NASCIO Demonstration Report

Document information	
Project Title	NASCIO
Project Number	02.05
Project Manager	Pildo Labs
Deliverable Name	NASCIO Demonstration Report
Edition	01.01.00
Template version	01.00.00
Task contributors	
Pildo Labs REGA Aeroports de Catalunya, Aeroclub Sabadell and Pildo Wessex LPR CatHelicopters UNIZA and LPS ONDA, RAM and IATC DHMI, Borajet and Blueskies BULATSA	

Abstract

NASCIO: Navigation SESAR Concepts Involving Operators
The NASCIO project is focused on the demonstration of the new Navigation Specifications described in the new PBN Manual, throughout 8 scenarios with a total of 56 flight trials involving all the key players of the Advanced ATM value chain: ANSPs, CAAs, operators (corporative, regional, commercial) and types of aircraft (rotorcraft, fixed wing). This project aims at completing, in a coordinated manner, with other on-going initiatives performed within various Research and Technological Frameworks towards the development of new advanced navigation concepts defined within SESAR.

Authoring & Approval

Prepared By - *Authors of the document.*		
Name & Company	Position & Title	Date
Pildo Labs		31/12/2014

Reviewed By - *Reviewers internal to the project.*		
Name & Company	Position & Title	Date
Pildo Labs		31/12/2014
Pildo Labs		31/12/2014

Approved for submission to the SJU By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
Pildo Labs		31/12/2014

Rejected By - *Representatives of the company involved in the project.*		
Name & Company	Position & Title	Date
-	-	-

Rational for rejection
-

Document History

Edition	Date	Status	Author	Justification
00.00.01	15/12/2014	Draft		New Document
01.00.00	31/12/2014	Issued		First version delivered to SJU
01.01.00	24/02/2015	Issued		Comments of SJU

Intellectual Property Rights (foreground)

This deliverable consists of SJU foreground.

Table of Contents

EXECUTIVE SUMMARY **4**

1 INTRODUCTION **5**

1.1 PURPOSE OF THE DOCUMENT 5
1.2 INTENDED READERSHIP 5
1.3 STRUCTURE OF THE DOCUMENT 5
1.4 GLOSSARY OF TERMS 5
1.5 ACRONYMS AND TERMINOLOGY 6

2 CONTEXT OF THE DEMONSTRATIONS **9**

2.1 SCOPE OF THE DEMONSTRATION AND COMPLEMENTARITY WITH THE SESAR PROGRAMME 10

3 PROGRAMME MANAGEMENT **15**

3.1 ORGANISATION 15
3.2 WORK BREAKDOWN STRUCTURE 17
3.3 FORMAL DELIVERABLES 18
3.4 OTHER DELIVERABLES AND KEY PROJECT MILESTONES 18
3.5 RISK MANAGEMENT 19

4 EXECUTION OF DEMONSTRATION EXERCISES **20**

4.1 EXERCISES PREPARATION 20
4.2 EXERCISES EXECUTION 20
4.3 DEVIATIONS FROM THE PLANNED ACTIVITIES 21

5 EXERCISES RESULTS **22**

5.1 SUMMARY OF EXERCISES RESULTS 22
5.2 CHOICE OF METRICS AND INDICATORS 24
5.3 ANALYSIS OF EXERCISES RESULTS, CONCLUSIONS AND RECOMMENDATIONS 24
5.3.1 Implementation status, challenges and blocking points 24

6 SUMMARY OF THE COMMUNICATION ACTIVITIES **27**

7 NEXT STEPS **28**

7.1 PROJECT OUTCOMES 28
7.2 CONCLUSIONS 28
7.3 RECOMMENDATIONS 28

8 REFERENCES **29**

8.1 REFERENCE DOCUMENTS 29

APPENDIX A NASCIO PRESS RELEASES **30**

A.1 EXE-02.05-002 30
A.2 EXE-02.05-003 32
A.3 EXE-02.05-004 33
A.4 EXE-02.05-005 34
A.5 EXE-02.05-006 & EXE-02.05-007 35
A.6 EXE-02.05-008 36

APPENDIX B SESAR JU NEWS ARTICLE **37**

APPENDIX C EGNOS Q4 2014 BULLETIN **38**

APPENDIX D MAGHREB ARAB PRESS **40**

List of tables

Table 2-1: Demonstration Exercise for EXE-02.05-001 10
Table 2-2: Demonstration Exercise for EXE-02.05-002 11
Table 2-3: Demonstration Exercise for EXE-02.05-003 11
Table 2-4: Demonstration Exercise for EXE-02.05-004 12
Table 2-5: Demonstration Exercise for EXE-02.05-005 12
Table 2-6: Demonstration Exercise for EXE-02.05-006 13
Table 2-7: Demonstration Exercise for EXE-02.05-007 13
Table 2-8: Demonstration Exercise for EXE-02.05-008 14
Table 3-1: NASCIO POCs 15
Table 3-2: Formal Deliverables 18
Table 3-3: Other deliverables and key milestones 18
Table 3-4 Identified risks 19
Table 4-1 Exercises preparation summary 20
Table 4-2 Exercise execution dates and number of flights 21
Table 4-3 Deviations from planned activities 21

List of figures

Figure 3-1: Project organisation chart 16
Figure 3-2: NASCIO Work Breakdown Structure 17

Executive summary

This document is the deliverable **B1: Demonstration Report** of the project NASCIO (02.05). It contains information on the execution of the exercises planned on document **A1: Demonstration Plan.** The information provided includes:

- Overview of the management organization
- Exercise preparation information
- Exercise execution detail, including deviations from the demonstration plan
- Summary of communication activities
- Conclusions and recommendations

The European States are in different phases of implementation of A37-11 Performance-based navigation global goals as defined in the ICAO 37th Assembly resolutions, and particularly "Implementation of RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones". SESAR SJU has identified a need to support the implementation of advanced navigation concepts in ECAC area within the framework of demonstration activities. The focus of the NASCIO project demonstration activities is on emphasizing GNSS based RNAV and RNP benefits to the aircraft and airport operators, while supporting ANSP and regulators in achievement of the national PBN implementation plans.

In support of these demonstration activities, advanced Instrument Flight Procedures (GNSS RNAV Point in Space SID, GNSS based RNP AR APCH and SID, Simultaneous Non-Interfering APV SBAS in mixed rotary/fixed wing operational environment, and Low Level GNSS RNAV-1 helicopter routes) have been designed and validated using the advancement of the NASCIO demonstration activities. NASCIO demonstration activities also promote state-of-the-art EGNOS, supporting navigation performance requirements for RNP AR APCHs and RNAV SIDs/STARs, for both helicopter and airplane operators.

The project is formed by the following companies:

- **PILDO Labs**: leader of the project, responsible of the project management and the analysis of the data recorded during the exercise.
- **Operators:** REGA, Aeroclub Sabadell, LPR, CAT Helicopters, UNIZA, IATC, RAM, Blueskies
- **ANSPs:** BULATSA, ONDA, DHMI

The project has been successfully executed following the plan established.

Some difficulties were encountered due to the unavailability of some aircraft, but the provided mitigation actions allowed the execution of the exercises.

Main conclusions of the exercise are that:

- Novel navigation operational concepts developed within SESAR, relying on GNSS technology and services, contributes to improve the fly ability of less served infrastructure, by providing best value for money solution to actual operators, in particular within general, business and regional aviation.
- Rotorcraft community gets important safety and operational benefits throughout the introduction of Point-In-Space flight procedures and Low Level Routes, facilitating emergency operations today only possible under visual conditions and rules.
- Questionnaires to Pilots and ATCOs show an overall acceptance of the concepts implementation.

1 Introduction

1.1 Purpose of the document

This document is the **deliverable B1: Demonstration Report**.

This document provides the Demonstration Report for NASCIO project and describes the results of demonstration exercises defined in deliverable A1: Demonstration Plan [1] and how they have been conducted.

1.2 Intended readership

The SESAR Joint Undertaking (SJU) and, particularly the SJU's points of contact and SESAR WP5 leaders and reviewers assigned for NASCIO shall found this document particularly interesting as it provides an accurate description of the demonstration exercises execution.

