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PJ07 OAUO

PJ07 OPTIMISED AIRSPACE USERS OPERATIONS

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Abstract

This document contains the Human Performance (HP) assessment report for the PJ.07-Solution 03 (Mission Trajectory Driven Processes) supported by Project PJ.18-Solution 01 (Mission Trajectories). It consists of the HP assessment Plan, the results of the HP activities conducted according to the HP assessment process, newly identified issues and the HP recommendations & requirements. It corresponds to the completion of the four steps of the Human Performance assessment process, namely: Step 1 – Understand the concept: Baseline, Solution and Assumptions, Step 2 – Understand the Human Performance Implications, Step 3 – Improve and Validate the concept and Step4 – Collate findings & conclude on transition to next V-phase..

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1 Executive Summary

This report describes the results of the activities conducted according to the SESAR Human Performance (HP) assessment process applied in the context of Mission Trajectory driven processes on the SESAR Solution PJ.07-03 supported by PJ.18-01a for V3 phase. Indeed, PJ.07 Optimized Airspace Users Operations (OAUO) aims at improved Airspace Users' participation - through their Wing Operations Centre (WOC) - into ATM Network Collaborative Processes as a transition into the future Trajectory Based Operations (TBO) - and Collaborative Decision Making environment. The objective is to improve the planning of flights taking into account existing ATM constraints and to minimize impacts of deteriorated operations for all stakeholders including airspace users, in relation with the current ICAO approach (ICAO Doc. 9965) on the establishment of a collaborative environment for flights & flow planning (FF-ICE).

The SESAR HP assessment process provides a framework to help ensure that HP aspects related to SESAR technical and operational developments are systematically identified and managed in the concept design, development and validation process. Level of maturity of the concept at the start of the HP assessment was considered to be V2. At the end of part of Wave1, one V3 exercise was performed, which allowed to determine the planning phase aspects as V3 completed. Other aspects related to the execution phase will require further validation. Therefore the argument structure for V3 was applied on the project. From the changes that would result from the improved Airspace Users' participation through their Wing Operations Centre (WOC), it is concluded that eleven of the twelve V3 second level HP arguments needed to be considered and satisfied in the HP assessment. The MT concept proposed, gives an improved participation of military Airspace User's by using iSMT and iRMT, implemented as iOAT FPL, for exchange of trajectory data between WOC, NM and ATC to the ATM and ATC processes.

From the OI steps allocated to the mission trajectory driven processes, only AOM-0303, AOM-0304-A and AUO-0215 have completed V3/TRL6 and are under the scope of solution PJ.07-03 "Sharing mission trajectory data with NM and ATC via an improved OAT Flight Plan (iOAT FPL)". The "Mission Trajectory Driven Processes" scope is wider and include in addition the rest of the OI steps. Solution PJ.07-03 captures those elements that were validated to V3/TRL6 in the context of SESAR 2020 Wave 1:

- The management of mission trajectory (MT) with variable profile areas (VPA) type of airspace reservations (ARES) as shared via iOAT FPL in the planning phase.
- The ARES conceptual evolution allowing more precise identification of ARES Entry and Exit location and time, to support the increased quality of the trajectory prediction in the corresponding wing operations centre (WOC), network manager (NM) and ATC systems. This includes the evolutions of the VPA module reference as integral part of the evolved iOAT FPL syntax & concept.
- The B2B services for iOAT FPL filing from WOC to NM as well as for the iOAT FPL distribution from NM to ATC. B2B services were as well successfully validated to connect Regional ATFCM (NM) and local ATC FMP systems.

Specific HP issues and benefits relating to the improved Airspace Users' participation through their WOC concept for each of the relevant arguments are identified by performing a review of existing literature as well as conducting a series of HP issue and benefit brainstorming sessions/interviews with relevant stakeholders including ATCOs, WOC and IFPS operators, engineers, safety and HF experts. Over 11 potential HP issues/benefits are identified in total.

Specific HP issues and benefits relating to the improved Airspace Users' participation for each of the relevant arguments are identified by performing a review of existing literature as well as conducting a series of HP issue and benefit brainstorming sessions/interviews with relevant stakeholders including operational experts, engineers, safety and HF experts. Over 11 potential HP issues/benefits are identified in total.

Based on the HP arguments and issues/benefits identified, several HP activities are recommended. The HP related validation activities conducted to date include:

- Interviews through WebEx with operational experts
- Dedicated F2F meetings with operational experts and relevant stakeholders
- Brainstorming sessions with relevant stakeholders
- Observations during the initial V3 shadow mode validation exercise

The output or 'evidence' collected from each of these activities that are relevant to the HP assessment are summarised in this report together with recommendations and/or requirements that have been proposed to help prevent or mitigate each of the potential HP issues identified. The HP recommendations and/or requirements relate to each HP argument that had to be considered in the HP assessment for the operational concept under validation. These recommendations and requirements relate to: the operational concept, the technical system, HMI and the training of the end user. In addition, HP recommendations for future V3 validation activities that need to be conducted in order to investigate the HP issues and benefits in more detail to achieve full V3 maturity on the execution phase aspects, as well as, potential mitigation are also provided.

From the completion of the HP maturity criteria checklist for transition from initial V3 to full V3, which is based on the 'evidence' obtained from the HP related validation activities conducted within SESAR PJ.07-03 supported by PJ.18-01a, it can be concluded that the operational concept captured under PJ.07-03 "Sharing mission trajectory data with NM and ATC via an improved OAT Flight Plan (iOAT FPL)" has completed V3, while other aspects tested in the validation exercises and related to the execution phase have reached the initial V3 level of HP maturity and satisfies the transition criteria to finalize to reach full V3 validation by further exercises in future.

2 Introduction

2.1 Purpose of the document

The purpose of this document is to describe the result of the activities conducted according to the Human Performance (HP) assessment process [1] in order to derive the HP assessment report for SESAR Solution PJ.07-03 for V3-phase including the HP requirements and recommendations to inform the design and development of the concept explored in the validation activities and to ensure that it is mature enough to move on the next V-phase.

2.2 Intended readership

The intended audience for this document are the other team members of the Solution PJ.07-03 under investigation. HP practitioners at the level of the transversal areas and federating projects are also expected to have an interest in this document.

Other SESAR 2020 Projects that may be interested in this document are to be found among:

- SESAR Activity PJ18-01a for common document preparation with PJ.07-03
- other solutions of the own project PJ07: PJ07-01 and PJ07-02
- other solutions of enabling project PJ18: PJ18-02, PJ18-04 and PJ18-06
- Project PJ08 for transversal Safety, Human Performance, Security Assessments and Cross Benefit Analysis (CBA)
- Project PJ09 for transversal Safety, Human Performance, Security Assessments and CBA
- Project PJ19 for the harmonization and consistency between the S2020 solutions, performance aspects and transversal views
- Project PJ22 for the harmonization and consistency of requirements over the various S2020 solutions

State Airspace User Representatives:

- Civil-Military ATM Coordination (CMAC)
- Military Engagement Programme in SESAR (MEPS)

Airspace Users

-

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2.3 Scope of the document

The HP Assessment report describes the recommended HP activities for the initial V3 shadow mode validation exercise and its preparation. It will consider the development of Shared Mission Trajectory (SMT) in medium/short-term planning phase by focusing on NM, IFPS and ANS ATC&FMP operators.

