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Stand 849

iFOCUCS: introduction

- Next generation CWP (controller working position)
- Designed by a multidisciplinary team
- Digital born product
- Improved ergonomics
- Larger presentation surface
- Touch devices
- Adaptive solution



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iFOCUCS: objectives

- Evolution of the system (non-strips operation, conflict detection, integration of mode-s surveillance data, etc)
- Include new auxiliary tools (flow management tools, meteorological information, drones information, etc)
- Integration of iTEC system in ENAIRE

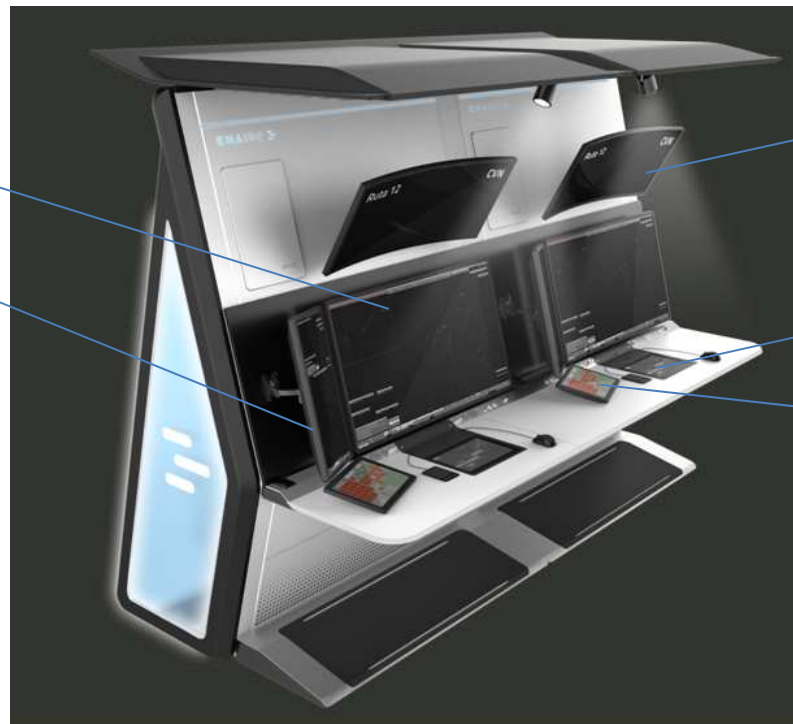


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iFOCUCS: Main elements

Main screen
Auxiliary screen



Auxiliary information

Touch Input Device (TID)

Voice communications



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iFOCUCS: Video and model

- iFOCUCS teaser
- iFOCUCS model



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iFOCUCS

Questions?



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iFOCUCS

Thank you for your attention



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COOPANS Alliance



- Established in 2006 as a collaboration between IAA, LFV and Naviar. ACG 2010, CCL 2011 and Nav Portugal 2018.
- Collaboration focused around
 - upgrade and standardize the partners ATM systems to be based on a common software
 - development and harmonization of operational concepts and maintenance processes
 - Cost sharing of system evolution
- 7 Control centres in 5 countries, becoming 8 centres in 6 countries



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COOPANS Alliance - starting point

- High level of harmonisation
- Geographical location of COOPANS sites could benefit from new possibilities to develop/test software
- VC a new future reality in ATM community
- Rationalization of infrastructure on national level, COOPANS level, European level
- Increased collaboration and support between partners



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COOPANS Virtual centre activities

- Participation in SESAR W1 PJ.16-03 and PJ.15-09
- Participation in SESAR W2 PJ.10-93 and VLD5 VC
- Participated in the virtual centre taskforce (established by SJU in 2018)
- Remote CWPs in operations in existing system (Dublin-Shannon APP; EKDK-EKBI)



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Expected benefits with the Virtual Centre

- Better use of available resources– increased capacity at network level
- Remote training of ATCOs – psuedo pilots, EXE preparation,
- ANSP cost saving – infrastructure rationalisation, optimize use of ATCOs
- Internal buy/sell of capacity
- Harmonisation activities and common SW builds resulting in extensive testing/travel activities
- Investigation of possible UCs
- Introduction of SW test bed/training
- Delegation of airspace - static
- Contingency
- Delegation of airspace dynamic
- Use of third party contingency capability/reduced mode ?



