



SESAR Solution 02-05 SPR/INTEROP-OSED for V3 - Part IV - Human Performance Assessment Report

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EARTH

EARTH - ENHANCED RUNWAY THROUGHPUT

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Abstract

This document contains the Human Performance (HP) assessment report for the Solution 02-05, 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 phase.

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1 Executive Summary

Solution PJ.02-05 addresses operational concepts which allow the implementation of the Simultaneous-non-Interfering (SNI) Operations for rotorcraft aimed to increase the Airport Performance using independent IFR rotorcraft procedures to/from a FATO (Standard/Advanced Point In Space procedures). Furthermore, the Solution 02-05 addresses **additionally** the applicability of PinS designing criteria to specific rotorcraft operations GBAS technologies based.

The Solution evaluates also the use of a combined SBAS (CAT I) procedures with Radius to Fix legs (RF) and Synthetic Vision System (SVS) for evaluating the possibility to reduce the approach minima value of the procedures, increasing pilot situational awareness and safety meanwhile reducing ATCO's and Pilot's workload.

2 Introduction

2.1 Purpose of the document

This document provides the Human Performance Assessment Report for SESAR Solution PJ02-05 for the V3 phase. It describes the results of Real Time Simulations and Live Flight Trials defined in the Validation Plan and provides a set of relevant conclusions, requirements and recommendations.

2.2 Intended readership

The members of solutions within PJ.02 EARTH - EnhAnced Runway THroughput

The members of the following solutions within S2020:

PJ.01-06	Enhanced Rotorcraft and GA operations in the TMA
PJ.14-03-01	GBAS
EHA	European Helicopter Association
PJ22	Validation and Demonstration Engineering;
PJ19	Content Integration;

2.3 Scope of the document

This document constitutes the Part IV of SPR-INTEROP/OSED and describes some result achieved during the validation activities conducted according to the HP Assessment Process and perform the Human Performance Assessment for Solution PJ.02-05 aimed to V3 maturity level in Sesar 2020 Wave 1.

2.4 Human performance work schedule within the Solution

This HP assessment Report covers the 4 steps of the HP assessment process for the Solution 02-05 for V3. It covers the following OI Steps:

- AO-0316 - Increased Airport Performance through Independent (parallel or convergent) IFR Rotorcraft Operations.

It should also be noted that PJ.02-05 work might also contribute to mature the OI AOM-0104-B which is led by PJ.01-06.

The HP assessment plan and the HP assessment process addressed by this document will consider those personnel whose work is directly affected by the introduction of the Solution 02-05 concept, namely TWR and APP Controllers, Clearance Delivery Controller, Supervisors and Apron Managers. The

impact on en-route controllers and aircraft operators is not considered, as it is assumed that there is no change compared to the baseline scenario.

2.5 Structure of the document

- **Section 1 Executive Summary:** provides a summary of the key information and elements contained in the document.
- **Section 2 Introduction:** presents the purpose and scope of the document, the intended audience, the scope of the document, the Human Performance work schedule and the main acronyms and terminology used throughout the document.
- **Section 3 Human Performance Assessment Process:** Provides a description of the Human Performance assessment methodology which main steps to be covered during the activities.
- **Section 4 Human Performance Assessment:** Provides a Step 1 and Step 2 description and details.
- **Section 5 References:** Applicable references identifies the documents (name, reference, source project) this sub-part of the VALP must comply to or uses as additional inputs to design the Human Assessment Plan.

2.6 Acronyms and Terminology

Term	Description
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 Solutions into larger clusters (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 be 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 workplace) 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.
PinS	Point in Space is an approach procedure designed for helicopters only that includes both a visual and an instrument segment
SNI- Simultaneous Non-Interfering	The SNI is a concept describing the way simultaneous non-interfering procedures must be defined and executed to ensure the different traffic streams do not interfere with each other. This concept is mainly specified for fixed wing traffic. In this document, the focus of this concept is set on separating fixed-wing traffic from rotary-wing traffic, namely the SNI concept specific for Rotorcraft/ATCO operation. The simultaneous non-interfering procedure for rotorcraft ensures, throughout the whole procedure and especially about the final approach segment as well as the missed approach segment, it does not cause interference in terms of observing and (re)scheduling and separating fixed-wing traffic from rotary-wing traffic by the Air Traffic Controller (ATCO)

Table 1: Acronyms and terminology

3 The Human Performance Assessment Process: Objective and Approach

The purpose of the HP assessment process concerned is to ensure that HP aspects related to SESAR2020 technical and operational developments are systematically identified and managed. 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.