2.4 Human performance work schedule within the Solution

The Human Performance activities for the PJ.07-03 started in January 2019 and are expected to finish in August 2019.

2.5 Structure of the document

The structure of this document is derived from the SJU SESAR 2020 Human Performance Report template [1]:

- Section 1 provides an executive summary of this document;
- Section 2 is the introduction of the document providing high level information related to the purpose, the audience, the scope, a glossary of terms and a list of acronyms and terminology;
- Section 3 describes the Human Performance Assessment Process detailing the objective and the approach;
- Section 4 describes the four two steps of the Human Performance Assessment. In particular, it reports the main findings and the HP recommendations and requirements from the activities performed as part of the HP assessment process;
- Section 5 gives the list of reference documents;
- Appendix A provides the HP recommendations register which specifies the list of HP recommendations gathered in the project;
- Appendix B provides the HP requirements register which offers the list of HP requirements gathered in the project;
- Appendix C provides the HP Log in which all the data/information obtained from all HP activities conducted as part of the HP assessment (Step1 – Step 4) have been documented. It specifies the list of HP requirements gathered in the project.

2.6 Acronyms and Terminology

Term	Definition
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
ARES	Airspace Reservation
CACD	Central Airspace and Capacity Database
CBA	Cross Benefit Analysis
CMC	Civil-Military ATM Coordination
EFPL	Extended Flight Plan
ETFMS	Enhanced Tactical Flow Management System
FDO	Flight Data Operator
FPL	Flight Plan
HP activity	An HP activity is an evidence-gathering activity carried out as part of Step 3 of the HP assessment process. An HP activity can relate to, among others, task analyses, cognitive walkthroughs, and experimental studies.
HP Argument	An HP argument is an HP claim that needs to be proven through the HP Assessment Process.
HP assessment	An HP assessment is the documented result of applying the HP assessment process to the SESAR Solution-level. HP assessments provide the input for the HP case.
HP assessment process	The HP assessment process is the process by which HP aspects related to the proposed changes in SESAR are identified and addressed. The development of this process constitutes the scope of Project 16.04.01. It covers the conduct of HP assessments on the Solution-level as well as the HP case building over larger clusters of Solutions.
HP benefit	An HP benefit relates to those aspects of the proposed ATM concept that are likely to have a positive impact on human performance.
HP case	An HP case is the documented result of combining HP assessments from SESAR Solutions into larger clusters (e.g. SESAR Projects, deployment packages) in SESAR.

HP impact	An HP impact relates to the effect of the proposed solution on the human operator. Impacts can be positive (i.e. leading to an increase in Human Performance) or negative (leading to a decrease in Human Performance).
HP issue	An HP issue relates to those aspects in the ATM concept that need to be resolved before the proposed change can deliver the intended positive effects on Human Performance.
HP recommendations	HP recommendations propose means for mitigating HP issues related to a specific operational or technical change. HF recommendations are proposals that require additional analysis (i.e. refinement and validation). Once this additional analysis is performed, HF recommendations may be transformed into HF requirements.
HP requirements	HP requirements are statements that specify required characteristics of a solution from an HF point of view. HP requirements should be integrated into the DOD, OSED, SPR, or specifications. HF requirements can be seen as the stable result of the HF contribution to the Solution, leading to a redefinition of the operational concept or the specification of the technical solution.
Human Factors (HF)	HF is used to denote aspects that influence a human’s capability to accomplish tasks and meet job requirements. These can be external to the human (e.g. light & noise conditions at the work place) or internal (e.g. fatigue). In this way, “Human Factors” can be considered as <i>focussing on the variables that determine Human Performance</i> .
Human Performance (HP)	HP is used to denote the human capability to successfully accomplish tasks and meet job requirements. In this way, “Human Performance” can be considered as <i>focussing on the observable result of human activity in a work context</i> . Human Performance is a function of Human Factors (see above). It also depends on aspects related to Recruitment, Training, Competence, and Staffing (RTCS) as well as Social Factors and Change Management.
IFPS	Integrated Initial Flight Plan Processing System
IFPZ	IFPS Zone
iOAT	Improved Operational Air Traffic
MEPS	Military Engagement Programme in SESAR

NM	Network Manager
OAUO	Optimized Airspace Users Operations
SA	Situational Awareness
TBO	Trajectory Based Operations (TBO)
UDPP	User Driven Prioritization Process
WOC	Wing Operations Centre

Table 1: Acronyms and terminology

3 The Human Performance Assessment Process: Objective and Approach

The HP assessment process is a four-step process. Figure 1 provides an overview of these four steps with the tasks to be carried out and the two main outputs (i.e. HP plan and HP assessment report). In addition, an HP Log is maintained throughout the lifecycle of the Solution in which all the data/information obtained from all HP activities conducted as part of the HP assessment is documented. This HP Log is a living document and is continuously updated and / or added to as the SESAR Solution progresses.