Secondly, this document could be used by all members of the project as it contains clear descriptions of all technical and operational concepts, details and tools used during the project.

Finally, the document might provide remarkable inputs to other projects dealing with PBN navigation applications implementation.

1.3 Structure of the document

The document is organised as follows:

- Section 1 is this introduction;
- Section 2 presents how this project and the demonstrations are related with the SESAR programme and the near-future objectives of different stakeholders;
- Section 3 explains the programme management;
- Section 4 provides general information regarding the execution of the exercises;
- Section 5 contains an overview of the most relevant results regarding the execution of all exercises;
- Section 6 includes all the demonstration exercises reports, mostly referencing each exercise end report;
- Section 7 is the summary of project's communication activities carried out in the frame of the project;
- Section 8 provides the conclusions and recommendations based on the obtained results;
- Section 9 includes the applicable and reference documents;
- Annexes, where additional details referenced along the document are provided.

1.4 Glossary of terms

Approach Procedure with Vertical guidance (APV): An instrument procedure which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.

Required Navigation Performance (RNP): Navigation performance necessary to execute an operation within a defined airspace.

Note. - Navigation performance and requirements are defined for a particular RNP type and/or application.

Required Navigation Performance – Authorisation Required (RNP-AR): RNP AR APCH operations are classified as approach procedures with vertical guidance (APVs) in accordance with Annex 6 — Operation of Aircraft. This type of operation requires a positive vertical navigation (VNAV) guidance system for the final approach segment (FAS). Current RNP AR APCH implementations utilize a barometric vertical navigation system (BARO-VNAV) meeting specified airworthiness requirements. Other suitably accurate vertical guidance may be implemented provided equivalent accuracy, integrity and containment can be assured.

1.5 Acronyms and Terminology

Term	Definition
A/C	Aircraft
AD	Aerodrome
AIP	Aeronautical Information Publication
AMSL	Above Mean Sea Level
APCH	Approach
APV	Approach with Vertical Guidance
ARP	Aerodrome Reference Point
ATM	Air Traffic Management
ATS	Air Traffic Services
CAA	Civil Aviation Authority
DEP	Departure
EFIS	Electronic Flight Instrument System
EGNOS	European Geostationary Navigation Overlay Service
EPBC	OACI code Babice aerodrome
EPLL	OACI code Lodz airport
FAF	Final Approach Fix
FAP	Final Approach Point
FAS	Final Approach Segment
FAS-DB	Final Approach Segment – Data Block
FTE	Flight Technical Error

Term	Definition
GMTN	OACI code Tetouan Saniat R'mel airport
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPS-NPA	Global Positioning System – Non Precision Approach
IAF	Initial Approach Fix
IF	Intermediate fix / Initial fix
IFP	Instrumental Flight Procedure
IFR	Instrumental Flight Rules
LBBG	OACI code Burgas airport
LEBL	OACI code Barcelona - El Prat airport
LELL	OACI code Sabadell airport
LESU	OACI code La Seu d'Urgell aerodrome
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical guidance
LSA	Local Safety Authorities
LSIK	OACI code Interlaken Hospital heliport
LSXI	OACI code Wilderswil airport (REGA base)
LTFD	OACI code Balikesir Koca Seyit airport
LZIB	OACI code Bratislava airport
MAPt	Missed Approach Point
MFD	Multi-function Display
MNM	Minimum
OFA	Operational Focus Area
PBN	Performance Based Navigation
PFD	Primary Flight Display
PinS	Point in Space
RNAV	Area Navigation

Term	Definition
RNP	Required Navigation Performance
RNP-AR	Required Navigation Performance – Authorisation Required
RWY	Runway
SESAR	Single European Sky ATM Research Programme
SID	Standard Instrumental Departure
SJU	SESAR Joint Undertaking
THR	Threshold
TMA	Terminal Control Area
TWR	Tower
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
WP	Waypoint

2 Context of the Demonstrations

Following ICAO recommendations, the regional ANSPs are target stakeholder for the implementation of Performance Based Concepts. Most of European ANSPs still do not have defined PBN implementation roadmap or PBN Implementation plans fully developed. There are a spectrum of reasons for this status, the knowledge capacity required by the ANSP's and the CAA staff being one of them. Better use of airspace, including its design, shaped upon PBN concepts and enormously increased situational awareness for both flight crew and ATCO, are considered as the key immediate benefits.

Demand for introducing new navigation applications in all flight phases is there, since most of airline operators are looking for the capabilities and services oriented to both increase efficiency and to reduce the fuel burn in their operations. At this moment it seems that the actual requests by users on APV approaches operations are mainly focused on those operations enabled through Barometric guidance, so called APV BARO-VNAV, but things are moving fast and first formal demands of PBN concepts are being received by ANSP's.

NASCIO shall support ANSPs on one side to provide better understanding and training on the elements to be put in place for those operations since the applied methodology at project level is based on generic PBN material.

In this sense, it is worth to mention that for the CAA's, the NASCIO Demonstration Activities represents the possibility of understanding the particularities linked to the implementation of new PBN concepts in order to adapt existing internal processes to the validation / certification of advanced ATM solutions and accelerate the future acceptance by involving them since the very beginning and making them participate in the complete implementation life-cycle.

The participation of aircraft operators in the NASCIO Demonstration Activities is based on the need of understanding the benefits of extended PBN and RNP solutions, and especially those related with efficiency increase in terms of all-weather conditions operations and fuel burn reduction.

The main interest of the operators is to take advantage of the new RNAV GNSS procedures in order to:

- Optimize approach routing from various arrival directions;
- Optimize the descent profile provided the APV SBAS;
- Allow engine-idle descent (at least during the final segment);
- Improve track keeping;
- Use of more flexible route and procedure design.

All of these lead to reduced fuel burn and noise footprint, which finally means a reduced environmental impact and reduced costs.

On top of that, the reduction of delays, diversions and cancellations due to bad weather is a very high priority for commercial flights.

NASCIO Demonstration Activities represent a completion of the work in various on-going R&D initiatives aimed at implementation or development of the advanced navigation concepts defined within SESAR, in a coordinated way allowing consolidation of eight PBN related activities.

In particular, benefits of implementing the RNAV/RNP navigation applications is under scope of all demonstration activities, covering all instrument flight phases, from the RNAV departures though en-route RNAV applications to RNP approaches.

Demonstration activities are also aiming at attracting the national Civil Aviation Authorities' more attention in order to assure better acceptance of on-going RNP concepts implementation, among NASCIO target stakeholders, the aircraft and airport operators, in the state whom the particular demonstration scenario is applicable.

NASCIO Demonstration Activities have unified objectives:

- To demonstrate in a multi-aircraft/flight environment the benefits provided by new navigation operational concepts being developed within SESAR;
- To capitalize and complement results from other R&D activities in order to evaluate them in a pre-operational environment;
- To provide interested Stakeholders and Operators the possibility to evaluate advanced concepts and solutions in a pre-operational environment, involving their own fleet and means;
- To accelerate operational acceptance and subsequent industrialization of PBN and RNP concepts, including EGNOS APV procedures, capitalizing available pre-operational material;
- To feed the results outcome from the demonstrations within the SESAR activities as in proof-of-concept consolidation;
- To increase operational exposure of advanced navigation concepts to a wider audience and in particular operators;
- To coordinate and optimize efforts between all players, activities and Institutions involved on the development of new navigation concepts.

2.1 Scope of the demonstration and complementarity with the SESAR Programme

Demonstration Exercise ID and Title	**EXE-02.05-001** **Helicopter PinS RNP 0.3 APCHs/DEPs in Switzerland**
Leading organization	Pildo Labs
Demonstration exercise objectives	To demonstrate EGNOS capabilities for use in PinS RNP 0.3 APCH and SID Operations
OFA addressed	OFA02.02.04 Approach Procedures with Vertical Guidance
Applicable Operational Context	LSIK Interlaken hospital heliport
Number of flight trials	10
Demonstration Technique	Flight trials on GNSS equipped helicopter with additional flight validation platform installed inside.