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, a 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 updated and/or added to as the Solution progresses

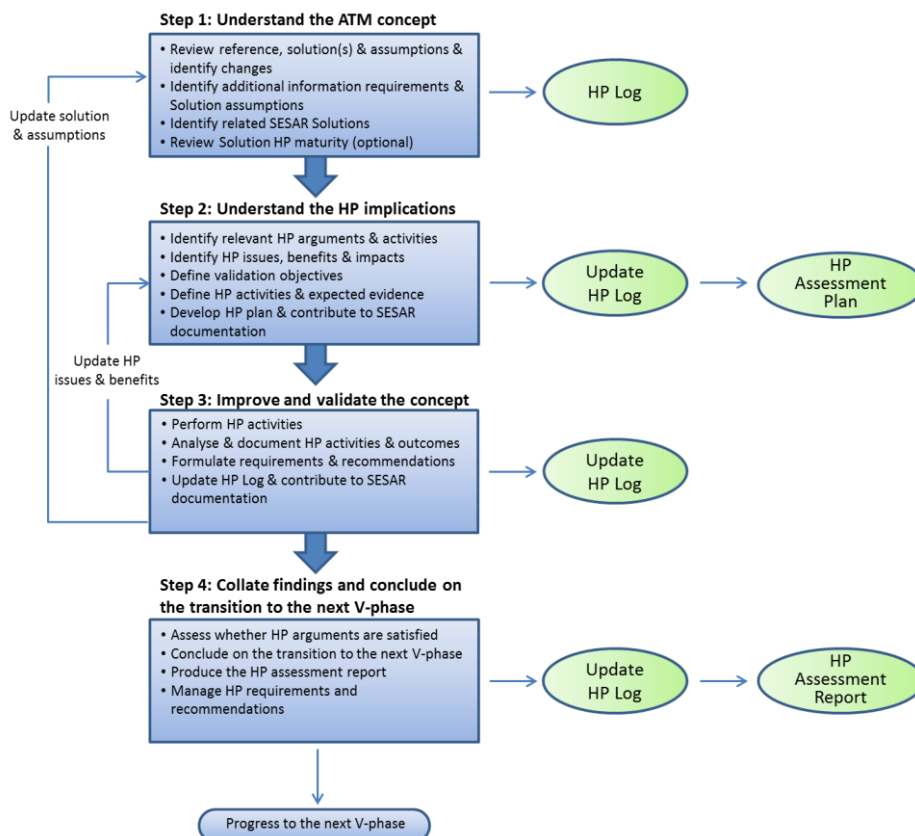


Figure 1: Steps of the HP assessment process

4 Human Performance Assessment

4.1 Step 1 Understand the ATM concept

4.1.1 Description of reference scenario

The Solution Reference Scenario focused on current rotorcraft operations that are not allowed to approach/depart to/from an airport under IFR rules. In most of European airports, the rotorcraft are allowed to taking-off/landing from/to an airport only under VFR rules (or VFR special) and using the runway. Thus, if allowed, a Rotorcraft which intends to approach/depart to/from a European airport must use the runway and its ILS procedures, often specifically designed for high performance fixed-wing aircraft.

This impacts on the access and equity to an airport and drastically limit the Rotorcraft Airspace Users, obliged to fly longer procedures and wait long time before cleared to landing (e.g. priority is usually given to the fixed wing Commercial airlines).

Further information, related to the overall *previous operating method* process, can be found in Section § 3.3.1 of the PJ.02-05 SPR-INTEROP/OSED Part I V3 [6].

4.1.2 Description of solution scenario

Nowadays, thanks to the GNSS technology, it's possible to design an operational environment made up of IFR procedures "SBAS based" and purposely designed for rotorcraft as the PinS Point in Space procedures.