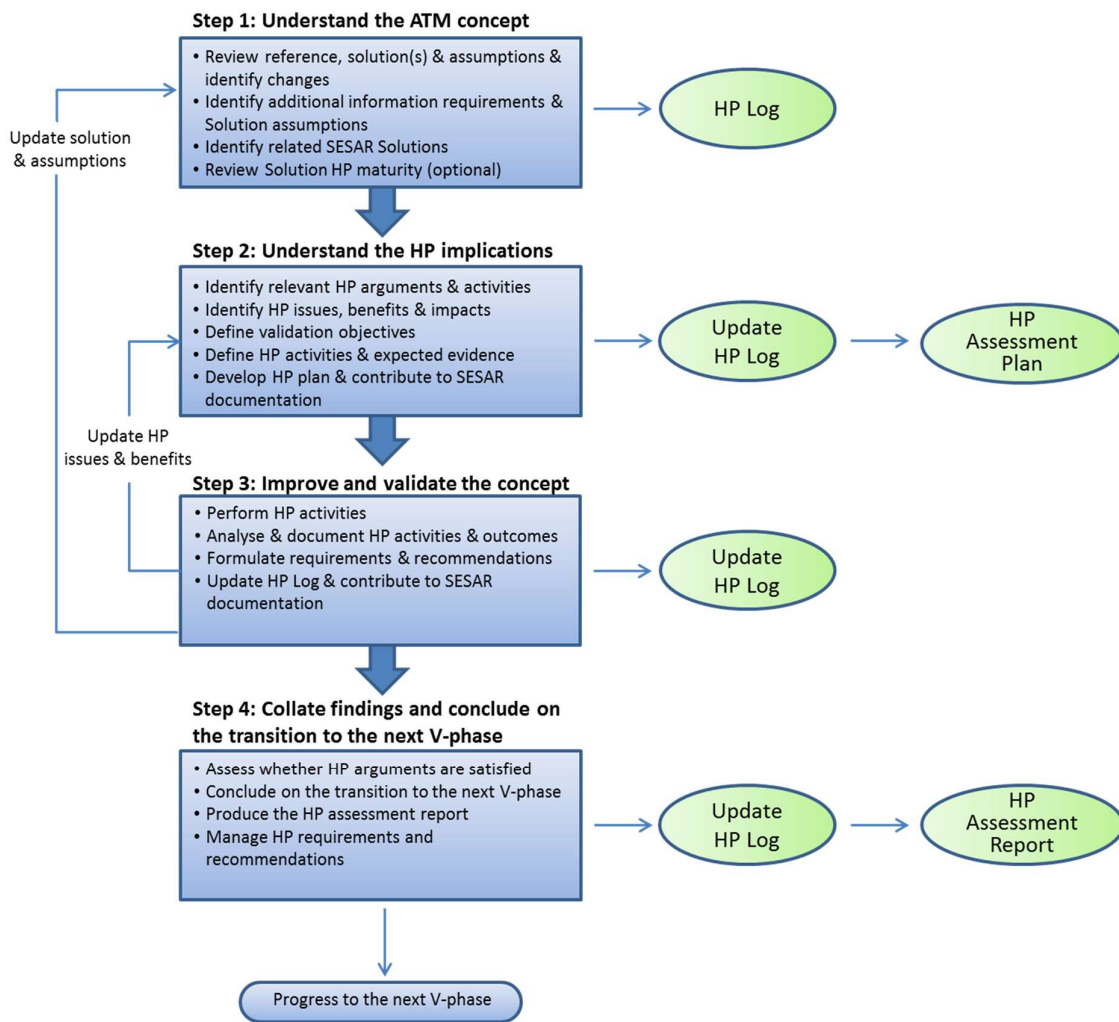


Figure 1: Steps of the HP assessment process

The SESAR HP assessment process provides a framework to help ensure that HP aspects related to SESAR technical and operational developments are systematically identified and managed in the concept design, development and validation process [1]. The SESAR HP assessment process uses an ‘argument’ and ‘evidence’ approach. A HP argument is a ‘HP claim that needs to be proven’. The aim of the HP assessment is to provide the necessary ‘evidence’ to show that the HP arguments impacted have been considered and satisfied by the HP assessment process. This includes the identification of HP requirements and recommendations to support the design and development of the concept.

After successful passing of the V2 maturity Gate in autumn 2018, the level of maturity of the concept at the start of this HP assessment is considered to be V2. The assessment targets V3 for the planning phase and initial V3 for the execution phase. Therefore the argument structure for V3 was applied on the project. From the changes that would result from the improved Airspace Users’ participation through their Flight/Wing Operations Centre (WOC), it is concluded that eleven of the eleven V3 second level HP arguments needed to be considered and satisfied in the HP assessment, namely:

1. Roles & Responsibilities

- *Argument 1.1:* The roles and responsibilities of the human are clear & exhaustive
- *Argument 1.2:* The operating methods are clear, exhaustive and support human performance
- *Argument 1.3:* Human actors can achieve their tasks in normal, abnormal and degraded modes of operation

2. Human & System

- *Argument 2.1:* There is appropriate allocation of tasks between the human and the machine
- *Argument 2.2:* The performance of the technical system supports the human in carrying out their tasks
- *Argument 2.3:* The design of the HMI supports the human in carrying out their tasks

3. Teams & Communication

- *Argument 3.1:* The effects on team composition
- *Argument 3.2:* The allocation on tasks between human actors support human performance
- *Argument 3.3:* The communication between team members supports human performance

4. HP related transition factors

- *Argument 4.2:* Changes in competence requirements are analysed

- *Argument 4.5*: Training needs are identified for affected human actors

Specific HP issues and benefits relating to the improved Airspace Users' participation through their WOC concept for each of the relevant arguments are identified by performing a review of existing literature as well as conducting a series of HP issue and benefit brainstorming sessions/interviews with relevant stakeholders including ATCOs, WOC and IFPS operators, engineers, safety and HF experts. Over 11 potential HP issues/benefits are identified in total.

Based on the HP arguments and issues/benefits identified, few HP activities are recommended. The HP related validation activities conducted to date include:

- Interviews through WebEx with operational experts
- Dedicated F2F meetings with operational experts and relevant stakeholders
- Brainstorming sessions with relevant stakeholders
- Observations during the V3 shadow mode validation exercise.

The output or 'evidence' collected from each of these activities that are relevant to the HP assessment are summarised in this report together with recommendations and/or requirements that have been proposed to help prevent or mitigate each of the potential HP issues identified. The HP recommendations and/ or requirements relate to each HP argument that had to be considered in the HP assessment for the operational concept under validation. These recommendations and requirements relate to: the operational concept and the training of the end user. In addition, HP recommendations for future validation activities that need to be conducted in V3 in order to investigate the HP issues and benefits during the execution phase in more detail, as well as, potential mitigation are also provided.

From the OI steps allocated to the mission trajectory driven processes, only AOM-0303, AOM-0304-A and AUO-0215 have completed V3/TRL6 and are under the scope of solution PJ.07-03 "Sharing mission trajectory data with NM and ATC via an improved OAT Flight Plan (iOAT FPL)". This solution has been developed in the context of the validation of the wider "Mission Trajectory Driven Processes", which also covers the rest of the OI steps. Solution PJ.07-03 captures those elements that were validated to V3/TRL6 in the context of SESAR 2020 Wave 1:

- The management of mission trajectory (MT) with variable profile areas (VPA) type of airspace reservations (ARES) as shared via iOAT FPL in **the planning phase**.
- The ARES conceptual evolution allowing more precise identification of ARES Entry and Exit location and time, to support the increased quality of the trajectory prediction in the corresponding wing operations centre (WOC), network manager (NM) and ATC systems. This includes the evolutions of the VPA module reference as integral part of the evolved iOAT FPL syntax & concept.
- The B2B services for iOAT FPL filing from WOC to NM as well as for the iOAT FPL distribution from NM to ATC. B2B services were as well successfully validated to connect Regional ATFCM (NM) and local ATC FMP systems.



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4 Human Performance Assessment

4.1 Step 1 Understand the ATM concept

4.1.1 Description of reference scenario

In the most countries in the IFPZ military and civil AUs have their own aeronautical environmental dataset. Furthermore, Military (OAT) flight plan formats are not harmonized at European level and do not support a common validation and central processing by NM as for GAT FPLs. In consequence, military FPLs, if not filed as GAT FPL, cannot be distributed to concerned ANSPs. This leads to a lack of awareness about military traffic intentions that can impact ATM Network performance (including safety), and a lack of flexibility in the definition of cross borders exercises and limitations in terms of interoperability.

Military FPLs can be fully OAT or contain OAT sections. For those OAT parts of the trajectory the flight will not adhere to the common ATM network rules, which increases the complexity of civil and military traffic management and interaction in the same airspace.

PJ07 Optimized Airspace Users Operations (OAUO) aims at improved Airspace Users' participation - through their Wing Operations Centre - into ATM Network Collaborative Processes in the future Trajectory Based Operations (TBO) - and Collaborative Decision Making environment. The objective is to improve the planning of flights taking into account existing ATM constraints and to minimize impacts of deteriorated operations for all stakeholders including airspace users. The collaborative planning and flight execution processes shall be performed at "level playing field", i.e. that performance of all actors is taken into consideration, including AU's performance degradation in case of flight operation in capacity constrained situations.