Table 2-1: Demonstration Exercise for EXE-02.05-001

Demonstration Exercise ID and Title	**EXE-02.05-002** **Regional airline GNSS RNAV-1 SIDs, RNP AR APCHs and RNP APCHs in Spain**
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To demonstrate EGNOS capabilities for use in RNAV-1 Operations in TMA and ▪ To demonstrate EGNOS capabilities for use in APV SBAS Operations
OFA addressed	OFA: 02.02.04 Approach Procedures with Vertical Guidance; OFA: 02.01.01 Optimised RNP Structures
Applicable Operational Context	LESU La Seu d'Urgell airport LELL Sabadell airport
Number of flight trials	6
Demonstration Technique	Flight trials on GNSS equipped aircraft with additional flight validation platform installed inside.

Table 2-2: Demonstration Exercise for EXE-02.05-002

Demonstration Exercise ID and Title	**EXE-02.05-003** **Helicopter GNSS PinS DEP, RNP APCH and RNAV Route in Poland**
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To demonstrate EGNOS capabilities for use in SBAS APVs and PinS DEP Operations ▪ To demonstrate benefits of the GNSS based LOW RNAV-1 helicopter routes ▪ To support PANSA for the implementation of the GNSS based RNP/RNAV operations
OFA addressed	OFA: 02.02.04 Approach Procedures with Vertical Guidance; OFA: 02.01.01 Optimised RNP Structures
Applicable Operational Context	EPLL Lodz Lublinek airport EPBC Babice airport
Number of flight trials	6
Demonstration Technique	Flight trials on GNSS equipped helicopter with additional flight validation platform installed inside.

Table 2-3: Demonstration Exercise for EXE-02.05-003

Demonstration Exercise ID and Title	**EXE-02.05-004** **Helicopter SNI RNP 0.3 PinS APCHs and RNAV route in Spain**
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To demonstrate SNI operations at the airports ▪ To demonstrate benefits of the GNSS based LOW LVL RNAV-1 helicopter routes ▪ To demonstrate EGNOS capabilities for use in APV SBAS PinS Operations
OFA addressed	OFA: 02.02.04 Approach Procedures with Vertical Guidance; OFA: 02.01.01 Optimised RNP Structures
Applicable Operational Context	LEBL Barcelona airport LESU La Seu d'Urgell airport
Number of flight trials	6
Demonstration Technique	Flight trials on GNSS equipped helicopter with additional flight validation platform installed inside.

Table 2-4: Demonstration Exercise for EXE-02.05-004

Demonstration Exercise ID and Title	**EXE-02.05-005** **General Aviation APVs in Slovakia**
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To support LPS SR for the implementation of the APV SBAS Operations ▪ To demonstrate EGNOS capabilities for use in APV SBAS Operations
OFA addressed	02.02.04 Approach Procedures with Vertical Guidance
Applicable Operational Context	LZIB Bratislava airport
Number of flight trials	6
Demonstration Technique	Flight trials on GNSS equipped airplane with additional flight validation platform installed inside.

Table 2-5: Demonstration Exercise for EXE-02.05-005

Demonstration Exercise ID and Title	EXE-02.05-006 Regional airline APVs in Morocco
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To demonstrate benefits of the APV SBAS operations ▪ To support ONDA for the implementation of the APV SBAS Operations
OFA addressed	OFA: 02.02.04 Approach Procedures with Vertical Guidance
Applicable Operational Context	GMTN Tetouan Saniat R'mel airport
Number of flight trials	6
Demonstration Technique	Flight trials on GNSS equipped airplane with additional flight validation platform installed inside.

Table 2-6: Demonstration Exercise for EXE-02.05-006

Demonstration Exercise ID and Title	EXE-02.05-007 Regional airline APVs in Turkey
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To demonstrate benefits of the APV SBAS operations ▪ To support DHMI for the implementation of the APV SBAS Operations
OFA addressed	OFA: 02.02.04 Approach Procedures with Vertical Guidance
Applicable Operational Context	LTFD Balikesir Koca Seyit airport
Number of flight trials	8
Demonstration Technique	Flight trials on GNSS equipped aircraft with additional flight validation platform installed inside.

Table 2-7: Demonstration Exercise for EXE-02.05-007

Demonstration Exercise ID and Title	EXE-02.05-008 Corporate aviation APVs in Bulgaria
Leading organization	Pildo Labs
Demonstration exercise objectives	▪ To demonstrate benefits of the APV SBAS operations ▪ To support LSA for the implementation of the APV SBAS Operations
OFA addressed	OFA: 02.02.04 Approach Procedures with Vertical Guidance
Applicable Operational Context	LBBG Burgas airport
Number of flight trials	8
Demonstration Technique	Flight trials on GNSS equipped airplane with additional flight validation platform installed inside.

Table 2-8: Demonstration Exercise for EXE-02.05-008

3 Programme management

3.1 Organisation

The NASCIO project consortium is composed by several partners and supporters. Pildo Labs has been acting as project “Coordinator”, conducting project management with all “Consortium Members”. Under such organisation, Pildo has been responsible for most project management tasks, and in particular of those related with interfacing with the SJU. This includes, between others, submission of deliverables, quarterly progress reporting, and notification of significant project achievements and organisation of project meetings.

The following table provides information on Point of Contacts for each of NASCIO project consortium member:

Consortium member	Managerial POC	Technical POC
Pildo Labs (PLD)		
REGA		
Aeroports de Catalunya (ACAT)		
LPR		
CAT Helicopters (CATH)		
Zilina University (UNIZA)		
ONDA		
DHMI		
Bulatsa (BUL)		-
Supporter	**Managerial POC**	**Technical POC**
Aeroclub Sabadell (AERO)		
Pildo Wessex (WES)		
LPS SR		-
RAM		-
IATC		-
Borajet (BOR)		-
Blue Skies Aviation (BLUE)		-

Table 3-1: NASCIO POCs

The following figure provides an overview of the project organisation:

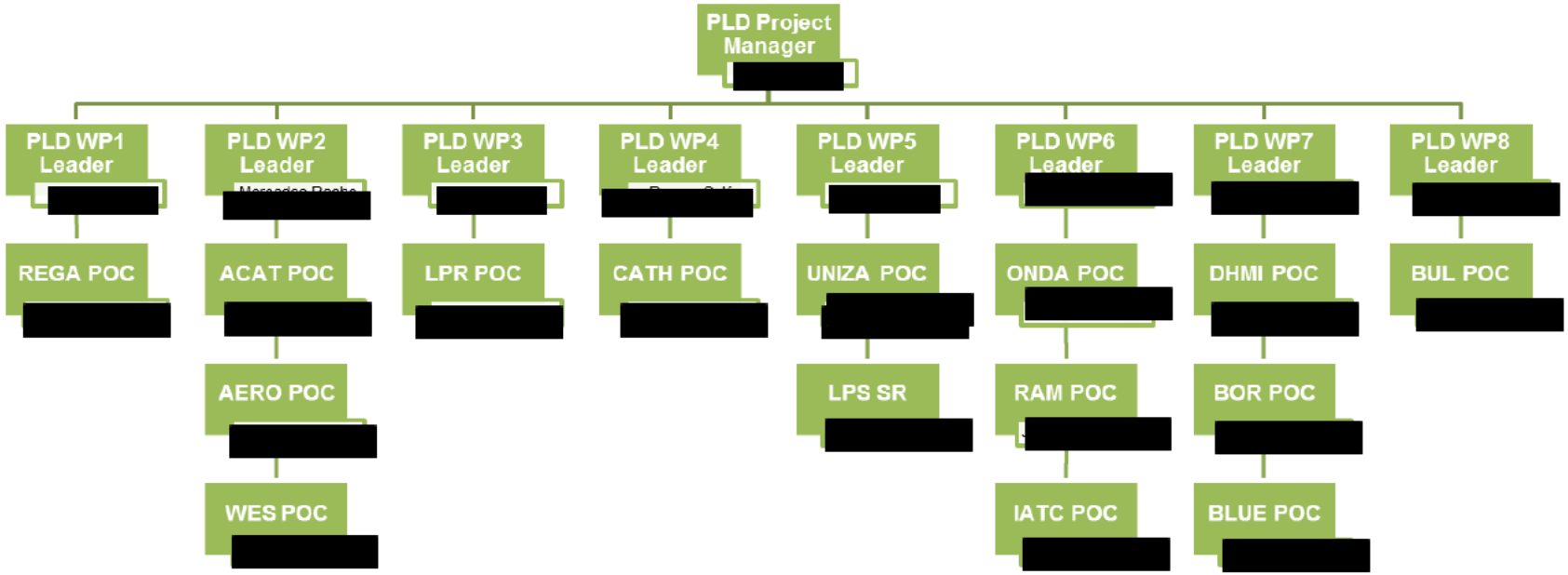


Figure 3-1: Project organisation chart

3.2 Work Breakdown Structure

In the following Figure the NASCIO Work Breakdown Structure is shown together with responsibility assignment within sub-working packages.