Based on the above, the Solution Scenario focused on the introduction of enhanced IFR approach/departure procedure tailored to the rotorcraft. These procedures allow rotorcraft to approach/depart to/from a dedicated landing location defined as FATO (Final Approach Take Off area). As well, in the context of the Solution 02-05, specific designing criteria, widely explored by ICAO (e.g. PANS OPS DOC8168, ICAO DOC9643 SOIR for parallel/near-parallel approach),

As well, in the context of the Solution 02-05, specific designing criteria, widely explored by ICAO (e.g. PANS OPS DOC8168, ICAO DOC9643 SOIR for parallel/near-parallel approach), were taken into consideration to develop new Rotorcraft procedures which enable SNI operations (Simultaneous Non-Interfering) at airport. These procedures are known as SNI Point-In-Space approach/Departure procedures. These procedures are SBAS based and the Required Performance Navigation, considered for whole procedure, was RNPO.3 (e.g. Initial, Intermediate, Final segments and Missed Approach Segments as well).

Further information, related to the overall new operating method process, can be found in Section § 3.3.2 of the PJ.02-05 SPR-INTEROP/OSED Part I V3 [6].

Specifically, the Solution Scenarios assessed during the Validation activities (e.g. Real Time Simulations and in Live Flight Trial) are shown in the following tables:

Scenario	Sectors involved	Airports	Runways / FATO in use	Special Operational Procedures for Rotorcraft
Solution Scenario	LIMMANW	LIMC	Fixed wing	TO/FROM FATO (LILK): Rotorcraft will carry out the PinS procedures RNP310, RNP320 and RNP350 to the FATO based on SNI (Simultaneous Non-Interfering Operations);
	LIMMANE		ARR: RWY 35L	
	LIMMASW		Rotorcraft (LIMC / Cascina Costa - LILK)	
			ARR: FATO	
			DEP: FATO	

Table 2: Solution Scenario – RTS#2 and RTS#3

Scenario	Sectors involved	Airports	Runways / FATO in use	Special Operational Procedures for Rotorcraft
Solution Scenario	LIMMANW	LIMC	Fixed wing	TO/FROM FATO (LILK): Rotorcraft will carry out the PinS procedure RNP350X, RNP350Y, RNP350W and RNP350Z to the FATO based on SNI (Simultaneous Non-Interfering Operations);
	LIMMANE		ARR: RWY 35L	
	LIMMASW		Rotorcraft (LIMC / Cascina Costa - LILK)	
			ARR: FATO	
			DEP: FATO	

Table 3: Solution Scenario – LT#4

4.1.3 Consolidated list of assumptions

A consolidated list of assumption can be found in the core text of the PJ.02-05 Validation Report [7].

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

No Dependencies-IN were identified for the Solution 02-05. Vice versa, the work done in the context of the Solution 02-05 can positively contribute to the following Solutions that will surely benefit from the findings achieved within the PJ.02-05:

- PJ.01-06 - Enhanced Rotorcraft and GA operations in the TMA and
- PJ.14-03-01 - GBAS.

4.1.5 Identification of the nature of the change

HP argument branch	Change & affected actors
1. ROLES & RESPONSIBILITIES	
1.1 ROLES & RESPONSIBILITIES	<p>Changes in roles and the responsibilities have not been foreseen. In fact, the approach phases haven't been changed compared to procedures flown today.</p>
1.2 OPERATING METHODS	<p>The operating method will change thanks to GNSS technology that let involved actors to have:</p> <ul style="list-style-type: none"> ● Combined SBAS (CAT I) procedures with Radius to Fix legs (RF) and Synthetic Vision System (SVS); <p>To achieve Simultaneous Non-Interfering (SNI) operations and facilitate the integration of rotorcraft operations with fixed wing operations in the future ATM environment.</p>
1.3 TASKS	<p>The tasks of air traffic controllers and flight crews are the actual ones.</p> <p>Air traffic controllers must provide:</p> <ul style="list-style-type: none"> ● the separation minima between the integrated traffic of rotorcrafts and fixed wings, ● monitor/manage the mixed traffics ● route clearances, ● information about the guidance system status. <p>The flight crew of helicopter, in this case, must:</p> <ul style="list-style-type: none"> ● adhere to route clearances, ● adhere to minimum altitudes and heights allowed by the helicopter features, ● consult rotorcraft systems and sub-systems, ● perform a proper crew briefing.
2. HUMAN & SYSTEM	
2.1 ALLOCATION OF TASKS (HUMAN & SYSTEM)	<p>No changes in allocation of tasks have been foreseen.</p>