The PJ07 Optimized Airspace Users Operations project will include further evolution of the Airspace Users ATM processes and tools developed in SESAR1 in projects 07.05.04, 07.06.02 and WP11.1. Those SESAR1 projects have established the basis for sharing more information (e.g. preferences) at planning phase between Wing Operations Centres and ATM stakeholders through the use of the Extended Flight Plan (EFPL) and the improved OAT Flight Plan (iOAT FPL). For the User Driven Prioritization Process (UDPP), Airspace Users have defined methods beyond slot swapping to protect important flights in capacity constraints.

The co-definition and validation by Airspace Users and ATM stakeholders of the additional information in future trajectories and how it should be used (trajectory management processes), as well as the integration of UDPP within the trajectory management processes and the Demand Capacity Balancing (DCB) processes are the objectives of PJ07 with PJ18 and PJ09. UDPP validation started in SESAR1 will be completed in PJ07 in collaboration with the ATM stakeholders in PJ09 and PJ04.

For any further details about the reference scenario, please refer to chapter 3.3.1 of the SPR-INTEROP/OSED [2].

4.1.2 Description of solution scenario

The operational scenarios and use cases of solution PJ.07-03 are described in chapter 3.3.2 of the SPR-INTEROP/OSED (see [2]). The focus of this V3 shadow mode validation exercise was on the planning phase.

4.1.3 Consolidated list of assumptions

The following assumptions relating to the “improved Airspace Users’ participation - through their Flight/Wing Operations Centre (WOC) - into ATM Network Collaborative Processes” are listed below:

- It is currently assumed that the concept has been mostly elaborated having as reference the ANSPs in which the civil-military integration is achieved with ATCOs responsible for controlling both civil and military aircraft, depending on different operational situations. Examples of these ANSPs are DFS and ANS CR. Consequently, the scope of the HP assessment has been limited to similar operational situations with these characteristics. Further studies may be needed in order to extend the HP assessment in case of the application of the concept is envisaged in other types of ANSPs;
- Other adjustments to rules and regulations may be required for a full implementation of the concept as well as some improvements to the supporting system.

4.1.4 List of related SESAR Solutions to be considered in the HP assessment

SESAR’s vision builds on the notion of trajectory-based operations’ and relies on the provision of ANS in support of the execution of the business or mission trajectory. Going beyond 2035 towards 2050, performance-based operations will be implemented across Europe, with multiple options envisaged, such as seamless coordination between ANSPs or full end-to-end ANS provided at network level. As reported in [2], PJ.07-03 is concentrating on the mission trajectory driven processes. Mission Trajectory Driven Processes refer, through a full integration of the Wing Operations Centre (WOC) within the ATM system, to the updating of WOC processes for the management of the shared and reference mission trajectory (SMT/RMT). *These processes respond to the need to accommodate individual military airspace user needs and priorities without compromising the military mission effectiveness, the optimum ATM system outcome and the performances of all stakeholders.* This solution is supported by

- **PJ.18-01a – Mission Trajectories.** Improved mission trajectories will be integrated into the TBO environment throughout all phases of trajectory planning and execution (SMT/RMT). Enhanced mission trajectory will be subject to trajectory management processes and contain 4D targets and ATM constraints.

Furthermore, the operational concept is relate (in future Wave 2) to PJ08 “Advanced Airspace Management (AAM)” which will develop a Dynamic Airspace Configuration function including Dynamic Mobile Areas based on improved traffic prediction, and will be executed as one of the processes for matching capacity to traffic demand and meeting performance objectives. PJ08 will evaluate two solutions:

- **Solution PJ.08.01** – *Management of Dynamic Airspace Configurations* will develop processes, procedures and tools through: (a) En-route ATC sector design and configuration principles based on 4D trajectory forecasts; (b) The activation of airspace configurations through an integrated collaborative decision-making process, at local, sub-regional and regional levels; (c) En-route ATC sector configurations with both fixed and dynamic elements (i.e. fixed and flexible routing, reserved/restricted airspace – ARES, CBA, CBO, DMA).
- **Solution PJ.08.02** – *Dynamic Airspace Configuration supporting Moving Areas* is the continuation of solution one to extend the support of DAC to Dynamic Mobile Areas of type 3 (a ‘bubble’ moving with the aircraft to be separated from the rest of the traffic. The use of such areas limits the size and duration of the volume of segregated airspace to the required minimum). It includes all the updates needed for DAC management and processes, and all the systems and tools supporting DMA type 3. Besides DMA type 3, this solution also includes the automated impact assessment of hazard zones due to weather phenomena, which can evolve in four dimensions, and their integration into the DAC process.

All those solutions deal with (1) the need to accommodate airspace users' needs and priorities without compromising optimum ATM system outcome and the performances of all stakeholders and (2) the essential role of NM in managing all these requests. It is worth to note that this role may require further studies aiming at evaluating several HP issues such as the impact of the new operational concepts on the NM workload, Situation Awareness (SA), necessary tools and competences to manage all the available information.

4.1.5 Identification of the nature of the change

HP argument branch	Change & affected actors
1. ROLES & RESPONSIBILITIES	
1.1 ROLES & RESPONSIBILITIES	<ul style="list-style-type: none"> • The role of the IFPS and WOC operator is clear and exhaustive
1.2 OPERATING METHODS	<ul style="list-style-type: none"> • The current operating methods are adequate to accomplish IFPS and WOC operator tasks
1.3 TASKS	<ul style="list-style-type: none"> • The IFPS and WOC operator can achieve his/her tasks (in normal & abnormal conditions of the operational environment and degraded modes of operation).
2. HUMAN & SYSTEM	
2.1 ALLOCATION OF TASKS (HUMAN & SYSTEM)	<ul style="list-style-type: none"> • The IFPS and WOC operator is supported by the system in accomplishing his/her tasks

2.2 PERFORMANCE OF TECHNICAL SYSTEM	<ul style="list-style-type: none"> The performance of the technical system supports the IFPS operator in carrying out his/her task.
2.3 HUMAN – MACHINE INTERFACE	<ul style="list-style-type: none"> The design of the human-machine interface supports the IFPS and WOC operator in carrying out his/her tasks
3. TEAMS & COMMUNICATION	
3.1 TEAM COMPOSITION	<ul style="list-style-type: none"> The team composition is adequate to assure the operational processes at NM to process, validate and distribute the MT/iOAT FPL.
3.2 ALLOCATION OF TASKS	<ul style="list-style-type: none"> The proposed task allocation between human actors is supported by technical systems/the HMI.
3.3 COMMUNICATION	<ul style="list-style-type: none"> The communication and situational awareness of the IFPS and WOC operator in managing air traffic are increased.
4. HP RELATED TRANSITION FACTORS	
4.1 ACCEPTANCE & JOB SATISFACTION	
4.2 COMPETENCE REQUIREMENTS	<ul style="list-style-type: none"> The IFPS and WOC operator has the competences to correct the iOAT FPL
4.3 STAFFING REQUIREMENTS & STAFFING LEVELS	
4.4 RECRUITMENT & SELECTION PROCESSES	
4.5 IDENTIFICATION OF TRAINING NEEDS	<ul style="list-style-type: none"> The training needs resulting from the proposed changes to the human actors' roles and tasks have been preliminary identified.