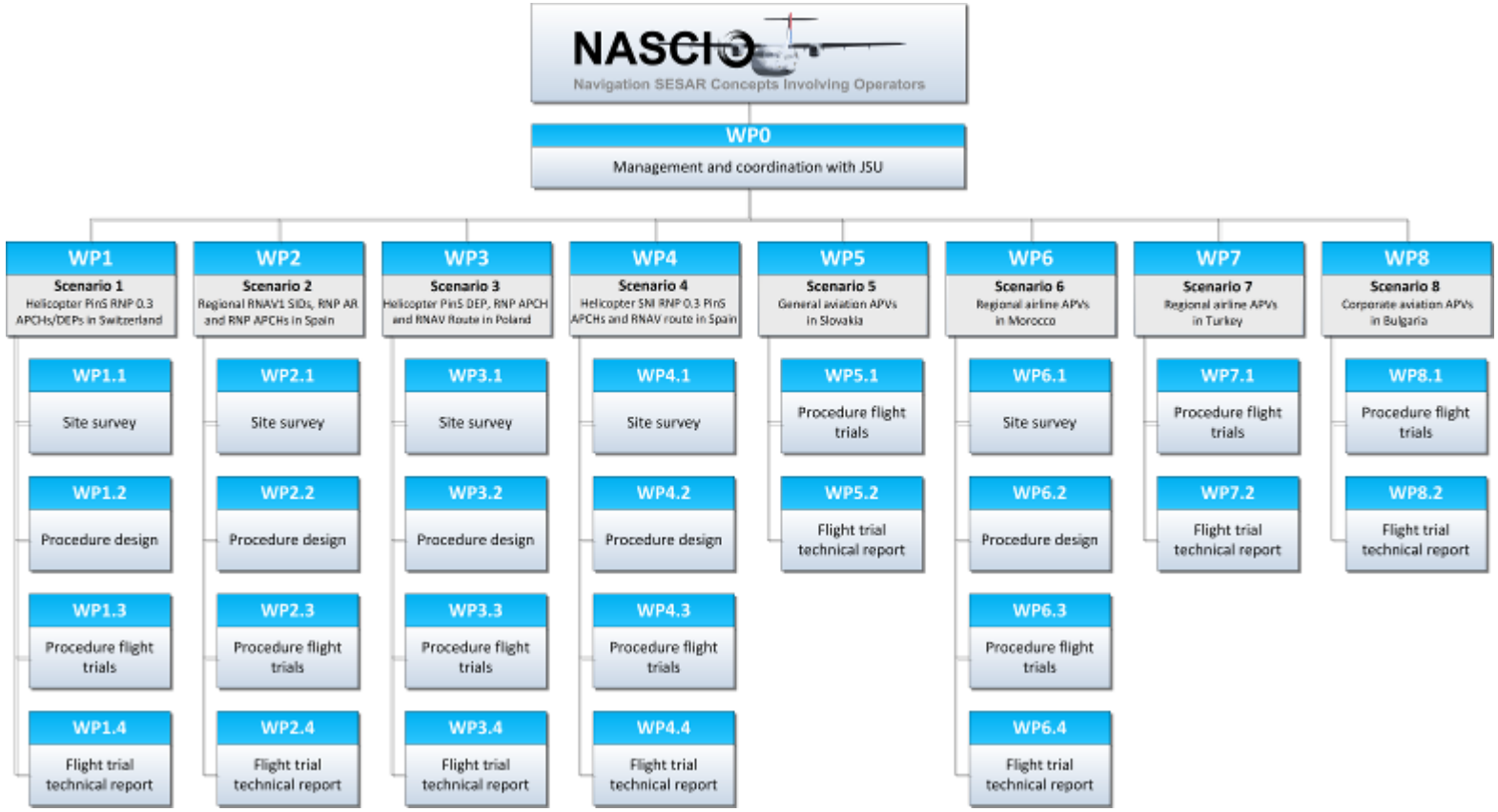


Figure 3-2: NASCIO Work Breakdown Structure

3.3 Formal Deliverables

The following deliverables have been sent in the dates mentioned below:

Deliverable name	Date
Demonstration Plan (A1)	**21/12/2012**
Demonstration Report (B1)	**31/12/2014**

Table 3-2: Formal Deliverables

3.4 Other deliverables and key project milestones

The following table depicts the details for the achievement of milestones and the submission of other project deliverables.

Deliverable/Milestone name	Date
KOM Minutes of Meeting	**14/09/2012**
Acceptance Review #1	**28/10/2012 + <60 days** (After acceptance of Deliverable A.1)
Mid project Critical Review Meeting	**17/10/2013**
EXE-02.05-001 End report	**31/12/2014**
EXE-02.05-002 End report	**31/12/2014**
EXE-02.05-003 End report	**31/12/2014**
EXE-02.05-004 End report	**31/12/2014**
EXE-02.05-005 End report	**31/12/2014**
EXE-02.05-006 End report	**31/12/2014**
EXE-02.05-007 End report	**31/12/2014**
EXE-02.05-008 End report	**31/12/2014**
Final Review #2	**31/12/2014 + <60 days** (After acceptance of Deliverable B.1)

Table 3-3: Other deliverables and key milestones

3.5 Risk Management

A risk is any foreseeable circumstance that might affect the project in a negative way.

A responsible entity is assigned to each risk to assure that the necessary mitigation actions are undertaken.

Pildo Labs shall do a continuous monitoring of the risks identified below, as well as of those arising during the project (which would be included as part of the quarterly reports).

Risk description	Probability	Severity	Owner	Developed
Lack of human resources, personnel becomes not available during the project	Low	Low	All	NO
Supporter of the demonstration exercise is unable to participate in activity ▪ EXE-02.05-002 ▪ EXE-02.05-006 ▪ EXE-02.05-007	Medium	High	Pildo	YES (*)
GNSS equipped airplane is not available at the moment of IFP flight validation ▪ EXE-02.05-002 ▪ EXE-02.05-006	Medium	High	Pildo	NO
GNSS equipped helicopter is not available at the moment of IFP flight validation ▪ EXE-02.05-004	Medium	High	CAT Helicopters	NO
Initial assumptions for the IFP Design proved misleading during development process and limiting potential operationalization (certification process by respective CAA) ▪ EXE-02.05-003	Medium	Low	LPR	NO
Flight Validation of the RNP AR IAP is limited by technological capabilities of the Flight Validation and Inspection system ▪ EXE-02.05-001	Medium	High	Pildo	NO

Table 3-4 Identified risks

(*) This risk was mitigated by subcontracting other supporters (AERO, BLUE and IATC), which provided GNSS equipped aircraft for the demonstration flights.