2.2 PERFORMANCE OF TECHNICAL SYSTEM	<p>Changes about performance of technical system hasn't been foreseen.</p> <p>Controllers are provided with conventional technical system, so no change has been foreseen.</p> <p>Furthermore, controllers in the future might be provided with additional tools so that be supported in the Conflict Detection to manage the Separation of the traffic.</p> <p>The performance of technical system about the flight crew is not supposed to change even if the airborne acquires new devices (e.g. GNSS/SBAS receiver).</p>
2.3 HUMAN – MACHINE INTERFACE	The display/HMI changes haven't been foreseen.
3. TEAMS & COMMUNICATION	
3.1 TEAM COMPOSITION	Changes in team composition haven't been foreseen.
3.2 ALLOCATION OF TASKS	The allocation of tasks changes hasn't been foreseen.
3.3 COMMUNICATION	Concerning the exchanges and communication between air traffic controllers and flight crew, no specific changes have been considered in respect to the conventional working methods.
4. HP RELATED TRANSITION FACTORS	
4.1 ACCEPTANCE & JOB SATISFACTION	The proposed procedures will enhance acceptance and job satisfaction thanks to the possibility to manage different type of operations without changing the current procedures flown.
4.2 COMPETENCE REQUIREMENTS	Changes in competence requirements have not been foreseen.
4.3 STAFFING REQUIREMENTS & STAFFING LEVELS	Changes in staffing requirements and staffing level have not been foreseen.

Table 4: 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

Arg.	HP issue / Benefit	HP/Valid. Obj. ID	HP validation objective	Recommended activity/ies
1.2.5	<p>The new operating methods may lead to one of the following situations:</p> <p>(i) Controllers follow the prescribed operating methods but with a negative impact on HP (additional workload and stress, lack of trust in the system, increased potential for errors);</p> <p>(ii) Controllers don't follow the prescribed operating methods, drifting from standard procedures in a variable way, with a negative impact on HP (loss of shared situation awareness, increased potential for errors),</p>	OBJ-02-05-V3-VALP-HPAP-001	To assess that new operating methods proposed by the solution can be followed in an accurate, efficient and timely manner with no negative impact on HP and acceptable limits of potential errors.	RTS Live Trials
1.3.3	The proposed solution of combined SBAS (CAT I) procedures with Radius to Fix legs (RF) and Synthetic Vision System (SVS) will reduce the approach minima value of the procedure, increasing pilot situational awareness and maintaining acceptable the ATCOs' and pilot's workload level.	OBJ-02-05-V3-VALP-HPAP-002	To assess if the proposed solution of combined SBAS (CAT I) procedures with Radius to Fix legs (RF) and Synthetic Vision System (SVS) will reduce the approach minima value of the procedure, increasing pilot situational awareness and maintaining	RTS Live Trials

Arg.	HP issue / Benefit	HP/Valid. Obj. ID	HP validation objective	Recommended activity/ies
			acceptable the ATCOs' and pilot's workload level.	
1.3.5	The proposed solution is expected to keep an acceptable level of situational awareness (individual and team) thanks to Simultaneous-non-Interfering (SNI) Operations.	OBJ-02-05-V3-VALP-HPAP-003	To assess that the level of individual and team situational awareness is acceptable thanks to Simultaneous-non-Interfering (SNI) Operations.	RTS Live Trials
2.1.5	The proposed solution addresses additionally the applicability of PinS designing criteria to specific rotorcraft operations and other GBAS technologies based that will be consistent with the operator's task demands.	OBJ-02-05-V3-VALP-HPAP-004	To assess if the performance of technical system based on GNSS technologies is consistent with the operator's task demands.	RTS Live Trials
3.3.1	The proposed solution will not change the intra-team and inter-team communication.	OBJ-02-05-V3-VALP-HPAP-005	To assess that proposed procedures will not change the intra-team and inter-team communication and so these support the information requirements of team members.	RTS Live Trials
3.3.5	The proposed solution is expected to maintain sufficient human actors shared situation awareness on traffic.	OBJ-02-05-V3-VALP-HPAP-006		RTS Live Trials



Arg.	HP issue / Benefit	HP/Valid. Obj. ID	HP validation objective	Recommended activity/ies
4.1.2	The impact of changes due to the proposed solution on job satisfaction of affected human actors will be no negative.	OBJ-02-05-V3-VALP-HPAP-007	To assess the impact of changes due to the proposed solution on job satisfaction of affected human actors will be no negative.	RTS Live Trials

Table 5: Description of the change



4.3 Step 3 Improve and validate the concept

4.3.1 Description of HP activities conducted

This section provides a summary of activity conducted within V3 phase to identify HP issues, benefits and impacts.