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PJ.16-03 EXE#2 TRL 4

- **Picture/description from TRL4 presentation**



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Show stoppers

- Political issues
- ATCO licensing
- NSA requirements
- Data delivery/storage abroad
- Military aspects
- Route charges
- Responsibilities – investigations, insurances etc.



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Future - Next step

- Common exercise/demonstration between PJ.10-93 and VLD5
- 4 COOPANS sites connected to a cloud service in Paris, possibly more participants to be added
- Delegation of airspace/contingency and cross border sectorization static/dynamic
- Use of new SOA platform with services from PJ.16-03
- Introduction of live/shadow/recorded data



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COOPANS

REAL COOPERATION, REAL RESULTS



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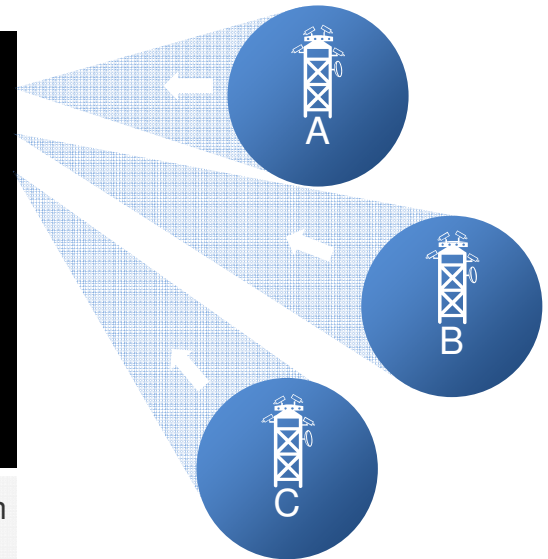
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Leading experience in multi-remote tower technologies

Controller Working Position



Full integration of enhanced voice services	Multi-airport planning tool for efficient and safe traffic handling	Low Cost Surveillance & Safety Net	Combined Civil / Military operations	Validations with DFS and Hungaro Control
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Control of up to 3 airports by one Air Traffic Controller



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First passive shadow mode operation of 3 remote airports controlled by one single ATCO