Table 2: Description of the change

4.2 Step 2 Understand the HP implications

4.2.1 Identification of relevant arguments, HP issues & benefits and HP activities

The HP arguments are “claims” that need to be “proven” by the HP assessment. Therefore, the aim of HP assessment is to provide “evidence” to show the HP arguments impacted have been considered and satisfied by the HP assessment process. From the changes that would result from the introduction of the operational concept (as described in **Error! Reference source not found.**), it is identified that eleven out of the twelve V2 level two HP arguments need to be considered by the HP assessment. Hence the arguments to be considered by the HP assessment process are:

- Argument 1.1 The roles and responsibilities of the human are clear & exhaustive
- Argument 1.2: The operating methods are clear, exhaustive and support human performance
- Argument 1.3: Human actors can achieve their tasks in normal, abnormal and degraded modes of operation
- Argument 2.1 There is appropriate allocation of tasks between the human and the machine
- Argument 2.2 The performance of the technical system supports the human in carrying out their tasks
- Argument 2.3 The design of the HMI supports the human in carrying out their tasks
- Argument 3.1 Effects on team composition
- Argument 3.2 The allocation on tasks between human actors support human performance
- Argument 3.3 The communication between team members supports human performance
- Argument 4.2 Changes in competence requirements are identified
- Argument 4.5 Training needs are identified for affected human actors.



The table below describes these HP arguments. It also lists the Solution-specific HP issues and benefits that have been identified related to an HP argument. For each issue and / or benefit the impact on human performance as well as system performance (in terms of KPAs) is described. From this, the HP validation objectives can be defined. On the basis of the general guidance on the satisfaction of HP arguments as well as the HP issues and benefits identified for the PJ.07-03 Solution, the recommended HP activity/ies are described.

Arg.	Issue ID	HP issue / Benefit	HP/Valid. Obj. ID	HP objective	validation recommended activity/ies
1.1.1		<i>Not all human actors impacted by the new operational concept are identified.</i>	S07-03-SMV3-ARG1.1.1	Assess the workload of the WOC & IFPS operator, communication load and Situational Awareness (SA)	Identify/update how WOC & IFPS operators are likely impacted by the change. Describe the roles and responsibilities of those actors after the change and check against the current situation. (ATC operators not covered; exercises covers only planning phase)
1.1.2		<i>The description of roles & responsibilities doesn't cover all tasks to be performed by a human actor.</i>	S07-03-SMV3-ARG1.1.2	Assess the workload of the IFPS operator, communication load and SA.	Identify/update tasks to be performed by the affected human actors using Task Analyses to identify role changes in the solution scenario(s) compared to roles in the reference scenario &





					check against the description of roles and responsibilities.
1.1.3		<i>Neither roles nor responsibilities are clear and consistent. Once the new operational concept will be put in place....</i>	S07-03-SMV3-ARG1.1.3	Assess the workload of the IFPS operator, communication load and SA	Review roles and responsibilities to ensure they are clear and consistent. The review will be carried out with end users.
1.2.1		<i>Operating methods don't cover operations in normal operating conditions.</i>	S07-03-SMV3-ARG1.2.1	Identify specific case studies	Identify/update situations that constitute normal operating conditions in cooperation with the safety and operational specialists & check against the scope of the operating methods.
1.2.4		<i>The content of operating methods isn't clear and consistent.</i>	S07-03-SMV3-ARG1.2.4	Identify specific case studies	Review operating methods to ensure they are clear and consistent
1.3.3		<i>The level of workload (induced by cognitive and/or physical task demands) isn't acceptable.</i>	S07-03-SMV3-ARG1.3.3	Assess the workload of the IFPS operator	Assess workload and underlying factors in the shadow mode trial





1.3.5	<i>Human actors cannot maintain a sufficient level of situation awareness.</i>	S07-03-SMV3-ARG1.3.5	Assess the SA of the IFPS operator	Assess SA and underlying factors in the shadow mode trial
2.1.2	<i>Changes to the task allocation between human and machine don't support human performance.</i>	S07-03-SMV3-ARG2.1.2	Assess the IFPS operator workload and assess HMI usability	Perform cognitive Task Analysis and focus group to identify cognitive/ task demands, potential error, and recovery means
2.2.1	<i>The accuracy of information provided by the system is inadequate for carrying out the task.</i>	S07-03-SMV3-ARG2.2.1	Assess HMI usability	Perform Cognitive Task Analysis and focus group for comparing system provided information with information requirements of the human
2.3.1	<i>The type of information provided doesn't satisfy the information requirements of the IFPS operator.</i>	S07-03-SMV3-ARG2.3.1	Assess HMI usability	Assess Human Performance & Usability during Real-Time Simulation or operational trials with: (i) subjective methods: questionnaire, debriefings & interviews (feedback on system support) and (ii) objective methods: data recordings, observations (task performance).





3.1.1	<i>Changes to existing roles in the team are identified</i>	S07-03-SMV3-ARG3.1.1	Assess the workload of the IFPS operator, communication load and SA	Perform/review Task Analysis to identify role changes in the solution scenario(s) compared to roles in the reference scenario
3.2.2	<i>The proposed task allocation between human actors isn't supported by technical system.</i>	S07-03-SMV3-ARG3.2.2	Assess the workload of the IFPS operator, SA and HMI usability	Perform/review Task Analysis or focus groups with end users (e.g. HP Issue Analysis, review of mock-up) to identify task needs/requirements and review proposed technical systems to ensure that the technical system covers the task requirements identified
3.3.5	<i>Team members cannot maintain a sufficient level of shared situation awareness</i>	S07-03-SMV3-ARG3.3.5	Assess HMI; assess shared SA	Identify factors that will impact upon team situational awareness using Cognitive Task Analysis and/or focus groups with end users (e.g. HP Issue Analysis, review of prototype) and identify preliminary mitigation





4.2.1	<p><i>Knowledge, skill and experience requirements for the WOC operators have been identified.</i> Indeed, once the new operational concept will be put in place, the IFPS operator will need to acquire the necessary competences to manage all the process.</p>	S07-03-SMV3-ARG4.2.1	Identify detailed requirements	Identify the necessary competences to manage the tasks that have been identified in 1.1.1 and 1.1.2
4.5	<p>For each new operator (i.e. WOC, FDO, IFPS, civil/military ATCOs) specific training or refresher courses are needed.</p> <p>New operators (i.e. WOC, FDO, civil/military ATCOs) need to have a specific license for dealing with the new system and the improved FPL format</p>	S07-03-SMV3-ARG4.5	Identify specific topics	If possible, identify the specific training or refresher courses according to the necessary competences (4.2.1)

Table 3: HP Arguments, related HP issues and benefits, and proposed HP activity



4.3 Step 3 Improve and validate the concept

4.3.1 Description of HP activities conducted

To identify potential HP issues, benefits & impacts relating to the improved Airspace Users' participation - through their Wing Operations Centre (WOC) - into ATM Network Collaborative Processes concept, two preliminary activities were performed: (i) dedicated WebEx and (ii) a HP issue analysis. The dedicated WebEx were conducted from March to May 2019 to identify potential issues relating to the introduction of PJ.07-03 Solution. These took into account also documents produced from previous work conducted by the project team for the V1 and V2 phases of the same concept (e.g. SESAR1 VALP and VALR related to EXE 789 and EXE-07.03-V2 respectively). With regard to the HP issue analysis, during January and May 2019 different interviews, dedicated WebEx and small focus groups were conducted with various subject matter experts to help identify potential issues and impacts that may result from the introduction of this operational concept. The subject matter experts participating in these interviews consisted of the final end users and the actors who have been also involved in the previous validation exercise.

