated taxi time is sent at the same time if it changes significantly.
26. The flow returns at step 7.

Note: the Downlinked Runway Exit becoming available at this stage, or any update of this exit, are considered as a change to a known constraint.

[9] – Flight crew misses the runway exit foreseen in the planned taxi-in route

27. The A-SMGCS surveillance function detects and informs the A-SMGCS Routing function that the aircraft has missed the planned runway exit.
28. The A-SMGCS Routing function re-calculates a new planned taxi-in route in automatic mode taking into account the next suitable runway exit.
29. The ATC system re-calculates the corresponding estimated taxi time, and if necessary updates the EIBT.
30. The flow continues at step 10.

[10], [16] – Tower Runway Controller [10] or Tower Ground Controller [16] instructs via R/T the Flight Crew to hold short at runway hold position/intermediate holding position corresponding to the runway/taxiway intersection.

31. The Tower Runway Controller [10] or the Tower Ground Controller [16] informs the system via an input to the HMI that a hold instruction has been given via R/T.

32. The stop bar is turned on (if present).
33. The Flight Crew stops the aircraft at the holding/intermediate stop position.
34. The other aircraft crosses the runway/taxiway intersection.
35. The Tower Runway Controller or the Tower Ground Controller instructs the Flight Crew via R/T to continue taxiing and makes an input to the HMI to inform the system.
36. The stop bar turns off (if present).
37. The Use Case resumes at step 10, step 16 respectively.

[12] – Low visibility procedures are in force and the aircraft is equipped with data link and an on-board Airport Moving Map (AMM)

38. Enhanced Block Control operating methods are applied and VSB_{HP} symbols are displayed on the Tower Controller's HMI. In addition to the VSB_{IHP}, Tower Ground Controller has the capability to assign also $VSB_{N\ HP}$ not linked to any already existing intermediate holding position.
39. Enhanced Block Control operating method will be activated and VSB symbols (including both VSB_{HP} and $VSB_{N\ HP}$) are displayed on the on-board AMM.
40. All the VSBs are in default status (i.e. lit depending on local procedures).
41. The Tower Ground Controller inputs the clearance limit corresponding to a specific VSB into the ATC system and issues it to the Flight Crew via data link. The concerned VSB switches to lit status
42. The Flight Crew receive the clearance and acknowledge it by sending a WILCO message (DM0 – WILCO). The AMM displays the route that has been approved for taxiing until the VSB.
43. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route (i.e. beyond the VSB) as yet to be cleared (pending).
44. The Flight Crew taxi the aircraft until it reaches the VSB instructed by the clearance.
45. According to the operational situation, the Tower Ground Controller inputs the next clearance limit corresponding to the next VSB into the ATC system and issues it to the Flight Crew via data link. The concerned VSB switches to lit status, while the VSB linked to the previous clearance limit switches to the unlit status (e.g. GREEN colour).
46. The Flight Crew receive the clearance and acknowledge it by sending a WILCO message (DM0 – WILCO). The AMM displays the new portion of the route that has been approved for taxiing as a continuation of the previously displayed route.
47. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route (i.e. beyond the VSB) as yet to be cleared (pending).
48. The Flight Crew commence to taxi the aircraft along the cleared taxi route. Once the aircraft has crossed W1, the associated VSB switches to the default status
49. The Use Case continues at step 16.

[13] – The Flight Crew replies with a STANDBY message

50. The Flight Crew sends a STANDBY message (UM1 – STANDBY).
51. Upon ATSU system receipt of the STANDBY message, the message is displayed on the Tower Ground Controller HMI.
52. The Use Case resumes at step 13.

[13] – The Flight Crew cannot accept the taxi-in route received via data link

53. The Flight Crew sends an UNABLE message (UM0 – UNABLE) or reverts to R/T.
54. The Tower Ground Controller is notified by the system if the Flight Crew has sent an UNABLE message.
55. The Tower Ground Controller contacts the Flight Crew via R/T to clarify the situation.

56. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi-in route in the System via the HMI.
57. The Tower Ground Controller sends a revised taxi clearance to the Flight Crew via data link (UM249 – REVISED + UM308 – TAXI TO STAND Y5 VIA TWY Z3 K3 D MD3 A).
58. The Flight Crew receives the revised taxi clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).
59. The Use Case continues at step 14.

Between [15] and [16] – The Tower Ground Controller decides to modify the taxi-in route

60. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi-in route in the System via the HMI.
61. The Tower Ground Controller sends a revised taxi clearance to the Flight Crew via data link (UM249 – REVISED + UM308 – TAXI TO STAND Y5 VIA TWY Z3 K3 D MD3 A).
62. The Flight Crew receives the revised taxi clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).
63. The Use Case returns to step 14.

Between [15] and [16] – The Flight Crew requests a change of taxi-in route

64. The Flight Crew contacts the Tower Ground Controller via R/T, stating their request.
65. The Tower Ground Controller examines the request.
66. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi-in route in the System.
67. The Tower Ground Controller sends a revised taxi instruction to the Flight Crew via data link (UM249 – REVISED + UM308 – TAXI TO STAND Q1 VIA TWY D A).
68. The Flight Crew receives the revised taxi instruction and acknowledges by the sending of a WILCO message (DM0 – WILCO).
69. The Use Case returns to step 14.

[16] – The Tower Ground Controller transfers the flight to the Apron Manager

70. The Tower Ground Controller instructs the Flight Crew, via data link to contact the Apron Manager.
71. The Flight Crew acknowledges by the sending of a WILCO message (DM0 – WILCO).
72. The Flight Crew contacts the Apron Manager via R/T.
73. The Apron Manager issues further taxi instructions via data link[18] (UM308 – TAXI TO STAND Q1) by making an input to the HMI.
74. The Use Case returns to step 13.

[16] – Re-route after non-conformance to ATC instruction

75. The A-SMGCS Routing function calculates a new route after a deviation which needs to be cleared by the Tower Ground Controller.
76. The Use Case returns to step 12.

[18] The Apron Manager will provide the first part of the instruction by R/T when replying to the first contact from the Flight Crew, as the Tower Ground Controller in the nominal flow of this Use Case.

5.1.1.8 Failure Flows

[2] – The A-SMGCS Routing function cannot calculate a planned taxi-in route for a specific flight/all flights

77. The system informs the Tower Controller/Supervisor that no planned taxi-in route can be calculated for the flight/all flights.
78. The Tower Controller/Supervisor takes appropriate action to resolve the problem following local procedures.
79. The Use Case ends.

[4] – A CPDLC connexion between the ATC unit and the aircraft cannot be established

80. The flow continues at step 9.
81. R/T will be used to replace the D-TAXI messages.

[Anywhere] – The Tower Controller is alerted that the data link system/connection is not functioning correctly

82. R/T will be used to replace the D-TAXI messages.

5.1.2 Use case 1.2: "Plan and Provide Taxi-In Routing for an inbound flight" – AGL environment only (no datalink)

General Assumption

It is assumed that most airports will use the automatic mode as the principal mode to generate routes. The semi-automatic and manual modes will be used to modify the automatically generated route.

5.1.2.1 General Conditions (Scope and Summary)

This Use Case describes how the ATC system calculates in automatic mode a planned taxi route for an inbound flight, how the planned taxi route will be transmitted to the Flight Crew and how the Flight Crew will exploit the planned taxi route information. This Use Case also describes the guidance provided for an inbound flight, how the cleared taxi route is presented to the Tower Controller, how the cleared taxi route will be transmitted to the Flight Crew and how the Flight Crew will exploit the taxi route clearance. It will also describe how the AGL are operated in conjunction with the cleared route

This Use Case takes place in the Arrival phase (preparation of the landing activities) of the flight.

The airport in this Use Case is equipped with an AMAN, A-CDM and AGL.

The tower is equipped with A-SMGCS and EFS.

5.1.2.2 Pre-Conditions

The assigned landing runway, allocated stand and TLDT are known in the ATC system.

The Use Case is applicable in all weather conditions.

5.1.2.3 Post-Conditions

The Flight Crew arrives at the assigned stand.

5.1.2.4 Actors

- Tower Runway Controller
- Tower Ground Controller
- Apron Manager
- Flight Crew

5.1.2.5 Trigger

Availability of assigned landing runway, stand and TLDT in the ATC system.

5.1.2.6 Nominal Flow

1. The A-SMGCS Routing function is informed by the ATC system that the assigned landing runway, stand and TLDT for the flight are available.
2. The A-SMGCS Routing function calculates the planned taxi-in route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways and standard taxi routes, as well as allocated stand and anticipated runway exit.
3. The planned taxi-in route is used by the ATC system to calculate an accurate taxi time. This taxi time is used by the ATC system to refine the EIBT.
4. At a defined time and/or distance before the aircraft reaches the runway threshold, the AGL system illuminates the TCLs for all possible runway exits for guidance purposes.
5. The Flight Crew lands the aircraft and vacates the runway.
6. The AGL system switches off the TCLs for the not used runway exits, unless the next aircraft landing on the runway is already within the defined time and/or distance before the runway threshold

7. The Tower Runway Controller instructs the Flight Crew by R/T to contact the Tower Ground Controller.
8. The Flight Crew acknowledge and contact the Tower Ground Controller via R/T.
9. The Tower Ground Controller issues the taxi instruction “Follow the Greens to <clearance limit>” via R/T and updates the ATC system by making an input to the HMI.

   Note: It is assumed that the <clearance limit> will normally be either the assigned stand or the limit of the area of responsibility of the Tower Ground Controller issuing the “Follow the Greens” instruction.

10. The Flight Crew acknowledge the taxi instruction by R/T.
11. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).
12. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the aircraft) of the taxiway lights associated to the cleared taxi route.
13. The A-SMGCS HMI displays the segments of the AGL that are illuminated.
14. The Flight Crew commence to taxi the aircraft along the cleared taxi route. The AGL system automatically switches on segments of lights in front of the aircraft, according to the aircraft position and the route. The AGL system switches off lights behind the aircraft.
15. The aircraft enters the stand.
16. The use case ends.

5.1.2.7 Alternative Flows

[4] – A revised planned taxi-in route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration/stand change, taxiway closure,…)

17. The A-SMGCS Routing function re-calculates the planned taxi-in route in automatic mode, based on the new information available in the ATC system.
18. The ATC system re-calculates the corresponding estimated taxi time, and if necessary updates the EIBT.
19. The flow continues at step 5.

[5] – Flight crew misses the runway exit foreseen in the planned taxi-in route

20. The A-SMGCS surveillance function detects and informs the A-SMGCS Routing function that the aircraft has missed the planned runway exit.
21. The A-SMGCS Routing function re-calculates a new planned taxi-in route in automatic mode taking into account the next suitable runway exit.
22. The ATC system re-calculates the corresponding estimated taxi time, and if necessary updates the EIBT.
23. The flow continues at step 6.

[14] – Tower Ground Controller instructs via R/T the Flight Crew to hold short at runway hold position/intermediate holding position corresponding to the runway/taxiway intersection.

24. The Tower Ground Controller informs the system via an input to the HMI that a hold instruction has been given via R/T.
25. The segment of switched AGL terminates at the holding/intermediate stop bar and the stop bar is turned on.
26. No AGL segments are switched on in front of the aircraft along the aircraft taxi route, only the stop bar is turned on.
27. The Flight Crew stops the aircraft at the holding/intermediate stop position.
28. The other aircraft crosses the runway/taxiway intersection.
29. The Tower Ground Controller instructs the Flight Crew via R/T to continue taxiing and makes an input to the HMI to inform the system.
30. The Flight Crew receive the taxi clearance and acknowledge it by R/T

31. The stop bar turns off and the AGL turns on showing the cleared taxi route.
32. The Use Case continues at step 15.

[9] – Low visibility procedures are in force and Virtual Block Control is in operation

33. Virtual Block Control operating methods are applied and VSB_{IHP} symbols are displayed on the Tower Controller's HMI.
34. All the VSB_{IHP} are in default status (depending on local procedures).
35. The Tower Ground Controller inputs into the ATC system the clearance limit corresponding to an intermediate holding point (e.g. W1) associated with a specific VSB_{HP}. The concerned VSB_{HP} switches to lit status.
36. The Tower Ground Controller issues the clearance limit (e.g. W1) to the Flight Crew via R/T.
37. The Flight Crew receive the clearance and acknowledge it via R/T.
38. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route (e.g. beyond W1) as yet to be cleared (pending).
39. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the aircraft) of the taxiway lights associated to the cleared taxi route.
40. The A-SMGCS HMI displays the segments of the AGL that are illuminated.
41. The Flight Crew taxi the aircraft until it reaches the intermediate holding position corresponding to the issued clearance limit (e.g. W1).
42. According to the operational situation, the Tower Ground Controller inputs into the ATC system the clearance limit corresponding to the next VSB_{HP} (e.g. W2). The VSB_{HP} linked to the previous clearance limit (e.g. W1) switches to the unlit status (e.g. GREEN colour) while the VSB_{HP} linked to the next clearance limit (e.g. W2) switches to the lit status
43. The Tower Ground Controller issues the new clearance limit (e.g. W2) to the Flight Crew via R/T.
44. The Flight Crew receive the clearance and acknowledge it via R/T.
45. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route (e.g. beyond W2) as yet to be cleared (pending).
46. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the aircraft) of the taxiway lights associated to the cleared taxi route.
47. The A-SMGCS HMI displays the segments of the AGL that are illuminated.
48. The Flight Crew commence to taxi the aircraft along the cleared taxi route. Once the aircraft has crossed W1, the associated VSB_{IHP} switches to the default status
49. The Use Case continues at step 15.

[10] – The Flight Crew cannot accept the taxi-in route

50. The Flight Crew informs the Tower Ground Controller via R/T that they cannot accept the taxi in route.
51. The Tower Ground Controller contacts the Flight Crew via R/T to clarify the situation.
52. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi-in route in the System via the HMI.
53. The Tower Ground Controller issues a revised taxi clearance to the Flight Crew via R/T.
54. The Flight Crew acknowledge the revised taxi clearance via R/T.
55. The Use Case continues at step 11.

[15] – The Tower Ground Controller decides to modify the taxi-in route

56. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi-in route in the System via the HMI.
57. The Use Case returns to step 10.

[15] – The Flight Crew requests a change of taxi-in route

58. The Flight Crew contact the Tower Ground Controller via R/T, stating their request.
59. The Tower Ground Controller examines the request.
60. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi-in route in the System.
61. The Tower Ground Controller issues revised taxi instructions to the Flight Crew via R/T.
62. The Flight Crew acknowledge the revised taxi instructions via R/T
63. The Use Case returns to step 11.

[15] – The Tower Ground Controller inputs a Hold instruction into the system in order to give way to another mobile at a taxiway intersection.

1. The Tower Ground Controller inputs the hold instruction into the system via the HMI.
2. The segment of switched on AGL terminates at the defined position by the Tower Ground Controller
3. The Flight Crew stops the aircraft when no more lit AGLs are visual in front of the aircraft.
4. The other mobile crosses the taxiway intersection.
5. The Tower Ground Controller removes the Hold instruction via the HMI.
6. The Use Case returns to step 9.

[15] – The Tower Ground Controller transfers the flight to the Apron Manager

64. The Tower Ground Controller instructs the Flight Crew via R/T to contact the Apron Manager.
65. The Flight Crew acknowledge and contact the Apron Manager via R/T.
66. The Apron Manager issues further taxi instructions via R/T and updates the ATC system by making an input to the HMI.
67. The Use Case returns to step 10.

[15] – Re-route after non-conformance to ATC instruction

68. The A-SMGCS Routing function calculates a new route after a deviation which needs to be cleared by the Tower Ground Controller or Apron Manager.
69. The cleared route is transferred to the Guidance Function which switches the respective lamps to indicate the new route to the Flight Crew.
70. The Use Case returns to step 9.

5.1.2.8 Failure Flows

[2] – The A-SMGCS Routing function cannot calculate a planned taxi-in route for a specific flight/all flights

71. The system informs the Tower Controller/Supervisor that no planned taxi-in route can be calculated for the flight/all flights.
72. The Tower Controller/Supervisor takes appropriate action to resolve the problem following local procedures.
73. The Use Case ends.

Anywhere between [6] and [14] – The AGL is in operation and the A-SMGCS Routing and Guidance functions fail

74. All TCL will be switched off as fall-back[19].

[19] No procedure has been defined by OFA04.02.01 in case of Guidance failure. However, a proposal to be considered for future validation activities is to indicate a failure with a defined light sequence (e.g. all lights activated for 1s and deactivated for one 1s during 10s). Then all lights would be

5.2 Operational Scenario 2: “Turn-round”/”Departure”

The following Use Cases start in the Turn-round scenario, when the Flight Crew is preparing the flight for departure, and end in the Departure scenario, when they line up the aircraft on the runway for take-off. Although 06.02 DOD identifies two distinct scenarios for all the phases of the flight covered in the Use Cases, this OSED will not split the Use Case into these two scenarios in order to provide a complete view of future taxi-out operations.

Note: the descriptions of the scenarios have been taken from Step 1 Airport DOD – 2014 Update ([11]) made by 06.02. Additions or modifications (if any) will be made using italic font.

Turn-round

This scenario describes the processes and interactions during the ground handling of an aircraft when parked at the stand as well as the preparation of the aircraft to perform the next part of the trajectory or to start a new trajectory. The scenario assumes a generic aircraft stand configuration; nose in parking position. It is not the purpose of the scenario to identify tools which support specific actions but to generally refer to the “system”. However, where there is a specific and unique tool functionality, this may be mentioned.

According to A-CDM the turn-round scenario starts at the moment the aircraft is parked (AIBT - Actual In-Block Time) and ends at the moment the aircraft is being pushed back or vacates the parking position (AOBT – Actual Off-Block Time).

The scenario scope is determined based on the physical process. Part of the information related to the physical process of turn-round might be available before the start of the physical process. The detailed description of the process defining this information is included in preceding scenario(s). This will be the planning scenario where the information is made available during the planning of the *Business Trajectory* (BT) but also the scenarios of the preceding flight phases taxi-out/take-off and climb at origin airport, en-route, approach and landing/taxi-in during the execution of the inbound flight.

During the execution of the trajectory, many issues can occur that will have an impact on the planned trajectory. Revisions, modifications and updates of the trajectory will take place continuously. As an example related to the turn-round scenario, the way Estimated In-Blocks Time (EIBT) is defined and updated during the whole execution of all preceding phases can be mentioned, as well as the update of the Target Off-Block Time.

Although the determination of EIBT takes place within other phases, it is described as an information process in this scenario as the EIBT is a milestone for the preparation of the turn-round process. All planning for the events in this scenario has taken place in the medium / short term planning phase.

Departure

The Departure scenario describes the processes and interactions that an aircraft encounters from the time the aircraft is off block (CDM milestone: AOBT) until the aircraft is airborne (CDM milestone: *Actual Take-Off Time* – ATOT) as anticipated for SESAR Concept Story Board Step 1.

The Scenario covers all nominal and non-nominal procedures and is applicable for both VMC and Low Visibility Conditions (LVC).

The scenario assumes a generic airport configuration; scenarios concerning specific configurations, e.g. single runway mixed mode operations, may be developed as required.

It is not the purpose of the scenario to identify tools which support specific actions but to generally refer to the “ATM System” (ground or air). However, where there is a specific and unique tool functionality, this may be mentioned.

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deactivated for 10s. Then a voice instruction would be needed, addressing all mobiles following AGL instructions. This would need to be precisely defined and could read as: "Follow-the-Greens is deactivated. The green lights are navigation support only and are not a clearance. Wait for individual guidance instructions." After that and in darkness, all lights could be activated again in order to provide information to the pilots on where the taxiway centreline is located

5.2.1 Use Case 2.1: "Plan and provide taxi-out routing for an outbound flight" – Datalink environment (no AGL)

General Assumption

In the case where the airport ATC unit is unable to establish a CPDLC connection, the Flight Crew will inform ATC by R/T and continue to follow normal non-CPDLC procedures. Similarly, in case of emergency, of a time critical situation or to clarify any ambiguity, any actor involved in this Use Case can revert to voice and follow non-CPDLC procedures. In nominal conditions, dialogs initiated by data link shall be completed by data link and dialogs initiated by voice shall be completed by voice.

It is assumed that most airports will use the automatic mode as the principal mode to generate routes. The semi-automatic and manual modes will be used to modify the automatically generated route.

This Use Case assumes that push-back and start-up clearances are provided by the same Tower Controller and in this order. However, local procedures may affect this as both clearances can be provided simultaneously, or starting up the aircraft engines during push back may be prohibited, leading to clearances being provided in the reverse order. Also, different Tower Controllers may be in charge of start-up and push-back clearances.

5.2.1.1 General Conditions (Scope and Summary)

This Use Case describes how the ATC system calculates in automatic mode a planned taxi route for an outbound flight, how the calculated planned taxi-out route is presented to the Tower Controller for transmission to the Flight Crew and how the Flight Crew will exploit the planned taxi-out route information for their acceptance. It then describes the guidance provided for an outbound flight, how the cleared taxi route is presented to the Tower Controller, how the cleared taxi route will be transmitted to the Flight Crew and how the Flight Crew will exploit the taxi route clearance.

This Use Case starts in the Turn-round phase, and more specifically in the pre-departure activities.

The airport in this Use Case is equipped with a DMAN, A-CDM.

When there is an operational need for de-icing, the airport in this Use Case is also equipped with a De-icing Manager[20].

The tower is equipped with A-SMGCS, EFS and data link communication.

The aircraft is equipped with data link communication and an airport moving map.

Text in blue shows examples of the Uplink (UM) or Downlink (DM) data link messages, built using the latest set of D-TAXI message elements (as defined in EUROCAE SPR for Baseline 2 ATS data communication (ED-228 – [8]) detailed in 3.2.3.1.2.

5.2.1.2 Pre-Conditions

The Stand, Assigned Departure Runway and TSAT for the flight are known in the ATC system.

When de-icing conditions prevail, the requirement for de-icing (i.e. no de-icing, de-icing at stand, de-icing after push back or remote de-icing), the allocated de-icing area[21] (in the case of remote de-icing) and the expected de-icing time (in the case de-icing is required) for the flight are known in the ATC system.

Note: This information will be obtained from the De-Icing Manager. The requirement for de-icing and the allocated de-icing area will be possibly updated by the Tower Controller in the ATC system.

The Use Case is applicable in all weather conditions.

[20] In case a remote De-icing Manager does not become part of SESAR Step 1 airport concept, the required information to include de-icing into the route planning process can be obtained through A-CDM.

[21] See section 1.6 for the definition of "de-icing area".

5.2.1.3 Post-Conditions

The aircraft is lined up and ready for departure.

5.2.1.4 Actors

- Tower Clearance Delivery Controller
- Tower Ground Controller
- Tower Runway Controller
- Flight Crew

5.2.1.5 Trigger

Availability of stand, assigned departure runway and TSAT in the ATC system.

5.2.1.6 Nominal Flow

1. The A-SMGCS Routing function is informed by the ATC system that the assigned departure runway, stand and TSAT for the flight are available.
2. The A-SMGCS Routing function calculates the planned taxi-out route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways and standard taxi routes.
3. The calculated planned taxi-out route is used by the ATC system to calculate an estimated taxi time. This taxi time is used by the DMAN to refine the TSAT/TTOT.
4. The ATC system informs the Tower Clearance Delivery Controller that the planned taxi-out route is available.
5. The Tower Clearance Delivery Controller is informed by the ATC system when the Flight Crew has established a data link CPDLC connection.
6. The Flight Crew requests the ATC departure clearance and planned taxi-out route via data link (DM136 – REQUEST EXPECTED TAXI ROUTING).
7. The Tower Clearance Delivery Controller sends via data link the ATC Departure Clearance and the planned taxi-out route to the Flight Crew (UM305 – EXPECT TAXI TO HP Y11 RWY 27L VIA TWY N BD13 D ESTIMATED TAXI TIME 15MIN). The corresponding estimated taxi time is sent at the same time.
8. The planned taxi-out route is displayed to the Flight Crew as text information, and as a graphical path on the AMM display.
9. The Flight Crew verifies the planned taxi-out route and informs the system, via CPDLC, that they have received it by sending a reply (DM3 – ROGER).
10. The ATC system displays to the Tower Clearance Delivery Controller that the Flight Crew has received the ATC Departure Clearance and the planned taxi-out route.
11. The Tower Clearance Delivery Controller transfers the aircraft to the Tower Ground Controller (or to the Apron Manager, depending on the airport organisation) via data link (UM117R – CONTACT TOWER 123.450).
12. The Flight Crew acknowledges the message by sending a WILCO message (DM0 – WILCO).
13. The Flight Crew contacts the Tower Ground Control via R/T and prepares for push back.
14. The Flight Crew requests push back via data link (DM131 – REQUEST PUSHBACK)

    Note: In addition a specific time and push back direction maybe added.

15. Upon ATSU system receipt of a push back request, the request is displayed on the Tower Ground Controller's HMI.
16. The Tower Ground Controller approves the push back via data link, and makes an input to the HM (UM304 – PUSH BACK APPROVED).

    Note: In addition a specific time and a push back direction may be added.

17. The Flight Crew receives the push back approval message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO).
18. The Flight Crew instructs the ground handler (tug driver) accordingly.
19. The A-SMGCS HMI displays the portion of route that has been cleared (push back) and the remaining part of the route as yet to be cleared (pending).
20. The push back is completed and the Flight Crew sends a start-up request to the Tower Ground Controller by data link (DM134 – REQUEST START UP).
21. Upon ATSU system receipt of a start-up request, the request is displayed on the Tower Ground Controller HMI.
22. The Tower Ground Controller approves the start-up via data link, and makes an input to the HMI (UM302 – START UP APPROVED)

    Note: In addition a specific time may be added.
23. The Flight Crew receives the start-up approval message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO).
24. The Flight Crew commences to start up the engine/s.
25. The start-up is completed and the Flight Crew request taxi instructions by data link (DM135 – REQUEST TAXI)

    Note: In addition taxi request data maybe added.
26. Upon ATSU system receipt of a taxi request via data link, the request is displayed on the Tower Ground Controller's HMI.
27. The Tower Ground Controller verifies the planned taxi-out route and issues the taxi instruction via data link (UM308 – RWY 27L TAXI TO HP Y11 RWY 27L VIA TWY N BD13 D) and makes an input to the HMI.
28. The Flight Crew receives the D-TAXI message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO). The AMM displays the portion of the route that has been approved for taxiing.
29. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).
30. The Flight Crew commences to taxi the aircraft along the cleared taxi route. Guidance information is provided to the Flight Crew by the AMM
31. The Tower Ground Controller instructs the Flight Crew by data link to contact the Tower Runway Controller.
32. The Flight Crew contact the Tower Runway Controller by R/T.
33. On reaching the Holding Point the Tower Runway Controller issues line up clearance by R/T to the Flight Crew.
34. The Tower Runway Controller informs the system via an input to the HMI that line up clearance has been given.
35. The stop bar turns off.
36. The aircraft enters the runway and lines-up.
37. The use case ends.

5.2.1.7 Alternative Flows

[1] – When de-icing conditions prevail.

38. The A-SMGCS Routing function is informed by the ATC system that the assigned departure runway, stand, TSAT, requirement for de-icing (i.e. no de-icing, de-icing at stand, de-icing after push back or remote de-icing), allocated de-icing area (for remote de-icing) and expected de-icing time (when de-icing is required) for the flight are available.
39. The A-SMGCS Routing function calculates the planned taxi-out route (up to the Runway / Holding Point) in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways, standard taxi routes and de-icing areas location if remote de-icing is required.
40. The calculated planned taxi-out route is used by the ATC system to calculate an estimated taxi time. The expected de-icing time is taken into account to calculate this taxi time. This taxi time is used by the DMAN to refine the TSAT/TTOT.
41. The flow continues at step 4.

[5] – A revised planned taxi-out route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration, taxiway closure,…) before the uplink of the planned taxi-out route.

42. The A-SMGCS Routing function re-calculates the planned taxi-out route in automatic mode, based on the new information available in the ATC system.
43. The ATC system recalculates the corresponding estimated taxi time, and if necessary updates the TSAT/TTOT.
44. The flow resumes at step 5.

Note: any update of the requirement for de-icing or of an allocated de-icing area is considered as a change to a known constraint.

[11] – A revised planned taxi-out route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration/stand change, taxiway closure,…) after the uplink of the planned taxi-out route.

45. The A-SMGCS Routing function re-calculates the planned taxi-out route in automatic mode, based on the new information available in the ATC system.
46. The ATC system re-calculates the corresponding estimated taxi time, and if necessary updates the TSAT/TTOT.
47. The Tower Clearance Delivery Controller sends via data link the ATC Departure Clearance and the revised planned taxi-out route to the Flight Crew (UM249 REVISED + UM308 - EXPECT TAXI TO HP K7 RWY 27L VIA TWY N BD13 D ESTIMATED TAXI TIME 17MIN).
48. The flow returns to step 8.

Note: any update of the requirement for de-icing or of an allocated de-icing area is considered as a change to a known constraint.

[14] – The aircraft requires de-icing on stand.