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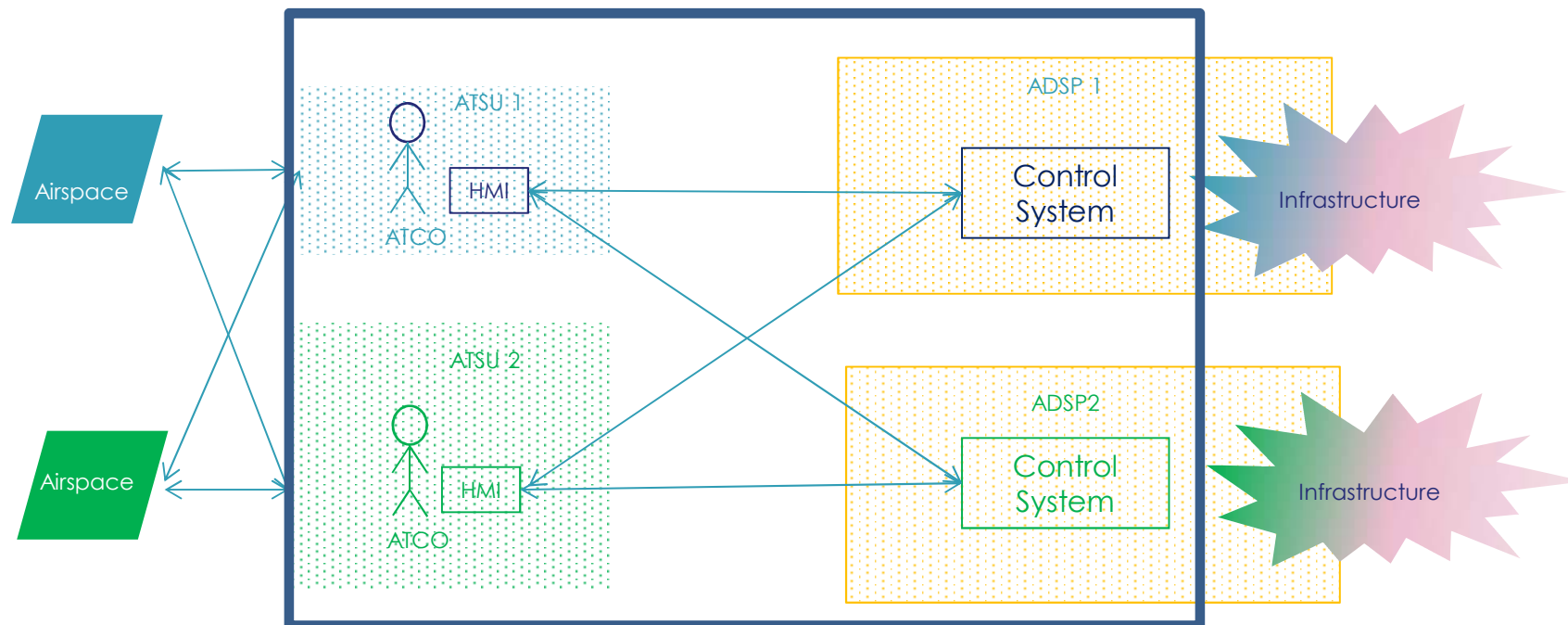
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Virtual Centre: Definition



Virtual Centre: an enabling solution for operational improvement



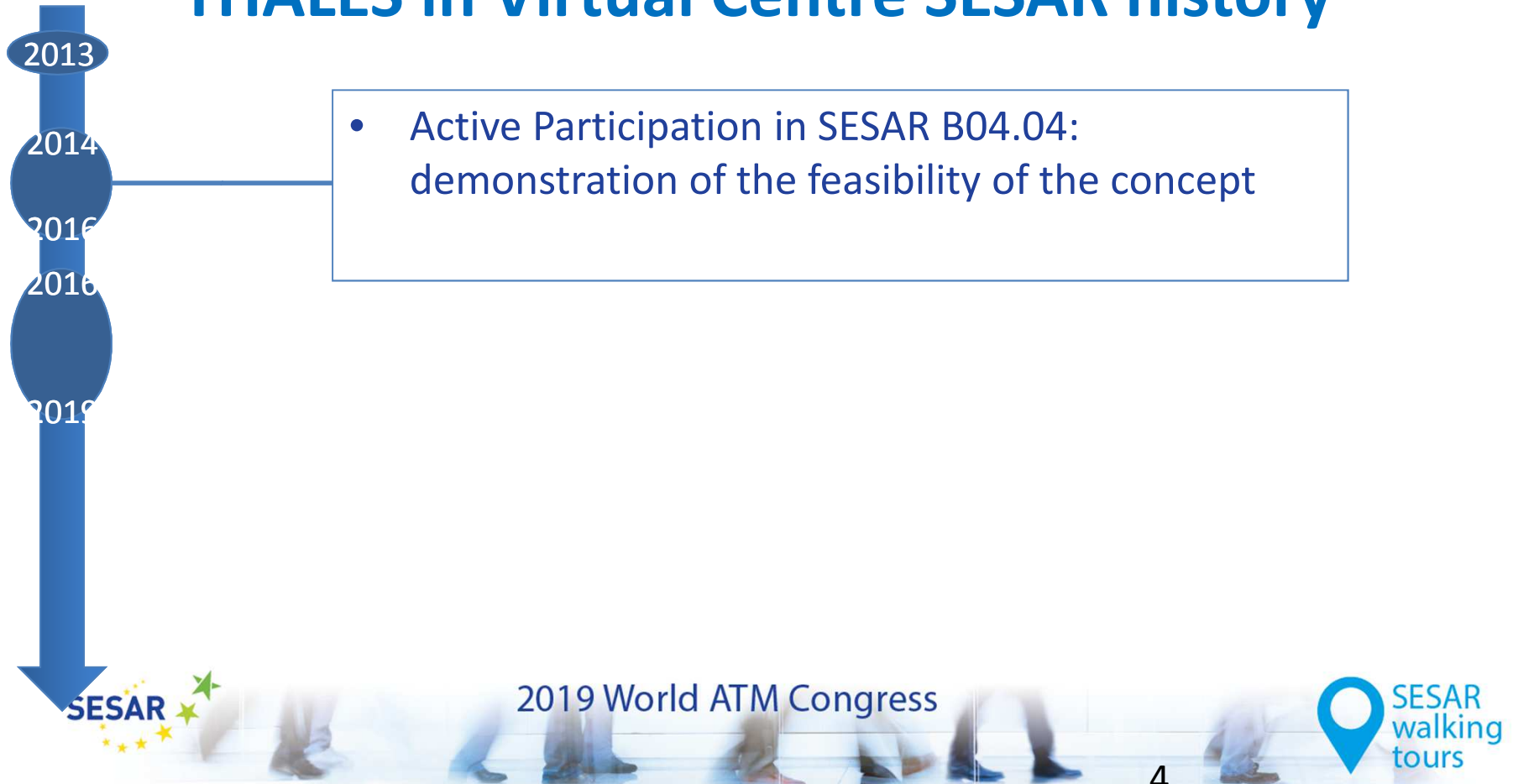
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THALES in Virtual Centre SESAR history