HP activity	By when
RTS	2018
Live Trials	2019

Table 6: Table of proposed HP activities and their priority

Activity 1.	RTS
Description	RTS will ensure that appropriate evidence will be provided to support HP arguments and claims for investigated solutions, focusing on the solutions impact in terms of Situation Awareness, Cognitive Workload, Trust and Confidence as well as gathering feedbacks about System Utility and Usability: –
Arguments & related issues addressed	1.2.5: Operating methods can be followed in an accurate, efficient and timely manner. 1.3.3: The level of workload (induced by cognitive and/or physical task demands) is acceptable. 1.3.5: Human actors can maintain a sufficient level of situation awareness. 2.1.5: Human actors can acquire an adequate mental model of the machine and its automated functions. 3.3.1: Intra-team and inter-team communication supports the information requirements of team members. 3.3.5: Team members can maintain a sufficient level of shared situation awareness. 4.1.2: The impact of changes on the job satisfaction of affected human actors has been considered.
HP objectives	

Required Evidence	ATCOs' and Pilot's feedback provided via questionnaires, debriefings. HF, ATM experts feedback provided via over the shoulder observations.
Tool selected out of the HP repository	Post Run Questionnaire, Post Simulation Questionnaire, Over the Shoulder Observation Checklist, Debriefing Agenda Topics prepared ad hoc to address the specific exercise objectives and related success criteria.
Planning and Approach	Situational awareness assessment involves the following steps: <ul style="list-style-type: none"> – Validation planning, development of HP objectives and associated scenario and measurement recommendations. – Attendance at simulation exercises. – Post-exercise data analysis – Report contribution.
Timeline	From Thu 05/10/17 to Fri 22/06/18

Table 7: Description of Activity 1 - RTS

ACTIVITY 2.	LIVE TRIAL
Description	Operational Trial will ensure that appropriate evidence will be provided to support HP arguments and claims for investigated solutions, focusing on the solutions impact in terms of Situational Awareness, Cognitive Workload, Acceptability as well as gathering feedbacks about HMI Usability.
Related Arguments	<p>1.2.5: Operating methods can be followed in an accurate, efficient and timely manner.</p> <p>1.3.3: The level of workload (induced by cognitive and/or physical task demands) is acceptable.</p> <p>1.3.5: Human actors can maintain a sufficient level of situation awareness.</p> <p>2.1.5: Human actors can acquire an adequate mental model of the machine and its automated functions.</p> <p>3.3.1: Intra-team and inter-team communication supports the information requirements of team members.</p> <p>3.3.5: Team members can maintain a sufficient level of shared situation awareness.</p>

	4.1.2: The impact of changes on the job satisfaction of affected human actors has been considered.
HP objectives	OBJ-02-05-V3-VALP-HPAP-007
Required Evidence	ATCOs' and Pilot's feedback provided via questionnaires, debriefings. HF, ATM experts feedback provided via over the shoulder observations.
Tools/Methods selected out of the hp repository	Post Run Questionnaire, Post Simulation Questionnaire, Over The Shoulder Observation Checklist, Debriefing Agenda Topics prepared ad hoc to address the specific exercise objectives and related success criteria.
Timeline	From Mon 02/07/18 to Fri 31/05/19

Table 8: Description of Activity 2 – Live Trial



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

4.4.1 Summary of HP activities results & recommendations / requirements

The Table 9 below, provides a summary of the HP argument and related issues/benefits along with the HP activities conducted during the V3 validation phase. It reports on the outcomes of HP issues that were included into the V3 HP assessment plan. For each argument and issue/benefit the results/evidence obtained from the activities conducted are briefly described along with the recommendations and/or requirements generated.

The status of each HP issue is also given. The status of an issue/benefit can either be 'closed', 'open', 'cancelled': An issue is considered 'closed' when the issue had been sufficiently answered or no additional activities relating to that issue are foreseen as necessary; An issue is considered as being 'open' when the issue has been either: partially addressed and more studies are needed or; the issue had been addressed by certain activities but as a result other related issues had arisen or; when no activity has been performed to date to address a specific issue. An issue is considered as being 'cancelled' when the activities conducted have shown the issue to be not relevant to the given concept under investigation.