49. The Flight Crew sends a request for de-icing on stand using data link (DM132 – REQUEST DEICING A12).
50. Upon ATSU system receipt of the de-icing request, the request is displayed on the Tower Ground Controller HMI.
51. The Tower Ground Controller approves the de-icing by data link (UM309 – DEICING APPROVED).
52. The Flight Crew receives the de-icing approval message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO).
53. The Flight Crew contacts the de-icing agent to start de-icing the aircraft.

54. Once de-icing is complete, the Flight Crew informs the Tower Ground Controller by data link (DM108 – DEICING COMPLETE).

55. The flow resumes at step 14.

[14] – The aircraft requires de-icing after push back.

56. The Flight Crew sends a request to push back and de-ice by data link (DM131 – REQUEST PUSHBACK + DM127 – FOR DEICING).

57. Upon ATSU system receipt of the push back request, the request is displayed on the Tower Ground Controller HMI.

58. The Tower Ground Controller approves the push back and the de-icing by data link (UM304 – PUSH BACK APPROVED; UM309 – DEICING APPROVED).

59. The Flight Crew receives the push back and de-icing approval message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO).

60. The Flight Crew instructs the ground handler (tug driver) accordingly.

61. The A-SMGCS HMI displays the portion of route that has been cleared (push back) and the remaining part of the route as yet to be cleared (pending).

62. The push back is completed and the Flight Crew contacts the de-icing agent to start de-icing the aircraft.

63. Once de-icing is complete, the Flight Crew informs the Tower Ground Controller by data link (DM108 – DEICING COMPLETE).

64. The flow continues at step 20.

[25] – The aircraft requires remote de-icing.

65. The start-up is completed and the Flight Crew request taxi instructions to the de-icing area by data link (DM135 – REQUEST TAXI TO DEICING STOP POSITION NE + DM132 – FOR DEICING).

66. Upon ATSU system receipt of a taxi request via data link, the request is displayed on the Tower Ground Controller's HMI.

67. The Tower Ground Controller verifies the planned taxi-out route and issues the taxi instruction by data link (UM308 – TAXI TO DEICING STOP POSITION NE TWY D VIA TWY A N B D) and makes an input to the HMI.

Note: the message may not indicate a specific de-icing bay (NE4 for example) but a stop before the allocated de-icing area (NE in the above example) because it is assumed the de-icing bay allocated to the aircraft is not known at this stage. If it was, the data link message would be changed to UM308 – TAXI TO DEICING POSITION NE4 TWY D VIA TWY A-N-B-D.

68. The Flight Crew receives the D-TAXI message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO). The AMM displays the portion of the route that has been approved for taxiing.

69. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).

70. The Flight Crew commences to taxi the aircraft along the cleared taxi route.

71. The Tower Ground Controller receives from the De-Icing Manager the de-icing bay allocated to the aircraft.

72. The Tower Ground Controller modifies, in semi-automatic or in manual mode, the taxi-out route via the HMI.

73. The Tower Ground Controller issues an update of the taxi instruction via R/T or by data link (UM249 – REVISED + UM308 – TAXI TO DEICING POSITION NE4 TWY D VIA TWY A N B D).

74. The Flight Crew receives the D-TAXI message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO). The AMM displays the new portion of the route that has been approved for taxiing as a continuation of the previously displayed route.

75. The Tower Ground Controller instructs the Flight Crew by data link (UM117R – CONTACT DEICING 123.450) to contact the de-icing agent.

76. The Flight Crew receives the D-TAXI message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO).

77. The Flight Crew contacts the de-icing agent via R/T.

78. Once de-icing is complete, the Flight Crew contacts the Tower Ground Controller via R/T and informs that de-icing is complete.

79. After the de-icing checklist is completed, the Flight Crew request taxi instructions by data link (DM135 – REQUEST TAXI) in order to vacate the de-icing bay and resume taxi.

80. The flow continues at step 26.

[31] – The Tower Ground Controller negotiates a different Holding Point with the Flight Crew that is accepted.

81. The Tower Ground Controller sends to the Flight Crew via data link a request to see if they can accept departure from a specific holding point (UM313 – CAN YOU ACCEPT INTERSECTION K6 FOR DEPARTURE RUNWAY 27L).

82. The Flight Crew sends a STANDBY message via data link whilst they discuss the runway length available (DM2 – STANDBY) (Optional).

83. The Flight Crew sends via data link confirmation that they can accept the specified holding point (DM4 – AFFIRM).

84. The Tower Ground Delivery Controller constructs in semi-automatic or manual mode an amended taxi-out route.

85. The ATC system calculates the corresponding estimated taxi time, and if necessary updates the TTOT.

86. The flow returns to step 27.

[31] – The Tower Ground Delivery Controller negotiates a different Holding Point with the Flight Crew that is not accepted

87. The Tower Ground Delivery Controller sends to the Flight Crew via data link a request to see if they can accept departure from a specific holding point (UM313 – CAN YOU ACCEPT INTERSECTION K6 FOR DEPARTURE RUNWAY 27L).

88. The Flight Crew sends a STANDBY message via data link whilst they discuss the runway length available (DM2 – STANDBY) (Optional).

89. The Flight Crew sends via data link confirmation that they cannot accept the specified holding point (DM5 – NEGATIVE).

90. The flow returns to step 27.

[16], [22], [27] – The Controller can for the time being not approve the data link request of the Flight Crew.

91. The Controller sends a STANDBY message (UM1 – STANDBY) via an input on the HMI.

92. The Use Case resumes step 16, step 22 or step 27.

[16], [22] – The Controller responds with an EXPECT message.

93. The Controller sends an EXPECT (UM270 – EXPECT PUSHBACK AT 1523 or UM270 – EXPECT STARTUP AT 938) message via an input on the HMI.

94. The Flight Crew receive the EXPECT message and acknowledge the message by the sending of a ROGER message (DM3 – ROGER).

95. The Use Case resumes at step 16 or step 22.

[17], [23], [28] – The Flight Crew replies with a STANDBY message.

96. The Flight Crew sends a STANDBY message (UM1 – STANDBY).

97. Upon ATSU system receipt of the STANDBY message, the message shall be displayed on the Controller HMI.

98. The Use Case resumes at step 17, step 23 or step 28.

[31] – The Tower Ground Controller decides to modify the taxi-out route (e.g. change from taxiway D to B).

99. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi out route in the System via the HMI.

100. The Tower Ground Controller sends the revised clearance via data link to the Flight Crew (UM249 – REVISED + UM308 RWY 27L TAXI TO HP Y11 RWY 27L VIA TWY N B BD20).

101. The Flight Crew receives the revised taxi clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).

102. The Use Case returns to step 29.

[31] – The Flight Crew requests a change of taxi-out route or Holding Point.

103. The Flight Crew contacts the Tower Ground Controller via R/T, stating their request.

104. The Tower Ground Controller examines the request.

105. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi out route in the System.

106. The Tower Ground Controller sends the revised clearance via data link to the Flight Crew (UM249 – REVISED + UM308 – RWY 27L TAXI TO HP Y11 RWY 27L VIA TWY BD20).

107. The Flight Crew receives the revised taxi clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).

108. The Use Case returns to step 29.

Between [30] and [31] – The Tower Ground Controller inputs a Hold Short instruction into the system in order to give way to another mobile at a taxiway intersection.

109. The Tower Ground Controller inputs the hold instruction into the system via the HMI.

110. The Tower Ground Controller sends the revised taxi instruction via data link to the Flight Crew (UM249 – REVISED + UM308 – RWY 27L TAXI HP Y11 RWY 27L VIA TWY N BD13 D HOLD SHORT TWY D).

Note: if the Tower Ground Controller considers that the HOLD SHORT Instruction is time critical, he shall not use data link but R/T in order to communicate with the Flight Crew.

111. The Flight Crew receives the revised taxi clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).

112. The Flight Crew stops the aircraft before the taxiway intersection. The AMM highlights the portion of the route that is no longer cleared.

113. The other mobile crosses the taxiway intersection.

114. The Tower Ground Controller instructs the Flight Crew via data link to continue taxiing and makes an input to the HMI to inform the system (UM306 – RESUME TAXI).

115. The Flight Crew receives the D-TAXI message and acknowledges the message by the sending of a WILCO message (DM0 – WILCO). The AMM displays the portion of the route that has been approved for taxiing.

116. The Use Case returns to step 29.

[30] – The flight is taxiing to runway 27R that involves crossing active runway 27L during the taxi out

117. The Tower Ground Controller issues the taxi instruction by data link (D-TAXI message), and makes an input to the HMI (UM308 – RWY 27L TAXI HP Y11 RWY 27L VIA TWY N BD13-D HOLD SHORT RWY 27L).

118. The Flight Crew receives the clearance and acknowledges by the sending of a WILCO message (DM0 – WILCO).

119. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).

120. The Flight Crew commences to taxi the aircraft along the cleared taxi route. Guidance information to the Flight Crew is provided by the AMM.

121. When reaching the Stop Bar at the Holding Point of runway 27L, the Tower Ground Controller instructs the Flight Crew by data link to contact the Tower Runway Controller.

122. The Flight Crew contact the Tower Runway Controller by R/T.

123. The Tower Runway Controller issues a clearance by R/T to Cross Runway 27L to the Flight Crew.

124. The Tower Runway Controller informs the system via an input to the HMI that the Crossing clearance has been given.

125. The Flight Crew acknowledge the crossing clearance via R/T.

126. The stop bar turns off.

127. The Flight Crew crosses the runway.

128. The Tower Runway Controller instructs the Flight Crew by R/T to contact the Tower Ground Controller.

129. The Flight Crew contact the Tower Ground Controller.

130. The Tower Ground Controller issues the taxi instruction via R/T or data link (D-TAXI message), and makes an input to the HMI (UM308 – RWY 27R TAXI TO HP Z8 RWY 27R VIA TWY K8).

131. The Use Case returns to step 28.

Between [30] and [31] – The Flight Crew requests to return to the gate for technical reasons.

132. The Flight Crew contact the Tower Ground Controller via R/T, stating their request.

133. The Tower Ground Controller assesses the request and modifies, in semi-automatic or manual mode, the taxi-out route in the System into a taxi-in route.

134. The Tower Ground Controller sends the revised clearance via data link to the Flight Crew (UM249 – REVISED + UM308 TAXI TO STAND Q1 VIA TWY D BD14 F).

135. The Flight Crew receives the revised taxi clearance and acknowledges by the sending of a WILCO message. (DM0 – WILCO)

136. The Use Case continues at step 14 in the use case “Plan and Provide Taxi-In Routing for an inbound flight” – Datalink Environment (no AGL).

[16], [22], [27] – The Tower Controller cannot approve the data link request of the Flight Crew.

137. The Tower Ground Controller sends an UNABLE message (UM0 – UNABLE) via an input on the HMI, or reverts to R/T.

138. The Flight Crew is notified by the system if the Tower Ground Controller has sent an UNABLE message and closes it on their HMI.

139. The Tower Ground Controller contacts the Flight Crew via R/T to clarify the situation.

140. The Use Case ends or continues at step 18, 24 or 29.

[17], [23], [28] – The Flight Crew cannot accept the data link message received.

141. The Flight Crew send an UNABLE message (DM0 – UNABLE), or revert to R/T.

142. The Tower Clearance Delivery Controller (for the UNABLE START-UP message) or the Tower Ground Controller (for the UNABLE PUSHBACK and UNABLE TAXI messages) is notified by the system if the Flight Crew has sent an UNABLE message.

143. The Tower Clearance Delivery Controller or the Tower Ground Controller contacts the Flight Crew via R/T to clarify the situation.

144. The Use Case ends or returns to step 14, 16, 20, 22, 25 or 27.

5.2.1.8 Failure Flows

[2] – The A-SMGCS Routing function cannot calculate a planned taxi-out route for a specific flight/all flights.

145. The system informs the Tower Controller/Supervisor that no planned taxi-out route can be calculated for the flight/all flights.

146. The Tower Controller/Supervisor takes appropriate action to resolve the problem following local procedures.

147. The Use Case ends.

[5] – A CPDLC between the ATC unit and the aircraft cannot be established.

148. The Use Case ends.

[Anywhere] – The Tower Controller is alerted that the data link system/connection is not functioning correctly.

149. R/T will be used to replace the D-TAXI messages.

5.2.2 Use Case 2.2: "Plan and provide taxi-out routing for an outbound flight" – AGL environment only (no data link)

General Assumption

It is assumed that most airports will use the automatic mode as the principal mode to generate routes. The semi-automatic and manual modes will be used to modify the automatically generated route.

This Use Case assumes that push-back and start-up clearances are provided by the same Tower Controller and in this order. However, local procedures may affect this as both clearances can be provided simultaneously, or starting up the aircraft engines during push back may be prohibited, leading to clearances being provided in the reverse order. Also, different Tower Controllers may be in charge of start-up and push-back clearances.

5.2.2.1 General Conditions (Scope and Summary)

This Use Case describes how the ATC system calculates in automatic mode a planned taxi route for an outbound flight, how the calculated planned taxi-out route is presented to the Tower Controller.

It then describes the guidance provided for an outbound flight, how the cleared taxi route is presented to the Tower Controller, how the cleared taxi route will be transmitted to the Flight Crew and how the Flight Crew will exploit the taxi route clearance. It also describes how the AGL are operated in conjunction with the cleared route.

This Use Case takes place in the Short Term planning phase, and more specifically near the end of the Turn-Round Process.

The airport in this Use Case is equipped with a DMAN, A-CDM and AGL.

When there is an operational need for de-icing, the airport in this Use Case is also equipped with a De-icing Manager[22].

The tower is equipped with A-SMGCS and EFS.

5.2.2.2 Pre-Conditions

The Stand, Assigned Departure Runway and TSAT for the flight are known in the ATC system.

When de-icing conditions prevail, the requirement for de-icing (i.e. no de-icing, de-icing at stand, de-icing after push back or remote de-icing), the allocated de-icing area[23] (for remote de-icing) and the expected de-icing time (in the case de-icing is required) for the flight are known in the ATC system.

Note: This information will be obtained from the De-icing Manager. The requirement for de-icing and the allocated de-icing area will be possibly updated by the Tower Controller in the ATC system.

The Use Case is applicable in all weather conditions.

5.2.2.3 Post-Conditions

The aircraft is lined up and ready for departure.

5.2.2.4 Actors

- Tower Clearance Delivery Controller
- Tower Ground Controller
- Tower Runway Controller
- Flight Crew

[22] In case a remote De-icing Manager does not become part of SESAR Step 1 airport concept, the required information to include de-icing into the route planning process can be obtained through A-CDM.
[23] See section 1.6 for the definition of "de-icing area".

5.2.2.5 Trigger

Availability of stand, assigned departure runway and TSAT in the ATC system.

5.2.2.6 Nominal Flow

1. The A-SMGCS Routing function is informed by the ATC system that the assigned departure runway, stand and TSAT for the flight are available.
2. The A-SMGCS Routing function calculates the planned taxi-out route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways and standard taxi routes.
3. The calculated planned taxi-out route is used by the ATC system to calculate an estimated taxi time. This taxi time is used by the DMAN to refine the TSAT/TTOT.
4. The ATC system informs the Tower Clearance Delivery Controller that the planned taxi-out route is available.
5. The Flight Crew requests the ATC Departure Clearance via R/T or ACARS.
6. The Tower Clearance Delivery Controller issues the ATC Departure Clearance and updates the ATC system, indicating that the ATC Departure Clearance has been delivered.
7. The Tower Clearance Delivery Controller transfers the aircraft to the Tower Ground Controller (or to the Apron Manager, depending on the airport organisation) via R/T.
8. The Flight Crew contacts the Tower Ground Control via R/T and prepares for push back.
9. The Flight Crew requests push back via R/T.

   Note: In addition a specific time and push back direction may be added.

10. The Tower Ground Controller approves the push back via R/T

    Note: In addition a specific time and push back direction may be added.

11. The Flight Crew acknowledges the pushback approval via R/T.
12. The Flight Crew instructs the ground handler (tug driver) accordingly (or at some airports the tug driver receives instructions directly from the Tower Ground Controller).
13. The A-SMGCS HMI displays the portion of route that has been cleared (push back) and the remaining part of the route as yet to be cleared (pending).
14. The push back is completed and the Flight Crew request start-up approval to the Tower Ground Controller by R/T.
15. The Tower Ground Controller approves the start-up via R/T and makes an input to the HMI. *Note: In addition a specific time may be added.*
16. The Flight Crew acknowledges the start-up approval via R/T.
17. The Flight Crew commences to start up the engine/s.
18. The start-up is completed and the Flight Crew request taxi instructions by R/T.
19. The Tower Ground Controller verifies the planned taxi-out route and issues the taxi instruction “Follow the Greens to <clearance limit>”via R/T and makes an input to the HMI.

    Note: It is assumed that the <clearance limit> will normally be either the holding point for the departure runway or the limit of the area of responsibility of the Tower Ground Controller issuing the “Follow the Greens” instruction.

20. The Flight Crew acknowledges the taxi instructions via R/T.
21. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).
22. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the aircraft) of the taxiway lights associated to the cleared taxi route.
23. The A-SMGCS HMI displays the segments of the AGL that are illuminated.

24. The Flight Crew commences to taxi the aircraft along the cleared taxi route. The AGL system automatically switches on segments of lights in front of the aircraft, according to the aircraft position and the route. The AGL system switches off lights behind the aircraft.
25. The Tower Ground Controller instructs the Flight Crew by R/T to contact the Tower Runway Controller.
26. The Flight Crew contact the Tower Runway Controller by R/T.
27. On reaching the Holding Point the Tower Runway Controller issues line up clearance by R/T to the Flight Crew.
28. The Tower Runway Controller informs the system via an input to the HMI that line up clearance has been given.
29. The stop bar turns off and the AGL turns on showing the taxi route onto the runway.
30. The aircraft enters the runway and lines-up.
31. The use case ends.

5.2.2.7 Alternative Flows

<u>[1] – When de-icing conditions prevail.</u>

32. The A-SMGCS Routing function is informed by the ATC system that the assigned departure runway, stand, TSAT, requirement for de-icing (i.e. no de-icing, de-icing at stand, de-icing after push back or remote de-icing), allocated de-icing area (for remote de-icing) and expected de-icing time (when de-icing is required) for the flight are available.
33. The A-SMGCS Routing function calculates the planned taxi-out route (up to the Runway / Holding Point) in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways, standard taxi routes and de-icing areas location if remote de-icing is required.
34. The calculated planned taxi-out route is used by the ATC system to calculate an estimated taxi time. The expected de-icing time is taken into account to calculate this taxi time. This taxi time is used by the DMAN to refine the TSAT/TTOT.
35. The flow continues at step 4.

<u>[5] – A revised planned taxi-out route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration, taxiway closure,…).</u>

36. The A-SMGCS Routing function re-calculates the planned taxi-out route in automatic mode, based on the new information available in the ATC system.
37. The ATC system recalculates the corresponding estimated taxi time, and if necessary updates the TSAT/TTOT.
38. The flow returns to step 4.

Note: any update of the requirement for de-icing or of an allocated de-icing area is considered as a change to a known constraint.

<u>[9] – The aircraft requires de-icing on stand.</u>

39. The Flight Crew sends a request for de-icing on stand via R/T.
40. The Tower Ground Controller approves the de-icing via R/T.
41. The Flight Crew acknowledges the de-icing approval via R/T.
42. The Flight Crew contacts the de-icing agent to start de-icing the aircraft.
43. Once de-icing is complete, the Flight Crew informs the Tower Ground Controller via R/T.
44. The flow resumes at step 9.

[9] – The aircraft requires de-icing after push back.

45. The Flight Crew request to push back and de-ice via R/T.
46. The Tower Ground Controller approves the push back and the de-icing via R/T.
47. The Flight Crew acknowledges the pushback approval and the de-icing approval via R/T.
48. The Flight Crew instructs the ground handler (tug driver) accordingly (or at some airports the tug driver receives instructions directly from the Tower Ground Controller).
49. The A-SMGCS HMI displays the portion of route that has been cleared (push back) and the remaining part of the route as yet to be cleared (pending).
50. The push back is completed and the Flight Crew contacts the de-icing agent to start de-icing the aircraft.
51. Once de-icing is complete, the Flight Crew informs the Tower Ground Controller via R/T.
52. The flow continues at step 14.

[10] – AGL system capable of displaying Pushback segment.

53. The AGL system turns on the Pushback segment of the taxiway lights associated with the Pushback procedure.
54. The Use Case resumes at step 11.

[18] – The aircraft requires remote de-icing.

55. The start-up is completed and the Flight Crew request taxi instructions to the de-icing area by R/T.
56. The Tower Ground Controller verifies the planned taxi-out route and issues the taxi instruction “Follow the Greens to <clearance limit>”via R/T and makes an input to the HMI.

Note: the message may not indicate a specific de-icing bay (NE4 for example) but a stop before the allocated de-icing area (NE in the above example) because it is assumed the de-icing bay allocated to the aircraft is not known at this stage.

57. The Flight Crew acknowledges the taxi instructions via R/T.
58. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).
59. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the aircraft) of the taxiway lights associated to the cleared taxi route.
60. The A-SMGCS HMI displays the segments of the AGL that are illuminated.
61. The Flight Crew commences to taxi the aircraft along the cleared taxi route. The AGL system automatically switches on segments of lights in front of the aircraft, according to the aircraft position and the route. The AGL system switches off lights behind the aircraft.
62. Once the Tower Ground Controller receives from the de-icing manager the de-icing bay allocated to the aircraft, the Tower Ground Controller updates the cleared trajectory via an input to the HMI.
63. The Tower Ground Controller instructs the Flight Crew to contact the de-icing agent via R/T.
64. The Flight Crew contacts the de-icing agent via R/T.
65. Once de-icing is complete, the Flight Crew contacts the Tower Ground Controller via R/T and informs that de-icing is complete.
66. After the de-icing checklist is completed, the Flight Crew request taxi instructions by R/T in order to vacate the de-icing bay and resume taxi.
67. The flow resumes at step 18.

[25] – The Tower Ground Controller decides to modify the taxi-out route (change from taxiway D to B).

68. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi out route in the System via the HMI.
69. The Use Case continues at step 25.

Between [24] and [25] – The Flight Crew requests a change of taxi-out route or Holding Point.

70. The Flight Crew contact the Tower Ground Controller via R/T, stating their request.
71. The Tower Ground Controller examines the request.
72. The Tower Ground Controller modifies, in semi-automatic or manual mode, the taxi out route in the System.
73. The Tower Ground Controller approves the request by issuing a new "Follow the Greens <clearance limit> instruction via R/T.
74. The Flight Crew acknowledge it via R/T.
75. The Use Case returns to step 24.

Between [24] and [25] – The Tower Ground Controller inputs a Hold instruction into the system in order to give way to another mobile at a taxiway intersection.

76. The Tower Ground Controller inputs the hold instruction into the system via the HMI.
77. The segment of switched on AGL terminates at the defined position by the Tower Ground Controller
78. The Flight Crew stops the aircraft when no more lit AGLs are visual in front of the aircraft.
79. The other mobile crosses the taxiway intersection.
80. The Tower Ground Controller removes the Hold instruction via the HMI.
81. The Use Case returns to step 22.

[24] The flight is taxiing to runway 27R that involves crossing active runway 27L during the taxi out

82. When reaching the Stop Bar at the Holding Point of runway 27L, the Tower Ground Controller instructs the Flight Crew by R/T to contact the Tower Runway Controller.
83. The Flight Crew contact the Tower Runway Controller by R/T.
84. The Tower Runway Controller issues a clearance by R/T to Cross Runway 27L to the Flight Crew.
85. The Tower Runway Controller informs the system via an input to the HMI that the Crossing clearance has been given.
86. The Flight Crew acknowledge the crossing clearance via R/T.
87. The stop bar turns off and the AGL turns on showing the taxi route onto and off the runway up until the area of responsibility of the next Tower Controller.
88. The Flight Crew crosses the runway.
89. The Tower Runway Controller instructs the Flight Crew by R/T to contact the Tower Ground Controller.
90. The Flight Crew contact the Tower Ground Controller.
91. The Use Case returns to step 19.

Between [24] and [25] The Flight Crew requests to return to the gate for technical reasons.

92. The Flight Crew contact the Tower Ground Controller via R/T, stating their request.
93. The Tower Ground Controller assesses the request and modifies, in semi-automatic or manual mode, the taxi-out route in the System into a taxi-in route.

106. The Use Case returns to step 9 in the Use Case "Plan and Provide taxi-in routing for an inbound flight" – AGL environment (no datalink)

5.2.2.8 Failure Flows

[2] – The A-SMGCS Routing function cannot calculate a planned taxi-out route for a specific flight/all flights.

107. The system informs the Tower Controller/Supervisor that no planned taxi-out route can be calculated for the flight/all flights.
108. The Tower Controller/Supervisor takes appropriate action to resolve the problem following local procedures.
109. The Use Case returns to step 6.

Anywhere between [19] and [29] – The AGL is in operation and the A-SMGCS Routing and Guidance functions fail.

110. All TCL will be switched off as fall-back[19].

5.3 Operational Scenario 3: "Medium to Short term Planning"

Note: the description of the scenario has been taken from Step 1 Airport DOD – 2014 Update, Section 4.2.4 Operational Scenario Medium to Short Term Planning ([11]) made by 06.02. Additions or modifications (if any) will be made using italic font.

This Scenario provides an overview of all the planning activities required for the continuous refinement of the AOP during the Medium/Short Term Planning Phase.

The Medium Term planning phase addresses the airport plan evolution from about 6 months before the day of operation until one day before start of operations, while the short term planning phases addresses the airport plan evolution from one day before operation until and including the execution of operations.

In the Medium/Short Term Planning Phase, as the execution of the flight(s) / trajectory(ies) is getting closer, more specific data becomes available: accurate traffic demand, links between arrival and departure flights, *runway* configurations, weather predictions, trajectory planning deviations, etc.

At this stage the en-route to en-route concept can be applied, in other words the seamless ATM can be built. The main steps to follow are:

- Refine the operational capacity according to the actual situation (i.e. airport configuration, weather);
- Check if the Performance Targets can be achieved;
- Make the airspace user's demand balance with the declared capacity;
- Ensure coherence between Airport Operations and Network Operations.

The initial reference for the schedule is performed during the Long Term Planning Phase in terms of declared airport capacity. A description of these processes is out of the scope of the present Scenario and is covered by the Long Term Operational Scenario

The scenario starts after the *International Air Transport Association* (IATA) Schedules Conference; approx. 6 months before the day of operations. The scenario ends when the flight / trajectory is ready for execution (start of operation).

Focus of the scenario is on the short term activities until the actual start of operation.

Even though 06.02 scenario is focused on aircraft operations, other ground movements are directly related to the short term planning of the airport. Taxiing routes are directly affected by other movements and this may affect the overall performance of the airport. Thus, the use case "Plan and Provide Routing for a Ground Movement by a Mobile" is allocated in this operational scenario, as part of the Short-term planning phase.

5.3.1 Use Case 3.1: "Plan and Provide Routing for an Aircraft Towing manoeuvre" – Datalink environment (no AGL)

General Assumption

In the case where the ATC unit is unable to establish a CPDLC connection, the Vehicle Driver will inform ATC by R/T and continue to follow normal non-CPDLC procedures. Similarly, in case of emergency, of a time critical situation or to clarify any ambiguity, any actor involved in this Use Case can revert to voice and follow non-CPDLC procedures. In nominal conditions, dialogs initiated by data link shall be completed by data link and dialogs initiated by voice shall be completed by voice.

It is assumed that most airports will use the automatic mode as the principal mode to generate routes. The semi-automatic and manual modes will be used to modify the automatically generated route.

This Use Case assumes towing missions are assigned / negotiated by R/T, although some airports use display systems in the tow tugs, connected to the disposition systems via non-aviation data link.

5.3.1.1 General Conditions (Scope and Summary)

This use case describes how an Aircraft Towing manoeuvre will be planned in the system, how the ATC system calculates in automatic mode a planned route for the movement and how the calculated planned route is presented to the Tower Ground Controller. This Use Case also describes the guidance provided for an aircraft towing manoeuvre, how the cleared route is presented to the Tower Controller, how the cleared route will be transmitted to the Tow Vehicle Driver and how the Tow Vehicle Driver will exploit the route clearance.

5.3.1.2 Pre-Conditions

The airport is equipped with an A-SMGCS, EFS and data link communication.

The Use Case is applicable in all weather conditions

5.3.1.3 Post-Conditions

The tow manoeuvre is successfully completed.

5.3.1.4 Actors

Tower Ground Controller

Vehicle Driver (at certain airports the role of the Vehicle Driver exchanging information with the Tower Controller can be taken over by a Follow-me Car driver)

AOC

5.3.1.5 Trigger

Input of planned ground movement in the System by the AOC.

