D3.3.100 - PJ.10-W2-93A TLR6 Contextual Note

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PJ10-W2 PROSA

PJ10-W2 PROSA

Abstract

The objective of the SESAR Solution PJ.10-W2-Solution 93 is to explore the different possible cases of delegation of provision of ATM Services amongst ATSUs based on traffic / organisation needs (either static on fix-time transfer schedule (Day/Night) or dynamic, e.g. when the traffic density is below/over certain level) or on contingency needs.

In the scope of PJ.10-W2-Solution 93, Solution 93A is planned to reach TRL6 and be officially proposed for supporting PJ.10-W2-Solution 93 to reach V3. However, this Contextual Note shows the technical elements developed for the Technological Solutions 93A. This Technological Solution is corresponding to "Y" Virtual Centre architecture as proposed in the taxonomy issued by the EUROCAE WG122.

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1 Purpose

This Contextual Note provides to any interested reader (external and internal to the SESAR programme) an introduction to the Technological SESAR Solution 93A, in terms of scope, main Technical definition to the Virtual Centre improvements defined as "Y" Architecture.

This Contextual Note shows the results for technological Solution 93A, PJ.10-W2, and for hosting PJ.32-03 contribution to Virtual Centre service improvements and the "Y" architecture.

This Contextual Note defines the architecture of each PJ.10-W2-93 technological solution, as well as the common interface requirements for the ATM Data Service Provider (ADSP) and the Virtual Centre ATSUs (VC ATSUs) necessary to support the various possible cases of delegation and contingency of ATM services between ATSUs.

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2 Improvements in Air Traffic Management (ATM)

2.1 Challenges and Scope

The delegation of ATM services provision concept applies when one ATSU delegates a portion of its airspace, or the entire airspace, to another ATSU based on a particular condition. The Solution 93 investigates Use Cases for the Delegation of ATM and Contingency in conjunction with the Virtual Centre Technology where the ATM Data Service Provider (ADSP) is geographically separated from the Virtual Centre ATSU providing ATS to a region of airspace.

These technological solutions have been created in the project for structuring the development of different technical architecture options in support to the main ATM solution, thus allowing different levels of maturity to be reached for the proposed technical architectures.

In this option, multiple ATSUs are connected to the same ADSP. ATSUs may or may not belong to the same ANSP.
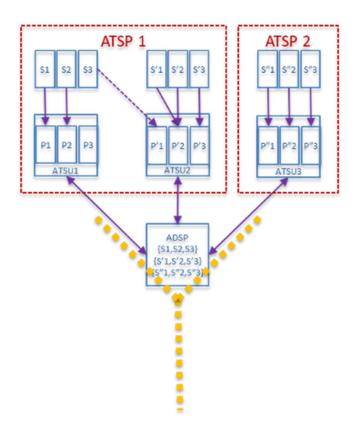

Figure 1: Y Architecture in a Virtual Centre Environment

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2.1.1 Introduction

The Delegation of ATS operational concept can be supported by three different architectures, as "Y", "D" and "U". Each of them has been developed in a specific technological solution and referenced as SESAR PJ.10-W2 Technological Solutions Architectures "Y, D and U". In the scope of PJ.10-W2-Solution 93, only Solution 93A is planned to reach TRL6 and be officially proposed for supporting PJ.10-W2-Solution 93 to reach V3. However, this analysis aims to develop the cost of the technical elements developed for the three Technological Solutions Architectures "Y, D and U", maintaining a clear separation between the common architecture parts and the specific ones. Each of these Technological Solutions is corresponding to a particular Virtual Centre architecture as proposed in the taxonomy issued by the EUROCAE WG122.

3 Operational Improvement Steps (OIs) & Enablers

POI-0075 Y-Architecture supporting use of Virtual Centre concept for delegation of ATM services provision amongst ATSUs[1]

The provision of Virtual Centre standardised services allows an ADSP to provide ATM data to several ATSUs with a common core system. Such a configuration allows straight forward delegation of ATM Services provision between those ATSUs, where CWPs from the receiving ATSU are able to receive the expected ATM data without affecting the respective ATSU AoRs. This one-ADSP-to-several-ATSUs configuration is referenced as a 'Y' architecture.

'Y' architecture is also well fitted for supporting ATSU contingency scenarios.