THALES in Virtual Centre SESAR history



THALES in Virtual Centre SESAR Today

2013

2014

2016

2016

2019

- Project coordinator of S2020 W1 PJ.16
- Solution leader of S2020 W1 PJ.16-03 (The VC solution)

- PJ.16-03 TRL4 EXE#2 Virtual remote training and testbed
- PJ.16-03 TRL4 EXE#4 Delegation of Airspace

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REAL COOPERATION, REAL RESULTS

skyguide

**FREQUENTIS
SESAR
PARTNERS**
Frequentis • Alcatel • HungaroControl
FREQUENTIS • HungaroControl

- PJ.16-03 TRL6 EXE#1 Large scale demonstration : most of the partners: **Event : 16th of Oct**
- PJ.16-03 TRL6 EXE#2 Technical feasibility of AAS Dynamic management of Airspace

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REAL COOPERATION, REAL RESULTS

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THALES in Virtual Centre SESAR future



- Project coordinator of S2020 W2 VLD 5
- Active participation of S2020 W2 PJ.10 Sol 93
- Large EXE with Operational and Technical objectives



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Thales in Virtual Centre outside SESAR

- AIR Services (Australia): APP / En-route groupinf for more than 20 years
- ASECNA: Contingency amongst ANSPs over SATCOM
- HungaroControl (Hungary): Remote Control of Kosovo
- IAA (Ireland): Dynamic resectorization



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THALES



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Daniele Teotino – ENAV SESAR Contribution Manager
Patrizia Criscuolo – ENAV PoC for SESAR PJ05



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Remote Tower Services: the ENAV Experience