In addition to these preliminary activities,

HP activity	By when
Dedicated WebEx on Network Manager	15 March 2019
V3 Shadow mode validation exercise	20-22 May 2019
Focus group and IFPS operator interview	22 May 2019

Table 4 contains an overview of other relevant HP activities and their priority together with deadlines. As the planned exercise will focus on the planning phase and mainly the evolutions of the NM processing, the focus will be NM actors.

HP activity	By when
Dedicated WebEx on Network Manager	15 March 2019
V3 Shadow mode validation exercise	20-22 May 2019
Focus group and IFPS operator interview	22 May 2019

Table 4: Table of proposed HP activities and their priority

Each of the activities conducted/planned is briefly described in the following tables

ACTIVITY 1.	
Description	Dedicated WebExes

Arguments & issues to be addressed	1.1.1, 1.1.2, 1.1.3, 1.2.1, 1.2.4, 1.3.3, 1.3.5, 2.1.2, 2.2.1, 2.3.1, 3.1.1, 3.2.2, 3.3.5, 4.2.1, 4.5
HP OBJECTIVES	S07-03-SMV3-ARG1.1.1 - S07-03-SMV3-ARG1.1.2 - S07-03-SMV3-ARG1.1.3 - S07-03-SMV3-ARG1.2.1 - S07-03-SMV3-ARG1.2.4 - S07-03-SMV3-ARG1.3.3 - S07-03-SMV3-ARG1.3.5 - S07-03-SMV3-ARG2.1.2 - S07-03-SMV3-ARG2.2.1 - S07-03-SMV3-ARG2.3.1 - S07-03-SMV3-ARG3.1.1 - S07-03-SMV3-ARG3.2.2 - S07-03-SMV3-ARG3.3.5 - S07-03-SMV3-ARG4.2.1 - S07-03-SMV3-ARG4.5
Required Evidence	An initial description of IFPS role and responsibility, tasks and systems has been defined. In particular, for what concern the new operational concept and the management of iOAT FPL and distribution of iSMT.
Tool selected out of the HP repository	Cognitive and Task analysis, focus group, shadow mode trial, direct observations.
Planning and Approach	A description of the activity is provided in the first row of this table.
resources	HP experts, actors/end users involved in the shadow mode trial
timeline	The results of this activity regarding the HP assessment will be reported in the HP report.

Table 5: Description of Activity 1- Dedicated WebEx on NM

ACTIVITY 2	
Description	V3 Shadow mode validation exercise
Arguments & issues to be addressed	1.1.1, 1.1.2, 1.1.3, 1.2.1, 1.2.4, 1.3.3, 1.3.5, 2.1.2, 2.2.1, 2.3.1, 3.1.1, 3.2.2, 3.3.5, 4.2.1, 4.5
HP objectives	S07-03-SMV3-ARG1.1.1 - S07-03-SMV3-ARG1.1.2 - S07-03-SMV3-ARG1.1.3 - S07-03-SMV3-ARG1.2.1 - S07-03-SMV3-ARG1.2.4 - S07-03-SMV3-ARG1.3.3 - S07-03-SMV3-ARG1.3.5 - S07-03-SMV3-ARG2.1.2 - S07-03-SMV3-ARG2.2.1 - S07-03-SMV3-ARG2.3.1 - S07-03-SMV3-ARG3.1.1 - S07-03-SMV3-ARG3.2.2 - S07-03-SMV3-ARG3.3.5 - S07-03-SMV3-ARG4.2.1 - S07-03-SMV3-ARG4.5
Required Evidence	A preliminary HP and HMI assessment of the IFPS operator has been performed in order to evaluate the potential impact of the new operational concept. Some examples have been identified and will be further discussed.
Tool selected out of the HP repository	Focus group, shadow mode trial.
Planning and Approach	The shadow mode trial duration is 2 days and is scheduled on 20-22 May 2019.
resources	HP experts, IFPS operators, actors/end users
timeline	The results of this activity regarding the HP assessment will be reported in the HP report.

Table 6: Description of Activity 2 – V3 Shadow mode validation exercise

ACTIVITY 3	
Description	Focus group and IFPS operator interview
Arguments & issues to be addressed	1.1.1, 1.1.2, 1.1.3, 1.2.1, 1.2.4, 1.3.3, 1.3.5, 2.1.2, 2.2.1, 2.3.1, 3.1.1 , 3.2.2, 3.3.5, 4.2.1, 4.5
HP objectives	S07-03-SMV3-ARG1.1.1 - S07-03-SMV3-ARG1.1.2 - S07-03-SMV3-ARG1.1.3 - S07-03-SMV3-ARG1.2.1 - S07-03-SMV3-ARG1.2.4 - S07-03-SMV3-ARG1.3.3 - S07-03-SMV3-ARG1.3.5 - S07-03-SMV3-ARG2.1.2 - S07-03-SMV3-ARG2.2.1 - S07-03-SMV3-ARG2.3.1 - S07-03-SMV3-ARG3.1.1 - S07-03-SMV3-ARG3.2.2 - S07-03-SMV3-ARG3.3.5 - S07-03-SMV3-ARG4.2.1 - S07-03-SMV3-ARG4.5
Required Evidence	A dedicated half-day has been designed in Bretigny at the end of the shadow mode trial in order to conclude the HP assessment of IFPS operator. This will allow to review/identify new HP issues/benefit, to discuss and analyse the IFPS perspective on the HP issues, to envisage suitable recommendations and requirements.
Tool selected out of the HP repository	Focus group, brainstorming, task analysis
Planning and Approach	The focus group and IFPS interview duration is half day and is scheduled on 22 May 2019.
resources	HP experts, IFPS operators, actors/end users
timeline	The results of this activity regarding the HP assessment will be reported in the HP report.

Table 7: Description of Activity 3: Focus group and IFPS operator interview

4.4 Step 4 Collate findings & conclude on transition to next V-phase

4.4.1 Summary of HP activities results & recommendations / requirements

Table 8 provides a summary of the main results / evidence, status of the HP issue and the HP recommendations / requirements for each of the HP issues/benefits identified from the activities conducted to date, i.e. the focus groups, interviews and validation exercise (see [4]).

The recommendations resulting from the activities conducted are proposed as a potential means to mitigate the HP issues identified relating to the operational concept. It should be noted that the recommendations required additional analysis, that is, refinements and / or validation before they are mature enough to become a requirement.

The requirements are statements that specify the required characteristics of the solution from a HP point of view. HP requirements can be seen as relatively stable and either lead to a redefinition of the operational concept or the specification of the technical solution.

The HP recommendations and requirements fall into one of several classes, among others:

- Technical system and HMI design
- Training of end user

In addition, HP recommendations can relate to test and validation activities that need to be conducted in later V phases in order to investigate issues/benefits and potential mitigation in more detail.

Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
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Arg. 1.1.1: The description of roles & responsibilities cover all affected human actors.

S07-03-SMV3-ARG1.1.1	Not all human actors impacted by the new operational concept are identified	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. Description of roles and responsibilities likely to be impacted by the change has been established to contain all affected human actors.	N/A	
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Arg. 1.1.2: The description of roles & responsibilities cover all tasks to be performed by a human actor.