This POI is valid for En-Route and TMA phase of flight

This architecture is deployed with the use of standard VC services in the first place, but it may be also deployed with the use of proprietary interfaces, thus making the use of the standard VC services optional that are no needed according to the Delegation of ATS functionalities. The "Required" services are needed for the "Y" Architectures in order to enable the Delegation of ATS process for the ADSP-ATSU services interface.

The table below provides a summary of the current Enabler allocations per Technological Solution Architecture (Y, D and U) and the validation coverage at the end of the projects achieved at TRL4-TRL6.

Enabler	Service	Sol93A POI-0075 "Y"	Sol93B POI-0076 "D"	Sol93C POI-0077 "U"	Initial Maturity	Target Maturity
SVC-008	Provision and Consumption of Flight Data Distribution Service in the context of Virtual Centres.	Optional	Optional	n/a	TRL6	TRL6
SVC-009	Provision and Consumption of Flight Data Management Service in the context of Virtual Centres	Optional	Optional	n/a	TRL6	TRL6
SVC-010	Provision and Consumption of Coordination And Transfer Management Service in the context of Virtual Centres	Optional	Optional	n/a	TRL6	TRL6
SVC-013	Provision and Consumption of Airspace Status Distribution Service	Optional	Optional	n/a	TRL6	TRL6
SVC-014	Provision and Consumption of Arrival Sequence Distribution Service	Optional	Optional	n/a	TRL4	TRL4

[1] CR 07418 Final Update POI-0075-SDM - OI Step - Change Request for Update

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SVC-015	Provision and Consumption of Arrival Sequence Management Service	Optional	Optional	n/a	TRL4	TRL4
SVC-016	Provision and Consumption of Correlation Distribution Service	Optional	Optional	n/a	TRL6	TRL6
SVC-017	Provision and Consumption of Correlation Management Service	Optional	Optional	n/a	TRL6	TRL6
SVC-018	Provision and Consumption of Medium Term Conflict Detection Distribution Service	Optional	Optional	n/a	TRL4	TRL4
SVC-019	Provision and Consumption of Medium Term Conflict Management Service	Optional	Optional	n/a	TRL4	TRL4
SVC-020	Provision and Consumption of Monitoring Aids Distribution Service	Optional	Optional	n/a	TRL4	**TRL6**
SVC-021	Provision and Consumption of Operational Configuration Distribution Service	Optional	Optional	n/a	TRL4	**TRL6**
SVC-049	Operational Configuration Distribution of Working Position Preview Mode, and Neighbouring ATSU Sector configuration for ATM Service Delegation	Optional	Optional	n/a	new	**TRL6**
SVC-022	Provision and Consumption of Operational Configuration Management Service	Optional	Optional	n/a	TRL4	**TRL6**
SVC-050	Operational Configuration Management of Working Position Preview Mode, and Neighbouring ATSU Sectors for ATM Service Delegation	Optional	Optional	n/a	new	**TRL6**
SVC-023	Provision and Consumption of Safety Net (SNET) Alert Distribution Service	Optional	Optional	n/a	TRL4	TRL4
SVC-024	Provision and Consumption of SSR Code Distribution Service	Optional	Optional	n/a	TRL4	TRL4
SVC-025	Provision and Consumption of SSR Code Management Service	Optional	Optional	n/a	TRL4	TRL4
SVC-026	Provision and Consumption of Support Functions Distribution Service	Optional	Optional	n/a	TRL4	TRL4
SVC-027	Provision and Consumption of Support Functions Management Service	Optional	Optional	n/a	TRL4	TRL4
SVC-028	Provision and Consumption of Surveillance Data Distribution Service	Optional	Optional	n/a	TRL4	TRL4
SVC-029	Provision and Consumption of Technical Supervision Distribution Service	Optional	Optional	n/a	TRL4	**TRL6**
SVC-031	Provision and Consumption of Time-based Separation Distribution Service	Optional	Optional	n/a	TRL4	TRL4
SVC-032	Provision and Consumption of Time-based Separation Management Service	Optional	Optional	n/a	TRL4	TRL4
SVC-033	Provision and Consumption of Voice Comm Information Distribution Service	Optional	Optional	n/a	TRL6	TRL6
SVC-034	Provision and Consumption of Voice Comm Management Service	Optional	Optional	n/a	TRL6	TRL6