5.3.1.6 Nominal Flow

1. The AOC plans the Ground Movement in the system, stating the Starting point, Ending Point and an estimated time schedule.
2. The A-SMGCS Routing function is informed by the system that a Ground Movement is planned in the system.
3. The A-SMGCS Routing function calculates a planned route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways and standard taxi routes.
4. The planned route is used by the ATC system to calculate an estimated taxi time.
5. The ATC system informs the Tower Ground Controller of the availability of the planned route in the system.
6. The Tower Ground Controller has the possibility to visualise and modify, using the A-SMGCS HMI, the planned route.
7. The Tow Vehicle Driver contacts the Tower Ground Controller by R/T and prepares for the towing manoeuvre.
8. The Tow Vehicle Driver requests a clearance via data link to perform the aircraft towing manoeuvre (REQUEST TOW).
9. Upon ATSU system receipt of the Tow request, the request is displayed on the Tower Ground Controller's HMI.
10. The Tower Ground Controller verifies the planned route for the manoeuvre and issues the TOW instruction via data link by making an input in the HMI (TOW TO STAND 49 VIA TWY A B C).
11. The Tow Vehicle Driver receives the TOW message and acknowledges the message by the sending of a WILCO message (WILCO).
12. The A-SMGCS HMI displays the portion of the route that has been approved for towing as cleared route and the remaining part of the route as yet to be cleared (i.e. pending).

13. The Tow Vehicle Driver commences the manoeuvre along the cleared route.
14. The Tow Vehicle Driver arrives at its destination and informs the Tower Ground Controller via R/T that the tow manoeuvre is terminated.
15. The Tower Ground Controller acknowledges the Tow Vehicle Driver and informs the system via an input to the HMI that the manoeuvre is terminated.
16. The use case ends.

5.3.1.7 Alternative Flows

[6] – A revised planned route is calculated by the A-SMGCS Routing function following a Tower Ground Controller input.

17. The Tower Ground Controller edits the system generated planned route in semi-automatic or manual mode.
18. After the editing by the Tower Ground Controller, the ATC system re-calculates the corresponding estimated taxi time.
19. The flow resumes at step 6.

[6] – A revised planned route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration/stand change, taxiway closure…).

20. The A-SMGCS Routing function re-calculates the planned taxi-in route in automatic mode, based on the new information available in the ATC system.
21. The ATC system re-calculates the corresponding estimated taxi time.
22. The flow resumes at step 6.

Between [13] and [14] – The Tower Ground Controller decides to modify the cleared route for the tow movement.

23. The Tower Ground Controller modifies, in semi-automatic or manual mode, the route in the system via the HMI.
24. The Tower Ground Controller contacts the Vehicle Driver via R/T and issues the amended TOW instructions.
25. The Vehicle Driver acknowledges the amended TOW instructions via R/T.
26. The flow resumes at step 13.

5.3.1.8 Failure Flows

[1] – Airport Operations Centre is not in a position to plan the manoeuvre, or the airport system is not capable of handling such input.

27. The Use Case ends.

5.3.2 Use Case 3.2: “Plan and Provide Routing for an Aircraft Towing manoeuvre” – AGL environment only (no data link)

General Assumption

It is assumed that most airports will use the automatic mode as the principal mode to generate routes. The semi-automatic and manual modes will be used to modify the automatically generated route.

This Use Case assumes towing missions are assigned/negotiated by R/T, although some airports use display systems in the tow tugs, connected to the disposition systems via non-aviation data link.

5.3.2.1 General Conditions (Scope and Summary)

This use case describes how an Aircraft Towing manoeuvre will be planned in the system, how the ATC system calculates in automatic mode a planned route for the movement and how the calculated planned route is presented to the Tower Ground Controller. This Use Case also describes the guidance provided for an aircraft towing manoeuvre, how the cleared route is presented to the Tower Controller, how the cleared route will be transmitted to the Tow Vehicle Driver and how the Tow Vehicle Driver will exploit the route clearance. It will also describe how the AGL are operated in conjunction with the cleared route.

5.3.2.2 Pre-Conditions

The airport is equipped with an A-SMGCS, EFS and AGL.

The Use Case is applicable in all weather conditions.

5.3.2.3 Post-Conditions

The tow manoeuvre is successfully completed

5.3.2.4 Actors

Tower Ground Controller

Vehicle Driver (at certain airports the role of the Vehicle Driver exchanging information with the Tower Controller can be taken over by a Follow-me Car driver)

AOC

5.3.2.5 Trigger

Input of planned ground movement in the System by the AOC.

5.3.2.6 Nominal Flow

1. The AOC plans the Ground Movement in the system, stating the Starting point, Ending Point and an estimated time schedule.
2. The A-SMGCS Routing function is informed by the system that a Ground Movement is planned in the system.
3. The A-SMGCS Routing function calculates a planned route in automatic mode, based on information available in the ATC system, such as taxiway rules, closed taxiways and standard taxi routes.
4. The planned route is used by the ATC system to calculate an estimated taxi time.
5. The ATC system informs the Tower Ground Controller of the availability of the planned route in the system.
6. The Tower Ground Controller has the possibility to visualise and modify, using the A-SMGCS HMI, the planned route.
7. The Tow Vehicle Driver contacts the Tower Ground Controller by R/T and requests a clearance to perform the aircraft towing manoeuvre.

8. The Tower Ground Controller verifies the planned route and issues the tow instruction “Follow the Greens to <clearance limit>” via R/T and makes an input to the HMI.

   Note: It is assumed that the <clearance limit> will normally be either the final destination of the tow manoeuvre or the limit of the area of responsibility of the Tower Ground Controller issuing the “Follow the Greens” instruction.

9. The Vehicle Driver acknowledges the TOW instructions via R/T.
10. The A-SMGCS HMI displays the portion of the route that has been approved for towing as cleared route and the remaining part of the route as yet to be cleared (pending).
11. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the aircraft) of the taxiway lights associated to the cleared route.
12. The A-SMGCS HMI displays the segments of the AGL that are illuminated.
13. The Tow Vehicle Driver commences the manoeuvre along the cleared route and the AGL switch automatically according to the mobile’s position and the route.
14. The Tow Vehicle Driver arrives at its destination and informs the Tower Ground Controller via R/T that the tow manoeuvre is terminated.
15. The Tower Ground Controller acknowledges the Tow Vehicle Driver and informs the system via an input to the HMI that the manoeuvre is terminated.
16. The use case ends.

5.3.2.7 Alternative Flows

<u>[6] – A revised planned route is calculated by the A-SMGCS Routing function following a Tower Ground Controller input.</u>

1. The Tower Ground Controller edits the system generated planned route in semi-automatic or manual mode.
2. After the editing by the Tower Ground Controller, the ATC system re-calculates the corresponding estimated taxi time.
3. The flow resumes at step 6.

<u>[6] – A revised planned route is calculated by the A-SMGCS Routing function following a change to a known constraint (e.g. runway configuration/stand change, taxiway closure…).</u>

4. The A-SMGCS Routing function re-calculates the planned taxi-in route in automatic mode, based on the new information available in the ATC system.
5. The ATC system re-calculates the corresponding estimated taxi time.
6. The flow resumes at step 6.

<u>Between [13] and [14] – The Tower Ground Controller decides to modify the cleared route for the tow movement.</u>

17. The Tower Ground Controller modifies, in semi-automatic or manual mode, the route in the System.
18. The flow returns to step 10.

5.3.2.8 Failure Flow

<u>Anywhere between [5] and [15] – The AGL is in operation and the A-SMGCS Routing and Guidance functions fail</u>

19. All TCL will be switched off as fall-back[19].

5.3.3 Use Case 3.3: “Guidance of Vehicles” – Data link environment (no AGL)

General Assumption

In the case where the ATC unit is unable to establish a CPDLC connection, the Vehicle Driver will inform ATC by R/T and continue to follow normal non-CPDLC procedures. Similarly, in case of emergency, of a time critical situation or to clarify any ambiguity, any actor involved in this Use Case can revert to voice and follow non-CPDLC procedures. In nominal conditions, dialogs initiated by data link shall be completed by data link and dialogs initiated by voice shall be completed by voice.

5.3.3.1 General Conditions (Scope and Summary)

This Use Case describes the guidance provided for a vehicle on the manoeuvring area, how the cleared route is presented to the Tower Controller, how the cleared route will be transmitted to the Vehicle Driver and how the driver will exploit the route information.

According to 06.02 Step 1 DOD, this Use Case takes place in the Medium to Short-Term Planning operational scenario, although aircraft flight phases do not apply to vehicles strictly speaking.

The airport in this Use Case is equipped with an A-SMGCS, EFS and data link.

The vehicle is equipped with data link and airport moving map.

Text in blue shows examples of the uplink or downlink data link messages for vehicles.

5.3.3.2 Pre-Conditions

The Use Case is applicable in all weather conditions.

5.3.3.3 Post-Conditions

The vehicle has reached his destination.

5.3.3.4 Actors

Vehicle Driver

Tower Ground Controller

Tower Runway Controller (for alternative flow only)

5.3.3.5 Trigger

Vehicle driver requests a clearance to proceed to his destination

5.3.3.6 Nominal Flow

1. The Vehicle Driver contacts the Tower Ground Controller via R/T and states his/her intention to proceed to his/her destination.
2. The Tower Ground Controller creates, in semi-automatic or manual mode, the planned route in the System via the HMI.
3. When the Vehicle Driver has established a data link connection, he/she requests to PROCEED via the sending of a datalink message (REQUEST PROCEED).
4. Upon ATSU system receipt of the PROCEED request, the request is displayed on the Tower Ground Controller’s HMI.
5. The Tower Ground Controller verifies the previously created route and approves the vehicle movement via data link and makes an input to the HMI (PROCEED TO STAND 49 VIA TWY A B C).
6. The Vehicle Driver receives the PROCEED approval and acknowledges the message by the sending of a WILCO message (WILCO).
7. The A-SMGCS HMI displays the part of the route that has been approved as cleared route.

8. The Vehicle Driver commences to drive along the cleared route. Guidance information is provided to the Vehicle Driver via the Airport Moving Map.
9. The Vehicle Driver arrives at the destination and informs the Tower Ground Controller via R/T.
10. The Tower Ground Controller acknowledges the Vehicle Driver and informs the system via an input to the HMI that the manoeuvre is terminated.
11. The use case ends.

5.3.3.7 Alternative Flows

[5] – The Tower Ground Controller can, for the time being not approve the data link request of the Vehicle Driver.

12. The Tower Ground Controller sends a STANDBY message (STANDBY) via an input on the HMI.
13. The flow resumes at step 5.

[6] – The Vehicle Driver replies with a STANDBY message.

14. The Vehicle Driver sends a STANDBY message (STANDBY).
15. Upon ATSU system receipt of the STANDBY message, the message is displayed on the Controller HMI.
16. The Use Case resumes at step 6.

[8] – The Tower Ground Controller decides to modify the taxi route.

17. The Tower Ground Controller modifies the cleared route in the System via the HMI.
18. The Tower Ground Controller sends a REVISED PROCEED message to the Vehicle Driver (REVISED PROCEED TO STAND 49 VIA TWY A B R C).
19. The Vehicle Driver receives the REVISED PROCEED message and acknowledge the message by the sending of a WILCO message (WILCO).
20. The A-SMGCS HMI displays the updated portion of the route that has been approved for driving as cleared route and the remaining part of the route as yet to be cleared (pending).
21. The flow resumes at step 8.

Between [8] and [9] – The Vehicle Driver requests a change of route.

22. The Vehicle Driver contacts the Tower Ground Controller via R/T, stating the request.
23. The Tower Ground Controller examines the request.
24. The Tower Ground Controller modifies, in semi-automatic or manual mode, the route in the System.
25. The Tower Ground Controller sends a revised clearance via data link to the Vehicle Driver (REVISED PROCEED TO STAND 49 VIA TWY B S T C).
26. The flow returns to step 6.

Between [8] and [9] – The Tower Ground Controller inputs a Hold Short instruction into the system in order to give way to another mobile at a taxiway intersection.

27. The Tower Ground Controller inputs the hold instruction into the system via the HMI.
28. The Tower Ground Controller sends the REVISED PROCEED instruction via data link to the Vehicle Driver (REVISED PROCEED TO STAND 49 VIA TWY B C HOLD SHORT TWY R).

Note: if the Tower Ground Controller considers that the HOLD SHORT Instruction is time critical, he shall not use data link but R/T in order to communicate with the Vehicle Driver.

29. The Vehicle Driver receives the REVISED PROCEED message and acknowledges the message by the sending of a WILCO message (WILCO).
30. The Vehicle Driver stops before the taxiway intersection. The AMM highlights the portion of the route that is no longer cleared.
31. The other mobile crosses the taxiway intersection.

32. The Tower Ground Controller updates the route by removing the Hold Short via an input on the HMI
33. The flow returns to step 5.

[3] – The vehicle route to the stand involves crossing an active runway

34. The Tower Ground Controller verifies the previously created route and approves the vehicle movement, via data link, up to the Holding Point of the Active Runway and makes an input to the HMI (PROCEED TO HP Y11 VIA TWY N BD13 D HOLD SHORT RWY 27L).
35. The Vehicle Driver receives the clearance and acknowledges by the sending of a WILCO message (WILCO).
36. The A-SMGCS HMI displays the portion of the route that has been approved for taxiing as cleared route and the remaining part of the route as yet to be cleared (pending).
37. The Vehicle Driver commences to drive along the cleared route. Guidance information to the Vehicle Driver is provided by the AMM.
38. When reaching the Stop Bar at the Holding Point of runway 27L, the Tower Ground Controller instructs the Vehicle Driver by data link to contact the Tower Runway Controller.
39. The Vehicle Driver contacts the Tower Runway Controller by R/T.
40. The Tower Runway Controller issues a clearance by R/T to Cross Runway 27L to the Vehicle Driver.
41. The Tower Runway Controller informs the system via an input to the HMI that the Crossing clearance has been given.
42. The Vehicle Driver acknowledges the crossing clearance via R/T.
43. The stop bar turns off.
44. The Vehicle Driver crosses the runway.
45. The Tower Runway Controller instructs the Vehicle Driver by R/T to contact the Tower Ground Controller.
46. The Vehicle Driver contacts the Tower Ground Controller.
47. The Tower Ground Controller issues a PROCEED instruction via data link and makes an input to the HMI (PROCEED TO STAND 88 VIA TWY X Y Z).
48. The flow continues at step 6.

[3] – The Tower Controller cannot approve the data link request of the Vehicle Driver.

49. The Tower Ground Controller sends an UNABLE message (UNABLE) via an input on the HMI, or reverts to R/T.
50. The Vehicle Driver is notified by the system if the Tower Ground Controller has sent an UNABLE message and closes it on his/her HMI.
51. The Tower Ground Controller contacts the Vehicle Driver via R/T to clarify the situation.
52. The Use Case ends or returns to step 1.

[6] – The Vehicle Driver cannot accept the data link message received.

53. The Vehicle Driver sends an UNABLE message (UNABLE), or reverts to R/T.
54. The Tower Ground Controller is notified by the system if the Vehicle Driver has sent an UNABLE message.
55. The Tower Ground Controller contacts the Flight Crew via R/T to clarify the situation.
56. The Use Case ends or returns to step 1.

5.3.3.8 Failure Flows

[3] – A CPDLC between the ATC unit and the Vehicle cannot be established.

57. The Use Case ends.

[Anywhere] – The Tower Controller is alerted that the data link system/connection is not functioning correctly.

58. R/T will be used to replace the Data link messages.

5.3.4 Use Case 3.4: "Guidance of Vehicles" – AGL environment (no data link)

5.3.4.1 General Conditions (Scope and Summary)

This Use Case describes the guidance provided for a vehicle on the manoeuvring area, how the cleared route is presented to the Tower Controller, how the cleared route will be transmitted to the Vehicle Driver and how the driver will exploit the route information. It also describes how the AGL are operated in conjunction with the cleared route.

According to 06.02 Step 1 DOD, this Use Case takes place in the Medium to Short-Term Planning operational scenario, although vehicles are not strictly speaking concerned with the same phases as an aircraft.

The airport in this Use Case is equipped with an A-SMGCS, EFS and AGL.

The vehicle is equipped with R/T.

5.3.4.2 Pre-Conditions

The Use Case is applicable in all weather conditions.

5.3.4.3 Post-Conditions

The vehicle has reached his destination.

5.3.4.4 Actors

Vehicle Driver

Tower Ground Controller

Tower Runway Controller (for alternative flow only)

5.3.4.5 Trigger

Vehicle driver requests a clearance to proceed to his destination.

5.3.4.6 Nominal Flow

1. The Vehicle Driver contacts the Tower Ground Controller via R/T and states his/her intention to proceed to his/her destination.
2. The Tower Ground Controller creates, in semi-automatic or manual mode, the planned route in the System via the HMI.
3. The Tower Ground Controller verifies the previously created route and issues the instruction "Follow the Greens to <clearance limit>" via R/T and makes an input to the HMI.

   Note: It is assumed that the <clearance limit> will normally be either the destination at the airfield or the limit of the area of responsibility of the Tower Ground Controller issuing the "Follow the Greens" instruction.

4. The Vehicle Driver acknowledges the instruction via R/T.
5. The A-SMGCS HMI displays the portion of the route that has been approved as cleared route.
6. The AGL system turns on segments (equalling a distance not greater than 300m ahead of the vehicle) of the taxiway lights associated to the cleared route.
7. The Vehicle Driver commences to drive along the cleared route. The AGL system automatically switches on segments of lights in front of the vehicle, according to the vehicle position and the route. The AGL system switches off lights behind the vehicle.
8. The Vehicle Driver arrives at the destination and informs the Tower Ground Controller via R/T.

9. The Tower Ground Controller acknowledges the Vehicle Driver and informs the system via an input to the HMI that the manoeuvre is terminated.
10. The use case ends.

5.3.4.7 Alternative Flows

Between [7] and [8] – The Tower Ground Controller decides to modify the taxi route.

11. The Tower Ground Controller modifies the cleared route in the System via the HMI.
12. The flow returns to step 5.

Between [7] and [8] – The Vehicle Driver requests a change of route.

13. The Vehicle Driver contacts the Tower Ground Controller via R/T, stating the request.
14. The Tower Ground Controller examines the request.
15. The Tower Ground Controller modifies, in semi-automatic or manual mode, the route in the System.
16. The flow returns to step 5.

Between [7] and [8] – The Tower Ground Controller inputs a Hold Short instruction into the system in order to give way to another mobile at a taxiway intersection.

27. The Tower Ground Controller inputs the hold instruction into the system via the HMI.
28. The segment of switched on AGL terminates at the defined position by the Tower Ground Controller
29. The Vehicle Driver stops when no more lit AGLs are visual in front of the vehicle.
30. The other mobile crosses the taxiway intersection.
31. The Tower Ground Controller updates the route by removing the Hold Short via an input on the HMI
32. The flow returns to step 5.

[3] – The vehicle route to the stand involves crossing an active runway

33. When reaching the Stop Bar at the Holding Point of runway 27L, the Tower Ground Controller instructs the Vehicle Driver by data link to contact the Tower Runway Controller.
34. The Vehicle Driver contacts the Tower Runway Controller by R/T.
35. The Tower Runway Controller issues a clearance by R/T to Cross Runway 27L to the Vehicle Driver.
36. The Tower Runway Controller informs the system via an input to the HMI that the Crossing clearance has been given.
37. The Vehicle Driver acknowledges the crossing clearance via R/T.
38. The stop bar turns off and the AGL turns on showing the route onto and off the runway up until the area of responsibility of the next Tower Controller.
39. The Vehicle Driver crosses the runway.
40. The Tower Runway Controller instructs the Vehicle Driver by R/T to contact the Tower Ground Controller.
41. The Vehicle Driver contacts the Tower Ground Controller.
42. The flow resumes at step 3.

5.3.4.8 Failure Flows

Anywhere between [6] and [8] – The AGL is in operation and the A-SMGCS Routing and Guidance functions fail.

55. All TCLs will be lit as fall-back[19].

6 Requirements

The operational requirements defined in this section are largely the same as those initially developed in Phase 2 by primary projects 06.07.02 (in its Preliminary OSED for advanced surface routing – [34]) and 06.07.03 (in its Phase 2 Preliminary OSED – [35]). These requirements have been complemented by requirements for Virtual Block Control initially defined by the now closed project 06.08.07 (in its Preliminary OSED for Domain 3) and by requirements for the cockpit aspects derived from those defined by project 09.13 (in its High level Functional Requirement Document for the advanced package – [37]). Consequently, the operational requirements previously defined by 06.07.02 and 06.07.03 in their Phases 1 and 2, as well as those defined by 06.08.07, are superseded by the present requirements

Identifiers of former operational requirements from 06.07.02, 06.07.03 and 06.08.07 have also been adapted to suit the numbering scheme adopted in this OFA OSED.

6.1 Route generation integrated with planning information

Requirements in this section cover SESAR Solution #22 (Automated assistance to controllers for surface movement planning and routing). This solution has achieved V3 following SESAR Release 5 and is thus considered as ready for industrialisation. A number of requirements in this section, mostly related to APTR, EBS, scheduled constraints, moving entities and supervision, remain in progress because they have not been validated in a representative environment in a SESAR Release. However, they do not impact the core solution.

6.1.1 General requirements on route generation (RGGE series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0001
Requirement	The A-SMGCS Routing function shall be able to work with three different levels of automation, manual, semi-automatic and automatic
Title	Three Different Levels of Automation (Operational Modes)
Status	<Validated>
Rationale	The A-SMGCS Routing function will work in automatic mode by default. Semi-automatic and manual modes provide less automation and allow the Tower Controller to manually change or adjust the routing of one or several mobiles. Some requirements are specific for a determinate mode.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0002
Requirement	Depending on the airport, it may be possible to implement a sole mode or

	any combination of the three modes (manual, semi-automatic and automatic).
Title	Mode Availability and Selection
Status	<In Progress>
Rationale	Busy airports will require all 3 modes to be implemented; however, there could be rare cases where smaller airports decide to implement only the semi-automatic and or manual mode.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0003
Requirement	Independent from the mode of operation, the A-SMGCS Routing function shall be able to link different elements of the airport surface to a route (e.g. starting point, intermediate point, predefined nodes, intermediate segment or destination point)
Title	A-SMGCS Routing function Route Generation Capability
Status	<Validated>
Rationale	Independent from the mode of operation, the A-SMGCS Routing function needs to incorporate the capability to link nodes on the aerodrome surface to a route that can be performed by the mobile.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0004
Requirement	The routes generated by the A-SMGCS Routing function shall contain information about their respective operational status (planned, pending, and cleared).
Title	Route Status
Status	<Validated>
Rationale	The status of a route may affect how the system deals with it.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0005
Requirement	Once the status of a route has been changed to cleared or pending, it shall not revert to planned status and no planned route shall be provided to mobiles.
Title	No reverting to planned status
Status	<Validated>
Rationale	Once a TAXI or PUSH BACK clearance has been received, the mobile enter into the execution phase of its movement and the planned route does not exist anymore
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0006
Requirement	The A-SMGCS Routing function shall be able to plan routes in more than one AoR.
Title	Planning scope

Status	<Validated>
Rationale	The planning function shall have the capability to cover all the movement, in order to be useful (mainly in the automatic mode).
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0007
Requirement	Independent from the mode of operation, the Tower Controller shall be able to modify cleared routes within his/her AoR.
Title	Route Modification for Routes through Multiple AoRs
Status	<Validated>
Rationale	If an airport has multiple AoRs, the responsibility of a Tower Controller for the modification of a cleared route is limited to a specified geographical area.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0008
Requirement	Independent from the mode of operation, the Tower Controller shall be able to modify planned routes within his/her AoR.
Title	Planned route Modification within the Tower Controller's AoR
Status	<Validated>
Rationale	If an airport has multiple AoRs, the Tower Controller will have the possibility

	to modify the planned route in his/her AoR without coordination.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0009
Requirement	In the automatic and semi-automatic mode, when a Tower Controller modifies a planned route outside his/her AoR, the modification shall remain in place when any Tower Controller subsequently edits the route so that they are aware of the modification.
Title	Route Modification outside the Tower Controller's AoR for Routes through Multiple AoRs
Status	<In Progress>
Rationale	If an airport has multiple AoRs, the Tower Controller will have the possibility to modify the planned route outside his/her AoR after coordination with affected Tower Controllers. The level and means of coordination will depend on local procedures: it can be an implicit coordination (system indication) or an explicit coordination (system coordination or voice coordination).
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0010
Requirement	Independent from the mode of operation, the Tower Controller shall be able

	to validate routes within his AoR only.
Title	Route Validation for Routes through Multiple AoRs
Status	<Validated>
Rationale	Even in automatic mode, the Tower Controller still needs to validate the proposed route in his AoR before execution. This has to be reflected in the route generation process.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0011
Requirement	Independent from the mode of operation, changing the standard handover point laid down in the A-SMGCS Routing function shall require coordination with the adjacent Tower Controller to first accept the new handover point before the route is transmitted to the mobile.
Title	Handover Point Adjustment
Status	<Validated>
Rationale	Changing of the handover point can only be made after coordination between the Tower Controllers of two adjacent AoRs to make sure that the affected Tower Controllers are aware and/or agree on the change. The level and means of coordination will depend on local procedures: it can be an implicit coordination (system indication) or an explicit coordination (system coordination or voice coordination).
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0013
Requirement	Independent from the mode of operation, the A-SMGCS Routing function shall be able to integrate Alternative Parallel Taxiway Routing procedures into the route definition or generation process.
Title	APTR Integration into Routes
Status	<Validated>
Rationale	APTR is a means to increase performance on aprons. It is very important for many airports to have this functionality still available with the future system and automatically applied by the A-SMGCS Routing function.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0014
Requirement	Independent from the mode of operation, the A-SMGCS Routing function shall integrate information on the destination point for all types of pushback procedures into the taxi-out routes.
Title	Destination Point of Pushbacks
Status	<Validated>
Rationale	On airports with complex apron and terminal layouts, pushback procedures need to be integrated with the other traffic in order to keep the performance at an acceptable level. Today, Tower Controllers optimize e.g. inbound and outbound relations in cul-de-sac areas by advising destination points for pushback procedures. The performance is dependent on the ability of the A-SMGCS Routing function to do at least the same as the Tower Controllers do today, but automatically.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0015
Requirement	Independent from the mode of operation, the A-SMGCS Routing function shall be able to manage a change of operational configuration automatically.
Title	Capability to Manage Operational Change Automatically
Status	<Validated>
Rationale	In case of a planned or ad hoc change of the operational configuration of an airport (e.g. landing and departure direction are swapped), the A-SMGCS Routing function needs to be able to assist the Tower Controller in planning the traffic according to the new situation by providing proposals for new routes and by automatically adjusting the operational direction of taxiways that can only be used in one direction at a time.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0016
Requirement	The A-SMGCS Routing function shall have the capacity of creating and dissolving “moving entities” consisting of more than one mobile sharing the same route (e.g. tug and aircraft, follow-me car and aircraft). The service shall work with this entity as a whole, with one unique route and taking into account the dimensions of all the mobiles and the distance between them.
Title	Entities management
Status	<In Progress>
Rationale	To simplify the operations and to avoid giving contradictory instructions, mobiles taking part in the same operation have to be considered one entity.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0017
Requirement	The A-SMGCS Routing function shall enable to create and dissolve “moving entities” that include both cooperative mobiles and non-cooperative ones and which share a same route.
Title	Entities generation and dissolution
Status	<In Progress>
Rationale	The system has to be capable of taking into account groups of cooperative and non-cooperative vehicles that operate as a single entity along a route.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0018
Requirement	The A-SMGCS Routing function shall be able to use runway exit points downlinked by arriving aircraft.
Title	Starting point for EBS-equipped arriving aircraft
Status	<In Progress>
Rationale	The runway exit point provided by aircraft equipped with EBS is the starting point of the route computed by the A-SMGCS Routing function for this aircraft.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.08	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0068	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0019
Requirement	The A-SMGCS Routing function shall take into account all the current and scheduled operational constraints, limitations and ad-hoc changes to the airport resource utilisation strategy while generating routes (automatic mode) or aiding in the generation (semi-automatic mode).
Title	Constraints
Status	<Validated>
Rationale	Routes have to take into account the real situation of the operation, and adapt when necessary in order to give a useful output.
Category	<Operational>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-ENV1.0001	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0020
Requirement	The A-SMGCS Routing function shall recalculate the routes of the mobiles affected by an unplanned constraint and show them to the Tower Controllers.
Title	Rerouting calculation
Status	<In Progress>
Rationale	In case of the appearance of a new constraint, the re-routing has to be made taking into account the safety of the movements. Tower Controllers need to be aware on the affected mobiles in the vicinity of the affected area.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0021
Requirement	The A-SMGCS Routing function shall automatically recalculate an alternative route and show it to the Tower Controller, after receiving an ‘UNABLE’ message from a data link equipped mobile.
Title	Alternative rerouting
Status	<In Progress>
Rationale	If a reason is given by the flight crew or the vehicle driver, the Tower Controller can judge whether an alternative routing may be feasible to the flight crew or vehicle driver and send it via data link (or whether reverting to R/T is more appropriate).
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0022
Requirement	The A-SMGCS Routing function shall compute the estimated unimpeded taxi time, from starting to end point, associated to any planned route.
Title	Initial estimated unimpeded taxi time calculation
Status	<Validated>
Rationale	The initial estimated taxi time is an essential information for airport sequencers. For departing aircraft, the estimated unimpeded taxi time is calculated from stand to runway holding point. For arriving aircraft, the estimated unimpeded taxi time is calculated from runway exit point to stand.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-PRE1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0023
Requirement	The A-SMGCS Routing function shall compute the estimated unimpeded remaining taxi time, from current position to end point, for any route.
Title	Remaining estimated unimpeded taxi time calculation
Status	<Validated>
Rationale	The remaining estimated taxi time is an essential information for airport sequencers and shall be updated continuously once aircraft start taxiing.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-PRE1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0024
Requirement	The A-SMGCS Routing function shall update the estimated unimpeded taxi time when the Tower Controller modifies the route and the new estimated taxi time changes by more than a locally configurable time. This applies to both initial and remaining estimated unimpeded taxi times.
Title	Initial and remaining estimated unimpeded taxi time update.
Status	<Validated>
Rationale	The remaining estimated unimpeded taxi time shall be updated every time there is a route modification that significantly changes it.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-PRE1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-	N/A