S07-03-SMV3-ARG1.1.2	The description of roles & responsibilities doesn't cover all tasks to be performed by a human actor.	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. For each human actor likely to be affected by the change, the description of roles and responsibilities and tasks has been established.	N/A	
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Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
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Arg. 1.1.3: Roles and responsibilities are clear and consistent (in V1: non-contradictory).

S07-03-SMV3-ARG1.1.3	Neither roles nor responsibilities are clear and consistent.	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. Roles & responsibilities have been determined to be clear and consistent by end users and linguistic experts.	N/A	
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Arg. 1.2.1: Operating methods don't cover operations in normal operating conditions.

S07-03-SMV3-ARG1.2.1	Operating methods don't cover operations in normal operating conditions.	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. Operating methods are found to cover identified normal operating conditions.	N/A	
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Arg. 1.2.4: The content of operating methods isn't clear and consistent.

Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
S07-03-SMV3-ARG1.2.4	The content of operating methods isn't clear and consistent.	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. The content of the operating methods has been determined to be clear and consistent by end users and native speakers/linguistic experts.	N/A	
Arg. 1.3.3: The level of workload (induced by cognitive and/or physical task demands) isn't acceptable.							
S07-03-SMV3-ARG1.3.3	The level of workload (induced by cognitive and/or physical task demands) isn't acceptable.	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. The potential changes to the level of workload/task demands and the preliminary mitigation identified are acceptable (acceptable can be defined based on end users opinion and	N/A	

Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
					good HF practice relating to workload).		
Arg. 1.3.5: Human actors cannot maintain a sufficient level of situation awareness.							
S07-03-SMV3-ARG1.3.5	Human actors cannot maintain a sufficient level of situation awareness.	Closed	OBJ-VALST2-HP.001	Shadow mode trial, observations, focus group	V3. Level of situational awareness within acceptable limits ('acceptable limits' to be defined with regard to the tool used for the assessment).	N/A	
Arg. 2.1.2: Changes to the task allocation between human and machine support human performance.							
S07-03-SMV3-ARG2.1.2	Changes to the task allocation between human and machine don't support human performance.	Closed	OBJ-VALST2-HP.002	Shadow mode trial, observations, focus group	V3. The task allocation is consistent with deliverable of 16.5.2.	N/A	

Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
Arg. 2.2.1: The accuracy and timeliness of information provided by the system is adequate for carrying out the task.							
S07-03-SMV3-ARG2.2.1	The accuracy of information provided by the system is inadequate for carrying out the task	Closed	OBJ-VALST2-HP.002	Shadow mode trial, observations, focus group	V3. The system output is in line with the information needs of the human.	N/A	
Arg. 2.3.1: The type of information provided satisfies the information requirements of the human.							
S07-03-SMV3-ARG2.3.1	The type of information provided doesn't satisfy the information requirements of the IFPS operator.	Closed	OBJ-VALST2-HP.002	Shadow mode trial, observations, focus group	V3. Information provided allows task achievement.	N/A	
Arg. 3.1.1: Changes to existing roles in the team are identified (including roles that become obsolete).							
S07-03-SMV3-ARG3.1.1	Changes to existing roles in the team are identified	Closed	OBJ-VALST2-HP.003	Shadow mode trial, observations, focus group	V3. Affected (or potentially affected) actors are identified.	N/A	

Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
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Arg. 3.2.2: The proposed task allocation between human actors is supported by technical systems/the HMI.

S07-03-SMV3-ARG3.2.2	The proposed task allocation between human actors isn't supported by technical system.	Closed	OBJ-VALST2-HP.003	Shadow mode trial, observations, focus group	V3. Usability is judged as sufficient.	N/A	
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Arg. 3.3.5: Team members can maintain a sufficient level of shared situation awareness.

S07-03-SMV3-ARG3.3.5	Team members cannot maintain a sufficient level of shared situation awareness	Open	OBJ-VALST2-HP.003	Shadow mode trial, observations, focus group	V3. Level of team situational awareness within acceptable limits ('acceptable limits' to be defined with regard to the tool used for the assessment).	WOC-IFPS operators_ Team SA_Recom_1	
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Arg. 4.2.1: Knowledge, skill and experience requirements for human actors have been identified.

Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
S07-03-SMV3-ARG4.2.1	<i>Knowledge, skill and experience requirements for the WOC operators have been identified. Indeed, once the new operational concept will be put in place, the IFPS operator will need to acquire the necessary competences to manage all the process.</i>	Open	OBJ-VALST2-HP.004	Shadow mode trial, observations, focus group	V3. Knowledge, skill and experience requirements are identified/consolidated.	WOC-IFPS operators_Knowledge and skills_Recom_2	

Arg. 4.5: Training needs are identified for affected human actors. (V3 only)

S07-03-SMV3-ARG4.5	For each new operator (i.e. WOC, FDO, IFPS, civil/military ATCOs) specific training or refresher courses are needed. New operators (i.e. WOC, FDO, civil/military ATCOs) need to have specific license	Open	OBJ-VALST2-HP.004	Shadow mode trial, observations, focus group	V3. Knowledge, skill and experience requirements are identified/consolidated.	WOC-IFPS operators_Training_Recom_3	
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Issue ID	HP issue / Benefit	HP Issue/ Benefit Status	HP/ Valid. Obj. ID	activity conducted	results / evidence	recommendations	requirements
	for dealing with the new system and the improved FPL format						

Table 8: Summary of the HP results and recommendations/ requirements for each identified issue & related argument



4.4.2 Maturity of the Solution

The HP maturity criteria checklist for transition from initial V3 to V3 was used to determine the HP maturity of the operational concept following the HP related activities conducted to date (see table below). The checklist was completed based on the activities conducted and the evidence collected to date, as described in Table 8.

Maturity checklist for finalising the V3 assessment

ID	Question	Answer	Comments
		<i>Fill in 'yes' or 'no'.</i>	<i>Please substantiate your answer.</i>
1	Has a Human Performance Assessment Report been completed? Have all relevant arguments been addressed and appropriately supported?	yes	Yes. All the 11 HP issues have been addressed and, for each, a specific recommendation and/or requirement has been identified and properly reported in the HP report as well as in the Recommendations and Requirements Register respectively.
2	Are the benefits and issues in terms of human performance and operability related to the proposed solution sufficiently assessed (i.e. on the level required for V3)?	yes	Yes. The focus of the validation activities, namely real time simulations/shadow mode trial to date has been the WOC, IFPS operators and ATCOs role which are the main actors impacted by the concept. Potential issues identified that impact other actors (such as the ground staff, pilots, technical engineers) have been discussed to some degree and where possible mitigation identified.
3	Have all the parts of the solution/concept been considered?	Yes*	The focus of this exercise was on the Short term planning phase covering WOC-NM-ATC roles and the aspects related to direct flight data exchanges between WOC and ATC for iRMT revision were not covered. Furthermore, this exercise just covered the technical feasibility to introduce iOAT FPLs in regional and sub-regional/local ATFCM systems; i.e. ETFMS and FMP/TCM. This is considered sufficient for the scope of solution PJ.07-03 “Sharing mission trajectory data with NM and ATC via an improved OAT Flight Plan (iOAT FPL)”. The concept of the operational use in this area (in particular during the execution phase) is not yet available/developed by