ER APP ATC 184	ATM Data Service Provider for ATC services in a Virtual Centre context	Required	Required	n/a	TRL6	TRL6
ER APP ATC 185	ATM Data Service Provider for Voice services in a Virtual Centre context	Required	Required	n/a	TRL6	TRL6
ER APP ATC 186	Virtual Centre ATSU	Required	Required	n/a	TRL6	TRL6
ER APP ATC 193	Management in the VC ATSU of a CWP preview mode during delegation of ATS Provision between ATUs	Required	Required	Optional	new	**TRL6**
ER APP ATC 194	Management in the ADSP of a CWP preview mode during delegation of ATS Provision between ATUs	Required	Required	Optional	new	**TRL6**
ER APP ATC 195	Management in the VC ATSU of Delegation of ATS Provision between ATSUs with Static AoRs for Y-Architecture	Required	n/a	n/a	new	**TRL6**
ER APP ATC 196	Management in the VC ATSU of Delegation of ATS provision between ATSUs with Dynamic AoRs for U-Architecture	n/a	n/a	Required	new	**TRL4**
ER APP ATC 197	Management in the ADSP of Delegation of ATS provision between ATSUs with Dynamic AoRs for U-Architecture	n/a	n/a	Required	new	**TRL4**
ER APP ATC 215	Management in the VC ATSU of Delegation of ATS Provision between ATUs with Static AoRs in a D-Architecture	n/a	Required	n/a	new	**TRL4**
ER APP ATC 216	Management in the ADSP of Delegation of ATS provision between ATUs with Static AoRs in a Y-Architecture	Required	n/a	n/a	new	**TRL6**
ER APP ATC 217	Management in the ADSP of Delegation of ATS provision between ATUs with Static AoRs in a D-Architecture	n/a	Required	n/a	new	**TRL4**
ER APP ATC 218	Management in the VC ATSU of Delegation of ATS provision between ATUs with Dynamic AoRs in a Y-Architecture	Optional	n/a	n/a	new	**TRL6**
ER APP ATC 209	Management in the ADSP of Delegation of ATS provision between ATUs with Dynamic AoRs in a Y-Architecture	Optional	n/a	n/a	new	**TRL6**
STD-097	EUROCAE ER for Taxonomy of Services between ATSU & ADSP(s), and between ADSP & ADSP	Optional	Optional	n/a	TRL4	**TRL4**

Table 1: Recap of SESAR Technological Solutions PJ.10-W2-93 related POIs, Enablers and maturities

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Below is reported the table on PJ10.W2-93A /POI-0075 "Y" Architecture with the Functional Blocks/Roles &Enablers

SESAR Solution ID and Title	Functional Blocks/Role impacted by the SESAR Solution (from EATMA)	Enabler ID (from EATMA)	Enabler Title (from EATMA)	Initial Maturity	Target Maturity	Enabler Compulsory
PJ.10-W2-93A	Flight Planning - Lifecycle Management - Data Distribution	SVC-008	Provision and Consumption of FlightDataDistribution Service in the context of Virtual Centres.	TRL6	TRL6	Optional
PJ.10-W2-93A	Flight Planning - Lifecycle Management - Data Distribution	SVC-009	Provision and Consumption of FlightDataManagement Service in the context of Virtual Centres	TRL6	TRL6	Optional
PJ.10-W2-93A	Coordination and Transfer	SVC-010	Provision and Consumption of CoordinationAndTransferManagement Service in the context of Virtual Centres	TRL6	TRL6	Optional
PJ.10-W2-93A	Support Functions	SVC-013	Provision and Consumption of Airspace Status Distribution Service	TRL6	TRL6	Optional
PJ.10-W2-93A	Arrival Management	SVC-014	Provision and Consumption of Arrival Sequence Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Arrival Management	SVC-015	Provision and Consumption of Arrival Sequence Management Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Correlation Management	SVC-016	Provision and Consumption of Correlation Distribution Service	TRL6	TRL6	Optional
PJ.10-W2-93A	Correlation Management	SVC-017	Provision and Consumption of Correlation Management Service	TRL6	TRL6	Optional
PJ.10-W2-93A	Conflict Management	SVC-018	Provision and Consumption of Medium Term Conflict Detection Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Conflict Management	SVC-019	Provision and Consumption of Medium Term Conflict Management Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Monitoring Aids	SVC-020	Provision and Consumption of Monitoring Aids Distribution Service	TRL4	TRL6	Optional
PJ.10-W2-93A	Operational Supervision	SVC-021	Provision and Consumption of Operational Configuration Distribution Service	TRL4	TRL6	Optional
PJ.10-W2-93A	Operational Supervision	SVC-049	Operational Configuration Distribution of Working Position Preview Mode, and Neighbouring ATSU Sector configuration for ATM Service Delegation	new	TRL6	Optional
PJ.10-W2-93A	Operational Supervision	SVC-022	Provision and Consumption of Operational Configuration Management Service	TRL4	TRL6	Optional
PJ.10-W2-93A	Operational Supervision	SVC-050	Operational Configuration Management of Working Position Preview Mode, and Neighbouring ATSU Sectors for ATM Service Delegation	new	TRL6	Optional