4 Execution of Demonstration Exercises

4.1 Exercises Preparation

This section summarises the activities undertaken to prepare the demonstration exercise. The following table depicts the tasks carried out per scenario:

Scenario	Procedure Design	Ground Validation	ATS Coordination	Tools and A/C
EXE-02.05-001	Y	Y	Y	ProDAN, Platero, AW109-SP
EXE-02.05-002	Y	Y	Y	ProDAN, Platero, Cessna 182T
EXE-02.05-003	Y	Y	Y	ProDAN, Platero, LPR flight simulator, EC-135
EXE-02.05-004	Y	Y	Y	ProDAN, Platero, AS355
EXE-02.05-005	N	Y	Y	Platero, Piper Seneca III
EXE-02.05-006	Y	Y	Y	ProDAN, Platero, Tecnam P2006T
EXE-02.05-007	N	Y	Y	Platero, Cessna 402B
EXE-02.05-008	N	Y	Y	Platero, F2TH

Table 4-1 Exercises preparation summary

Detailed information about the preparatory activities can be found in the different exercises execution end reports [2].

4.2 Exercises Execution

The activities included in the exercise execution are the pre-flight briefing, the demonstration flight and data collection, and finally, flight data processing and post-flight briefing.

The number of flights and the date when the exercises where executed are summarized in the table below:

Exercise ID	Number of flights	Exercise Execution End Date
EXE-02.05-001	N/A (*)	Planned Q1 2015
EXE-02.05-002	10	10/09/2014
EXE-02.05-003	13	11/04/2014
EXE-02.05-004	12	29/08/2014
EXE-02.05-005	10	02/10/2014

Exercise ID	Number of flights	Exercise Execution End Date
EXE-02.05-006	3	18/12/2014
EXE-02.05-007	4	02/12/2014
EXE-02.05-008	15	21/11/2014

Table 4-2 Exercise execution dates and number of flights

(*) EXE-02.05-001 demonstration flights cannot be performed due to unavailability of AW109-SP helicopter from REGA (maintenance issues for more than 50% of the total fleet). More information described in EXE-02.05-001 End Report [2].

4.3 Deviations from the planned activities

This section summarizes the changes with respect to the content within the Demonstration Plan. The following table lists a brief description of the deviations found in each scenario.

Exercise ID	Deviations description
EXE-02.05-001	Unavailability of AW109-SP due to maintenance issues.
EXE-02.05-002	▪ Unavailability of ATR 42-600 from Pyrenees Airlines and ATR; ▪ Procedure designed at LELL airport to test the flight validation platform.
EXE-02.05-003	N/A
EXE-02.05-004	▪ No landings in LEBL because the heliport is still under certification process; ▪ Problems with GNSS signal and flights data processing; ▪ Lack of time/dates to perform the route LESU – LEBL.
EXE-02.05-005	▪ Zilina University replaced CAA SK as a consortium member; ▪ Due to this consortium change, the initial scope of the scenario (RNAV-1 SIDs/STARs) was modified to perform APV procedures at LZIB airport, designed by LPS SR in the frame of ACCEPTA project
EXE-02.05-006	Unavailability of ATR aircraft from RAM.
EXE-02.05-007	▪ Unavailability of ATR aircraft from BORAJET; ▪ Alternative procedure designed by Pildo flown due to bad weather conditions.
EXE-02.05-008	▪ Platero display not installed in the cockpit; ▪ Procedure waypoints manually entered in aircraft's FMS → deviations in FAS.

Table 4-3 Deviations from planned activities

The full description of the deviations from the planned activities can be found in the exercises execution end reports [2].

5 Exercises Results

5.1 Summary of Exercises Results

This section lists the objectives set in the demonstration plan [1] together with information of the status reached and a justification.

Exercise ID	EXE-02.05-003, EXE-02.05-004
Demo Objective	Demonstrate safety and navigation performance capabilities of EGNOS based RNAV Navigation Application in the RNAV-1 or RNP x en-route low level helicopter operations.
Objective ID	OBJ-02.05-1
Success Criterion	▪ Lower operational MEA than for conventional IFR procedures demonstrated during both procedure design and flight validation phases. ▪ Increased safety level of operations through improved situational awareness. ▪ Positive acceptance by the aircraft operators and ANSP. ▪ LSSIP updated by the CAA with addressing demonstration activities.
Demo Objective Status	OK
Justification	EXE-02.05-003 and EXE-02.05-004 End Reports [2] demonstrate a positive result regarding this objective according to the KPIs defined in section 5.2.

Exercise ID	EXE-02.05-002, EXE-02.05-008
Demo Objective	Demonstrate safety and navigation performance capabilities of EGNOS based RNAV Navigation Application in the RNAV-1 and RNP x SID/STAR airline and helicopter operations.
Objective ID	OBJ-02.05-2
Success Criterion	▪ Lower operational MSA and APCH minima than for conventional IFR procedures demonstrated during both procedure design and flight validation phases. ▪ Increased safety level of operations through improved situational awareness. ▪ LSSIP updated by the CAA with addressing demonstration activities.
Demo Objective Status	OK
Justification	The results in the EXE-02.05-002 and EXE-02.05-008 End Reports [2] show a successful objective achievement according to the results based on the pilot's opinion and deviations from nominal trajectory.

Exercise ID	EXE-02.05-002
Demo Objective	Demonstrate safety and navigation performance capabilities of EGNOS based RNP AR Navigation Application in curved approach helicopter operations.
Objective ID	OBJ-02.05-3
Success Criterion	▪ Same flyability and lower minima of the RNP AR Approach based on EGNOS than with other RNP APCH or conventional IAP demonstrated during both procedure design and flight validation phases. ▪ Improved use of airspace structure and limitations of the conventional navigation applications demonstrated during both procedure design phase. ▪ Increased safety level of operations through improved situational awareness. ▪ LSSIP updated by the CAA with addressing demonstration activities.
Demo Objective Status	OK
Justification	The results in the EXE-02.05-002 End Report [2] showing the designed procedure and the performance of the pilot executing this type of approaches prove a successful objective achievement.

Exercise ID	EXE-02.05-001, EXE-02.05-002, EXE-02.05-003, EXE-02.05-004, EXE-02.05-005, EXE-02.05-006, EXE-02.05-007, EXE-02.05-008
Demo Objective	To get to a pre-operational stage in the implementation of the APV SBAS Approach operations.
Objective ID	OBJ-02.05-4
Success Criterion	▪ Lower minima and better flyability of the APV SBAS than for the conventional IAP demonstrated during both procedure design and flight validation phases. ▪ Increased safety level of operations through improved situational awareness. ▪ Positive acceptance by the aircraft operators and ANSP. ▪ LSSIP updated by the CAA with addressing demonstration activities.
Demo Objective Status	OK
Justification	The results of the different exercise end reports [2] prove a better flyability and lower minima of APV SBAS procedures, an increased level of safety and a positive acceptance by operators and ANSP according to the KPIs defined in section 5.2.

5.2 Choice of metrics and indicators

The following KPIs are defined to measure the results of the exercises and are calculated accumulating the data collected for all flights as well as the pilots opinion:

- **Degree of satisfaction of pilots**;
- **Flyability of introduced procedures**, including subjective evaluation from pilots and average deviations during the flight (meters).

The flight data has been collected from Platero, a flight validation platform provided by Pildo Labs and installed in the aircraft of each scenario. The collected data has been processed to obtain the deviation values.

5.3 Analysis of Exercises Results, Conclusions and Recommendations

Please refer to exercises end reports [2] for a detailed explanation of the results of the flight demonstrations, and to the section 7 of this document for general conclusions and recommendations of the exercises included in the project.

5.3.1 Implementation status, challenges and blocking points

Exercise ID	**EXE-02.05-001** **Helicopter PinS RNP 0.3 APCHs/DEPs in Switzerland**
Implementation status	N/A, flights to be scheduled on the first quarter of 2015.
Proposed actions	Code procedures into avionics database of AW109-SP FMS and arrange possible dates to perform the flight demonstrations.

Exercise ID	**EXE-02.05-002** **Regional airline GNSS RNAV-1 SIDs, RNP AR APCHs and RNP APCHs in Spain**
Implementation status	The operational implementation process of the procedures is blocked by the Spanish CAA (AESA). Current Spanish regulations do not allow the implementation of instrument flight procedures to non-IFR runway, which is the case of La Seu d'Urgell airport.
Proposed actions	Pressure to Spanish Ministry of Infrastructures ("Fomento") at highest possible level from EU institutions (EASA, SESAR, European Commission) for forcing a change on the regulations.