			CONOPS or OSED between NM & ANSP. This is the scope for future V3 activities in Wave 2
4	Have potential interactions with related projects/concepts been considered and addressed?	yes	Yes. The PJ.07 Optimized Airspace Users Operations project will include further evolution of the Airspace Users ATM processes and tools developed in SESAR1 in projects 07.06.04, 07.06.02 and WP11.1. Those SESAR1 projects have established the basis for sharing more information (e.g. preferences) at planning phase between Flight/Wing Operations Centres and ATM stakeholders through the use of the Extended Flight Plan (EFPL) and the improved OAT Flight Plan (iOAT FPL). For the User Driven Prioritization Process (UDPP), Airspace Users have defined methods beyond slot swapping to protect important flights in capacity constraints. The co-definition and validation by Airspace Users and ATM stakeholders of the additional information in future trajectories and how it should be used (trajectory management processes), as well as the integration of UDPP within the trajectory management processes and the Demand Capacity Balancing (DCB) processes are the objectives of PJ07 with PJ18 and PJ09. UDPP validation started in SESAR1 will be completed in PJ07 in collaboration with the ATM stakeholders in PJ09 and PJ04. For any further details about the reference scenario, please refer to chapter 3.3.1 of the SPR-INTEROP/OSED.
5	Is the level of human performance needed to achieve the desired system performance for the proposed solution consistent with human capabilities?	yes	Yes. See "Issue-Objective-Outcome" HP Log sheet
6	Are the assessments results in line with what is targeted for that concept? If not, has	yes	Yes. See "Issue-Objective-Outcome" HP Log sheet

	the impact on the overall strategic performance objectives/targets been analysed?		
7	Has the proposed solution been tested with end-users and under sufficiently realistic conditions, including abnormal and degraded conditions?	no	In this exercise no end-users were involved in and not abnormal and degraded conditions were tested. Recommendation to include this during the industrialization activities.
8	Do validation results confirm that the interactions between human and technology are operationally feasible, and consistent with agreed human performance requirements?	yes	Yes. See "Issue-Objective-Outcome" HP Log sheet - Arguments addressed and associated actual evidence - Outcomes of the validation exercises
9	Have all relevant SESAR documentation been updated according to the HP activities outcomes (OSED, SPR)?	yes	Yes
10	Do the outcomes satisfy the HP issues/benefits in order to reach the expected KPA?	yes	Yes
11	Have HP recommendations and HP requirements correctly been considered in HMI design, procedures/documentation and training?	yes	Yes. See "Recommendation Register" HP Log sheet

12	Have the major factors that can influence the transition feasibility (e.g. changes in competence requirements, recruitment and selection, training needs, staffing requirements, and relocation of the workforce) been addressed? Are there any ideas on how to overcome any issues?	yes	Yes. See "Recommendation Register" HP Log sheet
13	Have any impacts been identified that may require changes to regulation in the area of HP/ATM? This includes changes in roles & responsibilities, competence requirements, or the task allocation between human & machine.	N/A	
14	Has the next V-phase sufficiently been prepared (additional testing conditions, open HP issues to be addressed)?	yes	Yes. Where appropriate recommended activities to be conducted in the future in V3 have been identified (see HP Log and Recommendations register)

Table 9: Maturity checklist for finalising the initial V3 assessment

From the completion of the HP maturity criteria checklist for transition from initial V3 to V3 which is based on the ‘evidence’ obtained from the HP related validation activities conducted within SESAR PJ07.03 it can be concluded that the operational concept tested in the validation exercises has reached the V3 level of HP maturity for the scope of solution PJ.07-03 as defined in the contextual note (i.e., focused on the planning phase) and **satisfies the transition criteria to start full V3 validation** for the rest of the elements (i.e., focused on the execution phase).

5 References

- [1] 16.04.01 Evolution from the ATM HF case to a HP Case Methodology for SESAR, HP assessment process for projects in V1, V2 or V3. D10-001, 00.01.00
- [2] PJ.07-03 SPR-INTEROP/OSED for V3, D4.2, Edition 00.03.01-Draft, 15 August 2019
- [3] PJ.07-03 Validation Plan (VALP) for V3 - Part I, D4.2, Edition 00.00.06, 31 July 2019
- [4] PJ.07-03 Validation Report (VALR) for V3 - Part I (under preparation)

Appendix A – HP Recommendations Register

HP Recommendations Register									
Reference Recommendation number	Type of recommendation	Recommendation	Rationale	Assessment source + Reference report	Scope	Concept/solution	Recommendation status	Rationale in case of rejection	Comments
WOC-IFPS operators_Team SA_Recom_1	Training	It is recommended to ensure the same level of SA and familiarity with the operational concept for all the involved stakeholders (e.g. WOC, IFPS operators and	It is more the operational concept (ARES, VPA, exemption policy etc), the unfamiliarity with military flight plans and military needs for (some) IFPS and ATC etc. and for the WOC the unfamiliarity with the civil ATM network rules (RAD)	Shadow mode trial, observations, focus group	Air/Ground	SOL07-03	Accepted		



HP Recommendations Register									
Reference Recommendation number	Type of recommendation	Recommendation	Rationale	Assessment source + Reference report	Scope	Concept/solution	Recommendation status	Rationale in case of rejection	Comments
		civil/military ATCOs)	which makes training necessary.						
WOC-IFPS operators_Knowledge and skills_Recom_2	Training	It is recommended to define an adequate training before the implementation of the operational concept in order to ensure the necessary knowledge	Team members cannot maintain a sufficient level of shared situation awareness	Shadow mode trial, observations, focus group	Air/Ground	SOL07-03	Accepted		





HP Recommendations Register									
Reference Recommendation number	Type of recommendation	Recommendation	Rationale	Assessment source + Reference report	Scope	Concept/solution	Recommendation status	Rationale in case of rejection	Comments
		and skills to properly deal with it for all the involved stakeholders (e.g. WOC, IFPS operators and civil/military ATCOs)							
WOC-IFPS operators_Training_Recom_3	Training	It is recommended to define an adequate duration and types of the	Knowledge, skill and experience requirements for the WOC operators	Shadow mode trial, observati	Air/Ground	SOL07-03	Accepted		





HP Recommendations Register									
Reference Recommendation number	Type of recommendation	Recommendation	Rationale	Assessment source + Reference report	Scope	Concept/solution	Recommendation status	Rationale in case of rejection	Comments
		training for each group of actors (e.g. WOC, IFPS operators and civil/military ATCOs) before the integration of the operational concept and as well as related types of licences	have been identified. Indeed, once the new operational concept will be put in place, the IFPS/WOC operator will need to acquire the necessary competences to manage all the process.	ons, focus group					

Table 10: HP recommendations

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Appendix B – HP Requirements Register

HP Requirements Register									
Reference	Type of requirement	Requirement	Rationale	Assessment source + Reference report if available	Scope (Air, Air/Ground, Ground)	Concept/solution Involved	Requirement status	Rationale in case of rejection	Comments

Table 11: HP Requirements



Appendix C – HP Log



HP Log T4-D2 Initial
V3 HP report draft.xls

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