		off-block	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0025
Requirement	In low visibility conditions, estimated unimpeded taxi times computed by the A-SMGCS Routing function shall be multiplied by a factor determined locally for each route.
Title	Estimated unimpeded taxi time adjustment for LVPs
Status	<In Progress>
Rationale	In case of low visibility, mobiles will taxi or drive more slowly than in normal visibility conditions and the A-SMGCS Routing function has to take this into account when computing the taxi time associated to a route through a multiplying factor. This factor is computed for each route, as the local configuration of aprons and taxiways will affect its value, and should be based on observations.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0026
Requirement	For an aircraft needing remote de-icing, the A-SMGCS Routing function shall consider the de-icing bay provided by the de-icing manager as an intermediate point in the generated taxi-out route.
Title	Taxi-out route going through de-icing bay.
Status	<Validated>
Rationale	In case an aircraft needs remote de-icing, A-SMGCS Routing function has to generate a taxi-out route going through the allocated de-icing bay.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0027
Requirement	For an aircraft needing de-icing after push back or remote de-icing, the A-SMGCS Routing function shall include the estimated de-icing time provided by the de-icing manager in the estimated unimpeded taxi time.
Title	Addition of de-icing time to unimpeded taxi time update.
Status	<Validated>
Rationale	In case an aircraft needs de-icing after having pushed back, the time for de-icing needs to be taken into account in the total taxi-out time.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-PRE1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0028
Requirement	The Tower Controller shall use the A-SMGCS Routing function to continuously keep the system informed of the detailed taxi clearances, and revisions to these clearances, which he/she provides to mobiles.
Title	Tower Controller keeping the system informed
Status	<Validated>
Rationale	The Tower Controller has to keep the system informed of the detailed taxi routes he/she allocates to mobiles in order to keep the system information consistent with the traffic situation and allow the other services depending on the A-SMGCS Routing function to work as expected. This applies both to initial taxi routes and any potential revision of these initial taxi routes, in case of a conflict with another mobile or a new constraint.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-PRE1.0421	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0030
Requirement	When the Tower Controller initiates the modification of a route conflicting with a new constraint, the A-SMGCS Routing function shall automatically propose a new route conforming to this constraint in addition to the other rules and constraints mentioned in REQ-06.07.02-OSED-RGAU.0012.
Title	Route proposal on conflict between route and constraint
Status	<In Progress>
Rationale	To support the Tower Controller in updating the routes conflicting with a new constraint, the A-SMGCS Routing function shall make a first proposal to the Tower Controller. This proposal is generated and taking the new constraint as an additional rule to the aerodrome circulation rules, the limitations due to the aircraft type, the taxiway rules and any other constraint. This prevents the Tower Controller from having to input all the route elements around the new constraint.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGGE.0031
Requirement	The A-SMGCS Routing function shall be monitored by the ATSU technical supervision system.
Title	Technical supervision of the A-SMGCS Routing function
Status	<In Progress>
Rationale	Technical supervisors shall be aware of the status of the A-SMGCS Routing function at every moment.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.1.2 Automatic route generation requirements (RGAU series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0001
Requirement	In the automatic mode, routes shall be planned and generated by the A-SMGCS Routing function without any manual input.
Title	Automatic Mode Route Generation Not Requiring Tower Controller Input
Status	<Validated>
Rationale	In the automatic mode, the task of generating routes for the mobiles will be performed by the A-SMGCS Routing function without manual input for increased efficiency and reduced Tower Controller workload.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0002
Requirement	The A-SMGCS Routing function shall allow configuring the time at which a planned route is automatically generated for a specific aircraft (in relation to the TLDT for arrivals and TSAT for departures).
Title	Planning starting time
Status	<Validated>
Rationale	Each airport has a different variability and different density of operations, thus how much in advance a route can be calculated may be different in every airport. These times will have to be validated in each airport.

Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0003
Requirement	In the automatic mode, the A-SMGCS Routing function shall generate a planned route up to a locally configurable time before the Flight Crew actually requires it.
Title	Automatic Mode Route Generation Restricted Time Window
Status	<Validated>
Rationale	Operational time windows, e.g. defined by airline operational procedures, may require a route to arrive before or after a certain point in time. The A-SMGCS Routing function shall take these restrictions into account and provide the mobile with the route early enough.
Category	<Operational>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0004
Requirement	The routes automatically generated by the A-SMGCS Routing function shall use as a basis default routes configured into the system, corresponding to routes published in the AIP or usual routes defined in the Tower Controller operating handbook if they exist.
Title	Standard Taxi Routes as Basis for Route Generation in Automatic Mode
Status	<Validated>
Rationale	The A-SMGCS Routing function will not have the capability to generate routes according to the overall traffic situation at this stage. Thus, it makes sense to take the published standard taxi routes as a basis and then apply

	any known constraint. The result of the generation process can either be different or identical compared to the default taxi route and may lead to a number of different taxi routes kept internal to the system.
Category	<Functional>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-ENV1.0001	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0005
Requirement	In the automatic mode, the A-SMGCS Routing function shall obtain the starting point of a movement from other airport systems.
Title	Automatic Mode Starting and End Point of Route from Other Airport Systems
Status	<Validated>
Rationale	In the automatic mode, the task of generating routes for the mobiles will be performed by the A-SMGCS Routing function based on data on starting and end point provided by other airport systems such as the AODB or the AOP.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0006
Requirement	The A-SMGCS Routing function shall be capable of determining a taxi starting point for arrivals based on statistic values for the type of aircraft and landing runway.

Title	Starting point for arrivals
Status	<Validated>
Rationale	In automatic mode, neither the Tower Controller nor the Flight Crew will have to input the starting point for the A-SMGCS Routing function. In semi-automatic mode this information can be used by the system to aid the route generation by the Tower Controller.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0007
Requirement	In the automatic mode, the destination of a route shall be automatically fed into the A-SMGCS Routing function.
Title	Destination point
Status	<Validated>
Rationale	In automatic mode, neither the Tower Controller nor the Flight Crew will have to input the destination for the A-SMGCS Routing function.
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0008
Requirement	In the semi-automatic and automatic modes, the A-SMGCS Routing function shall use as the starting point of the planned route for arriving aircraft the pre-defined runway exit for this aircraft.
Title	Runway Exit Information in Semi-Automatic and Automatic Mode
Status	<Validated>
Rationale	The A-SMGCS Routing function needs data on the runway exit from other airport systems for the route generation process.
Category	<Functional>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0023
Requirement	In the semi-automatic and automatic modes, the A-SMGCS Routing function shall prioritise using the runway exit received from an arriving EBS-equipped aircraft as the starting point of the planned route for that aircraft.
Title	Downlinked runway exit information in semi-automatic and automatic modes
Status	<In Progress>
Rationale	If an arriving aircraft is equipped with EBS and has downlinked its planned runway exit, this information should be used in priority to the default value used otherwise.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0024
Requirement	In the semi-automatic and automatic modes, when an arriving aircraft exits the runway after landing, the A-SMGCS Routing function shall use the actual runway exit taken as starting point for the planned taxi route.
Title	Update of starting point after landing
Status	<Validated>
Rationale	If an arriving aircraft is equipped with EBS and has downlinked its planned runway exit, this information should be used in priority to the default value used otherwise.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0009
Requirement	In the semi-automatic and automatic mode, the A-SMGCS Routing function shall use as the destination point of the planned route for an arriving aircraft the allocated stand received from the appropriate airport system.
Title	Stand Information in Semi-Automatic and Automatic Mode
Status	<Validated>
Rationale	The A-SMGCS Routing function needs data on the allocated stand from other airport systems for the route generation process.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0010
Requirement	In the semi-automatic and automatic mode, the A-SMGCS Routing function shall use as the destination point of the planned route for a departing aircraft the holding point received from the appropriate airport system.
Title	Holding Point Information in Semi-Automatic and Automatic Mode
Status	<Validated>
Rationale	The A-SMGCS Routing function needs input data on the holding position from other airport systems for the route generation process.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0011
Requirement	In the semi-automatic and automatic mode, the A-SMGCS Routing function shall automatically take into account the aircraft type provided by the appropriate airport system to select taxiway segments which are suitable for this aircraft type.

Title	Route Generator Checks Aircraft Type in Semi-Automatic and Automatic Mode
Status	<Validated>
Rationale	In the process of defining a route, a taxiway segment linking the selected nodes could be incapable of supporting the aircraft type of the mobile and shall therefore not be included into the route for safety reasons.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0012
Requirement	In the automatic mode, the A-SMGCS Routing function route generator shall propose the best route option, calculated according to local optimisation criteria and conforming to the aerodrome circulation rules, for the concerned mobile taking into account its type, taxiway rules and any other constraint.
Title	Automatic Mode Route Generator Proposes Shortest Route to Tower Controller
Status	<Validated>
Rationale	As a first routing criterion, the shortest route the respective mobile can take is calculated.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-ENV1.0001	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0013
Requirement	In case the Tower Controller tries to check a route that has not yet been generated because some input information is missing, his HMI shall inform him that no route is available for this mobile and which data is missing.
Title	Unavailable route
Status	<Validated>
Rationale	Tower Controllers shall be informed in case a route has not yet been generated.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0015
Requirement	In the automatic mode, the A-SMGCS Routing function shall enable the Tower Controller to modify a proposed route before sending it without having to decline the proposal first.
Title	Accepting the Route Proposal in Automatic Mode
Status	<Validated>
Rationale	The Tower Controller needs the opportunity to modify a route before he or she clears it.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0016
Requirement	In the automatic mode, the A-SMGCS Routing function shall enable the Tower Controller to request an automatically generated alternative route to a proposed one.
Title	Alternative Route Proposal in Automatic Mode
Status	<Validated>
Rationale	The A-SMGCS Routing function shall be able to present alternative routes as it is quicker compared to the Tower Controller modifying the route with semi-automatic mode procedures.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0017
Requirement	The modification of a route by the Tower Controller shall activate the semi-automatic mode.
Title	Change from Automatic Mode to Semi-Automatic Mode
Status	<Validated>
Rationale	The Tower Controller will have the ability to change a planned or cleared route at any time. For this task, the A-SMGCS Routing function provides him with the ability to apply semi-automatic mode procedures in automatic.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0018
Requirement	In the automatic mode, the A-SMGCS Routing function shall provide the Tower Controller with a function to accept modifications to a route.
Title	Automatic Mode Route Modification Finished Indication
Status	<Validated>
Rationale	In contrast to the process of defining a new route, the A-SMGCS Routing function does not have an automatic indication whether or not the modification was completed. Thus, a trigger is needed to allow the Tower Controller to manually indicate the completion of the modification process.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0019
Requirement	In the automatic mode, the A-SMGCS Routing function shall be able to modify all planned routes automatically in case of a change of runway directions. Whether or not the changed planned routes will be presented to the Tower Controllers for validation shall be a local decision.
Title	Automatic Mode Route Modifications in Case of Change of Runway Direction
Status	<Validated>
Rationale	The A-SMGCS Routing function shall be able to modify all routes after a change of operational direction automatically. Whether or not the Tower Controllers will be asked to accept the changes shall remain a local decision.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-ENV1.0001	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0020
Requirement	In case the Tower Controller HMI provides means to input, edit, or delete current, recurring or future constraints (e.g. runway configuration/stand change, taxiway closure) on the aerodrome surface, in semi-automatic and automatic mode, these planned changes shall be taken into account by the A-SMGCS Routing function when the Tower Controller defines a new route or when a route is modified.
Title	Constraint Table Manager in Semi-Automatic and Automatic Mode
Status	<In Progress>
Rationale	This requirement assumes that the CWP provides a means to input, edit, or delete current, recurring or future constraints (e.g. runway configuration/stand change, taxiway closure). The A-SMGCS Routing function shall assist the Tower Controller to plan the future traffic on the aerodrome by providing a means to generate routes conforming to current, recurring, and future constraints.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAU.0022
Requirement	The A-SMGCS Routing function shall plan routes for every vehicle operating: • on or across the runway, or • on taxiways in LVC, or • towing an aircraft.
Title	Planning routes to vehicles
Status	<In Progress>
Rationale	Most critical vehicle movements have to be coordinated with the rest of the taxiing operations in order to operate in an efficient and safe way
Category	<Functional>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6201.0004	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.1.3 Route edition requirements (RGED series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0001
Requirement	In the semi-automatic mode, the Tower Controller shall be able to provide the A-SMGCS Routing function with starting and end points of the route.
Title	Tower Controller to Provide Start and End Point to A-SMGCS Routing function in Semi-Automatic Mode
Status	<Validated>
Rationale	The semi-automatic route generator shall enable the Tower Controller to input manually the start and ending points of a route.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0002
Requirement	In the semi-automatic mode, the A-SMGCS Routing function shall assist the Tower Controller by automatically adding missing segments (between two selected elements) to routes according to aerodrome circulation rules and the current operational configuration.
Title	A-SMGCS Routing function Assistance to Tower Controller Route Generation in Semi-Automatic Mode
Status	<Validated>
Rationale	The semi-automatic route generator shall provide additional assistance to the Tower Controller in the route generation process.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-ENV1.0001	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0003
Requirement	In the semi-automatic mode, the A-SMGCS Routing function shall automatically take into account the specific taxiway capabilities when a Tower Controller defines a route.
Title	Route Generator Checks Capabilities of Taxiways in Semi-Automatic and Automatic Mode
Status	<Validated>
Rationale	In the process of defining a route, a taxiway segment linking the selected nodes could be incapable of the weight or dimensions of the mobile and shall therefore not be included into the route for safety reasons.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0004
Requirement	If an incompatibility between the aircraft type and specific taxiway capabilities is detected, the A-SMGCS Routing function shall select another valid segment.
Title	Route Generator Checks Compatibility of Mobile and Movement with Taxiways in Semi-Automatic Mode
Status	<Validated>
Rationale	In the process of defining a route, a taxiway segment linking the selected nodes could be incapable of the weight or dimensions of the mobile and shall therefore not be included into the route for safety reasons.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0005
Requirement	The A-SMGCS Routing function shall provide the Tower Controller with a function to allow the possibility to finish the route edition process at any time.
Title	Completion of route edition
Status	<Validated>
Rationale	The A-SMGCS Routing function needs to know when the Tower Controller has finished editing the route.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0006
Requirement	In the semi-automatic mode, the HMI shall assist the Tower Controller in constructing a route by displaying all available route elements on the graphical representation of the aerodrome layout on the HMI.
Title	Display of Route Elements on the HMI Semi-Automatic Mode
Status	<Validated>
Rationale	The semi-automatic mode route generation process is based on the Tower Controller defining the whole route on a node-at-turn to node-at-turn basis. Thus, the HMI needs to provide the Tower Controller with the necessary nodal grid on the graphical representation of the aerodrome layout.
Category	<HMI>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0007
Requirement	In manual mode, the HMI may assist the Tower Controller in constructing a route by displaying all available route elements on the graphical representation of the aerodrome layout on the HMI.
Title	Display of Route Elements on the HMI in Manual Mode
Status	<Validated>
Rationale	The manual mode route generation process is based on the Tower Controller defining the whole route on a node-by-node basis. Thus, the HMI needs to provide the Tower Controller with the necessary nodal grid on the graphical representation of the aerodrome layout.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0008
Requirement	In case of overriding constraints (e.g. use of direction on a taxiway) the Tower Controller shall be warned.
Title	Manual override warning
Status	<Validated>
Rationale	Provision of specific warning in case manual route update overrides aerodrome layout rules will support the Tower Controllers to build a reliable picture about ground surface movements.

Category	<Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0009
Requirement	In manual and semi-automatic mode, the A-SMGCS Routing function shall enable the Tower Controller to start entering or modifying a route from its start, any intermediate point or its end.
Title	Route Generation Not Requiring Specific Direction in Manual and semi-automatic Mode
Status	<Validated>
Rationale	Tower Controllers have different ways of working and in some situations it may be better to start the route generation in the middle of the final route, at the beginning, or at the end point. The A-SMGCS Routing function shall cater for all these options.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0010
Requirement	In manual and semi-automatic modes, the Tower Controller HMI shall depict all possible pre-defined destinations for a pushback, a pull-out or a push-pull for mobiles in the taxi-out process.
Title	Pre-Defined Pushback and Pull-Out Destination Depiction in Manual and Semi-Automatic Mode

Status	<Validated>
Rationale	In order to allow the Tower Controller to plan and instruct pushbacks, the pre-defined destination points for pushbacks need to be depicted on the HMI.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0011
Requirement	In the manual and semi-automatic modes, the Tower Controller shall be able to incorporate a pre-defined destination for the pushback, a pull out or a push-pull into the taxi-out route.
Title	Pre-Defined Pushback and Push-Pull Destination Integration in Manual and Semi-Automatic Modes
Status	<Validated>
Rationale	On many airports, pushback and push-pull procedures are executed with pre-defined destination positions in order to optimise the overall traffic situation.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0012
Requirement	In the manual and semi-automatic mode and in case of APTR available, the A-SMGCS Routing function shall be able to integrate a pre-defined

	destination for the pushback, pull-out or a push-pull into the taxi-out route including the clear indication on which of the centreline or taxi lane the destination point (and the route in manual mode) are located.
Title	Pre-Defined Pushback and Push-Pull Destination Integration at APTR Airport in Manual and Semi-Automatic Modes
Status	<In Progress>
Rationale	On many airports, pushback and push-pull procedures are executed with pre-defined destination positions on the centre line or either of the taxi lanes (orange, blue, or yellow) in order to optimize the overall traffic situation.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0013
Requirement	In the manual and semi-automatic mode, the A-SMGCS Routing function shall provide the Tower Controller with the capability to define the end point of a pushback, pull out, or push-pull procedure manually and independent from any pre-defined destination point.
Title	Free and Manual Pushback and Push-Pull Destination Integration Manual and semi-automatic Mode
Status	<In Progress>
Rationale	Sometimes the pre-defined destination positions are not sufficient to optimize a traffic situation as much as possible. Thus, the Tower Controller shall always be able to define a destination position free of any limitations. In the semi-automatic mode, the Tower Controller can simply select the destination and the A-SMGCS Routing function will generate a route for the pushback between current position of the aircraft and the destination selected by the Tower Controller.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0014
Requirement	In the manual and semi-automatic modes, the A-SMGCS Routing function shall provide the Tower Controller with the capability to combine a pushback procedure with a pull-action.
Title	Manual Definition of Push-Pull Route Manual and Semi-Automatic Modes
Status	<In Progress>
Rationale	The Tower Controller shall be able to link any manually defined push procedure with any manually defined pull procedure to a push-pull procedure. In semi-automatic mode, for both parts (push and pull), only starting point and destination point are required as an input.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGED.0016
Requirement	The Tower Controller shall be able to edit specific elements of a route (e.g. starting point, intermediate point, intermediate segment or destination point) on the radar display, or in the mobile's strip if the CWP includes an EFS.
Title	Route Modification Possible Anytime in Manual Mode
Status	<Validated>
Rationale	Tower Controllers shall always be able to modify a route. The A-SMGCS Routing function shall support this process by providing the necessary selectable elements, which may be displayed to the Tower Controller. If the HMI provides an EFS, route modification shall also be possible from the strips to reduce the Tower Controller's workload for some route modifications.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-	N/A

		block	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.1.4 Interface requirements (RGIN series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGIN.0001
Requirement	A-SMGCS Routing function shall use surveillance data as an input.
Title	A-SMGCS Routing function – Surveillance Interface
Status	<Validated>
Rationale	Surveillance systems will feed some of the required information (aircraft position) for routing generation.
Category	<Interoperability>
Validation Method	<Analytical Modelling>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGIN.0002
Requirement	The A-SMGCS Routing function shall be linked to the airport data systems to access the information about routing restrictions, aircraft type and the start and end points.
Title	A-SMGCS Routing function – airport data systems interface
Status	<Validated>
Rationale	Almost every modern airport has a data base with the different restrictions or particularities of its layout. Also the Airport Operations Plan could be a useful source of information about the characteristics of the aircraft moving through the airport.
Category	<Interoperability>
Validation Method	<Analytical Modelling>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGIN.0003
Requirement	The holding point provided by the airport data systems for departing aircraft shall depend on the aircraft type.
Title	A-SMGCS Routing function – airport data systems interface – holding point
Status	<Validated>
Rationale	The A-SMGCS Routing function needs to receive information to select the appropriate holding point according to the aircraft type in order to give the appropriate runway length for take-off.
Category	<Interoperability>
Validation Method	<Analytical Modelling>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGIN.0004
Requirement	Routes generated by the A-SMGCS Routing function and created by Tower Controllers shall be stored in an independent data base, accessible to all airport systems.
Title	Routes data base
Status	<Validated>
Rationale	A failure in the A-SMGCS Routing function shall not affect the route information of the routes already generated / in use
Category	<Interoperability>
Validation Method	<Analytical Modelling>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-	N/A

		block	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGIN.0006
Requirement	The A-SMGCS Routing function shall have a bi-directional link with the sequencer systems in use on the airport.
Title	A-SMGCS Routing function – sequencer systems interface
Status	<Validated>
Rationale	For the correct use of both systems (queue generators and A-SMGCS Routing function) they shall share information. So routes can be calculated having in mind the calculated queue at the runway and the sequencer can work with accurate and updated taxi times. How this interaction is going to be performed will be defined in further documents of the project (INTEROP).
Category	<Interoperability>
Validation Method	<Analytical Modelling>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGIN.0007
Requirement	A-SMGCS Routing function shall provide route information to the guidance function.
Title	A-SMGCS Routing function – Guidance Function Interface
Status	<Validated>
Rationale	A-SMGCS Routing function shall give the Guidance function information needed to guide the mobiles via any guidance system available in the airport. The guidance function is in charge of making the mobiles to follow the route generated by the A-SMGCS Routing function.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.1.5 HMI requirements (RGHM series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0001
Requirement	The Tower Controller – A-SMGCS Routing function interaction shall be only possible through the Tower Controller's CWP.
Title	A-SMGCS Routing function – Tower Controller interaction
Status	<Validated>
Rationale	All the interaction with the function has to be made using the same method to avoid redundancy or an unnecessary increase in the Tower Controllers' workload (making him to pay attention to more than one display / HMI).
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA06.01.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0002
Requirement	The Tower Controller shall be able to work (via his/her CWP) on any mode of operation (automatic, semi-automatic or manual).
Title	Mode selection
Status	<Validated>
Rationale	The Tower Controller is the one who decides what mode to use. Manual mode has to be always an option, because is the backup mode for the A-SMGCS routing and planning function.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0003
Requirement	Tower Controller’s HMI should be able to display (by selection of the Tower Controller), only planned routes, only cleared routes or all routes.
Title	Route visualisation
Status	<In Progress>
Rationale	.Tower Controller may need different information in different traffic situations.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0004
Requirement	The CDS shall enable the Flight Crew to interact with the A-SMGCS Routing function.
Title	Flight crew interface
Status	<In Progress>
Rationale	The CDS is the only way the Flight Crew has to interact with the A-SMGCS Routing function
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.08	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0005
Requirement	The VDS shall enable the Vehicle Driver to interact with the A-SMGCS Routing function.
Title	Driver interface
Status	<In Progress>
Rationale	The VDS is the only way the driver has to interact with the A-SMGCS Routing function
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0006
Requirement	The different statuses of taxi routes shall be clearly identifiable on both ground and air displays.
Title	Route status visualisation
Status	<Validated>
Rationale	Planned and cleared routes have to be easily identified to avoid confusion.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0007
Requirement	The Tower Controller's HMI shall enable him/her to check any route for any mobile at any time.
Title	Route visualisation 2
Status	<Validated>
Rationale	Tower Controllers shall have access to the route information all the time.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0008
Requirement	In the semi-automatic or the manual mode, the Tower Controller's HMI shall show the taxiway layout elements (e.g. starting points, predefined nodes, or destination point) that Tower Controllers can select to create or modify routes.
Title	Route generation display
Status	<Validated>
Rationale	The Tower Controller's HMI is the only way the Tower Controllers have to interact with the A-SMGCS Routing function.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0009
Requirement	The Tower Controller's HMI shall allow to display the elements of the aerodrome layout (e.g. taxiway segments, clearance limits, starting and destination points) when the Tower Controller is interacting with a route.
Title	Automatic Mode No Nodes Depicted on HMI
Status	<Validated>
Rationale	The Tower Controller will not need the of display aerodrome elements for defining a route in automatic mode, as this task will be executed by the A-SMGCS Routing function.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0010
Requirement	Independent from the mode of operation and on airports with Alternative Parallel Taxi Routing available, the Tower Controller shall be able to distinguish between the centre line and the parallel taxi lanes.
Title	APTR Display of Selected Centre Line
Status	<In Progress>
Rationale	In order to make use of APTR, the information on which line to use needs to be a part of the route displayed on the HMI.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0011
Requirement	If the A-SMGCS Routing function recalculates a planned route in case of an unplanned constraint, it shall provide an HMI indication to the Tower Controller if the planned route has already been displayed to this Tower Controller.
Title	Planned rerouting proposal
Status	<In Progress>
Rationale	Any planned route, which has already been displayed to the Tower Controller, which is affected by a new constraint and which is automatically recalculated, must lead to an HMI indication to warn the Tower Controller that the planned route that he/she previously visualised has changed. The purpose is to avoid surprising the Tower Controller at the time he/she will clear the planned route.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0013
Requirement	In the automatic mode, the HMI shall provide the Tower Controller with a function to accept the proposed route or to change it before acceptance.
Title	Automatic Mode HMI Function for Accepting or Modifying the Route Proposal
Status	<Validated>
Rationale	The Tower Controller is responsible for clearing route proposals generated by the A-SMGCS Routing function. Therefore, he or she needs a possibility to accept the proposed route.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0014
Requirement	Tower Controller's HMI shall inform him/her of the status of the service and alert him in case of a system failure.
Title	Status of the service
Status	<In Progress>
Rationale	Tower Controllers shall be aware of the status of the A-SMGCS Routing function at every moment.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0017
Requirement	Independent from the mode of operation, the Tower Controller HMI shall clearly indicate the difference between a planned, a cleared and a pending route.
Title	Statuses of Route Depicted Differently
Status	<Validated>
Rationale	Independent from the mode of operation, the Tower Controller needs to be able to visually distinguish between the statuses of a route.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA06.01.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0018
Requirement	Independent from the mode of operation, the Tower Controller HMI shall display complete routes.
Title	Complete route display
Status	<Validated>
Rationale	If a route extends in several AoR, the HMIs should display the route in all AoRs
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA06.01.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0019
Requirement	On the Tower Controller HMI, the representation of a cleared route shall start from the current position of the mobile and end at the limit of the clearance.
Title	Cleared route display starting from current position
Status	<Validated>
Rationale	The graphical representation of cleared routes must only show the future path of the mobile as the past portion is not relevant. The clearance limit can be the destination of the mobile or an intermediate holding point.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA06.01.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-	N/A

		taxi-out-routing	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGHM.0020
Requirement	The CWP shall enable the Tower Controller to distinguish linked mobiles from other mobiles on the Tower Controller display.
Title	Linked mobiles presentation
Status	<In Progress>
Rationale	Tower Controller shall be aware of the linked mobiles moving through his/her AoR.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA06.01.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.1.6 Architecture requirements (RGAR series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0001
Requirement	Each sub-service shall be able to work regardless of the status of the other sub-services.
Title	Sub-service autonomy
Status	<Validated>
Rationale	In case of a failure in a sub-service, it has to be possible to shut it down or reset it without generating negative effects on other sub-services.
Category	<Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-	N/A

		taxi-out-routing	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0002
Requirement	The A-SMGCS Routing function shall have two completely independent sub-services for the automatic and semi-automatic modes on one hand, and for the manual mode on the other hand.
Title	Independency of modes
Status	<Validated>
Rationale	Manual mode shall be an option when automatic or semi-automatic modes fail.
Category	<Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0003
Requirement	The A-SMGCS Routing function shall allow the generation of routes in manual mode against any constraint or limitation in the system database.
Title	Manual mode limitations
Status	<Validated>
Rationale	In manual mode Tower Controllers have total freedom, so they can use it in situations when is needed to route mobiles through unconventional paths or when the system is failing and the limitations shown are not reliable.
Category	<Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-	N/A

		for-a-vehicle	
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0004
Requirement	The A-SMGCS Routing function shall record and store the runway exit used per aircraft.
Title	Runway exits data base
Status	<Validated>
Rationale	The A-SMGCS Routing function will use this data to choose the start point of arriving aircraft.
Category	<Safety>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0005
Requirement	The manual mode shall serve as fall-back modes if the automatic route generator fails and has to be re-started as an individual service.
Title	Route Generator Fall-Back Strategy
Status	<Validated>
Rationale	As the A-SMGCS Routing function will comprise a number of individual services, the manual route building will still be available in case the automatic route generator fails. The Tower Controller can continue to manage traffic in this lower mode until the automatic route generation service has been restarted.
Category	<Reliability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-	N/A

		for-a-vehicle	
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0008
Requirement	A single failure in a sub-system shall not cause the remaining A-SMGCS Routing function functionalities to fail as well.
Title	Failure resilience
Status	<Validated>
Rationale	To achieve a minimum level of reliability, system capacity cannot decrease as a result of a single failure.
Category	<Safety>
Validation Method	<Fast Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-RGAR.0009
Requirement	If the A-SMGCS Routing function completely fails, the Tower Controller shall be able to revert to the previous operating method of the airport.
Title	A-SMGCS Routing function Fallback
Status	<Validated>
Rationale	The introduction of the A-SMGCS Routing function doesn't mean that taxi routing of the airport will only rely on the function.
Category	<Safety>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.1.7 Training requirements (RGTR series)

[REQ]

Identifier	REQ-06.07.02-OSED-RGTR.0001
Requirement	The personnel using this new operating methods and systems shall receive the necessary training.
Title	Training requirements
Status	<Validated>
Rationale	The new operating procedures and system are different enough to make new training necessary.
Category	<Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.2 Provision of cleared route to mobiles by voice (R/T)

Requirements in this section are not related to a specific SESAR Solution, but describe a number of features required for the Tower Controller CWP and the airport FDPS necessary for the implementation of the operational concept for integrated surface management.