Exercise ID	**EXE-02.05-003** **Helicopter GNSS PinS DEP, RNP APCH and RNAV Route in Poland**
Implementation status	The operational implementation process of the procedures was started the body in charge of national AIP for publication and approval in coordination with CAA. No planning or schedule has been provided with regard to publication or approval.

Encountered difficulties	▪ Doubts from the aerodrome management related to the operational costs (procedure maintenance, periodic reviews, changes) of the procedures ▪ Doubs from the aerodrome related to responsibility in case of aviation accident or incident ▪ Possible need for signing a letter of agreement between the aerodrome and the operators flying the procedure ▪ Possible costs for training AFIS officers because of the implementation of the new procedure.
Proposed actions	Encourage Air Navigation Service Providers (PANSA in Poland) to handle the publication and maintenance of IFR procedures for small aerodromes.

Exercise ID	**EXE-02.05-004** **Helicopter SNI RNP 0.3 PinS APCHs and RNAV route in Spain**
Implementation status	The low-level connecting route between La Seu and Barcelona cannot be implemented as it is designed in class G airspace (uncontrolled). Current Spanish regulations do not allow the implementation of instrument flight procedures in uncontrolled airspace. This policy is contractor with new SERA regulation. Implementation of SNI procedure for BCN airport is pending for final implementation and certification of new helipad.
Proposed actions	Pressure to Spanish Ministry of Infrastructures (“Fomento”) at highest possible level from EU institutions (EASA, SESAR, European Commission) for forcing a change on the regulations.

Exercise ID	**EXE-02.05-005** **General Aviation APVs in Slovakia**
Implementation status	Procedures published in the Slovakian AIP (05-FEB-2015).

Exercise ID	**EXE-02.05-006** **Regional airline APVs in Morocco**
Implementation status	Flights were intended to demonstrate the advantage of EGNOS in the region to the main aviation stakeholders: ONDA, RAM, airport, local operators. Procedure publication is subject to an establishment of an EGNOS working agreement between ONDA and the ESSP, or alternatively consider other procedures for non-EU countries that would not require any agreement signature as per today accepted for basic GPS

Exercise ID	**EXE-02.05-007** **Regional airline APVs in Turkey**
Implementation status	Flights were intended to demonstrate the advantage of EGNOS in the region to the main aviation stakeholders: DHMI, Borajet, airport, local operators. Procedure publication is subject to an establishment of an EGNOS working agreement between DHMI and the ESSP, or alternatively consider other procedures for non-EU countries that would not require any agreement signature as per today accepted for basic GPS

Exercise ID	**EXE-02.05-008** **Corporate aviation APVs in Bulgaria**
Implementation status	Procedures are expected to be published in the Bulgarian AIP by mid 2015.
Encountered difficulties	▪ Aircraft not ready for validating of EGNOS based procedures

6 Summary of the Communication Activities

This section presents the list of communication activities performed in the frame of the project:

- **NASCIO Press Releases**

  Distributed along a large list of contacts detailed in the demonstration plan [1], a copy of the NASCIO press releases is included in Appendix A.

- **SESAR JU News section Article**

  Article prepared by SESAR JU, based on the Project's Press Release related to this scenario. The article describes and presents the NASCIO project and the SNI concept, which has been tested in the EXE-02.05-004.

  The link to the website article is: http://www.sesarju.eu/newsroom/all-news/sesar-demonstrates-how-maximize-airport-capacity-helicopter-landing-procedure

  A copy of the article is included in Appendix B of this report.

- **EGNOS Q4 2014 bulletin**

  A reference to the SNI approach to Barcelona airport performed in EXE-02.05-004 has been made in the EGNOS bulletin of the last quarter of 2014 (Q4 2014). The bulletin, prepared by the ESSP, includes information about the SNI approach to LEBL airport in the front cover and page 11.

  The links to the bulletin are:

  - http://view.pagetiger.com/Egnos-Bulletin/Q42014
  - http://www.essp-sas.eu/download/egnos_bulletin/egnos_bulletin_13.pdf

  A copy of the articles and the front cover is attached in Appendix C of this document.

- **SESAR Demonstration Activities internal workshop**

  Pildo Labs presented the project in SESAR Demonstration Activities internal workshop held in Lisbon (Portugal) 28 and 29 November 2013.

- **Maghreb Arab Press Online and Moroccan radios**

  The procedure performed in Teotuan airport (EXE-02.05-006) is being broadcasted by some Moroccan radios and has been published in the Maghreb Arab Press by ONDA.

  A copy of the article is included in Appendix D of this report.

- **Results presentation in Helitech and Airmed conferences**

  The outcomes of some the flights performed in Poland (PinS departure, RNAV1 low level route and RNP APCH CAT H) and Barcelona (SNI approach) under the frame of NASCIO project have been presented in these international congresses.

  Helitech is the largest exhibition in Europe dedicated to the helicopter sector. Airmed is an aeromedical services global congress that has been held for more than 30 years.

7 Next Steps

7.1 Project Outcomes

The following outcomes of the project activities have been identified:

- **Outcome 1:** successful flight demonstrations served to put into a pre-operational stage the implementation of the designed and validated procedures. The ultimate approval into operations by the National Aviation Authorities requires the development of local safety material by the ANSPs, which in most of the cases is already being put in place aside the actual project based on successful results obtained.
- **Outcome 2:** new SESAR navigation concepts have been operationally demonstrated, by involving pilots from operators and Air Traffic Controllers from ANSPs, at locations where important benefits will be obtained in comparison to existing solutions.
- **Outcome 3:** contribute with real in-flight tests and results to the development and validation of new design criteria for implementing SNI operations at busy airports, complementing other initiatives promoted under other European R&D Frameworks like Clean Sky.
- **Outcome 4:** improve time to market for concepts and services developed within SESAR and other European R&D Framework Programmes

7.2 Conclusions

The main conclusions of the flight demonstration exercises carried out in the frame of the project are:

- **Conclusion 1:** novel navigation operational concepts developed within SESAR, relying on Satellite Navigation technology and services, contributes to improve the fly ability of less served infrastructure, by providing best value for money solution to actual operators, in particular within general, business and regional aviation.
- **Conclusion 2:** rotorcraft community gets important safety and operational benefits throughout the introduction of Point-In-Space flight procedures and Low Level Routes, facilitating emergency operations today only possible under visual conditions and rules.
- **Conclusion 3:** Questionnaires to Pilots and ATCOs show an overall acceptance of the concepts implementation.

7.3 Recommendations

Based on the conclusions presented in previous chapter and the information acquainted during the project activities, the consortium would like to make the following recommendations:

- **Recommendation 1:** promote the definition of a standardized process for the ultimate approval by the different National Aviation Authorities of concepts demonstrated, by avoiding national flavours on interpreting and applying applicable regulations.
- **Recommendation 2:** extend the work performed on SNI concept, with further trials and demonstrations feeding in-flight results to the on-going initiatives.
- **Recommendation 3:** intensify the involvement of Operator Associations, like EHA or EBAA, on the promotion and training to operators on new concepts demonstrated.
- **Recommendation 4:** support the organization of a workshop on NASCIO results, involving Stakeholders and Operators Associations, as well as EASA for the Regulatory aspects.

8 References

8.1 Reference Documents

The documents mentioned in the template are examples that can be removed.

The following documents provide input/guidance/further information/other:

[1] NASCIO Deliverable A1, version 00.01.01, date 21/12/2012

[2] NASCIO Deliverables EXE-02.05-00X End Report, version 01.00.00, date 31/12/2014 (Replace X for the corresponding number of the demonstration exercise)

Appendix A NASCIO Press Releases

A.1 EXE-02.05-002

PildoLabs move smart

SESAR JOINT UNDERTAKING

Today's partners for Tomorrow's aviation

Successful EGNOS trial approaches
at Sabadell and La Seu d'Urgell airports

Last September 2014, Pildo Labs and Aeroclub Barcelona-Sabadell performed a double EGNOS flight campaing at Sabadell and La Seu d'Urgell airports. The aim of this activity was to demonstrate the feasibility for the implementation and operation of EGNOS approaches in such a challenging areas where, nowadays, only VFR operations are permitted.