The HP recommendations and requirements fall into one of several categories:

- System design
- OPS (operating methods / procedures)
- New objective
- Training
- Other



In addition, HP recommendations can relate to test and validation activities that need to be conducted in the next phase 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. 1.2.5: Operating methods can be followed in an accurate, efficient and timely manner.

	The new operating methods may lead to one of the following situations: (i) Controllers follow the prescribed operating methods but with a negative impact on HP (additional workload and stress, lack of trust in the system, increased potential for errors); (ii) Controllers don't follow the prescribed operating methods, drifting	Closed	OBJ-02-05-V3-VALP-HPAP-001	RTS LFT	The ATCOs affirm that the new operating methods proposed by solution and related RNP procedures can be followed and allow to accomplish their tasks within acceptable level of accuracy and efficiency. Furthermore, these new procedures needed a further refinement.	It is recommended that the RNP procedures will show missed approach segment when necessary, adding the missed approach branch through an activating button.	No requirements identify for this objective.
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<p>from standard procedures in a variable way, with a negative impact on HP (loss of shared situation awareness, increased potential for errors).</p>						
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Arg. 1.3.3: The level of workload (induced by cognitive and/or physical task demands) is acceptable.

<p>The proposed solution of combined SBAS (CAT I) procedures with Radius to Fix legs (RF) and Synthetic Vision System (SVS) will reduce the approach minima value of the procedure, increasing pilot situational</p>	<p>Closed</p>	<p>OBJ-02-05-V3-VALP-HPAP-002</p>	<p>RTS LFT</p>	<p>According to ATCOs perspective situational awareness and workload levels, gathered during runs execution and Live Flight Trials, are very positive compared to maturity level inducing further developments of solution to enhance potential benefits.</p>	<p>No recommendations identify for this objective.</p>	<p>No requirements identify for this objective.</p>
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awareness and maintaining acceptable the ATCOs' and pilot's workload level.							
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Arg. 1.3.5: Human actors can maintain a sufficient level of situation awareness.

The proposed solution is expected to keep an acceptable level of situational awareness (individual and team) thanks to Simultaneous-non-Interfering (SNI) Operations.	Closed	OBJ-02-05-V3-VALP-HPAP-003	RTS LFT	Actors involved highlight that the Simultaneous Non-Interfering operations could be increase individual and team situational awareness but needed further refinements.	It is recommended that the tower RADAR display should be visualize the procedure to increase ATCOs situational awareness.	The RADAR display shall be providing the clear information on procedures track about the R/C position.
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Arg. 2.1.5: Human actors can acquire an adequate mental model of the machine and its automated functions.

The proposed solution addresses the applicability of PinS designing	Closed	OBJ-02-05-V3-VALP-HPAP-004	RTS LFT	The new operating methods proposed by the solution, related RNP procedures based	No recommendations identify for this objective.	No requirements identify for this objective.
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<p>criteria to specific rotorcraft operations and other GBAS technologies based that will be consistent with the operator's task demands.</p>				<p>on GNSS technologies allow ATCOs to accomplish their tasks within acceptable levels of attention and effort.</p>		
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Arg. 3.3.1: Intra-team and inter-team communication supports the information requirements of team members.

<p>The proposed solution will not change the intra-team and inter-team communication.</p>	<p>Closed</p>	<p>OBJ-02-05-V3-VALP-HPAP-005</p>	<p>RTS LFT</p>	<p>Feedback gathered during the RTS and Live Flight Trial related to inter and intra-team cooperation that is intended to be also in terms of communication has positive impact on the actors involved. The new tested procedures not showed change the intra-team and inter-team communication and so these support the</p>	<p>No recommendations identify for this objective.</p>	<p>No requirements identify for this objective.</p>
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					information requirements of team members.		
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Arg. 3.3.5: Team members can maintain a sufficient level of shared situation awareness.

The proposed solution is expected to maintain sufficient human actors shared situation awareness on traffic.	Closed	OBJ-02-05-V3-VALP-HPAP-006	RTS LFT	The ATCOs and Pilots affirmed that proposed procedures are maintain to sufficient shared situation awareness on traffic.	It is recommended should be to have a decision high of 200 ft and a Rotorcraft inbound distance of 2,5 NM at least;	The criterion as separation, phraseology, working methods to be respected and velocity shall be defined for actors involved.
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Arg. 4.1.2: The impact of changes on the job satisfaction of affected human actors has been considered.