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0001
Requirement	The Tower Controller shall be able to input a PUSHBACK instruction via the tower HMI.
Title	PUSHBACK Approval
Status	<Validated>
Rationale	Tower Controllers need to be able to input a PUSHBACK instruction.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0002
Requirement	The tower HMI shall allow the input by the Tower Controller of a TAXI instruction.
Title	TAXI Approval
Status	<Validated>
Rationale	Tower Controllers need to be able to input a TAXI instruction.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0003
Requirement	The tower HMI shall allow the input by the Tower Controller of a HOLD instruction.
Title	HOLD Instruction
Status	<Validated>
Rationale	Tower Controllers need to be able to input a HOLD instruction.
Category	<HMI>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0004
Requirement	The tower HMI shall allow the input by the Tower Controller of a HOLD SHORT position instruction.
Title	HOLD SHORT instruction
Status	<In Progress>
Rationale	Tower Controllers need to be able to input a HOLD SHORT instruction.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0005
Requirement	The tower HMI shall allow the input by the Tower Controller of a LINE UP Clearance.
Title	LINE UP Clearance
Status	<Validated>
Rationale	Tower Controllers need to be able to input a LINE UP Clearance.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0006
Requirement	The tower HMI should allow the input by the Tower Controller of a CONDITIONAL LINE UP Clearance.
Title	CONDITIONAL LINE UP Clearance
Status	<Validated>
Rationale	Tower Controllers need to be able to input a CONDITIONAL LINE UP Clearance.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0007
Requirement	The system shall be able to change the status of a portion of a route from planned to cleared / pending upon receipt of a PUSHBACK input.
Title	Change of route status (PUSHBACK approval)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0008
Requirement	The system shall be able to change the status of a portion of a route from planned to cleared / pending upon receipt of a TAXI input.
Title	Change of route status (TAXI Approval)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL

Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0009
Requirement	The system shall be able to change the status of a portion of a route from cleared to pending upon receipt of a HOLD input.
Title	Change of route status (HOLD instruction)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0010
Requirement	The system shall be able to change the status of a portion of a route from cleared to pending upon receipt of a HOLD SHORT input.
Title	Change of route status (HOLD SHORT instruction)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0011
Requirement	The system shall be able to change the status of a portion of a route from pending to cleared upon receipt of a LINE UP input.
Title	Change of route status (LINE UP Clearance)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0012
Requirement	The system should be able to change the status of a portion of a route from pending to cleared upon receipt of a CONDITIONAL LINE UP input and when the operational parameters are met e.g. a preceding departure has started rolling or an arrival has passed the holding position).
Title	Change of route status (CONDITIONAL LINE UP Clearance)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0013
Requirement	The system shall be able to change the status of a portion of a route from pending to cleared upon receipt of a CROSS input.
Title	Change of route status (CROSS Clearance)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0014
Requirement	The system shall be able to change the status of a portion of a route from pending to cleared upon receipt of a ENTER input.
Title	Change of route status (ENTER Clearance)
Status	<Validated>
Rationale	Tower Controllers need to be able to visualise the status of each route and the system needs the status for conformance monitoring and switching of AGL
Category	<HMI><Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0015

Requirement	The HMI shall allow the input by the Tower Controller of a PUSHBACK Long.
Title	PUSHBACK Long
Status	<In Progress>
Rationale	Tower Controllers need to be able to specify in the data link PUSHBACK APPROVAL message the pushback type according to the operation condition
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0016
Requirement	The HMI shall allow the input by the Tower Controller of a PUSHBACK Push and Pull.
Title	PUSHBACK Push and Pull
Status	<In Progress>
Rationale	Tower Controllers need to be able to specify in the data link PUSHBACK APPROVAL message the pushback type according to the operation condition
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-CLRT.0017
Requirement	The transfer of a mobile from a Tower Runway Controller to a Tower Ground Controller shall be performed via voice.
Title	Precedence of R/T for transfer from runway
Status	<Validated>
Rationale	For safety reasons, the initial contact between a mobile and the Tower Ground Controller shall be done using voice so as to make sure it is on the right frequency. Other transfers can be done using either voice or data link.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3 Provision of planned and cleared route to mobiles by data link

Requirements in this section cover three different SESAR Solutions, which are presented together in a single operational service as they all relate to communications between Tower Controllers, Flight Crews and Vehicle Drivers, and are thus strongly linked from an operational perspective. These Solutions are:

- D-TAXI application for CPDLC service (#23);
- Manual taxi routing (#26); and
- Improved vehicle guidance.

Requirements are grouped into categories addressing a specific aspect of operations (push back, start-up, taxi clearance) or HMI aspects. Each of these categories is then divided into requirements applicable to aircraft only (for D-TAXI and manual taxi routing Solutions, identified as REQ-06.07.02-OSED-DTXI.XXX), to vehicles only (for Improved vehicle guidance, identified as REQ-06.07.02-OSED-DVLH.XXXX) and to all types of mobiles (for all three Solutions, identified as REQ-06.07.02-OSED-DLNK.XXXX).

Solution #23 has achieved V3 following SESAR Release 5 and is thus considered as ready for industrialisation. A number of requirements in this section, mostly related to APTR, free text messages, de-icing operations and specific instructions (HOLD, REVISED TAXI, EXPECT AT), remain in progress because they have not been validated in a representative environment in a SESAR Release. However, they do not impact the core solution.

6.3.1 General requirements

6.3.1.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0001
Requirement	Independent from the mode of operation, a planned route, or updates to its planned route, shall not be sent to an aircraft after a locally configurable limit, which can be a time before TSAT/TLDT or, for arriving aircraft, an altitude or a distance from the runway.
Title	Limit on provision of planned route
Status	<In Progress>
Rationale	Airlines often implement the sterile cockpit concept in their Standard Operation Procedures, which requests the Flight Crew to restrict their activity to essential tasks during approach and landing. Sending planned route information once the aircraft is in this phase should thus be prevented, as the crew will not be able to process it or may be disturbed by the data link message. The limit for this phase is defined as an altitude or a time before landing, depending on the airline procedures. For departing aircraft, sending a planned route too close to the start-up/pushback clearance will not provide any benefit to the Flight Crew.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.04	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA03.01.08	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-	N/A

		block	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0003
Requirement	The airborne system and the A-SMGCS Routing function shall interact via data link.
Title	A-SMGCS Routing function – airborne system interface
Status	<Validated>
Rationale	One of the aims of this new operating method is to reduce radio communication.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0008
Requirement	HOLD instructions shall be sent via data link only to stationary aircraft.
Title	Precedence of R/T for instructions to hold position
Status	<In Progress>
Rationale	Issuing a HOLD instruction to a moving aircraft is a consequence of a time-critical situation and should consequently be performed with R/T rather than data link
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0025
Requirement	The ACM service shall be completed prior to initiating D-TAXI
Title	ACM service
Status	<Validated>
Rationale	The ACM service encompasses the transfer of voice communication and the transfer of CPDLC authority and should be always made available before usage of D-TAXI
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0009
Requirement	The D-TAXI Ground domain shall include the D-TAXI ATSU system, Tower Controllers and associated HMI, a processing function for D-TAXI messages and an interface with the ground communication network. *Note: Depending on the distribution of roles and responsibilities on an airport, the ATC ground authority can be partially or totally be replaced by another authority (e.g., an airline managing its own apron).*
Title	Ground domain
Status	<Validated>
Rationale	Ground domain requirement to operate D-TAXI
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0010
Requirement	The D-TAXI Aircraft domain shall include Flight Crew, HMI and aircraft system, consisting of an interface with the air-ground communications network, various aircraft subsystems, and a processing function for the messages exchanges, requests, and responses.
Title	Aircraft domain
Status	<Validated>
Rationale	Aircraft domain requirement to operate D-TAXI
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0026
Requirement	A data Link connection shall be established using the DLIC service between the mobile and the ATSU.
Title	DLIC service
Status	<Validated>
Rationale	The DLIC service provides the log-on procedure to the ATN and exchanges the required application information.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0027
Requirement	Independent from the mode of operation, if the Tower Controller modifies the runway exit, stand or holding point in a planned route, accepting the modification shall trigger the sending of a new data link route information to

	the affected mobile.
Title	Tower Controller Route Modification of Planned Route Triggers Route Update
Status	<Validated>
Rationale	In order to reduce the impact on the Flight Crew workload, only major changes to a planned route trigger the provision of a revised planned route. In order to reduce Tower Controller workload, the additional step of triggering the transmission of the changed route into the cockpit can be eliminated.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD- Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0028
Requirement	The planned route for an arriving aircraft shall be automatically uplinked following the reception of a REQUEST EXPECT TAXI message from this aircraft system.
Title	Uplink of planned routes to arriving aircraft
Status	<Validated>
Rationale	Planned routes are automatically uplinked to arriving aircraft upon reception of the corresponding request.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0029
Requirement	In case an arriving aircraft has requested its planned route and it is not available in the ground system, the ground system shall reply with an UNABLE message.
Title	Unavailable planned route for arriving aircraft
Status	<In Progress>
Rationale	If the planned route requested by an arriving aircraft is not known to the ground systems, the ground system has to reply with an UNABLE message.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0030
Requirement	If it is available in the ground system, the planned route for a departing aircraft shall be automatically uplinked to the aircraft with its departure clearance.
Title	Uplink of planned routes to departing aircraft
Status	<Validated>
Rationale	Planned routes are automatically uplinked to departing aircraft with their departure clearance. In case the planned route is not available, only the departure clearance is uplinked.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.1.2 Vehicle-related requirements

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0004
Requirement	A-SMGCS Routing function and VDS shall interact via data link.
Title	A-SMGCS Routing function – VDS interface
Status	<In Progress>
Rationale	One of the aims of this new operating method is to reduce radio communication. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0004
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0007
Requirement	The VDS HMI shall allow the Vehicle Driver requesting to be part of an entity with other mobiles (e.g. tug when towing, follow-me car when leading).
Title	Entities generation input
Status	<In Progress>
Rationale	Vehicles leading an entity will be always equipped whit the necessary systems. Other mobiles may not. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0007
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0020
Requirement	The Data Link for Vehicles domain shall include Vehicle Driver, HMI and Vehicle system, consisting of an interface with the ground-ground

	communications network, various vehicle subsystems, and a processing function for the messages exchanges, requests, and responses.
Title	Vehicle domain
Status	<In Progress>
Rationale	Vehicle domain requirement to operate Data Link. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.00020
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.1.3 Requirements applicable to all mobiles

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0002
Requirement	Routes uplinked to mobiles shall contain the continuous sequence of taxiways from starting point to destination.
Title	Continuity of uplinked route
Status	<Validated>
Rationale	The complete taxi path has to be provided to mobiles in order to not have any discontinuity when they are displayed on the CDS or VDS. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0002
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0005
Requirement	The A-SMGCS Routing function, the CDS and the VDS shall use AMDB databases compliant to RTCA DO-272 / EUROCAE ED-99 to support the

	display of the airport layout on moving maps. The CDS should use AMDB compliant to ARINC 816 standard.
Title	Use of standardised AMDB for airport layout
Status	<Validated>
Rationale	In an effort to ensure the interoperability of the A-SMGCS Routing function and the consistency of airport descriptions in ATC, aircraft and vehicles systems, standardised airport data bases need to be used.. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0005
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0006
Requirement	AMDBs used by the A-SMGCS Routing function, the CDS and the VDS shall be updated following the Aeronautical Information Regulation And Control (AIRAC) cycle.
Title	Update of standardised AMDB for airport layout
Status	<Validated>
Rationale	In an effort to ensure the interoperability of the A-SMGCS Routing function and the consistency of airport data bases used by ATC, aircraft and vehicles systems need to be updated through a single process. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0006
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2 Data link HMI requirements for Tower Controller

6.3.2.1 Data link identifiers (0100 series)

6.3.2.1.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0103
Requirement	The Tower Controller shall be able to know through the HMI the departure flights parking position.
Title	Parking position (stand)
Status	<Validated>
Rationale	Tower Controllers need to know the departure flights stand before they have switched on the transponder
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.1.2 Vehicle-related requirements

N/A

6.3.2.1.3 Requirements applicable to all mobiles

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0100
Requirement	An identifier shall be available on the Tower Controller's HMI to differentiate mobiles that are data link equipped and non-data link equipped.
Title	Identifier for data link equipped aircraft
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether a mobile has data link capability. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0100.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0101
Requirement	The Tower Controller's HMI shall indicate when a mobile has established a data link connection with the ATSU.
Title	Identifier for data link connected mobile
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether a mobile has established a data link connection. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0101.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0102
Requirement	Tower Controller's shall have the possibility to choose between sending a data link message or making a standard non-data link clearance input associated with R/T on the HMI.
Title	Option for data link or non-data link
Status	<Validated>
Rationale	Even if aircraft is data link equipped, the Tower Controller might select not to use it for operational/safety reasons. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0102
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.2 Start up (0200 series)

6.3.2.2.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0200
Requirement	The HMI shall be able to display the reception of a START-UP Request sent by the Flight Crew.
Title	START-UP Request display
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a Start-Up Request
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0201
Requirement	The HMI shall allow the input by the Tower Controller of a data link START-UP approval message.
Title	START-UP Approval
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver a data link a START-UP APPROVAL message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0202

Requirement	The HMI shall allow the input by the Tower Controller of a STANDBY data link message in reply to a START-UP REQUEST message.
Title	STANDBY START-UP from Tower Controller
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link a STANDBY message in reply to a START-UP REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0203
Requirement	The HMI shall allow the input by the Tower Controller of an UNABLE data link message in reply to a START-UP REQUEST message.
Title	UNABLE START-UP from Tower Controller
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link an UNABLE message in reply to a START-UP REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0204
Requirement	The HMI shall be able to display the reception of a STANDBY message sent by the Flight Crew in reply to a START-UP approval message.
Title	STANDBY START-UP from Flight Crew
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a STANDBY message in reply to a START-UP approval message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0205
Requirement	The HMI shall be able to display the reception of an UNABLE message sent by the Flight Crew in reply to a START-UP approval message.
Title	UNABLE START-UP from Flight Crew
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link an UNABLE message in reply to a START-UP approval message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0206
Requirement	The HMI shall be able to display the reception of a WILCO message sent by the Flight Crew in reply to a START-UP approval message.
Title	WILCO START-UP from Flight Crew
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a WILCO message in reply to a START-UP approval message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0207
Requirement	The HMI shall allow the input by the Tower Controller of an EXPECT START-UP AT [TIME] data link message in reply to a START-UP REQUEST message.

Title	EXPECT START-UP from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link an EXPECT START-UP message in reply to a START-UP REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0208
Requirement	If the Flight Crew does not accept the planned route, the respective UNABLE message shall be displayed on the Tower Controller’s HMI.
Title	UNABLE Message Triggers Information
Status	<Validated>
Rationale	When the Flight Crew declines a route, a new route needs to be defined or generated for the mobile in question.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0009	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.2.2 Vehicle-related requirements

N/A

6.3.2.2.3 Requirements applicable to all mobiles

N/A

6.3.2.3 Push back (0300 series)

6.3.2.3.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0300
Requirement	The HMI shall be able to display the reception of a PUSHBACK Request sent by the Flight Crew.
Title	DPUSH Request display
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a Pushback Request
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0301
Requirement	The HMI shall allow the input by the Tower Controller of a data link PUSHBACK approval message.
Title	DPUSH Approval
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver a data link PUSHBACK APPROVAL message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0302
Requirement	The HMI shall allow the input by the Tower Controller of a STANDBY data link message in reply to a PUSHBACK REQUEST message.
Title	STANDBY DPUSH from Tower Controller
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link a STANDBY message in reply to a PUSHBACK REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0303
Requirement	The HMI shall allow the input by the Tower Controller of an UNABLE data link message in reply to a PUSHBACK REQUEST message..
Title	UNABLE DPUSH from Tower Controller
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link an UNABLE message in reply to a PUSHBACK REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0304
Requirement	The HMI shall allow the input by the Tower Controller of an EXPECT PUSHBACK AT [TIME] data link message in reply to a PUSHBACK REQUEST message.
Title	EXPECT PUSHBACK from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link an EXPECT PUSHBACK message in reply to a PUSHBACK REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0305
Requirement	The Tower Controller shall be able to input a PUSHBACK direction on the

	HMI if several pushback directions are available for the parking stand.
Title	PUSHBACK direction
Status	<In Progress>
Rationale	Tower Controllers need to be able to specify in the data link PUSHBACK APPROVAL message the direction for pushback if more than one pushback direction has been specified for the parking stand
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0306
Requirement	The HMI shall be able to display the reception of a STANDBY message sent by the Flight Crew in reply to a PUSHBACK approval message.
Title	STANDBY DPUSH from Flight Crew
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a STANDBY message in reply to a PUSHBACK approval message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0307
Requirement	The HMI shall be able to display the reception of an UNABLE message sent by the Flight Crew in reply to a PUSHBACK approval message.
Title	UNABLE DPUSH from Flight Crew
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link an UNABLE message in reply to a PUSHBACK approval message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0308
Requirement	The HMI shall be able to display the reception of a WILCO message sent by the Flight Crew in reply to a PUSHBACK approval message.
Title	WILCO DPUSH from Flight Crew
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a WILCO message in reply to a PUSHBACK approval message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0309
Requirement	An identifier shall be available on the Tower Controller's HMI to differentiate aircraft self-manoeuvring and pushback-dependent.
Title	Identifier for self-manoeuvring aircraft
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has self-manoeuvring capability
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.3.2 Vehicle-related requirements

N/A

6.3.2.3.3 Requirements applicable to all mobiles

N/A

6.3.2.4 Taxi instructions (0400 series)

6.3.2.4.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0400
Requirement	The HMI shall be able to display the reception of a data link TAXI Request sent by the Flight Crew.
Title	Data link -TAXI Request display
Status	<Validated>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a Taxi Request
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0401
Requirement	The HMI shall allow the input by the Tower Controller of a route representation automatically translated into a D-TAXI TAXI message by the system.
Title	D-TAXI message
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link a TAXI instruction describing the cleared part of the TAXI route.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0402
Requirement	The HMI shall allow the input by the Tower Controller of a STANDBY data link message in reply to a data link TAXI REQUEST message.
Title	STANDBY data link TAXI from Tower Controller
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link a STANDBY message in reply to a D-TAXI REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0403
Requirement	The HMI shall allow the input by the Tower Controller of an UNABLE data link message in reply to a data link TAXI REQUEST message.
Title	UNABLE Data link TAXI from Tower Controller
Status	<Validated>
Rationale	Tower Controllers need to be able to deliver via data link an UNABLE message in reply to a data link TAXI REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0404
Requirement	The HMI shall be able to display the reception of a STANDBY message sent by the Flight Crew in reply to a data link TAXI or data link REVISED TAXI message.
Title	STANDBY data link TAXI from Flight Crew
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a STANDBY message in reply to a data link TAXI or data link REVISED TAXI message
Category	<HMI>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0405
Requirement	The HMI shall be able to display the reception of an UNABLE message sent by the Flight Crew in reply to a data link TAXI or data link REVISED TAXI message.
Title	UNABLE data link TAXI from Flight Crew
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link an UNABLE message in reply to a data link TAXI or data link REVISED TAXI message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0406
Requirement	The HMI shall be able to display the reception of a WILCO message sent by the Flight Crew in reply to a data link TAXI or data link REVISED TAXI message.
Title	WILCO data link TAXI / data link REVISED TAXI from Flight Crew
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether an aircraft has sent via data link a WILCO message in reply to a data link TAXI or data link REVISED TAXI message
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0407
Requirement	The HMI shall allow the input by the Tower Controller of a data link REVISED TAXI message.
Title	data link REVISED TAXI message
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a Revision to the TAXI instruction already send
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0408
Requirement	The HMI shall allow the input by the Tower Controller of a HOLD POSITION data link message.
Title	HOLD POSITION instruction via data link
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a HOLD POSITION instruction to a stationary aircraft.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0410
Requirement	The HMI shall allow the input by the Tower Controller of an EXPECT TAXI AT [TIME] data link message in reply to a TAXI REQUEST message.
Title	EXPECT TAXI from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link an EXPECT TAXI message in reply to a TAXI REQUEST message.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0411
Requirement	Tower Controller shall be able to request through HMI if the Flight Crew is able to accept a specific Runway Holding Point for the departure.
Title	Able to accept Runway Holding Point
Status	<Validated>
Rationale	Tower Controllers need to know if the departure flight is able to depart by a specific Runway Holding Point
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.4.2 Vehicle-related requirements

N/A

6.3.2.4.3 Requirements applicable to all mobiles

N/A

6.3.2.5 General data link HMI requirements (0500 series)

6.3.2.5.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0501
Requirement	The HMI shall remove the display of information related to an open data link dialogue after the reception of a WILCO or ROGER data link message from the Flight Crew.
Title	Closure of data link dialogue information
Status	<Validated>
Rationale	The Tower Controller needs to know when a data link dialogue is terminated (e.g. via MESSAGE IN/OUT windows)
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0502
Requirement	The HMI shall display a WARNING message when NO REPLY has been received from the Flight Crew (after the expiration of the Operational Timer).
Title	NO REPLY display
Status	<Validated>
Rationale	Tower Controllers need to know when an open data link dialogue has timed out
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0503
Requirement	The HMI shall display a message when an UNABLE message has been received from the Flight Crew.

Title	UNABLE display
Status	<Validated>
Rationale	Tower Controllers need to know when the Flight Crew replies with UNABLE
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0504
Requirement	The HMI shall display a message when a STANDBY message has been received from the Flight Crew.
Title	STANDBY display
Status	<Validated>
Rationale	Tower Controllers need to know when the Flight Crew replies with STANDBY
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0507
Requirement	The Tower Controller HMI shall display an alert if a data link message arrives and is not actioned within a specified period (local parameter depending on the message).
Title	Warning for the Tower Controller of an untreated Data link message
Status	<Validated>
Rationale	The Tower Controller might not notice when a data link message arrives
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.5.2 Vehicle-related requirements

N/A

6.3.2.5.3 Requirements applicable to all mobiles

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0500
Requirement	The HMI shall display information related to any open data link dialogue.
Title	Open data link dialogue information
Status	<Validated>
Rationale	The Tower Controller needs to know when a data link dialogue is in progress (e.g. via MESSAGE IN/OUT windows). This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0500
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0505
Requirement	The Tower Controller HMI, the CDS and the VDS shall allow the input respectively by the Tower Controller, the Flight Crew or the Vehicle Driver of a Free Text data link message.
Title	Free Text data link Message
Status	<Validated>
Rationale	Actors need to be able to send a free text data link message to the each other for unusual, non-critical events. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0505
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0506
Requirement	The Tower Controller HMI, the CDS and the VDS shall be able to display a Free Text data link message.
Title	Display of a Free Text message from the Flight Crew
Status	<In Progress>
Rationale	Actors need to be able to visualise a received a free text data link message from another actor for unusual, non-critical events. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0506
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLNK.0508
Requirement	The Tower Controller, the Flight Crew and the Vehicle Driver shall be able to access through the HMI previously sent or received messages.
Title	Access to message history window
Status	<Validated>
Rationale	The Tower Controller, Flight Crew or Vehicle Driver might want to check to any previous message exchange. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0508
Category	<HMI>
Validation Method	<Real Time Simulation>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.6 Proceed / Tow (0600 series)

6.3.2.6.1 Aircraft-related requirements (D-TAXI)

N/A

6.3.2.6.2 Vehicle-related requirements

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0600
Requirement	The HMI shall be able to display the reception of a data link PROCEED REQUEST sent by the Vehicle driver.
Title	Data link PROCEED Request display
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a vehicle has sent via data link a PROCEED Request. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0600
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0601
Requirement	The HMI shall allow the input by the Tower Controller of a route representation automatically translated into a Data Link PROCEED message by the system.
Title	Data Link message
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a PROCEED

	instruction describing the cleared part of the route. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0601
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0602
Requirement	The HMI shall allow the input by the Tower Controller of a STANDBY data link message in reply to a data link PROCEED REQUEST message.
Title	STANDBY data link TAXI from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a STANDBY message in reply to a Data Link PROCEED REQUEST message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0602
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0603
Requirement	The HMI shall allow the input by the Tower Controller of an UNABLE data link message in reply to a data link PROCEED REQUEST message.
Title	UNABLE Data link PROCEED from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link an UNABLE message in reply to a data link PROCEED REQUEST message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0603
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0604
Requirement	The HMI shall be able to display the reception of a STANDBY message sent by the Vehicle Driver in reply to a data link PROCEED or data link REVISED PROCEED message.
Title	STANDBY data link PROCEED from Vehicle Driver
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a Vehicle has sent via data link a STANDBY message in reply to a data link PROCEED or data link REVISED PROCEED message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0604
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0605
Requirement	The HMI shall be able to display the reception of an UNABLE message sent by the Vehicle Driver in reply to a data link PROCEED or data link REVISED PROCEED message.
Title	UNABLE data link TAXI from Vehicle Driver
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a Vehicle has sent via data link an UNABLE message in reply to a data link PROCEED or data link REVISED PROCEED message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0605
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0606
Requirement	The HMI shall be able to display the reception of a WILCO message sent by the Vehicle Driver in reply to a data link PROCEED or data link REVISED PROCEED message.
Title	WILCO data link PROCEED / data link REVISED PROCEED from Vehicle Driver
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a Vehicle has sent via data link a WILCO message in reply to a data link PROCEED or data link REVISED PROCEED message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0606
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0607
Requirement	The HMI shall allow the input by the Tower Controller of a data link REVISED PROCEED message.
Title	Data link REVISED PROCEED message
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a Revision to the PROCEED instruction already send. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0607
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0608

Requirement	The HMI shall allow the input by the Tower Controller of an EXPECT PROCEED AT [TIME] data link message in reply to a PROCEED REQUEST message.
Title	EXPECT PROCEED from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link an EXPECT PROCEED message in reply to a PROCEED REQUEST message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0608
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0611
Requirement	The Tower Controller's HMI shall be able to display the reception of a data link TOW Request sent by the Vehicle driver
Title	Data link -TOW Request display
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a vehicle has sent via data link a TOW Request. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0611
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0612
Requirement	The Tower Controller's HMI shall allow him/her to input of a route representation automatically translated into a Data Link TOW message by the system
Title	Data Link message
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a TOW instruction describing the cleared part of the route. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0612
Category	<HMI>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0613
Requirement	The HMI shall allow the input by the Tower Controller of a STANDBY data link message in reply to a data link TOW REQUEST message
Title	STANDBY data link TOW from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a STANDBY message in reply to a Data Link TOW REQUEST message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0613
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0614
Requirement	The HMI shall allow the input by the Tower Controller of an UNABLE data link message in reply to a data link TOW REQUEST message
Title	UNABLE Data link TOW from Tower Controller
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link an UNABLE message in reply to a data link TOW REQUEST message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0614
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0615
Requirement	The HMI shall be able to display the reception of a STANDBY message sent by the Vehicle Driver in reply to a data link TOW or data link REVISED TOW message
Title	STANDBY data link TOW from Vehicle Driver
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a Vehicle has sent via data link a STANDBY message in reply to a data link TOW or data link REVISED TOW message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0615
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0616
Requirement	The HMI shall be able to display the reception of an UNABLE message sent by the Vehicle Driver in reply to a data link TOW or data link REVISED TOW message
Title	UNABLE data link TOW from Vehicle Driver
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a Vehicle has sent via data link an UNABLE message in reply to a data link TOW or data link REVISED TOW message This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0616
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0617
Requirement	The HMI shall be able to display the reception of a WILCO message sent by the Vehicle Driver in reply to a data link TOW or data link REVISED TOW

	message
Title	WILCO data link TOW / data link REVISED TOW from Vehicle Driver
Status	<In Progress>
Rationale	Tower Controllers need to be able to identify whether a Vehicle has sent via data link a WILCO message in reply to a data link TOW or data link REVISED TOW message. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0617
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0070	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0618
Requirement	The HMI shall allow the input by the Tower Controller of a data link REVISED TOW message
Title	data link REVISED TOW message
Status	<In Progress>
Rationale	Tower Controllers need to be able to deliver via data link a Revision to the TOW instruction already send. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0618
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.2.6.3 Requirements applicable to all mobiles

N/A

6.3.3 Data link HMI requirements for Flight Crew and Vehicle Driver (0700 series)

6.3.3.1 Aircraft-related requirements (D-TAXI)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0700
Requirement	The CDS shall enable the Flight Crew to send UNABLE messages with an

	optional possibility of a brief explanation of the reason. The selection of the UNABLE message has to be easy and fast.
Title	Unable sender functionality
Status	<In Progress>
Rationale	A 'rationale' field in some UNABLE messages may be useful in order to help the A-SMGCS Routing function to generate an alternative route. The Flight Crew, especially during arrival phase, need to send the message with the less impact on their workload as possible.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0701
Requirement	The Flight Crew shall be able to compose a REQUEST START-UP message (DM134) via the Data link Messages Composition.
Title	Start-up request from Flight Crew
Status	<Validated>
Rationale	To allow the Flight Crew to obtain the start-up clearance for the aircraft (D-TAXI Start-Up sub-service). The start-up request may be combined with pushback or taxi-out requests.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0702
Requirement	The Flight Crew shall be able to compose a REQUEST PUSHBACK message (DM131).
Title	Push-back request from Flight Crew
Status	<Validated>
Rationale	To allow the Flight Crew to obtain the pushback clearance (D-TAXI Pushback sub-service). The pushback request may be combined with the start-up, de-icing or taxi-out requests.

Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0703
Requirement	The Flight Crew shall be able to compose a REQUEST TAXI message (DM135).
Title	Taxi clearance request from Flight Crew
Status	<Validated>
Rationale	To allow the Flight Crew to taxi-out or taxi-in on a cleared taxi-route (D-TAXI Taxi-Out or Taxi-In sub-service).
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0704
Requirement	The Flight Crew shall be able to compose a data link message that contains a taxi clearance request (REQUEST TAXI, DM135) concatenated with : • FOR DE-ICING (DM127) • ABLE INTERSECTION (DM128) • FOR DE-ICING + ABLE INTERSECTION
Title	Requests concatenated with taxi clearance request from Flight Crew
Status	<In Progress>
Rationale	To allow the Flight Crew to indicate the reason for the taxi request: • FOR DE-ICING (DM127): to indicate that the purpose of this request is to reach a de-icing area. • ABLE INTERSECTION (DM128): to indicate its capacity to use an intersection runway
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0705
Requirement	The Flight Crew shall be able to compose a REQUEST DE-ICING message (DM132).
Title	De-icing request from Flight Crew
Status	<In Progress>
Rationale	To allow the Flight Crew to request de-icing
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0706
Requirement	The Flight Crew shall be able to add free text to a D-TAXI clearance request.
Title	Addition of free text information from Flight Crew
Status	<In Progress>
Rationale	To allow the Flight Crew to add non-pre-formatted information
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0707
Requirement	The Flight Crew shall be able to compose a REQUEST EXPECTED TAXI ROUTING [ground locationO] message (DM136).
Title	Expected taxi route request from Flight Crew

Status	<Validated>
Rationale	To allow the Flight Crew to get an early understanding of what the taxi route might be (D-TAXI Departure Information sub-service or D-TAXI Arrival Taxi Information sub-service)
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0708
Requirement	The Flight Crew shall be able to compose a READY FOR START-UP (or PUSHBACK or TAXI) via the message READY FOR [clearance type][assigned time] (DM129) and to input the time when they are ready to execute the relevant clearance.
Title	DEICING COMPLETE information
Status	<Validated>
Rationale	To allow the Flight Crew to coordinate with Tower Controller on the time of start-up of engines or push back or taxi in order to optimize the traffic management
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0709
Requirement	The Flight Crew shall be able to compose a DE-ICING COMPLETE via the message DM108.
Title	DEICING COMPLETE information
Status	<In Progress>
Rationale	To allow the Flight Crew to coordinate with Tower Controller at the end of the de-icing
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0710
Requirement	Following reception of WHEN CAN YOU ACCEPT (UM283) [clearance type] (clearance type is either START-UP or PUSHBACK or TAXI), the Flight Crew shall be able to send to the Air Traffic Control System a data link message among the following: • WE CAN ACCEPT [clearance type] [assigned time] (DM137): the Flight Crew can accept the specified clearance at the specified time. • WE CANNOT ACCEPT [clearance type] (DM138): the Flight Crew cannot accept the specified clearance.
Title	Answer to "WHEN CAN YOU ACCEPT (UM283)"
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0711
Requirement	The Flight Crew shall be able to compose the AFFIRM message (DM4) or the NEGATIVE message (DM5) answering a CAN YOU ACCEPT INTERSECTION [positionInformation] FOR DEPARTURE RUNWAY [runway] message (UM313).
Title	Composition of AFFIRM and NEGATIVE messages by the crew
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0712
Requirement	The Flight Crew shall be presented with the CPDLC Uplink Message elements received from the ATC Ground System, except LOGICAL ACKNOWLEDGMENT (UM227), whether they are received in a single-element or multiple-element message
Title	Display of uplink messages to the crew
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement to give a representation to the crew of the data link messages exchanged.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0713
Requirement	The Flight Crew shall be presented with the CPDLC Downlink Message elements they are composing, except LOGICAL ACKNOWLEDGMENT (DM100)
Title	Display of downlink messages to the crew
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement to give a representation to the crew of the data link messages exchanged.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0039	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0714
Requirement	The Flight Crew shall be presented with the planned taxi route path upon reception of an EXPECT TAXI [taxi route] [taxi durationO] (UM305) message element from the ATC System.
Title	Display of planned taxi route
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement. The parameter [taxi durationO] has no particular impact on the display of the taxi route path.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0715
Requirement	Upon reception of an EXPECT TAXI [taxi route] [taxi durationO] (UM305) message element concatenated or not with: • REVISED (UM249) or, • RUNWAY [runway] INTERSECTION DEPARTURE [intersection] (UM317) or, • REVISED (UM249) + RUNWAY [runway] INTERSECTION DEPARTURE [intersection] (UM317), the previously displayed planned taxi route path (if any) shall be removed from the AMM.
Title	Display of revised EXPECT taxi route
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0716
Requirement	If the ATC System provides the [runwayO] INTERSECTION DEPARTURE [intersection] (UM317) message element concatenated with the taxi routing information message EXPECT TAXI [taxi route] [taxi durationO] (UM305), the planned taxi route path displayed to the Flight Crew shall take into account the specified intersection for the departure runway.
Title	Display of EXPECT taxi route with INTERSECTION
Status	<Validated>
Rationale	The intersection departure is the runway entrance that will be used to line up on the runway. This information is important for the crew since it is related with aircraft performances
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0717
Requirement	Upon reception of a revision to a planned taxi route via the messages elements: • REVISED (UM249) + EXPECT TAXI [taxi route] [taxi durationO] (UM305) or, • REVISED (UM249) + [runway] INTERSECTION DEPARTURE [intersection] (UM317) or, • REVISED (UM249) + [runway] INTERSECTION DEPARTURE [intersection] (UM317) + EXPECT TAXI [taxi route] [taxi durationO] (UM305), the Flight Crew shall be presented with a new expected taxi route path based on this data.
Title	Display of REVISED EXPECT taxi route with INTERSECTION
Status	<Validated>
Rationale	The intersection departure is the runway entrance that will be used to line up on the runway. This information is important for the crew since it is related with aircraft performances
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0718
Requirement	The planned taxi route path shall be removed from the AMM if the Flight Crew responds UNABLE to the associated data link message.
Title	Display removal of EXPECT taxi route on-board in case of UNABLE answer
Status	<Validated>
Rationale	A taxi route rejected by the Flight Crew is not valid anymore, then it could be confusing to let the path displayed whereas the aircraft cannot comply with it
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0719
Requirement	The Flight Crew shall be presented with the cleared taxi route path upon reception of [runway] TAXI [taxi route] (UM308) message element – no REVISED (UM249) in the message – from the Tower Controller.
Title	Display of taxi clearance on-board
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0720
Requirement	Upon reception of a revision to an expected taxi route or a taxi clearance, the previously displayed planned taxi route path (if any) shall be removed from the AMM.
Title	Display of REVISED expected taxi route on-board
Status	<Validated>
Rationale	To comply with "EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])" requirement.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-off-block	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0721
Requirement	If the ATC System provides the [runwayO] INTERSECTION DEPARTURE [intersection] (UM317) message element concatenated with the taxi clearance message [runway] TAXI [taxi route] (UM308), the cleared taxi route path displayed to the Flight Crew shall take into account the specified intersection for the departure runway.
Title	Runway intersection of a taxi route
Status	<Validated>
Rationale	The intersection departure is the runway entrance that will be used to line up on the runway. This information is important for the crew since it is related with aircraft performances
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0723

Requirement	Upon reception of a revision to a cleared taxi route via the messages elements: • REVISED (UM249) + [runway] TAXI [taxi route] (UM308) or, • REVISED (UM249) + [runway] INTERSECTION DEPARTURE [intersection] (UM317) or, • REVISED (UM249) + [runway] INTERSECTION DEPARTURE [intersection] (UM317) + [runway] TAXI [taxi route] (UM308), the Flight Crew shall be presented with a new cleared taxi route path based on this data.
Title	Display of REVISED taxi clearance on-board
Status	<Validated>
Rationale	The intersection departure is the runway entrance that will be used to line up on the runway. This information is important for the crew since it is related with aircraft performances
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0724
Requirement	Upon reception of a revision to a taxi clearance, all previously displayed taxi route paths (if any) shall be removed from the AMM.
Title	Display of REVISED taxi clearance on-board
Status	<Validated>
Rationale	To comply with “EUROCAE SPR for Baseline 2 ATS data communications (ED-228 – [8])” requirement. Besides, evaluations with Flight Crews confirmed that it was more efficient to proceed without visualising the difference between the planned and the cleared route because the previous route is not valid anymore and it saves Flight Crew’s time to acknowledge the new clearance
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0725
Requirement	Upon reception of a taxi clearance without revision message: • [runway] TAXI [taxi route] (UM308) or, • [runway] INTERSECTION DEPARTURE [intersection] (UM317) concatenated with [runway] TAXI [taxi route] (UM308), without REVISED (UM249) and when a taxi clearance is already displayed, the Flight Crew shall be presented with the clear taxi route path as a continuation of the previously displayed cleared taxi route paths.
Title	Display of continuation of taxi clearance on-board
Status	<In Progress>
Rationale	To answer the route continuation need
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.3.2 Vehicle-related requirements

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0727
Requirement	The VDS HMI shall enable the Vehicle Driver to send UNABLE messages with an optional possibility of a brief explanation of the reason. The selection of the UNABLE message shall be easy and fast.
Title	Unable sender functionality
Status	<In Progress>
Rationale	A 'rationale' field in some UNABLE messages may be useful in order to help the A-SMGCS Routing function to generate an alternative route. The Vehicle Driver needs to send the message with the less impact on their workload as possible. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0727
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0069	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Plan-and-provide-routing-for-a-vehicle	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.3.3 Requirements applicable to all-mobiles

N/A

6.3.4 Manual taxi route (0800 series)

6.3.4.1 Aircraft-related requirements (manual taxi route)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0800
Requirement	The Flight Crew shall be able to input a taxi route path into the aircraft systems and have this route displayed on the AMM.
Title	Manual input of taxi route
Status	<Validated>
Rationale	To improve Flight Crew awareness and to answer pilot need concerning the manually inserted taxi route.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0801
Requirement	The Flight Crew shall be presented the cleared taxi route path and the planned/prepared taxi route path in a distinctive manner.
Title	Display according to taxi route statuses
Status	<Validated>
Rationale	To answer Flight Crew need concerning the display of a manually inserted taxi route.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0802
Requirement	Taxi routes entered manually by Flight Crew shall have either a PREPARED or CLEARED status, as follows: • the taxi route status is PREPARED when it has been created or modified, • the taxi route status is set to CLEARED upon dedicated Flight Crew action.
Title	Definition of taxi route statuses
Status	<Validated>
Rationale	The status differentiation supports the Flight Crew's awareness of the type of route displayed and reduces the potential risk to confuse it: expected/prepared route (taxi is not allowed) or cleared route (taxi is allowed).
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.4.2 Vehicle-related requirements

N/A

6.3.4.3 Requirements applicable to all mobiles

N/A

6.3.5 Taxi route computation and display (0900 series)

6.3.5.1 Aircraft-related requirements (D-TAXI & manual taxi route)

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0900
Requirement	In case the aircraft is on the ground, the taxi route path displayed to the Flight Crew shall start from the current position of the aircraft and end at its destination point.
Title	End points of taxi route path
Status	<Validated>
Rationale	When the aircraft is on the ground, the taxi route path should always start at the aircraft current position.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0901
Requirement	The part of a taxi route path that has been passed as the aircraft moves along this route, or when the aircraft is joining the route via an intersecting route, shall be removed from the display on the AMM.
Title	Starting point for taxiing aircraft
Status	<Validated>
Rationale	Decluttering the display by removing portions of taxiways sequenced by the aircraft helps providing a clear and unambiguous display of the taxi route to the crew. It is consistent with general navigation display principles (F-PLN behavior). The requirement applies even when the aircraft is moving back in the case of a pushback.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0902
Requirement	The taxi route path displayed to the Flight Crew shall go along all the taxiways provided as input (data link or pilot input), in the sequence provided in the route input data.
Title	Taxi route path completeness
Status	<Validated>
Rationale	To get with the highest probability the most suitable operational route despite the high number of available routes.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0903
Requirement	When a taxiway contains several taxilines, the taxi route path displayed to the Flight Crew shall take into account the taxiline specified in the data link message for a data link taxi route when it is available.
Title	Taxi route path with APTR
Status	<In Progress>
Rationale	The aim is to display taxi route path which is consistent with taxi operation and in accordance with the AMM layout and aircraft ownship representation. If several taxilines are available on the same taxiway, the on-board Taxi Routing function should be able to follow each of them according to the route. When the taxiline is not specified in the data link message or in case of manual taxi route input, the shortest route path rule shall apply.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0904
Requirement	The taxi route path displayed to the Flight Crew shall be consistent with the direction in which the aircraft is moving and the capability for maneuvering of aircraft on the airport surface
Title	Compatibility of taxi route path with operational constraints
Status	<Validated>
Rationale	The aim is to display taxi route path which is consistent with taxi operation and in accordance with the AMM layout and aircraft ownship representation. In the case of aircraft pushback, the aircraft is moving in the opposite direction compared to the aircraft heading so that the route path will goes behind the aircraft in this case leaving from the tail of the airplane.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>

<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0905
Requirement	When the Flight Crew adds route elements to the taxi route input, the resulting taxi route path displayed on the AMM shall respect way of circulation (on one way taxiway)
Title	Compatibility of taxi route path with circulation rules
Status	<Validated>
Rationale	The system should not propose route solution using wrong way to the Flight Crew for safety reasons. Added elements are added by the system to possibly complete discontinuities of route input data.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0906
Requirement	An error message shall be displayed to the Flight Crew in case the taxi route path corresponding to the expected taxi route provided by the ATC system or the manual input from the Flight Crew cannot be computed.
Title	Error message when no taxi route path can be computed
Status	<Validated>
Rationale	To indicate to the Flight Crew that the taxi route cannot be displayed.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-DTXI.0910
Requirement	The Flight Crew shall be able to erase any taxi route path displayed on the AMM.
Title	Manual removal of taxi route
Status	<Validated>
Rationale	The aim is to enable the Flight Crew to erase a data link taxi route path in case the Tower Controller modifies the route via R/T. It avoids displaying obsolete information on the AMM. In the case of a manual taxi route it enables the Flight Crew to discard obsolete or incorrect information.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.5.2 Vehicle-related requirements

[REQ]

Identifier	REQ-06.07.02-OSED-DLVH.0912
Requirement	The taxi route path displayed to the Vehicle Driver shall start from the current position of the vehicle and end at its destination point.
Title	End points of taxi route path on vehicle
Status	<In Progress>
Rationale	The taxi route path should always start at the vehicle current position. This requirement was previously identified as REQ-06.07.02-OSED-DTXI.0912
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	<Test>

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0011	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.3.5.3 Requirements applicable to all mobiles

N/A

6.4 Airfield Ground Lighting

Requirements in this section cover SESAR Solution #47 (Guidance assistance through airfield ground lighting). This solution has achieved V3 following SESAR Release 5 and is thus considered as ready for industrialisation. A number of requirements in this section, mostly related to APTR, priorities, feedback on Tower Controller CWP and optimisation of spacing between mobiles, remain in progress because they have not been validated in a representative environment in a SESAR Release. However, they do not impact the core solution.

6.4.1 General AGL requirements (AGLG series)

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0001
Requirement	The AGL ground domain shall include a centralised server, control units in the field, communication means, ground lights and a monitoring HMI.
Title	Ground domain
Status	<Validated>
Rationale	Ground domain requirement to operate AGL
Category	<Functional>
Validation Method	<Live Trial><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0002
Requirement	The centralised server shall be capable of translating routing information into AGL segment or single lamp control (depending on local AGL installations).
Title	Translate route into AGL control
Status	<Validated>
Rationale	It is necessary that the information resulting from the route generation process and surveillance data set are translated into control commands for the AGL. The AGL control needs to be handled by a centralised server to deliver the respective (de-)activation of the lights.
Category	<Operational>
Validation Method	< Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0003
Requirement	The centralised server shall be able to receive information from the AGL system and to display this information on the HMI.
Title	Translate AGL information into an HMI information
Status	<Validated>
Rationale	As Tower Controllers are not able to assess the status of the AGL visually from their CWP, they need to refer to the visualized information on the HMI.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0004
Requirement	Each lamp shall report its status (on, off, error) back to the centralised server.
Title	Light status
Status	<In Progress>
Rationale	Defective lamps need to be identified as soon as possible to assure reliable guidance. It doesn't necessarily mean that each failure is indicated on the ATCO CWP but rather the maintenance department. Based e.g. on a minimum equipment list, further action can be taken/initiated.
Category	<Interoperability><Maintainability><Performance><Reliability>
Validation Method	<Live Trial><Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0005
Requirement	The Tower Controller should be able to select/deselect the detailed light

	status of the AGL on the CWP.
Title	Status monitoring
Status	<In Progress>
Rationale	The Tower Controller should have the ability to get a detailed status of the AGL.
Category	<HMI><Maintainability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0024
Requirement	The AGL Operator should define a Minimum Equipment List for all Taxiway Centreline Lights and Stop Bars.
Title	AGL MEL
Status	<In Progress>
Rationale	With a Minimum Equipment List, different thresholds to indicate inadequate availability to maintenance personnel and ATCOs. EASA hasn’t defined a minimum for TCLs but only for stop bars (no two lights unserviceable next to each other).
Category	<Maintainability><Operational><Performance>
Validation Method	<Expert Group (Judgement Analysis)>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0006
Requirement	An unserviceable AGL segment shall be indicated to the Tower Controller on the CWP.
Title	AGL failure indication
Status	<In Progress>
Rationale	Failures in AGL above a certain threshold need to be indicated to the ATCO immediately.
Category	<HMI><Maintainability>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0007
Requirement	The CWP shall be able to symbolically indicate the illuminated lamps in front of a mobile that has been given a cleared route.
Title	Route Indication on the HMI
Status	<Validated>
Rationale	The Tower Controller requires information on which segment in front of a mobile is switched on.
Category	<HMI>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0008
Requirement	The Tower HMI shall enable the Tower Supervisor / Controller to adjust the light intensity of the AGL.
Title	AGL intensity adjustment
Status	<Validated>
Rationale	Depending on the environmental conditions the light intensity has to be adjusted by the Tower Supervisor / Controller, e.g. in low visibility conditions the light intensity needs to be intensified.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0010
Requirement	The Tower HMI shall enable the Tower Supervisor / Controller to switch on and off all taxiway centreline lights.
Title	Segment control
Status	<Validated>
Rationale	If for any reason there is a need to (de-) activate all centreline lights, the Tower Supervisor / Controller should have the possibility to do so manually.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0018
Requirement	The centralised server shall be able to activate all the available runway exits (unidirectional from the runway towards the taxiway) up to a specified length (local parameter) when a flight is a defined distance or time (local implementation rules) from touchdown on that runway.
Title	Lighting of Runway Exits
Status	<Validated>
Rationale	Flight Crew require being able to see where the runway exits are during the landing phase in order to plan the braking and vacating of the aircraft from the runway.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0019
Requirement	The centralised server shall allocate priority to mobiles that are exiting a runway over conflicting mobiles moving on parallel or adjacent taxiways.
Title	Priority to mobiles exiting the runway
Status	<In Progress>
Rationale	Mobiles exiting the runway need to clear the Runway Protection area as soon as possible so should therefore have priority over other mobiles on the taxiways
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0020
Requirement	The centralised server shall be able to detect when aircraft are stopped or queuing for departure and reduce the separation between lit AGL segments accordingly.
Title	Reduce AGL separation at the holding point
Status	<In Progress>
Rationale	Aircraft waiting at the holding point do not need to be separated the same way as taxiing aircraft as this would reduce runway throughput.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0021
Requirement	The centralised server shall take into account long segments of taxiways being used in bi-directional mode in order to avoid a deadlock situation (local implementation rules)
Title	Bi-directional taxiway rules
Status	<In Progress>
Rationale	To avoid to mobiles taxiing in opposite directions along a taxiway and becoming deadlocked in a Face to Face situation.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0014	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0022
Requirement	The centralised server shall be able to take into account push back routes that are close to the taxiway and provide the required separation via the AGL (local implementation rules).
Title	Separation between taxiways and adjacent push back routes
Status	<In Progress>
Rationale	At certain airports some push back routes are very close to adjacent taxiways and wingtip separation may not be achieved if 2 aircraft pass at the same time.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLG.0023
Requirement	The centralised server shall be able to filter out vehicles operating on service roads adjacent to taxiways/taxi lanes
Title	Filter unwanted targets
Status	<In Progress>

Rationale	At certain airports some service roads are close taxiways and the vehicles operating on them can interfere with the centralised server when it calculates separations between mobiles on the taxiways.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.4.2 Requirements for segments and single lamp control (AGLS series)

[REQ]

Identifier	REQ-06.07.02-OSED-AGLS.0001
Requirement	The length of the controlled segments shall be locally configurable.
Title	Length of AGL segments
Status	<Validated>
Rationale	Due to the different airport layouts (e.g. lengths of taxiways) and the different technical possibilities of controlling lamps it is necessary that the centralised server is able to work with a varying number of lamps which represent a segment. Additionally this functionality provides more guidance flexibility by switching e.g. six lights on straights and three lights close to critical areas.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLS.0002
Requirement	The route indication for mobiles may consist of a configurable number of lights. There may be a need to have different parameters for aircraft and vehicles defining the maximum amount of lights (segments or single lamps) lit in front of the mobile (Ref: ICAO Doc 9830 para 3.4.3.13).
Title	Different route indication for aircraft and vehicles

Status	<In Progress>
Rationale	Different area of visibility depending on obscured segment
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLS.0003
Requirement	According to environmental and operational conditions the gap between two routes indications should consist of a configurable number of lights (segments or single lamps). (Ref ICAO Doc 9830 para 3.4.3.13).
Title	Separation between two route Indications
Status	<In Progress>
Rationale	Due to different types of aircraft, the presence of vehicles, the weather conditions, the day time, local and other restrictions the visualized separation can change .
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-ENV1.0001	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLS.0005
Requirement	The Tower Controller shall have a means on the HMI to prioritise one mobile over the other at crossing or converging taxiways a minimum of x meters (parameter to be defined locally) in front of the mobile.
Title	Swapping priority between mobiles
Status	<Validated>
Rationale	When two mobiles are in a conflicting situation the AGL for one of the mobiles will be restricted by the centralised server and it is an operational requirement for the Tower Controller to be able to easily override the priority given by the centralised server and swap the priority to the restricted mobile.
Category	<Operational><HMI>

Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLS.0006
Requirement	The Tower Controller shall have a means on the HMI (e.g. a red dot or line at the end of the AGL indication) to see when a mobiles TCLs are being restricted by another mobile in a conflicting situation. The indicator should appear when mobiles are approaching on converging taxiways but not when aircraft are taxiing in sequence on the same taxiway.
Title	Indication to the Tower Controller of TCL being restricted
Status	<Validated>
Rationale	When two mobiles are in a conflicting situation the AGL for one of the mobiles will be restricted by the centralised server and it is useful for the ATCO to know which mobile has the restriction in case the ATCO wishes to swap the priority.
Category	<HMI>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLS.0007
Requirement	The AGL Ground service should have a means to show to the Flight Crew/Vehicle Driver when the TCLs are being restricted by another mobile in a conflicting situation. The indicator should appear when mobiles are approaching on converging taxiways but not when aircraft are taxiing in sequence.
Title	Indication to the Flight Crew/Vehicle Driver of TCL being restricted
Status	<In Progress>
Rationale	When two mobiles are in a conflicting situation the AGL for one of the mobiles will be restricted by the centralised server and this will mean the green lights will stop being lit. Although this is in itself an indication to Flight

	Crew/Vehicle Drivers that they will have to stop it would be useful in addition to have the last 3 lamps lit differently e.g. red instead of green
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.4.3 Requirements for route deviations and stop bar regulation (AGLD series)

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0001
Requirement	Route deviations and holding position overruns shall result in the route indication being switched off for that mobile.
Title	Deactivation of AGL segments in case of route deviations
Status	<Validated>
Rationale	Indicate to the Flight Crew/Vehicle Driver immediately when a deviation is detected and stop the movement of the mobile.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0002
Requirement	The Guidance Function shall be able to switch stop bars on and off in order to control the movement and spacing of mobiles at crossing or converging taxiways.
Title	Clearances through stop bar regulation
Status	<In Progress>
Rationale	Assure spacing during taxiing/driving.
Category	<Operational><Safety>
Validation Method	<Real Time Simulation>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0010	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6201.0004	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0005
Requirement	The Controller input **'Line-Up'** shall trigger the Guidance Function to automatically de-activate the stop bar for the **cleared** aircraft. Surveillance position of the aircraft needs to be taken into account to avoid the stop bar de-activating too soon.
Title	Stop bar regulation following a Tower Controller Line-Up input
Status	<Validated>
Rationale	Stop bar regulation associated to Tower Controller Line-Up input.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0006
Requirement	The Controller input **'Take-off'** when no previous line-up clearance has been input shall trigger the Guidance Function to automatically de-activate stop bar for the **cleared** aircraft. Surveillance position of the aircraft needs to be taken into account to avoid the stop bar de-activating too soon.
Title	Stop bar regulation following a Tower Controller Take-Off input
Status	<In Progress>
Rationale	Stop bar regulation associated to Tower Controller Take-Off input.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0007
Requirement	The Controller input **'CROSS'** shall trigger the Guidance Function to automatically de-activate stop bar for the **cleared** mobile. Surveillance position of the aircraft needs to be taken into account to avoid the stop bar de-activating too soon.
Title	Stop bar regulation following a Tower Controller CROSS input
Status	<Validated>
Rationale	Stop bar regulation associated to Tower Controller CROSS input.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0008
Requirement	The Controller input **'ENTER'** shall trigger the Guidance Function to automatically de-activate stop bar for the **cleared** mobile. Surveillance position of the aircraft needs to be taken into account to avoid the stop bar de-activating too soon.
Title	Stop bar regulation following a Tower Controller ENTER input
Status	<Validated>
Rationale	Stop bar regulation associated to Tower Controller ENTER input.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLD.0009
Requirement	If not done with other sensors, the A-SMGCS Guidance function shall

	automatically turn on a de-activated stop bar when a mobile has passed over it by X meters (X local parameter).
Title	Automatic stop bars re-activation
Status	<Validated>
Rationale	To automatically re-activate Stop bars once passed by the mobile.
Category	<Operational>
Validation Method	<Real Time Simulation><Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.4.4 Requirements for APTR (AGLA series)

[REQ]

Identifier	REQ-06.07.02-OSED-AGLA.0001
Requirement	For airports with Alternative Parallel Taxi Route (APTR) the taxiway Centreline Lights shall be able to indicate the route by alternating coloured and green lights.
Title	Route indication by coloured taxiway centreline lights
Status	<In Progress>
Rationale	At some airports APTR is used for increasing a taxiway capacity by using two coloured taxiway centrelines instead of the normal one taxiway centreline. Therefore the AGL should be able to indicate e.g. yellow and blues centrelines.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-AGLA.0002
Requirement	The HMI of the Tower Controller shall be able to indicate the colour of lamps which are switched on for guiding a mobile on APTR.
Title	Visualization of coloured taxiway centreline lights to the Tower Controller
Status	<In Progress>

Rationale	At some airports APTR is used for increasing a taxiway capacity by using two coloured taxiway centrelines instead of the normal one taxiway centreline. Therefore the HMI should be able to display which taxiway centreline is used for guidance.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-HMIR.0078
Requirement	The CDS shall enable the Flight Crew to send UNABLE messages with an optional possibility of a brief explanation of the reason. The selection of the UNABLE message has to be easy and fast.
Title	Unable sender functionality
Status	<In Progress>
Rationale	A ‘rationale’ field in some UNABLE messages may be useful in order to help the A-SMGCS Routing function to generate an alternative route. The Flight Crew, especially during arrival phase, need to send the message with the less impact on their workload as possible.
Category	<Interoperability>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0088	<Partial>
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Intercontinental Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Primary Node	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Secondary Node	N/A

6.5 Virtual Block Control and Virtual Stop Bars

Requirements in this section cover SESAR Solution #48 (Virtual block control in LVPs). This solution has achieved V3 following SESAR Release 5 and is thus considered as ready for industrialisation. A number of requirements in this section, mostly related to dynamic clock control and uplink of information to aircraft, remain in progress because they have not been validated in a representative environment in a SESAR Release. However, they do not impact the core solution.