PJ.10-W2-93A	Safety Nets	SVC-023	Provision and Consumption of Safety Net (SNET) Alert Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Code Management	SVC-024	Provision and Consumption of SSR Code Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Code Management	SVC-025	Provision and Consumption of SSR Code Management Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Support Functions	SVC-026	Provision and Consumption of Support Functions Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Support Functions	SVC-027	Provision and Consumption of Support Functions Management Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Surveillance	SVC-028	Provision and Consumption of Surveillance Data Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Technical Supervision	SVC-029	Provision and Consumption of Technical Supervision Distribution Service	TRL4	TRL6	Optional
PJ.10-W2-93A	Arrival Management, Monitoring Aids	SVC-031	Provision and Consumption of Time-based Separation Distribution Service	TRL4	TRL4	Optional
PJ.10-W2-93A	Arrival Management, Monitoring Aids	SVC-032	Provision and Consumption of Time-based Separation Management Service	TRL4	TRL4	Optional
PJ.10-W2-93A	A/G Voice Communication, G/G Voice Communication	SVC-033	Provision and Consumption of Voice Comm Information Distribution Service	TRL6	TRL6	Optional
PJ.10-W2-93A	A/G Voice Communication, G/G Voice Communication	SVC-034	Provision and Consumption of Voice Comm Management Service	TRL6	TRL6	Optional
PJ.10-W2-93A	ADSP ATC	ER APP ATC 184	ATM Data Service Provider for ATC services in a Virtual Centre context	TRL6	TRL6	Required
PJ.10-W2-93A	ADSP Voice	ER APP ATC 185	ATM Data Service Provider for Voice services in a Virtual Centre context	TRL6	TRL6	Required
PJ.10-W2-93A	VC ATSU	ER APP ATC 186	Virtual Centre ATSU	TRL6	TRL6	Required
PJ.10-W2-93A	OPSUP HMI, CHMI	ER APP ATC 193	Management in the VC ATSU of a CWP preview mode during delegation of ATS Provision between ATUs	new	TRL6	Required
PJ.10-W2-93A	OPSUP, TP&M	ER APP ATC 194	Management in the ADSP of a CWP preview mode during delegation of ATS Provision between ATUs	new	TRL6	Required
PJ.10-W2-93A	CHMI	ER APP ATC 195	Management in the VC ATSU of Delegation of ATS Provision between ATUs with Static AoRs for Y-Architecture	new	TRL6	Required
PJ.10-W2-93A	ADSP ATC, ADSP Voice	ER APP ATC 216	Management in the ADSP of Delegation of ATS provision between ATUs with Static AoRs in a Y-Architecture	new	TRL6	Required

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PJ.10-W2-93A	OPSUP HMI, SUPP HMI, CHMI	ER APP ATC 218	Management in the VC ATSU of Delegation of ATS provision between ATUs with Dynamic AoRs in a Y-Architecture	new	TRL6	Optional
PJ.10-W2-93A	OPSUP, SUPP	ER APP ATC 209	Management in the ADSP of Delegation of ATS provision between ATUs with Dynamic AoRs in a Y-Architecture	new	TRL6	Optional
PJ.10-W2-93A	Any Service	STD-097	EUROCAE ER for Taxonomy of Services between ATSU & ADSP(s), and between ADSP &ADSP	TRL4	TRL4	Optional

Table 2: Solution Related Functional Blocks/Roles &Enablers

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4 Background and validation process

The PJ10.W2-93A is Solution targets a TRL6 maturity level.

A proper analysis was performed to be compliant with OSED Use Cases to cover the Operational Requirements.