The demostration performed at Sabadell Airport, one of the most important airports for general aviation in Spain, was the first EGNOS approach ever designed and flown at that airport.

The use of EGNOS in that airport would allow flying in safer conditions and an increase in the capacity of the airport, whilst at the same time decreasing the noise produced by those approaches. This is an important topic taking into account that the airport is located only 20 km from Barcelona's city center.

The second demonstration took place in the Airport of la Seu d'Urgell, with the support of Aeroports de Catalunya, the airport operator. This airport is located in the middle of Pyrenees, a very challenging scenario due to the mountainous landscape.

A curved approach (RNP AR) was designed and flown for the trial, again allowing flying in safer conditions whilst decreasing the number of disrupted and cancelled approaches caused by low visibility conditions.

Pildo Labs has been coordinating both demonstrations, leading as well the procedure design and validation. The validation was performed by in-house developed platform called 'PLATERO'.

The activity, framed within the NASCIO project, funded by SESAR, is an important contribution to encourage the use of EGNOS operations into small VFR airports.

A.2 EXE-02.05-003

Pildo Labs and LPR accomplished first demonstration flights for helicopter RNAV low-level Route

Pildo's flight validation platform (PLATERO) as support in NASCIO Helicopters trials

On the second week of April, Pildo Labs and Polish Helicopter Emergency Medical Service operator (LPR) have performed the first demonstration flights planned within NASCIO Project. The demonstration was aimed to complete a route between the main base of LPR in Babice (Warsaw) and Łódź.

The first day of demonstration was dedicated to test Pildo's flight validation platform (PLATERO) in the Flight Training Simulator, property of LPR. PLATERO has been implemented as support tool for NASCIO flight trials. Regarding the real flights, 5 approaches and 5 departures were carried out at Babice airfield; a total of 6 approaches were perfomed at Łódź airport. The route between Babice and Łódź was also smoothly flown.

RNAV GNSS approaches and departures are showing better results than previous procedures implemented for flying and landing, by improving minimum altitude, and performance in not favorable weather conditions. During all procedures, PLATERO platform was computing the deviation respect to the desired path, and its external EFIS was providing to pilots, the accurate and necessary information to follow the expected trajectory.

As next step, NASCIO consortium will continue working on Rotorcraft scenarios. Partners are working in the launching of NASCIO demonstration flights for RNP-AR in Interlaken, Switzerland, to be carried out by REGA (Swiss HEMS operator) and Pildo Labs. The testing schedule would be announced opportunely.

Pildo Labs and LPR, as demonstration team from NASCIO Consortium.

A.3 EXE-02.05-004

PildoLabs move smart

SESAR JOINT UNDERTAKING

Today's partners for Tomorrow's aviation

Successful tests at Barcelona Airport
of simultaneous airplane-helicopter IFR operations

Pildo Labs and the helicopter operator CatHelicopters has recently performed flight trials in the terminal area of Barcelona airport, demonstrating the technical feasibility for the implementation of Simultaneous Non-Interfering (SNI) operations between fixed-wing aircraft and helicopters in busy airports.

The flight tests were performed in August, one of the busiest periods for Barcelona airport, without arranging any restrictions for the regular commercial operations. An average of 934 movements per day was handled by the airport during August.

The helicopter instrument flight procedure has been designed by Pildo Labs, while the approach air traffic controllers from ENAIRE (former AENA) have supported the trials too.

The activity, framed within the European SESAR project NASCIO, is an important contribution to the validation of the Simultaneous Non-Interfering (SNI) concept of operations.

A.4 EXE-02.05-005

PildoLabs move smart

SESAR JOINT UNDERTAKING
Today's partners for Tomorrow's aviation

Successful LPV validation flights
at Bratislava airport

Pildo Labs and the University of Zilina, with the support of LPS SR (ANSP of the Slovak Republic), have recently performed validation flights of RNP APCHs down to LPV minima in Bratislava airport.

The flight tests were performed the first week of October 2014 with a Piper Seneca III, property of University of Zilina. LPS SR was the responsible to design the fixed-wing instrument flight procedure and provided the Air Traffic Control service during the flights.

Flight validation was performed by Pildo Labs using PLATERO in-house developed platform. The activity, framed within the European SESAR project NASCIO, is an important contribution to the validation of EGNOS operations in the Eastern European countries.

A.5 EXE-02.05-006 & EXE-02.05-007

PildoLabs move smart

SESAR JOINT UNDERTAKING
Today's partners for Tomorrow's aviation

PildoLabs, ONDA & DHMI perform the first EGNOS flights
at Tetouan and Balikesir Airports

On December 2014, Pildo Labs, in cooperation with the national air navigation service providers (ONDA and DHMI) and local operators, performed the first EGNOS approaches (APV SBAS) at Tetouan and Balikesir airports. The Tetouan demonstration counted as well with the support of the commercial airline Royal Air Maroc Express.

In the Moroccan case, this is the second EGNOS approach flown and validated in the country, after the first one performed by Pildo and ONDA in Al-Hoceima in 2012, in the frame of SIRAJ project (http://siraj.ec.pildo.com).

This campaign arrives 2 days after the green light of European Parliament for the conclusion of a cooperation agreement between EU and Morocco for a worldwide system of satellite navigation (agreement that had been signed in 2006).

In the Turkish case, EGNOS will be an important contributor to Balikesir airport, which only counts with an ILS (Instrument Landing System). After this successful campaign, DHMI plans to elaborate an implementation plan of EGNOS procedures from East to West of Turkey.

Those flights have been possible thanks to PLATERO, the flight validation platform developed in-house by Pildo Labs, which provides EGNOS horizontal and vertical guidance to the pilot.

These activities, framed within the European SESAR project NASCIO, are an important contribution to the use of EGNOS in the Eastern European region and North of Africa, edges of EGNOS coverage.

A.6 EXE-02.05-008

PildoLabs move smart

SESAR JOINT UNDERTAKING

Today's partners for Tomorrow's aviation

Flight Validation Trials at Burgas Airport

In 2015 BULATSA intends to publish PBN procedures for Burgas airport (Bulgaria) validated within the NASCIO project.

The implementation of Performance Based Navigation (PBN) procedures for Burgas airport is on its *final approach for landing*.

In 2012 BULATSA commenced the work on the procedure design for implementation of new procedures based on satellite technology (GNSS) for the terminal area of Burgas airport – located in eastern Bulgaria.

Two years later, most of the developments were finalised and BULATSA took advantage of the SESAR NASCIO project for performing a Flight Validation campaign for the procedures. The flights were executed in November using the Bulgarian flight inspection aircraft and the support of Pildo Labs and its portable validation platform (PLATERO).

The program will be completed with the publication of RNAV-1 departures and arrivals, and instrument approach procedures fully based on GNSS for serving both runway ends of the airport. Those procedures will be the first PBN manoeuvres published in Bulgaria and they will open the door for further implementation in other airports – Varna airport will be the next.

Appendix B SESAR JU News Article

SESAR JOINT UNDERTAKING — FROM INNOVATION TO SOLUTION

Discover SESAR | SESAR Benefits | From Innovation to Solution | SESAR Solutions | SESAR Newsroom

Home > Newsroom > News > SESAR demonstrates how to maximize airport capacity with helicopter landing procedure

SESAR DEMONSTRATES HOW TO MAXIMIZE AIRPORT CAPACITY WITH HELICOPTER LANDING PROCEDURE

06/10/2014

NASCIO Navigation SESAR Concepts Involving Operators

A series of flight trials at Barcelona airport, which were run as part of a SESAR demonstration project, have shown the feasibility of introducing new satellite-based operations that allow helicopters to operate in airports without interfering with regular airport traffic. Once introduced, the demonstrated Simultaneous Non-Interfering (SNI) operations look set to maximize airport as well as airspace capacity and dramatically enhance the ability of helicopters to take passengers to and from city and business destinations.