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0001
Requirement	Current block control operations (also called procedural control) under low visibility conditions shall be enhanced by reducing block sizes (increasing the number of control blocks) for the Air Traffic Controller.
Title	Virtual Block Control by Increasing Number of Control Blocks using VBC
Status	<In Progress>
Rationale	Control blocks are used to ensure safer ground movement operations in low visibility. Additional control blocks allow for more aircraft movements in the manoeuvring area under low visibility conditions at a time. The expectation is that control operations in low visibility will be more efficient and safe.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED IN ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0002
Requirement	In Virtual Block Control only one aircraft shall occupy one control block.
Title	Carry Out Enhanced Block Control
Status	<Validated>
Rationale	In order to keep operations safe, only one aircraft shall be present in one control block.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED IN ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0003
Requirement	The Tower Controller shall be able to dynamically reduce the size of a block.
Title	Dynamic Use of Virtual Stop Bars
Status	<In Progress>
Rationale	There may be situations where the Tower Controller might need to reduce the size of a block further in order to allow for two aircraft to be present in one block without infringing safety. In such situations it might suffice to ensure that one of the aircraft in that block will hold position and will not start moving unexpectedly.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-EFF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0004
Requirement	Existing Intermediate Holding Positions in the manoeuvring area shall be used as Virtual Stop Bar Positions for non-data link equipped aircraft.
Title	Use of Intermediate Holding Positions as Virtual Stop Bar Positions
Status	<Validated>
Rationale	Additional blocks are created by adding VSB positions on the Tower Controller display. VSBs only exist virtually on the Tower Controller display. Aircraft without AMM or data link updates for VSB positions and statuses need to rely on visual indicators on the ground for detecting VSB positions which are part of the clearance limits given by Tower Controllers. IHP lights were indicated in earlier research to be the best means on the ground available to represent a VSB position.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0005

Requirement	Only aircraft that are data link equipped and able to display VSB positions and statuses on an AMM shall be cleared to a VSB position that is not linked to an IHP.
Title	Use of Arbitrary Positions as VSB Positions
Status	<Validated>
Rationale	Only aircraft with data link and an AMM that can show positions and statuses of VSBs transmitted via data link shall be cleared to positions in the manoeuvring area that are not linked to an IHP. Otherwise the Flight Crew will not be able to determine the position of the aircraft with respect to the VSB location and might infringe a clearance limit.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0006
Requirement	Control of stop bars and VSBs shall occur through the same interface.
Title	Stop Bar and VSB Control
Status	<Validated>
Rationale	Switching of statuses of stop bars and VSBs must occur on the same interface in order to reduce workload and avoid the loss of situational awareness.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0007
Requirement	The Tower Controller must be able to assign a clearance limit to each aircraft that is directly linked to a stop bar or VSB position.
Title	Assign Clearance Limits
Status	<Validated>
Rationale	In order to enhance situational awareness, the Tower Controller must be

	able to use the block limits (stop bar or VSB position) as clearance limits and assign such a clearance limit to an aircraft.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0008
Requirement	The Tower Controller must be able to verify the clearance limit of each aircraft without further system input.
Title	Verify Clearance Limits
Status	<Validated>
Rationale	In order to reduce workload and enhance situational awareness, the Tower Controller must be able to verify the clearance limit of each aircraft without being forced to make a system input.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0009
Requirement	The Tower Controller must be alarmed in case of a stop bar or VSB violation.
Title	Stop Bar and VSB Violation Alert
Status	<Validated>
Rationale	If an aircraft crosses a lit stop bar or VSB, the Tower Controller must be alerted in order to enhance safety.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0010
Requirement	In critical areas stop bars or VSBs must be lit by default and when switched to be unlit must switch back to the lit status after a set time limit or after passage of an aircraft.
Title	Stop Bar and VSB Statuses in Critical Areas
Status	<Validated>
Rationale	In critical areas, to be defined by the ANSP (e.g. taxiway crossings behind Rapid Exit Taxiways), stop bars and VSBs must be lit by default in order to ensure safety of operations. When switched, the stop bars and VSBs must switch back to the lit status automatically after a given time limit or after passage of an aircraft in order to keep the critical areas safe.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0011
Requirement	Infringement of runway protection Stop Bars shall trigger an alarm with different visual and aural cues compared to the crossing of stop bars on the taxiways or in the apron area.
Title	Discern Runway Incursions from Stop Bar and VSB Violations
Status	<Validated>
Rationale	Violations that cause runway incursions must be treated differently from other types of stop bar and VSB violations, due to the severity of that violation (high velocity impact). Thus, alarms must be different as well (more serious for runway incursions).
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A

<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0012
Requirement	All data link equipped aircraft using an AMM should receive secured VSB position and status data.
Title	Secure VSB Related Data Link Elements
Status	<In Progress>
Rationale	All data link equipped aircraft using an AMM should receive VSB position and status data that cannot be easily disturbed/infringed from outside the ATM system.
Category	<HMI>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0038	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SEC1.0001	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0013
Requirement	All data link equipped aircraft using an AMM should receive sufficiently secured other traffic data that cannot be easily disturbed/infringed from outside the ATM system
Title	Secure Other Traffic Related Data Link Elements
Status	<In Progress>
Rationale	All data link equipped aircraft using an AMM should receive other traffic data that cannot be easily disturbed/infringed from outside the ATM system.
Category	<Security>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SEC1.0001	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0014
Requirement	The VSB application shall be integrated within an AMM.
Title	Integrate VSB Application with AMM
Status	<Validated>
Rationale	VSB presentation on AMM is required to maintain an adequate level of Flight Crew situational awareness.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0015
Requirement	The AMM integrated with the VSB application shall be displayed upon Flight Crew selection within both the pilot flying and the pilot monitoring primary field of view.
Title	Stop Bar and VSB Management
Status	<Validated>
Rationale	Both the pilot flying and the pilot monitoring shall be able to visualise stop bars and VSBs.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0016
Requirement	The VSB application shall display stop bar and VSB positions and statuses on the AMM.
Title	Stop Bar and VSB Information
Status	<Validated>
Rationale	The minimum stop bar and VSB information to be displayed consists of their positions and statuses.
Category	<Operational>
Validation Method	<Real Time Simulation>

Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0017
Requirement	Different stop bar and VSB statuses on the AMM shall be distinguished by means of an appropriate colour coding associated with only one meaning.
Title	Stop Bar and VSB Visualisation
Status	<Validated>
Rationale	Flight crew must be able to properly identify top bar and VSB statuses.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0018
Requirement	Stop bar and VSB colours on the display should be discriminable by the typical user under the variety of lighting conditions expected in a flight deck from a nominal reference design eye point.
Title	Stop Bar and VSB Discriminability
Status	<Validated>
Rationale	Dimensions and colours used for the stop bar and VSB symbols shall be adequate to the flight deck geometry.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0019
Requirement	Labels shall be used to identify stop bar and VSB symbols on the AMM. The spatial relationships between labels and the objects that they reference should be clear.
Title	Stop Bar and VSB Labels
Status	<Validated>
Rationale	Labels are required to properly identify stop bars and VSBs.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0020
Requirement	All stop bar and VSB labels shall be upright oriented and readable at an operational viewing distance under the full range of normally expected flight deck illumination conditions.
Title	Stop Bar and VSB Label Readability
Status	<Validated>
Rationale	Labels used to identify stop bar and VSB symbols shall be adequate to the flight deck geometry.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0021
Requirement	The AMM should display other traffic data.
Title	Traffic Data Integrated on AMM
Status	<Validated>
Rationale	Other traffic data visualisation is recommended to enhance the Flight Crew's situational awareness.
Category	<Operational>

Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0022
Requirement	The traffic symbol on the AMM should indicate specific directionality, if that data is available and of sufficient quality. Surface traffic should be clearly distinguished from airborne traffic.
Title	Traffic Data Visualisation
Status	<Validated>
Rationale	To enhance the Flight Crew’s situational awareness, other traffic data information should include directionality and surface/airborne status.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0023
Requirement	The AMM VSB application display should provide symbols and indications including at least Own-ship Location, Runways, Taxiways, and Aircraft Ground Speed.
Title	Minimum AMM Symbol Set
Status	<Validated>
Rationale	A minimum set of information shall be provided to ensure VSB application effectiveness.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-	N/A

		taxi-out-routing	
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0024
Requirement	The AMM VSB application display shall have the capability for manual de-cluttering during operational use.
Title	AMM De-clutter
Status	<Validated>
Rationale	In order to reduce clutter on the cockpit display, the VSB application shall provide de-cluttering functionality.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0025
Requirement	The AMM integrated with the VSB application shall provide the Flight Crew with appropriated controls to manage at least Map Range, Map Panning, and Map Orientation.
Title	Minimum AMM Control Set
Status	<Validated>
Rationale	A minimum set of AMM controls shall be provided to ensure VSB application effectiveness.
Category	<Functional>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0026
Requirement	Warning information shall be provided to alert the crew to unsafe operating conditions (e.g. Stop Bar violations).
Title	Flight Crew Alerting
Status	<Validated>

Rationale	Monitoring of Flight Crew operations is required to increase safety.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-SAF1.0421	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0027
Requirement	If the AMM VSB application is fully or partially disabled, or is not visible or accessible to the user due to a failure, this loss of function should be clearly indicated to the user with a positive indicator (lack of an indication is not sufficient to declare a failure condition).
Title	VSB Application Monitoring
Status	<In Progress>
Rationale	The monitoring of the service status is required to maintain SA and increase safety.
Category	<Operational>
Validation Method	<Real Time Simulation>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0028
Requirement	The AMM VSB application accuracy shall be sufficient for the intended function. The accuracy includes the effects of the aircraft reference point, defined as the accuracy of the location on the aircraft used to position the own-ship symbol, or used in a surveillance position report.
Title	VSB Position Accuracy
Status	<In Progress>
Rationale	Minimum position accuracy is required to assure VSB application effectiveness.
Category	<Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance

<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0029
Requirement	Tower Controllers shall be able to see only the status of the VSBs associated to the hooked aircraft.
Title	Display of VSBs associated to the hooked aircraft
Status	<In Progress>
Rationale	In order to give Tower Controllers with a quick understanding of the VSBs associated to each aircraft.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0030
Requirement	Tower Controllers shall be able to edit new Virtual Stop Bars not linked to any intermediate holding positions during flight execution.
Title	Online Editing of new VSBs not linked to IHP
Status	<In Progress>
Rationale	In order to implement a full dynamic virtual block control, any new VSBs could be edited by Tower Controllers in accordance with the current operational conditions.
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<APPLIES_TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0031
Requirement	When Dynamic Virtual Block Control procedures are in place, Tower Controllers shall be notified in case of any spacing reduction between two aircraft
Title	Spacing monitoring
Status	<In Progress>
Rationale	With the implementation of full dynamic block control, it could happen that two aircraft occupies the same block. Therefore, Tower Controllers need to be supported through a dedicated tool which monitor spacing between them
Category	<Operational>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0089	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

[REQ]

Identifier	REQ-06.07.02-OSED-VBCL.0032
Requirement	The AMM VSB application accuracy shall be sufficient for the intended function. The accuracy includes the effects of the aircraft reference point, defined as the accuracy of the location on the aircraft used to position the own-ship symbol, or used in a surveillance position report.
Title	VSB Position Accuracy
Status	<In Progress>
Rationale	Minimum position accuracy is required to assure VSB application effectiveness.
Category	<Performance>
Validation Method	<Live Trial>
Verification Method	

[REQ Trace]

Relationship	Linked Element Type	Identifier	Compliance
<SATISFIES>	<ATMS Requirement>	REQ-06.02-DOD-6200.0044	<Partial>
<APPLIES TO>	<Operational Focus Area>	OFA04.02.01	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	European Hub	N/A
<APPLIED_IN_ENVIRONMENT>	<Environment Class>	Multiple Independent Runways, non-complex surface layout	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-out-routing	N/A
<APPLIES_TO>	<Operational Process>	PCS-06.02-DOD-Prepare-and-execute-taxi-in-routing	N/A

6.6 Information Exchange Requirements

Note: in this section, an effort was made to comply with the guidelines on the writing of Information Exchange Requirements to use as issuers and addressees human actors identified in B.04.02's Role and Responsibilities document ([21]). However, in the case of information generated by a system (e.g. surveillance reports) or originating from outside the ATM community (e.g. AMDB supplier), the choice was made to use instead the first human actor using the information or an issuer/addressee not defined by B.04.02.

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0001	Airport layout	AMDB provider	Tower Clearance Delivery Controller; Tower Ground Controller	Airport Infrastructure			<In Progress>	A description of the airport infrastructure (runways, taxiways) and of the connectivity between the infrastructure elements is needed to generate routes.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0002	Taxiway preferred directions	Airport Air Traffic Services	Tower Clearance Delivery Controller; Tower Ground Controller	Preferred Taxiway Direction			<Validated >	The preferred taxiway direction is a key information for the A-SMGCS Routing function to build operationally realistic routes by selecting appropriate taxiways.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0003	Default taxi routes	Airport Air Traffic Services	Tower Clearance Delivery Controller; Tower Ground	Default Taxi Routes			<Validated >	The default taxi routes are the initial choice of taxi routes for the automatic A-SMGCS Routing function.	REQ-06.02-DOD-6200.0009<Partial>	

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
			Controller							

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0004	Aircraft type	Aircraft Operator	Tower Clearance Delivery Controller	Aircraft Type			<Validated>	The type of the aircraft may restrict the usable taxiways and thus constrain the routes that can be generated for the aircraft.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0005	Runway exit	Flight Crew	Tower Clearance Delivery Controller	Runway Exit			<Validated>	If available from the aircraft, the planned expected runway exit is the starting point of the arriving aircraft's planned route.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0006	Allocated stand	Stand Planner	Tower Clearance Delivery; Tower Ground Controller	Allocated Stand			<Validated>	The allocated stand is the end point of the arriving aircraft's planned route and the starting point of the departing's aircraft one. For tugged aircraft, the start and end stands are the starting and end points of the tug's planned route.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0007	Runway holding point	Tower Clearance Delivery Controller; Tower Ground Controller	Tower Clearance Delivery Controller; Tower Ground Controller; Tower Runway Controller	Runway Holding Point			<Validated>	The runway holding point is the end point of the departing aircraft's planned route.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0008	Runway configuration	Airport Tower Supervisor	Tower Clearance Delivery Controller; Tower Ground Controller	Current Runway Configuration			<Validated>	The current runway configuration (runway in use, closed runway) dictates the preferred directions of taxiways used to determine the aircraft's planned route.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0009	Taxiway configuration	Airport Tower Supervisor	Tower Clearance Delivery Controller; Tower Ground Controller	Current Taxiway Configuration			<Validated>	The current taxiway configuration indicates any closed taxiway to be avoided when determining the aircraft's planned route.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0010	LVPs in use	Airport Tower Supervisor	Tower Clearance Delivery Controller; Tower Ground Controller	LVPs in use			<Validated >	In Low Visibility Conditions, the valid routes can differ from those in CAVOK conditions.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0011	TSAT	Airport CDM Project Manager	Tower Clearance Delivery Controller	Target Start-up Approval Time for departing aircraft			<Validated >	The TSAT is needed to date the different points from the planned route and compute the estimated taxi time.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0012	Allocated bay	De-icing Agent	Tower Clearance Delivery Controller	Allocated De-icing Bay			<In Progress>	The de-icing bay allocated to the departing aircraft is necessary to build the complete planned route, in case of remote de-icing	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0013	Expected de-icing time	De-icing Agent	Tower Clearance Delivery Controller	Expected De-Icing Time			<In Progress>	The expected de-icing time is necessary to compute the estimated taxi time, in case of de-icing.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0014	Target report	A-SMGCS surveillance	Tower Clearance Delivery Controller; Apron Manager; Tower Ground Controller; Tower Runway Controller	Surveillance Target Report			<Validated>	Current position of mobiles is required for the A-SMGCS Routing function to generate planned routes for ground movements or to handle route changes by the Tower Controller.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0015	Route deviation alert	Airport Surveillance Systems	Tower Apron Manager; Tower Ground Controller; Tower Runway Controller	Information of route deviations that require rerouting.			<Validated>	A mobile that deviates from its route will need new routing information to reach its destination.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0016	TLDT	Airport CDM Project Manager	Tower Clearance Delivery Controller	Target Landing Time for arriving aircraft			<Validated>	The planned route, and the associated taxi in time, shall enable be computed some time before TLDT	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0017	TOBT	Airport CDM Project Manager	Tower Clearance Delivery Controller	Target Off-Block Time for departing aircraft			<Validated>	Planning process needs a time information in order to optimise routes of mobiles operating at the same time.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0019	Scheduled runway configuration change	Airport Tower Supervisor	Tower Clearance Delivery Controller; Tower Ground Controller	Planned Runway Configuration			<In Progress>	The planned runway configuration (runway in use, closed runway) dictates the preferred directions of taxiways used to determine the aircraft's planned route.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0001.0020	Mobile Id	Airport Flight Data Processing System	Tower Clearance Delivery Controller; Apron Manager; Tower Ground Controller; Tower Runway Controller	Mobile Id			<Validated>	Identification of mobiles is required by the A-SMGCS Routing function to allocate routes to the various mobiles on the aerodrome surface at a given time	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0001	Planned route	Tower Clearance Delivery Controller	Flight Crew; Vehicle Driver; Apron Manager; Tower Ground Controller; Tower Runway Controller	Planned Route			<Validated>	A planned route is computed for all mobiles, taking into account known constraints. The Flight Crew uses the planned route displayed on the airport moving map to prepare the taxi-in or the taxi-out phase. The Vehicle Driver uses the planned route displayed on the airport moving map to prepare his/her movement. The Apron Manager uses the planned route to gain situation awareness on the future movements in his/her area of responsibility. The Tower Ground Controller uses the planned route to gain situation awareness on the future movements in his/her area of responsibility. The Tower Runway Controller uses the planned route to gain situation awareness on the future movements in his/her area of responsibility.	REQ-06.02-DOD-6200.0009<Partial>; REQ-06.02-DOD-6200.0014<Partial>; REQ-06.02-DOD-6200.0044<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0002	Estimated taxi time	Tower Clearance Delivery Controller	Flight Crew; Tower Clearance Delivery Controller; Airport CDM Project Manager	Estimated Taxi Time			<Validated>	This corresponds to the estimated taxi time associated to the planned route allocated to a mobile. The Flight Crew can use the estimated taxi-out time to decide whether to taxi with one engine turned off. The Clearance Delivery Controller's DMAN uses the estimated taxi-out time to build the departure sequence. The A-CDM platform calculates an Estimated In Block time (EIBT) taking into account the taxi time, the expected runway / runway exit point, the Estimated/Target Landing Times (ELDT/TLDT) and parking stand.	REQ-06.02-DOD-6200.0009<Partial>; REQ-06.02-DOD-6200.0044<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0003	Status of the A-SMGCS Routing function	Tower Clearance Delivery Controller	Tower Ground Controller	Status of the availability of the service and the A-SMGCS Routing function.			<Validated>	Tower Controller's HMI shall inform the Tower Controller of the status of the service and alert him in case of a system failure	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0004	Remaining taxi time	Tower Clearance Delivery Controller	Tower Ground Controller; Tower Runway Controller; DMAN.	Estimated remaining taxi time corresponding to the planned route			<Validated>	This corresponds to the estimated remaining taxi time associated to the planned route. This is useful to assess poss ble changes on the departure sequence or influence other tactical actions by the Tower Controllers.	REQ-06.02-DOD-6200.0009<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0005	D-TAXI Push-Back Service	Flight Crew; Tower Ground Controller	Flight Crew; Tower Ground Controller	Parameters of the D-TAXI Push-Back Service according to EUROCAE WG78 standard			<Validated>	To perform the aircraft Push-Back phase by datalink	REQ-06.02-DOD-6200.0038<Partial>; REQ-06.02-DOD-6200.0039<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0006	D-TAXI Taxi Service	Flight Crew; Tower Ground Controller; Tower Runway Controller	Flight Crew; Tower Ground Controller; Tower Runway Controller	Parameters of the D-TAXI Taxi Service according to EUROCAE WG78 standard			<Validated>	To allow the transmission of the taxi-in, taxi out or revised taxi clearance by datalink	REQ-06.02-DOD-6200.0038<Partial>; REQ-06.02-DOD-6200.0039<Partial>;	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0007	AGL Switching Information	Tower Ground Controller	Tower Ground Controller	Taxiway lights switching status (on/off)			<Validated>	The A-SMGCS Guidance Function delivers routing related information to the airfield ground lighting control units, encompassing all necessary information for the switching of lights and other devices such as stop bars	REQ-06.02-DOD-6200.0088<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0008	AGL Operating Status	Tower Ground Controller	Tower Ground Controller	Taxiway segments, Operating Status On/Off			<Validated>	The airfield ground lighting control units send status information and warnings to the surface management system	REQ-06.02-DOD-6200.0088<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0009	D-TAXI Cleared Route Service	Tower Ground Controller	Flight Crew; Vehicle Driver	Cleared Route			<Validated>	To inform Flight Crew or Vehicle Driver of their cleared route on the airport surface	REQ-06.02-DOD-6200.0038<Partial> REQ-06.02-DOD-6200.0039<Partial> REQ-06.02-DOD-6200.0069<Partial> REQ-06.02-DOD-6200.0070<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0010	D-TAXI Start-Up Service	Flight Crew; Tower Clearance Delivery Controller	Flight Crew; Tower Clearance Delivery Controller	Parameters of the D-TAXI Start-Up Service according to EUROCAE WG78 standard			<Validated>	To perform the aircraft Start-Up phase by datalink	REQ-06.02-DOD-6200.0038<Partial>; REQ-06.02-DOD-6200.0039<Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0011	Virtual Stop Bar positions	Tower Ground Control	Flight Crew; Tower Ground Control	VSB positions			<Validated>	Additional blocks are created by adding VSB positions on the Tower Controller display. The stop bars only exist virtually on the Tower Controller display. Aircraft with AMM and data link receive VSB positions to feed the display on the AMM.	REQ-06.02-DOD-6200.0044 <Partial>; REQ-06.02-DOD-6200.0089 <Partial>; REQ-06.02-DOD-EFF1.0421 <Partial>; REQ-06.02-DOD-SAF1.0421 <Partial>	

[IER]

Identifier	Name	Issuer	Intended Addressees	Information Element	Involved Operational Activities	Interaction Rules and Policy	Status	Rationale	Satisfied DOD Requirement Identifier	Service Identifier
IER-06.07.02-OSED-0002.0012	Virtual Stop Bar status	Tower Ground Control	Flight Crew; Tower Ground Control	VSB status			<Validated>	When a VSB is switched on or off, the Tower Controller HMI and the AMM need to be updated. Airport safety nets also need to receive updates of the status of VSBs to trigger alerts in case of a violation.	REQ-06.02-DOD-6200.0044 <Partial>; REQ-06.02-DOD-6200.0089 <Partial>; REQ-06.02-DOD-EFF1.0421 <Partial>; REQ-06.02-DOD-SAF1.0421 <Partial>	

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7.1 Applicable Documents

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[2] Requirements and V&V Guidelines 03.00.00
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[3] Templates and Toolbox User Manual 03.00.00
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[4] EUROCONTROL ATM Lexicon
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7.2 Reference Documents

The following documents were used to provide input/guidance/further information/other:

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Appendix A Advanced features for OFA04.02.01 operational services

The purpose of this appendix is to document features that have been considered or partially validated during SESAR 1, but which have not been retained as part of SESAR Solutions due to a lack of maturity mature. This appendix can serve as an input for future R&D activities.

A.1 Route generation integrated with planning information

A.1.1 Detection of conflicting situations in the planning phase

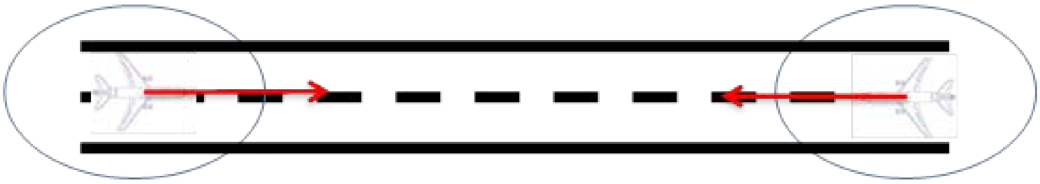
This advanced feature of the A-SMGCS Routing function takes into account the different conflicting situations that may occur when generating routes in the planning phase. It has been investigated by OFA04.02.01 up to V2 maturity level but has not been considered as mature enough to be included in SESAR Solution #22.

Depending on the severity of the conflict detected, two distinctions can be made: relevant and not severe. While relevant conflicting situations would justify a route recalculation for one or both the mobiles involved in the planning phase, not severe conflicting situation would preferably be solved by the Tower Ground Controller in the tactical phase. A short summary of the identified conflicting situations follows

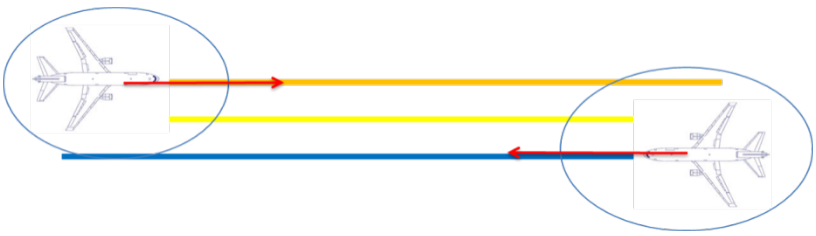
Relevant conflicting situations

The conflicting situations of interest for the route generation service are those occurring in the planning phase and that would justify a recalculation of the planned route for one or both the mobiles involved in order to optimize movements in the platform. A conflict can be considered as relevant when a mobile blocks the movement of another mobile during an extended time period for which the calculated taxi time exceeds a given threshold. The following situations could be included within these conflict classification criteria:

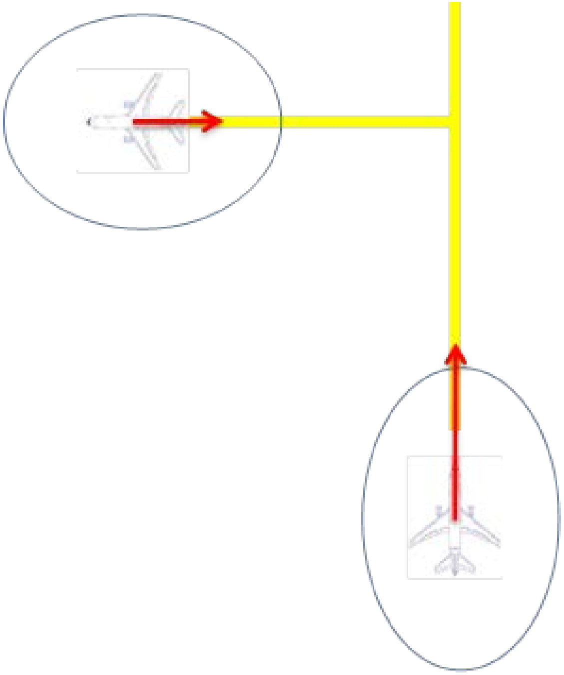
- Head-on conflicts: planned routes on a single taxiway or incompatible parallel taxiways with two mobiles moving in opposite directions without exit or entry points and using the same section of the taxiway in the same timeframe.