The impact of changes due to the proposed solution on job satisfaction of affected human actors will be no negative.	Closed	OBJ-02-05-V3-VALP-HPAP-007	RTS LFT	Regards to the procedures proposed, the actors involved exposes several feedback. They affirmed that RNP 350 procedure is the better, in fact, this procedure maintained vertical separation, the final inbound track	No recommendations identify for this objective.	No requirements identify for this objective.
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					parallel to ILS approach makes it easily recognizable if R/C is stabilized or not and reducing critical issue regarding approach 35L.	
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Table 9: Summary of the HP results and recommendations/ requirements for each identified issue & related argument



4.4.2 Maturity of the Solution

It is the conclusion of the project at a solution level that coverage of OI AO-0316 has reached V3 maturity and covered the expected Performance targets.

The evidences acquired during the Human Performance Assessment confirmed this target.

For further info please refer to PJ02-05 VALR V3 [7].

5 References

Human Performance

- [1] 16.06 Strawman Paper on Case Building in SESAR SWP 16.6
- [2] 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
- [3] 06.09.03 D05.1 Single Remote Tower Validation Plan – Appendix Human Performance Assessment Plan
- [4] 16.06.05 D 27 HP Reference Material D27
- [5] 16.04.02 D04 e-HP Repository - Release note
- [6] SESAR Solution 02-05 SPR-INTEROP/OSED Part I V3 (D4.1.012-1)
- [7] SESAR Solution 02-05 VALR V3 (D4.1.042)



Appendix A – Additional HP activities conducted

N/A

Founding Members



Appendix B – HP Recommendations Register

HP Recommendations Register									
Reference	Type of recommendation	Recommendation	Rationale	Assessment source + Reference report	Scope (Air, Air/Ground, Ground)	Concept/ solution Involved	Recommendation status	Rationale in case of rejection	Comments
OPS_Recom_1	OPS (operating methods / procedures)	It is recommended that the RNP procedures will show missed approach segment when necessary, adding the missed approach branch through an activating button.	The new operating methods may lead to situation of not efficient (increased potential for errors) if the missed approach segment is showed always. In fact, the ATCOs prefer that	EXE #02 and EXE #04 HP assessment	Air/Ground	Simultaneous Non-Interfering Operations	Accepted		N/A

HP Recommendations Register

			it shown when request it.						
OPS_Recom_2	OPS (operating methods / procedures)	It is recommended that the tower RADAR display should be visualize the procedure to increase ATCOs situational awareness.	During the LFT the RNP procedures haven't shown on the RADAR display.	EXE #02 and EXE #04 HP assessment	Ground	Simultaneous Non-Interfering Operations	Accepted		N/A
OPS_Recom_3	OPS (operating methods / procedures)	It is recommended should be to have a decision high of 200 ft and a Rotorcraft inbound distance of 2,5 NM at least.	ATCOs control rotorcraft flights seeing them at low altitude while, during the Flight Trial, the rotorcraft flight at higher	EXE #02 and EXE #04 HP assessment	Air/Ground	Simultaneous Non-Interfering Operations	Accepted		N/A



HP Recommendations Register									
			altitude following the RNP procedures, creating some uncertainty due to their current working method.						

Table 10: HP recommendations



Appendix C – 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
OPS_Req_1	OPS (operating methods / procedures)	The RADAR display shall be providing the clear information on procedures track about the R/C position.	During the LFT the information on procedures haven't shown on the RADAR display.	EXE #02 and EXE #04 HP assessment	Ground	Simultaneous Non-Interfering Operations	Accepted		N/A
OPS_Req_2	OPS (operating methods / procedures)	The criterion as separation, phraseology, working methods to be respected and velocity shall be defined for actors involved.	Considering the requirements merging during the assessment, ATCOs and Pilots suggested modifying the current	EXE #02 and EXE #04 HP assessment	Ground/Air	Simultaneous Non-Interfering Operations	Accepted		N/A



			regulation adding further information for improvement they are working method.						
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Table 11: HP Requirements





Appendix D – HP Log



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