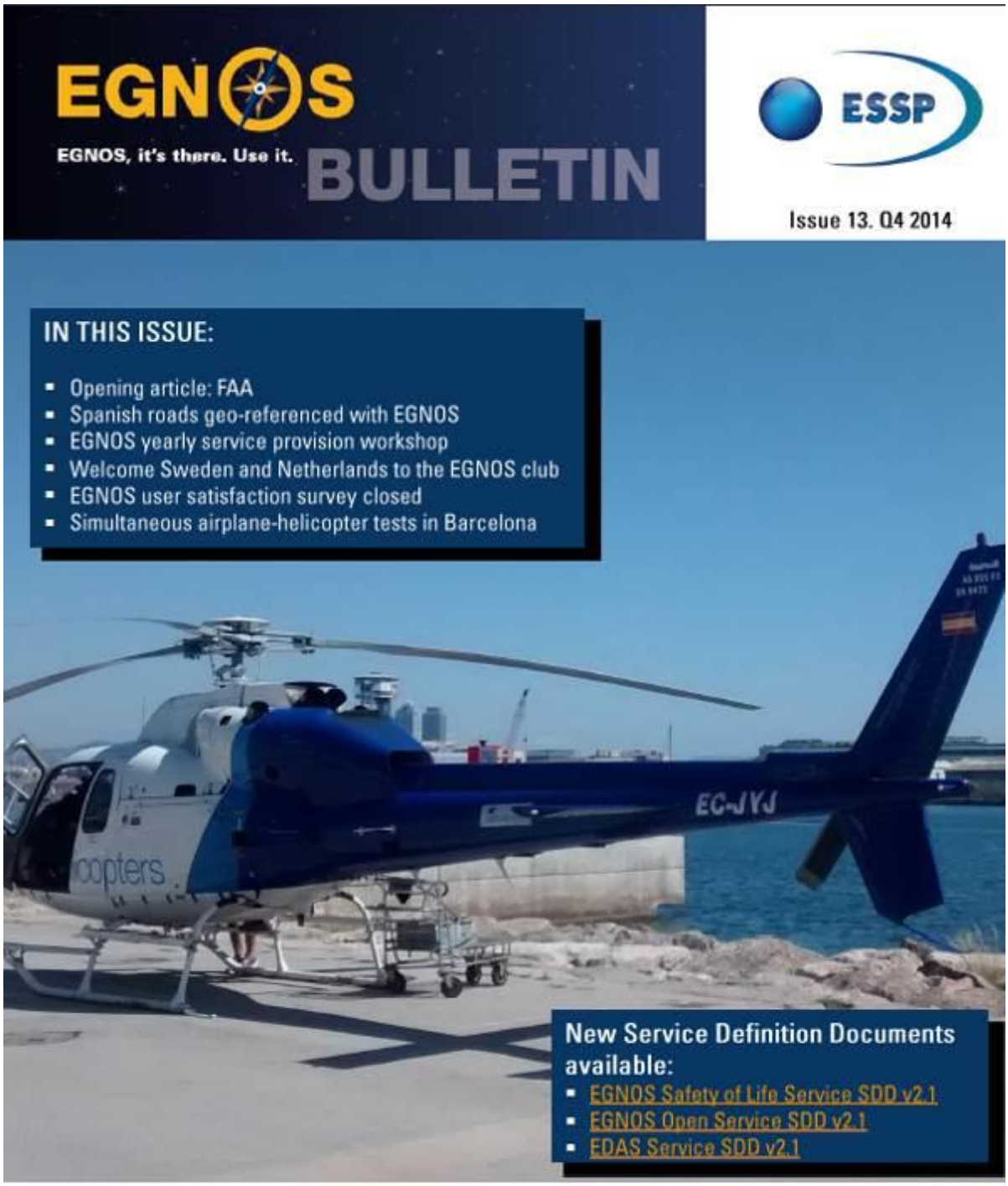
Simultaneous non-interfering operations (SNI) are instrument flight procedures designed to enable helicopters to operate to and from airports without conflicting with fixed-wing traffic or requiring runway slots. These procedures employ satellite guidance technology to fly low-level corridors, often perpendicular to the direction of the duty runway, down to a given point-in-space in the close vicinity of the airport followed by a final visual landing.

These latest SNI trials are part of the Navigation SESAR Concepts Involving Operators (NASCIO) SESAR demonstration project, which is co-funded by the SESAR Joint Undertaking. The project aims to demonstrate new navigation specifications in eight different scenarios including rotorcraft and fixed wing aircrafts as the main users than get benefit of new navigation concepts.

The flight trials were performed by Pildo Labs and the helicopter operator CatHelicopters with the support of ENAIRE (formerly AENA) air traffic control. Taking place in August 2014, one of the busiest periods for Barcelona airport with close to 1,000 movements a day, the trials showed how the introduction of SNI is possible without constraining restrictions on regular commercial operations.

Thanks to NASCIO, busy airports now have the opportunity to open the door to the helicopter community.

Appendix C EGNOS Q4 2014 Bulletin



European Global Navigation Satellite Systems Agency

Precise navigation, powered by Europe

Successful tests of Simultaneous Airplane-Helicopter IFR operations

A series of flight trials conducted at Barcelona airport during August, one of its busiest periods with over 1,000 movements a day, showed the feasibility of introducing new EGNOS-based operations that allow helicopters to operate in airports without interfering with regular airport traffic.

The concept is known as **Simultaneous Non-Interfering (SNI)** operation and allows introducing rotorcraft instrument flight procedures at busy airports without interfering at all with the fixed-wing traffic or with the existing instrument flight procedures. Therefore, SNIs enable helicopters to operate to and from airports without requiring runway slots. These procedures employ satellite guidance technology to fly low-level corridors, often perpendicular to the direction of the duty runway, down to a given point-in-space in the close vicinity of the airport followed by a final visual landing.

The SNI flight procedure under test was a Point In Space (PinS) LPV enabled by EGNOS and designed by Pildo Labs. It was flown by the Barcelona-based operator CatHelicopters using Pildo Labs' GNSS Flight Validation Platform, while the approach air traffic controllers from ENAIRE (former AENA) supported the trials too. The flight demonstrations were run as part of NASCIO, a SESAR demonstration project.

Appendix D Maghreb Arab Press

Press'Clipping

vendredi 26 décembre 2014

Support	MAGHREB ARABE PRESSE ONLINE Media Internet Maroc : Quotidien en Universel +2 Langues (Edition n° 20141226)	1/1
Titre	**Test en vol d'une procédure de navigation aérienne par satellite à l'aéroport de Tétouan (ONDA)**	

Article sur rubrique "" en page / 1 au format publicitaire de "" représentant cm².
Journalistes :

L'Office national des aéroports (ONDA) a participé, le 18 décembre courant, aux essais et démonstrations relatifs à un important projet de recherche et développement, portant sur les grandes possibilités qu'offrent les systèmes satellitaires à la navigation aérienne, aussi bien pour le trafic en route que pour les approches et les décollages, indique l'Office dans un communiqué parvenu jeudi à la MAP. Les démonstrations ont été opérées à l'aéroport de Tétouan et consistent en des tests en vol d'une procédure (approche avec guidage verticale) utilisant les signaux des satellites GPS et EGNOS au lieu et à la place des instruments classiques d'aide à l'atterrissage. L'équipe ONDA, constituée d'ingénieurs de l'aviation civile et de gestionnaires du trafic aérien, a eu la charge de mener l'étude et la conception de la procédure en question et de superviser les tests à l'aéroport de Tétouan, souligne-t-on de même source. Ces essais impliquent différents intervenants dans le domaine du management du trafic aérien, notamment les autorités de régulation, les fournisseurs de service de navigation et les opérateurs régionaux et commerciaux qui mettent tous leur savoir en commun et coopèrent de manière très étroite dans ce projet. Le projet de recherche et de développement appelé "NASCIO" est financé, conjointement, par la Commission européenne et Eurocontrol, précise l'ONDA.

-END OF DOCUMENT-