- Head-on conflicts: Alternative Parallel Taxiway Routing with incompatible code letter. Two mobiles with planned routes taxiing in opposite directions, using alternative lines, or with one of them using the centre line, on the same stretch of the lane within the same timeframe and where one both have incompatible code wingspan



- Pushback on taxi lane conflicts: planned routes with two mobiles converging at the same intersection, in which one of them is planned to do pushback towards an intersection while blocking the advance of the other mobile

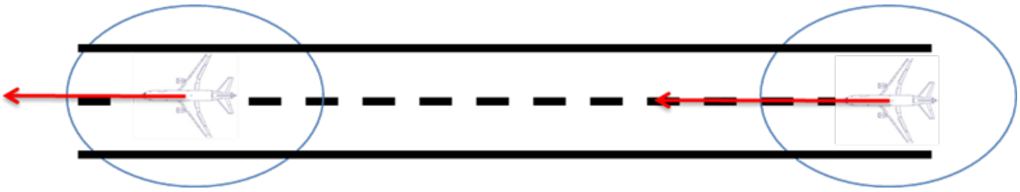


Non severe conflicting situations

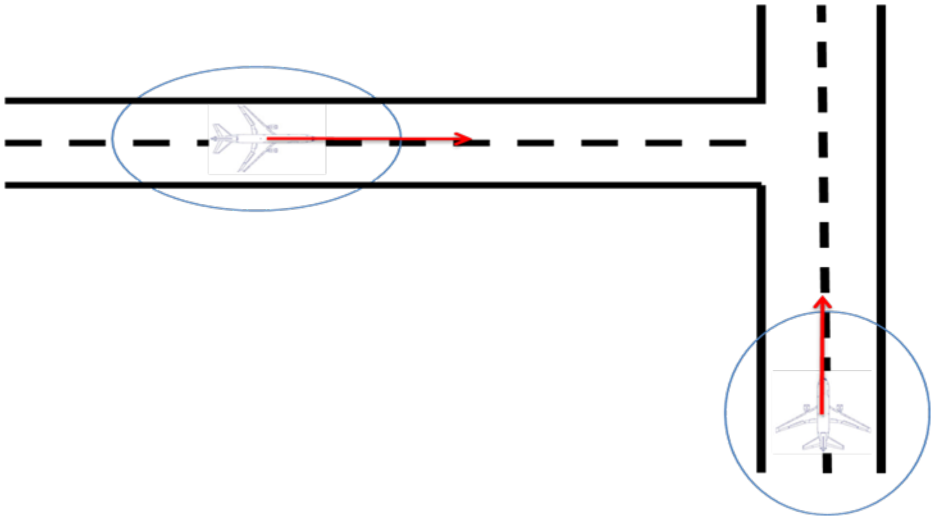
In this case, the conflicting situation encompasses all planning routes where there is a loss of separation between mobiles but without involving a blocking situation for an extended period of time. In these cases, the conflict can be solved tactically through a speed adjustment or by stopping one the aircraft involved during a defined time period which does not impact the calculated taxi time in a significant way

- Head-on – Alternative Parallel Taxiway Routing with compatible code letter: Two mobiles with planned routes taxiing in opposite directions, in which one of them would be using the centre line and the other one an alternative line on same stretch of the lane within same timeframe. This situation would be solved by changing the route of one of the airplanes towards the empty alternative lane due to compatible code wingspan.

- Catching up: planned routes with two mobiles taxiing in the same direction using the same section of the taxiway within the same timeframe and where the following aircraft speed is higher than the leading aircraft speed, resulting in an infringement of the separation bubble within the timeframe of the taxiway section occupancy. This situation would be solved by modifying the speed of the airplanes and due to the uncertainties in aircraft speeds, the speed adjustments will be given by the Tower Controller in the execution phase.



- Conflict at intersection: planned routes with two mobiles converging toward the same intersection within the same timeframe and there's a separation bubble infringement within the timeframe of intersection occupancy. This situation would be solved by stopping one of the airplanes for a short time period, and due to the uncertainties in aircraft trajectory prediction, the management of priorities will be handled by the Tower Controller in the execution phase.



Appendix B D-TAXI Operating Methods

D-TAXI Start-up Approval Request at Flight Crew's Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, an "R" (e.g., 9R) stands for ROGER, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Flight Crew sends a start-up approval request.
2	Upon ATSU system receipt of a start-up approval request, the Tower Controller may be notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon aircraft system receipt of STANDBY the Flight Crew is notified.
5U	The ATSU system /Tower Controller respond with an UNABLE.
5C	When the ATSU system/Tower Controller does not UNABLE the start-up request, the Tower Controller responds with an approval, or expect information or a combined approval and expect information.
6	Upon aircraft system receipt of the response message, the Flight Crew is notified.
7	The Flight Crew may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller may be notified.
9U	When the Flight Crew receives a start-up approval (may include concatenated expect information), and the Flight Crew cannot comply, or an expect message that the Flight Crew cannot understand, the Flight Crew responds with an UNABLE.
10U	Upon ATSU system receipt of UNABLE, the Tower Controller is notified.
9W	When the Flight Crew receives a start-up approval (may include concatenated expect information), and the Flight Crew can comply, the Flight Crew responds with a WILCO.
10W	Upon ATSU receipt of WILCO, the Tower Controller may be notified.
9R	When the Flight Crew receives an expect message (not including a clearance), and the Flight Crew understands the message, the Flight Crew responds with a ROGER.
10R	Upon ATSU receipt of ROGER, the Tower Controller may be notified.

Table 21: Flight Crew initiated D-TAXI Start-Up Request Operating Method

D-TAXI Start-up Approval Request at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "W" (e.g., 5W) stands for WILCO, and a "Y" (e.g., 5Y), stands for a message requiring a response other than a clearance.*

Step	Operating Method
1	The ATSU system /Tower Controller sends to the aircraft a start-up approval or other message requiring a response.
2	Upon aircraft system receipt of a start-up approval message, the Flight Crew is notified.
3	The Flight Crew may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller may be notified.
5U	When the Flight Crew receives a start-up approval (may include concatenated expect information), and the Flight Crew cannot comply, or an expect message that the Flight Crew cannot understand, the Flight Crew responds with an UNABLE.
6U	Upon ATSU system receipt of UNABLE, the Tower Controller is notified.
5W	When the Flight Crew receives a start-up approval (may include concatenated expect information), and the Flight Crew can comply, the Flight Crew responds with a WILCO.
6W	Upon ATSU system receipt of WILCO the Tower Controller may be notified.
5Y	When the Flight Crew receives a message (not including a clearance), and the Flight Crew understands the message, the Flight Crew responds.
6Y	Upon ATSU receipt of the response, the Tower Controller may be notified.

Table 22: ATSU/Controller Initiated D-TAXI Start-Up Operating Method

D-TAXI Push-back Request at Flight Crew Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, an "R" (e.g., 9R) stands for ROGER, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Flight Crew sends a push-back request.
2	Upon ATSU system receipt of a push-back request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon aircraft system receipt of STANDBY the Flight Crew is notified.
5U	The Tower Controller responds with an UNABLE.
5C	When the Tower Controller does not UNABLE the push-back request, the Tower Controller responds with a push-back clearance or an expect message.
6	Upon aircraft system receipt of the Tower Controller's response, the Flight Crew is notified.
7	The Flight Crew may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
9U	When the Flight Crew receives push-back approval and the Flight Crew cannot comply, or an expect message that the Flight Crew cannot understand, the Flight Crew responds with an UNABLE.
10U	Upon ATSU system receipt of UNABLE, the Tower Controller is notified.
9W	When the Flight Crew receives push-back approval, and the Flight Crew can comply, the Flight Crew responds with a WILCO.
10W	Upon ATSU receipt of WILCO, the Tower Controller may be notified.
9R	When the Flight Crew receives an expect message (not including a clearance), and the Flight Crew understands the message, the Flight Crew responds with a ROGER.
10R	Upon ATSU receipt of ROGER, the Tower Controller may be notified.

Table 23: Flight Crew initiated D-TAXI Push-Back approval Request Operating Method

D-TAXI Push-back Request at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends push-back instruction to the aircraft.
2	Upon aircraft system receipt of a push-back message, the Flight Crew is notified.
3	The Flight Crew may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Flight Crew receives push-back, and the Flight Crew cannot comply, the Flight Crew responds with an UNABLE.
6U	Upon ATSU system receipt of UNABLE, the Tower Controller is notified.
5W	When the Flight Crew receives push-back, and the Flight Crew can comply, the Flight Crew responds with a WILCO.
6W	Upon ATSU system receipt of WILCO the Tower Controller may be notified.

Table 24: Controller Initiated D-TAXI Push-Back Operating Method

D-TAXI Taxi out Request at Flight Crew Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, an "R" (e.g., 9R) stands for ROGER, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Flight Crew sends a taxi-out request.
2	Upon ATSU system receipt of a taxi-out request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon aircraft system receipt of STANDBY the Flight Crew is notified.
5U	The Tower Controller responds with an UNABLE.
5C	When the Tower Controller does not UNABLE the taxi-out request, the Tower Controller responds with a taxi-out approval.
6	Upon aircraft system receipt of the response, the Flight Crew is notified.
7	The Flight Crew may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
9U	When the Flight Crew receives a taxi-out approval, and the Flight Crew cannot comply, the Flight Crew responds with an UNABLE.
10U	Upon ATSU receipt of the UNABLE response, the Tower Controller is notified.
9W	When the Flight Crew receives a taxi-out approval, and the Flight Crew can comply, the Flight Crew responds with a WILCO.
10W	Upon ATSU receipt of the WILCO response, the Tower Controller may be notified.
9R	When the Flight Crew receives an expect message (not including a clearance), and the Flight Crew understands the message, the Flight Crew responds with a ROGER.
10R	Upon ATSU receipt of the ROGER response, the Tower Controller may be notified.

Table 25: Flight Crew Initiated D-TAXI Taxi-Out Request Operating Method

D-TAXI Taxi out Instruction at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a taxi-out instruction to the aircraft.
2	Upon aircraft system receipt of a taxi-out instruction message, the Flight Crew is notified.
3	The Flight Crew may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Flight Crew receives a taxi-out instruction, and the Flight Crew cannot comply, the Flight Crew responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Flight Crew receives a taxi-out instruction and the Flight Crew can comply, the Flight Crew responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 26: ATSU/Tower Controller Initiated D-TAXI Taxi-Out Operating Method

D-TAXI Taxi In Request at Flight Crew Initiative

***Note:** In the table below, a "U"(e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, an "R" (e.g., 9R) stands for ROGER, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Flight Crew sends a taxi-in request.
2	Upon ATSU system receipt of a taxi-in request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon aircraft system receipt of STANDBY the Flight Crew is notified.
5U	The Tower Controller responds with an UNABLE.
5C	When the Tower Controller does not UNABLE the taxi-in request, the Tower Controller responds with a taxi-in instruction and/or taxi route information.
6	Upon aircraft system receipt of the response, the Flight Crew is notified.
7	The Flight Crew may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
9U	When the Flight Crew receives a taxi-in instruction, and the Flight Crew cannot comply, the Flight Crew responds with an UNABLE.
10U	Upon ATSU system receipt of UNABLE, the Tower Controller is notified.
9W	When the Flight Crew receives a taxi-in instruction, and the Flight Crew can comply, the Flight Crew responds with a WILCO.
10W	Upon ATSU receipt of WILCO, the Tower Controller may be notified.
9R	When the Flight Crew receives an expect message (not including an approval), and the Flight Crew understands the message, the Flight Crew responds with a ROGER.
10R	Upon ATSU receipt of ROGER, the Tower Controller may be notified.

Table 27: Flight Crew initiated D-TAXI Taxi-In Request Operating Method

D-TAXI Taxi In Instruction at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a taxi-in instruction to the aircraft.
2	Upon aircraft system receipt of a taxi-in instruction message, the Flight Crew is notified.
3	The Flight Crew may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller may be notified.
5U	When the Flight Crew receives a taxi-in instruction, and the Flight Crew cannot comply, the Flight Crew responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Flight Crew receives a taxi-in instruction, and the Flight Crew can comply, the Flight Crew responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 28: ATSU/Controller Initiated D-TAXI Taxi-In Operating Method

D-TAXI REVISED Taxi at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a revised taxi to the aircraft.
2	Upon aircraft system receipt of a revised taxi message, the Flight Crew is notified.
3	The Flight Crew may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Flight Crew receives a revised taxi, and the Flight Crew cannot comply, the Flight Crew responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Flight Crew receives a revised taxi and the Flight Crew can comply, the Flight Crew responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 29: ATSU/Tower Controller Initiated REVISED D-TAXI Request Operating Method

Data Link PROCEED Request at Vehicle Drivers Initiative

Note: *In the table below a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, an "R" (e.g., 9R) stands for ROGER, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Vehicle Driver sends a PROCEED request.
2	Upon ATSU system receipt of a PROCEED request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon vehicle system receipt of STANDBY the Vehicle Driver is notified.
5U	The Tower Controller responds with an UNABLE.
5C	When the Tower Controller does not UNABLE the PROCEED request, the Tower Controller responds with a PROCEED approval.
6	Upon vehicle system receipt of the response, the Vehicle Drivers is notified.
7	The Vehicle Drivers may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
9U	When the Vehicle Driver receives a PROCEED approval, and the Vehicle Driver cannot comply, the Vehicle Driver responds with an UNABLE.
10U	Upon ATSU receipt of the UNABLE response, the Tower Controller is notified.
9W	When the Vehicle Driver receives a PROCEED approval, and the Vehicle Driver can comply, the Vehicle Driver responds with a WILCO.
10W	Upon ATSU receipt of the WILCO response, the Tower Controller may be notified.

Table 30: Vehicle Driver Initiated Data Link PROCEED Request Operating Method

Data Link PROCEED Instruction at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a PROCEED instruction to the vehicle.
2	Upon vehicle system receipt of a PROCEED instruction message, the Vehicle Driver is notified.
3	The Vehicle Driver may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Vehicle Driver receives a PROCEED instruction, and the Vehicle Driver cannot comply, the Vehicle Driver responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Vehicle Driver receives a PROCEED instruction and the Vehicle Driver can comply, the Vehicle Driver responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 31: ATSU/Tower Controller Initiated D-TAXI Taxi Operating Method

Data Link REVISED PROCEED Request at Vehicle Driver Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, an "R" (e.g., 9R) stands for ROGER, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Vehicle Driver sends a REVISED PROCEED request.
2	Upon ATSU system receipt of a REVISED PROCEED request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon vehicle system receipt of STANDBY the Vehicle Drivers is notified.
5U	The Tower Controller responds with an UNABLE.
6C	When the Tower Controller does not UNABLE the REVISED PROCEED request, the Tower Controller responds with a revised PROCEED or combined revised PROCEED and expect information.
7	The Vehicle Drivers may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller may be notified.
9U	When the Vehicle Drivers receives a REVISED PROCEED, and the Vehicle Drivers cannot comply, the Vehicle Drivers responds with an UNABLE.
10U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
9W	When the Vehicle Drivers receives a REVISED PROCEED, and the Vehicle Drivers can comply, the Vehicle Drivers responds with a WILCO.
10W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 32: Vehicle Drivers Initiated REVISED PROCEED Request Operating Method

Data Link REVISED PROCEED at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a REVISED PROCEED to the Vehicle Drivers.
2	Upon Vehicle Drivers system receipt of a REVISED PROCEED message, the Vehicle Drivers is notified.
3	The Vehicle Drivers may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Vehicle Drivers receives a REVISED PROCEED, and the Vehicle Drivers cannot comply, the Vehicle Drivers responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Vehicle Drivers receives a REVISED PROCEED and the Vehicle Drivers can comply, the Vehicle Drivers responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 33: ATSU/Tower Controller Initiated REVISED PROCEED Request Operating Method

Data Link TOW Request at Vehicle Drivers Initiative

Note: *In the table below a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 5C) stands for CLEARANCE, and a "W" (e.g., 9W) stands for WILCO*

Step	Operating Method
1	The Vehicle Driver sends a TOW request.
2	Upon ATSU system receipt of a TOW request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon vehicle system receipt of STANDBY the Vehicle Driver is notified.
5U	The Tower Controller responds with an UNABLE.
5C	The Tower Controller responds with a TOW approval.
6	Upon vehicle system receipt of the response, the Vehicle Drivers is notified.
7	The Vehicle Drivers may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
9W	When the Vehicle Driver receives a TOW approval, and the Vehicle Driver can comply, the Vehicle Driver responds with a WILCO.
10W	Upon ATSU receipt of the WILCO response, the Tower Controller may be notified.

Table 34: Vehicle Driver Initiated Data Link TOW Request Operating Method

Data Link TOW Instruction at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a TOW instruction to the vehicle.
2	Upon vehicle system receipt of a TOW instruction message, the Vehicle Driver is notified.
3	The Vehicle Driver may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Vehicle Driver receives a TOW instruction, and the Vehicle Driver cannot comply, the Vehicle Driver responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Vehicle Driver receives a TOW instruction and the Vehicle Driver can comply, the Vehicle Driver responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 35: ATSU/Tower Controller Initiated TOW Operating Method

Data Link REVISED TOW Request at Vehicle Driver Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, a "C" (e.g., 6C) stands for CLEARANCE, and a "W" (e.g., 9W) stands for WILCO.*

Step	Operating Method
1	The Vehicle Driver sends a request a revised TOW.
2	Upon ATSU system receipt of a revised TOW request, the Tower Controller is notified.
3	The Tower Controller may respond with a STANDBY.
4	Upon vehicle system receipt of STANDBY the Vehicle Drivers is notified.
5U	The Tower Controller responds with an UNABLE.
6C	The Tower Controller responds with a revised TOW or combined revised TOW and expect information.
7	The Vehicle Drivers may respond with STANDBY.
8	Upon ATSU system receipt of STANDBY, the Tower Controller may be notified.
9W	When the Vehicle Drivers receives a revised TOW, and the Vehicle Drivers can comply, the Vehicle Drivers responds with a WILCO.
10W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 36: Vehicle Driver Initiated Revised TOW Request Operating Method

Data Link REVISED TOW at ATSU/Tower Controller Initiative

Note: *In the table below, a "U" (e.g., 5U) stands for UNABLE, and a "W" (e.g., 5W) stands for WILCO.*

Step	Operating Method
1	The Tower Controller sends a revised TOW to the Vehicle Drivers.
2	Upon Vehicle Drivers system receipt of a revised TOW message, the Vehicle Drivers is notified.
3	The Vehicle Drivers may respond with STANDBY.
4	Upon ATSU system receipt of STANDBY, the Tower Controller is notified.
5U	When the Vehicle Drivers receives a revised TOW, and the Vehicle Drivers cannot comply, the Vehicle Drivers responds with an UNABLE.
6U	Upon ATSU system receipt of the UNABLE response, the Tower Controller is notified.
5W	When the Vehicle Drivers receives a revised TOW and the Vehicle Drivers can comply, the Vehicle Drivers responds with a WILCO.
6W	Upon ATSU system receipt of the WILCO response, the Tower Controller may be notified.

Table 37: ATSU/Tower Controller Initiated REVISED TOW Request Operating Method

Appendix C New Information Elements

This section contains a detailed description of the Information Elements that are exchanged by actors within ATM according to Information Exchange Requirements. It has to be used for the Information Elements which are neither in the ATM Information Reference Model (AIRM) nor in an external / standard source document.

C.1 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0001

Identifier	IE-001
Name	Airport infrastructure
Description	Description of airport's runways and taxiways
Properties	As published in the AIP
Rules applied	
Comments	A description of the airport infrastructure (runways, taxiways) and of the connectivity between the infrastructure elements is needed to generate routes.

C.2 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0002

Identifier	IE-002
Name	Preferred Taxiway Direction
Description	Preferred direction of each taxiway, for each runway configuration. This information is generally available in the airport ATC operating manual.
Properties	
Rules applied	
Comments	The preferred taxiway direction is a key information for the A-SMGCS Routing function to build operationally realistic routes by selecting appropriate taxiways.

C.3 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0003

Identifier	IE-003
Name	Default Taxi Routes
Description	Default taxi routes to go from specific stand or parking area to runway and vice versa. This information can be provided in the AIP.
Properties	
Rules applied	
Comments	The default taxi routes are the initial choice of taxi routes for the automatic A-SMGCS Routing function.

C.4 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0004

Identifier	IE-004
Name	Aircraft Type
Description	As indicated by ICAO Doc 8643 "AIRCRAFT TYPE DESIGNATORS"
Properties	
Rules applied	
Comments	The type of the aircraft may restrict the usable taxiways and thus constrain the routes that can be generated for the aircraft.

C.5 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0005

Identifier	IE-005
Name	Runway Exit
Description	Runway exit downlinked by arriving aircraft, when equipped with EBS.
Properties	
Rules applied	
Comments	If available from the aircraft, the planned expected runway exit is the starting point of the arriving aircraft's planned route.

C.6 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0006

Identifier	IE-006
Name	Allocated Stand
Description	Stand allocated to arriving aircraft or to departing aircraft. In the case of a tugged aircraft going from/to a stand, this information is needed to determine the start/end of its route.
Properties	
Rules applied	
Comments	The allocated stand is the end point of the arriving aircraft's planned route and the starting point of the departing's aircraft one. For tugged aircraft going from stand to another location (which can be a stand or any other named point or area on the aerodrome), this stand is the starting point of the tug's planned route. For tugged aircraft going from a location (which can be a stand or any other named point or area on the aerodrome) to a stand, this stand is the end point of the tug's planned route.

C.7 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0007

Identifier	IE-007
Name	Runway Holding Point
Description	Runway entry point for departing aircraft. The runway holding point is the end point of the departing aircraft's planned route.
Properties	
Rules applied	
Comments	The runway holding point is the end point of the departing aircraft's planned route.

C.8 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0008

Identifier	IE-008
Name	Current Runway Configuration
Description	The current runway configuration (runway in use, closed runway) dictates the preferred directions of taxiways used to determine the aircraft's planned route.
Properties	
Rules applied	
Comments	The current runway configuration (runway in use, closed runway) dictates the preferred directions of taxiways used to determine the aircraft's planned route.

C.9 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0009

Identifier	IE-009
Name	Current Taxiway Configuration
Description	The current taxiway configuration indicates any closed taxiway to be avoided when determining the aircraft's planned route.
Properties	
Rules applied	
Comments	The current taxiway configuration indicates any closed taxiway to be avoided when determining the aircraft's planned route.

C.10 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0010

Identifier	IE-010
Name	LVPs in use
Description	Indication of whether Low Visibility Procedures are in use.
Properties	
Rules applied	
Comments	In Low Visibility Conditions, the valid routes can differ from those in CAVOK conditions.

C.11 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0011

Identifier	IE-011
Name	Target Start-Up Approval Time for departing aircraft
Description	Target Start-Up Approval Time for departing aircraft
Properties	
Rules applied	Corresponds to a flight
Comments	The TSAT is needed to date the different points from the planned route and compute the estimated taxi time.

C.12 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0012

Identifier	IE-012
Name	Allocated De-Icing Bay
Description	De-icing bay allocated to the aircraft, in case of remote de-icing.
Properties	
Rules applied	Corresponds to a planned route
Comments	The de-icing bay allocated to the departing aircraft is necessary to build the complete planned route, in case of remote de-icing.

C.13 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0013

Identifier	IE-013
Name	Expected De-Icing Time
Description	Expected time required for de-icing, whether on stand or remote.
Properties	
Rules applied	Corresponds to an estimated taxi time
Comments	The expected de-icing time is necessary to compute the estimated taxi time, in case of de-icing.

C.14 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0014

Identifier	IE-014
Name	Surveillance Target Report
Description	Current position of a mobile on the aerodrome surface.
Properties	
Rules applied	
Comments	Current position of mobiles is required for the A-SMGCS Routing function to generate planned routes for ground movements or to handle route changes by the Tower Controller.

C.15 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0015

Identifier	IE-015
Name	Information of route deviations that require rerouting.
Description	Information that a mobile has deviated from its assigned route
Properties	
Rules applied	
Comments	A mobile that deviates from its route will need new routing information to reach its destination.

C.16 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0016

Identifier	IE-016
Name	Target Landing Time for arriving aircraft.
Description	Target time at which an aircraft will land
Properties	
Rules applied	
Comments	The planned route, and the associated taxi in time, shall enable be computed some time before TLDT.

C.17 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0017

Identifier	IE-017
Name	Target Off-Block Time for departing aircraft.
Description	Target time at which an aircraft will leave its stand
Properties	
Rules applied	
Comments	Planning process needs a time information in order to optimise routes of mobiles operating at the same time.

C.18 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0019

Identifier	IE-019
Name	Planned Runway Configuration.
Description	Description of a new configuration of the runway(s), which can to be activated by the Tower Supervisor.
Properties	
Rules applied	
Comments	The planned runway configuration (runway in use, closed runway) dictates the preferred directions of taxiways used to determine the aircraft's planned route..

C.19 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0001.0020

Identifier	IE-020
Name	Mobile Id.
Description	Identifier of a mobile.
Properties	
Rules applied	
Comments	Identification of mobiles is required by the A-SMGCS Routing function to allocate routes to the various mobiles on the aerodrome surface at a given time.

C.20 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0001

Identifier	IE-021
Name	Planned Route
Description	Planned route for mobile, given known constraints.
Properties	
Rules applied	
Comments	A planned route is computed for all mobiles, taking into account known constraints. The Flight Crew uses the planned route displayed on the airport moving map to prepare the taxi-in or the taxi-out phase. The Vehicle Driver uses the planned route displayed on the airport moving map to prepare his/her movement. The Apron Manager uses the planned route to gain situational awareness on the future movements in his/her area of responsibility. The Tower Ground Controller uses the planned route to gain situational awareness on the future movements in his/her area of responsibility. The Tower Runway Controller uses the planned route to gain situational awareness on the future movements in his/her area of responsibility.

C.21 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0002

Identifier	IE-022
Name	Estimated Taxi Time
Description	Estimated taxi time corresponding to the planned route
Properties	
Rules applied	The estimated taxi time corresponds to a planned route
Comments	This corresponds to the estimated taxi time associated to the planned route allocated to a mobile. The Flight Crew uses the estimated taxi-out time to decide whether to taxi with one engine turned off. The Clearance Delivery Controller's DMAN uses the estimated taxi-out time to build the departure sequence.

C.22 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0002

Identifier	IE-023
Name	Status of the availability of the service and the RPF
Description	Status of the A-SMGCS Routing function provided to the technical supervision
Properties	
Rules applied	Tower Controller’s HMI shall inform the Tower Controller of the status of the service and alert him in case of a system failure.

Comments	This corresponds to the estimated taxi time associated to the planned route allocated to a mobile. The Flight Crew uses the estimated taxi-out time to decide whether to taxi with one engine turned off. The Clearance Delivery Controller's DMAN uses the estimated taxi-out time to build the departure sequence.

C.23 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0004

Identifier	IE-024
Name	Estimated remaining taxi time corresponding to the planned route
Description	Estimated remaining axi time corresponding to the planned route
Properties	
Rules applied	
Comments	This corresponds to the estimated remaining taxi time associated to the planned route. This is useful to assess possible changes on the departure sequence or influence other tactical actions by the Tower Controllers.

C.24 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0005

Identifier	IE-025
Name	Parameters of the D-TAXI Push-Back Service according to EUROCAE WG78 standard
Description	Parameters to the Push-Back D-TAXI message, as defined in ED-228
Properties	
Rules applied	
Comments	To perform the aircraft Push-Back phase by datalink.

C.25 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0006

Identifier	IE-026
Name	Parameters of the D-TAXI Taxi Service according to EUROCAE WG78 standard
Description	Parameters to the Taxi and Revised Taxi D-TAXI messages, as defined in ED-228
Properties	
Rules applied	
Comments	To allow the transmission of the taxi-in, taxi out or revised taxi clearance by datalink.

C.26 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0007

Identifier	IE-027
Name	Taxiway lights switching status (on/off)
Description	Commands for switching on or off lights on taxiways
Properties	
Rules applied	
Comments	The A-SMGCS Guidance Function delivers routing related information to the airfield ground lighting control units, encompassing all necessary information for the switching of lights and other devices such as stop bars.

C.27 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0008

Identifier	IE-028
Name	Taxiway segments, Operating Status On/Off
Description	Taxilane light segments and their status (on or off)
Properties	
Rules applied	
Comments	The airfield ground lighting control units send status information and warnings to the surface management system.

C.28 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0009

Identifier	IE-029
Name	Cleared Route
Description	Cleared route provided by D-TAXI
Properties	
Rules applied	
Comments	To inform Flight Crew or Vehicle Driver of their Cleared route on the airport surface.

C.29 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0010

Identifier	IE-030
Name	Parameters of the D-TAXI Start-Up Service according to EUROCAE WG78 standard
Description	Parameters to the Start-Up Taxi D-TAXI message, as defined in ED-228
Properties	
Rules applied	
Comments	To perform the aircraft Start-Up phase by datalink.

C.30 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0011

Identifier	IE-031
Name	VSB positions
Description	Location of Virtual Stop Bars which can be activated by the Tower Controllers
Properties	
Rules applied	
Comments	Additional blocks are created by adding VSB positions on the Tower Controller display. The stop bars only exist virtually on the Tower Controller display. Aircraft with AMM and data link receive VSB positions to feed the display on the AMM.

C.31 Information Element for Information Exchange Requirement IER-06.07.02-OSED-0002.0012

Identifier	IE-031
Name	VSB status
Description	Status of Virtual Stop Bars which are activated or switched off by the Tower Controllers
Properties	
Rules applied	
Comments	When a VSB is switched on or off, the Tower Controller HMI and the AMM

	need to be updated. Airport safety nets also need to receive updates of the status of VSBs to trigger alerts in case of a violation.

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