The VC solution & design PJ10.W2-93A was assessed through different objectives:

- Its capability to support the delegation process of ATM services between two ATSUs connected to a same ADSP

- The number and maturity of existing or newly developed services between ADSP and ATSUs

- The interoperability aspects

- The performance of the global VC platform with regard to the operational acceptance of the overall delegation process

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5 Results and performance achievements

The below text is an outcome of the validations not a recommendation for the Y architecture:

- The use cases based on the Y architectures have provided a much better operational benefit considering the requirements applied for the "Y" Architecture due to service exchange information of centralized ADSP with two ATSUs;

- Although some new services were developed and validated at TRL6, some other existing since PJ16.03 were improved from TRL4 to TRL6 (mainly under the Y architecture);

Most of these objectives was covered for all exercises. Generally, for the "Y" Architecture, even if some limitations were available in the platform, it was considered mature enough to support the operational validation and ready for use to play the identified operational scenarios.

In particular, the Status of both voice ADSPs and ATC ADSP were monitored via local supervision tools (EXE#03). The broker and related Network components were monitored via supervision tools that measure their performances real-time.

Overall, the Y Architecture based platform was judged mature enough to provide the requested services to the operators. The used ADSP (CCS & iTEC) have both shown their maturity to deliver required services to different ATSUs to support delegation steps (switch from operational to preview and then operational modes for the CWPs of the receiving ATSU).

Particular feedback was aimed at testing the performance of the VC Validation Platform services from a technical point of view. The responses given by the systems/services were all within the expected thresholds and the performances were judged acceptable by the ATCOs involved for the operational use for the UC# based on Y architecture.

In conclusion for the general results on Y Architectures, the necessary service interface for supporting the delegation procedure (management of preview mode and operational mode) were implemented and successfully validated. During all the exercises the QoS was acceptable, because of the service vulnerability and interoperability when delegation is in place. Thus, the designed Architectures demonstrated its feasibility and will provide a sound basis for the future validation exercise, where there will be the need to validate the final architecture with a more realistic scenario.

For the Economic benefit the impact of the Delegation of ATS was also considered in the CBA. The quality of the services and associated economic was obtained to guarantee the implementation of the technical requirements needed for Delegation and Contingency of ATS.

6 Recommendations and Additional activities

PJ10.W2-93A used VC architectures to validate the delegation concept between ATSUs. In addition, all the services are based on standards previously developed in SESAR Wave 1 (PJ16.03). These development from previous research activities allowed us to successfully validate the delegation concept in use cases based on the Y Arch.

However several recommendation will be used for the Next Phase:

- **VC architectures «Y» Maturity**

  - Despite the improved maturity of some services from TRL4 to TRL6, there are a lot of others which are kept at TRL4. Future efforts should be concentrated on developing new services ADSP-ATSU and ADSP-ADSP, while increasing the maturity of the current VC services

  - As the Y architecture is nothing else than the "One Data Centre" concept, research and development on future ATCO decision support tools (such as CD&R), that could be based on AI technics, is a must and should bring increase of capacity while maintaining the same level of Safety

  - **ATSEP** Requirements on the Y Architecture to be further developed in SESAR 3

- Furthermore, the concept has been demonstrated as operationally feasible for the following use cases:

  - o Night use case

  - o Fixed time use case

  - o Contingency Use Case

Considering the On-Demand use case only, (Cross-border, Civil Military and ATFCM), the operational feasibility results are not as almost positive as in the previous Use cases.

Therefore, Project in SESAR 3, Solution ISLAND will complement further work to ensure an appropriate delivery of ATS Services in the delegating and receiving ATSUs. This includes the validation of services presented so far as optional by the solution but appear as mandatory for the cases that still need to be validated.

The transition from AS-IS legacy system to a TO-BE system capable of performing the delegation of ATS in the receiving/delegating ATSUs, including the mandatory and optional services, shall be investigated in the next phases.

In conclusion, future efforts should be put on the development of new services, such as ADSP-ATSU and ADSP-ADSP, while also focusing on increasing the maturity of our current VC services.

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Given that the Y architecture is essentially the "One Data Centre" concept, it is imperative that we invest in research and development for future ATCO decision support tools, such as CD&R, which could be based on AI techniques. By doing so, we can increase our capacity while maintaining the same level of safety, which is of utmost importance.

 Further work on required on:

- o Preview mode
- o Supervision & Monitoring& ATSEPs
- o ATSEP roles
- o Conflict Detection and Resolution support tools
- o ATSEP Requirements on the Y Architecture to be further developed in SESAR 3

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7 Actors impacted by the SESAR Solution

The following stakeholders are impacted by PJ10.W2- Solution 93A in the Validation process:

- Air Navigation Service Providers (ANSPs);

- Air Data Service Provider (ADSP);

- Network Manager;

- Ground systems manufacturers;

- Airspace Users;

- Civil-Military coordination;

- Standardization Group EUROCAE WG-122;

- Regulatory for certification aspects.

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8 Impact on Aircraft System

None impact on Aircraft system.

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9 Impact on Ground Systems

Some conclusions on the technical feasibility are reported in a general manner regarding several implementation to improve the Delegation process.

In addition, the impact only for the ADSPs are reported in the different Contextual note Sol A, SOL B and Sol C according to different Architectures per validation exercises.

The impacted ground functionalities are reported below:

- **Preview mode**

- The preview mode is the main "technical enabler" of the overall delegation of ATS between ATSUs. It was successfully implemented in most exercises and the process resulted acceptable both at the CWPs and ADSPs levels.

- **Supervision & Monitoring & ATSEPs**

- **ATSEP roles**

  - With the today legacy ATM systems (ADSP+ATSUs) the actors in charge of the technical system are located in the same place: the technical SPVRs are used to monitor the operational systems real-time at the ATSU OPS room and they can rely on a group of ATSEPs, also located at the same place. The ATSEPs are in charge of all the technical infrastructure that support the ATSU with the ATM data. With the a Y architecture design, the ATSEPs have to be split between at least two locations: the location of the data centre, the locations of the ATSUs (the data centre can be at one of the ATSUs), this requires a new organisation of the ATSEP role.

  - The supervision & monitoring of the ATC and voice ADSP from different ATSUs shall be put in place while harmonisation of such tools is required

  - Procedures and working methods shall be adapted & harmonized between the ATSUs

  - (i.e., a replicated view). The preview mode shall be integrated into the controller working position, and the receiving controller shall be able to interact with the preview mode functionality as per his/her screen (i.e., filters, configuration of visuals, etc.).

- **Conflict Detection and Resolution support tools**

  - The existence of Conflict Detection and Resolution tools, if proper implementations are done, has been considered as positive. However, if the system already allows to measure distance between flights and to identify potential losses of minima separation, the supporting aid can be considered as a desire rather than a pre-requisite.

10 Regulatory Framework Considerations

The National Supervisory Authorities (NSAs) of both the delegating and receiving ATSUs must work closely for following development (and the list is not exhaustive):

- EASA involvement for licencing and Certification aspects;

- Based on the Virtual Centre concept on "Y" Architecture, it is recommended the review of ATCO and ATSEP licensing schemes by providing them with new Certification means

- Review of eventual SLAs- Service Level Agreements put in place between the involved ATSUs

- Supervision of the implemented changes at each ATSU for the need for example of Cross-border delegation and this shall include those related to IOP- Interoperability

The current Certificate for ATS provision includes the services of both the ATS and Common Data Layer. Existing ATSU can provide ATM Data Service to another provider of the service provision Regulation. The two ATSU would need to demonstrate the suitability of the services provided /consumed.

11 Standardization Framework Considerations

The solution PJ10.93 is a follow up of the SESAR Wave 1 PJ16.03 which provided first list of services between ADSPs and ATSUs. The maturity of the services varies from TRL4 to TRL6 and our solution has increased the maturity of some services from TRL4 to TRL6 while new services (mainly those supporting the delegation process) have been created and validated at TRL6.

WG-122 ER-26 could seek to standardize on the basis of Y architectural option but, it is noted to recognise that the long-term goal is towards the U or D model. In SESAR3 more research and development activities may need to be done in this area first particularly on ADSP interface.

Furthermore, none of the listed services was standardized yet. As the European standardization body in ATM domain is EUROCAE, our recommendation to EUROCAE is to rapidly start the work of standardization of the VC services, especially those subject to validation under Solution 93. In a first step, one can focus on the most mature services, e.g., at TRL6. This recommendation is already a reality as we are aware that EUROCAE has already started the standardisation task in parallel with the SESAR research & development projects.

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12 Solution Data pack

D3.3 - PJ.10-W2-93-SOLA: Solution pack TRL6 (31st March 2023) including:
- D3.2.030 - PJ.10-W2-93-V3 Final SPR-INTEROP/OSED
- D3.2.180 - PJ.10-W2-93-V3 Final CBA
- D3.2.060 - PJ.10-W2-93-V3 Final TS/IRS
- D3.2.150 - PJ.10-W2-93-V3 Final VALR

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