R&D Framework

- ✓ SESAR 1
- ✓ SESAR 2020 W1
- ✓ SESAR 2020 W2

- ✓ EASA Regulation activities
- ✓ EUROCAE WG-100
- ✓ Internal WG



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SESAR 1: RACoon LSD

- ✈ **First Italian initiative** on Remote TWR solutions
- ✈ **Single Remote** and **Multiple Local/Remote** operations
- ✈ Challenging scenarios Milano **Malpensa** and **Linate**: the 2nd and 3rd airport in Italy
- ✈ Stepwise approach:
 1. RTS execution (October 2015)
 2. Shadow Mode & Training (September 2016)
 3. Flight Trial Campaign (October 2016)
- ✈ More than **100 real flights** remotely managed:
 - 82 flights on Linate – **Remote Single Airport**
 - 36 flights on Malpensa – **Multiple Airport (Local/Remote)**



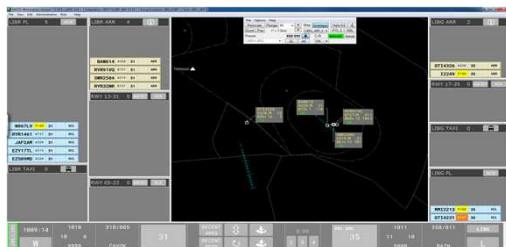
Conclusions:

- ✈ **Single Airport Concept is viable and acceptable:** no reduction in Capacity and Safety levels, no relevant change in the conventional working method
- ✈ **Multiple Airport Scenario:** positive results on perceived workload and situational awareness. Additional support tools required. Further study needed
- ✈ **Training is fundamental:** operators need to become familiar with the new equipment

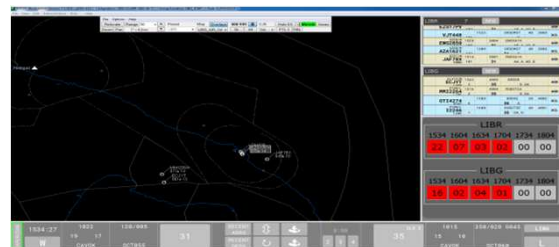


SESAR2020 Wave 1

- Solution PJ05-02: Remotely Provided ATS for Multiple Aerodromes for 2 medium density aerodromes - Project co-funded by SJU under EU H2020 R&I Programme
- RTS Multiple Remote Tower
- Scenarios Brindisi (LIBR) and Grottaglie (LIBG) Airports:
 - Visual information replacing the tower view with the Out The Window view (OTW)
 - 2 Remote TWR Modules + 1 Supervisor WP
 - SPV planning tools for planning ahead
 - CWP features:
 - 4 Roles available: LIBR, LIBG, LIBR+LIBG, Supervisor (SPV)
 - Air Surveillance, Electronic Flight Strips (Presentation and updating of flight plan and control data), Met info
- RTS execution (November 2018)



LIBR + LIBG
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Conclusions:

- New operating methods do not impact negatively ATCOs Situational Awareness
- workload induced by the Multiple Remote Tower Module was acceptable → Training important
- suggested that the Supervisor should act as Planner Controller, managing the sequence in order to reduce the workload in high traffic situations
- Improvement on HMI and OTW presentation



FURTHER STUDY NEEDED



SESAR2020 Wave 2



- ENAV contribution to Virtual Technologies for TWR will continue along Wave 2 under PJ.05-W2 Project *Digital technologies for Tower*
- ENAV participation in both PJ05 W2 solutions:
 - Solution PJ.05-W2-35 *Multiple Remote Tower and Remote Tower Centre*
 - Solution PJ.05-W2-97 *HMI Interaction modes for Airport Tower*
- 2 RTS + 1 Shadow Mode validation exercises planned by 2022



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Conclusions

- Enav is fully committed to remote TWR solution and is contributing to mature the solution towards new challenges
- R&D experience and positive outcomes on RTS currently deployed abroad are boosting deployment plans in Italy
- R&D experience is allowing to create a robust cooperation framework on Remote TWR solution with the Italian and international ATM Stakeholders.



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PJ05 Remote Tower for Multiple Airports

- Concept and Main Results of a PJ05 V3 Validation
- “Multiple” is a very prospering Concept



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PJ05 Remote Tower for Multiple Airports

- Concept and Main Results of a PJ05 V3 Validation
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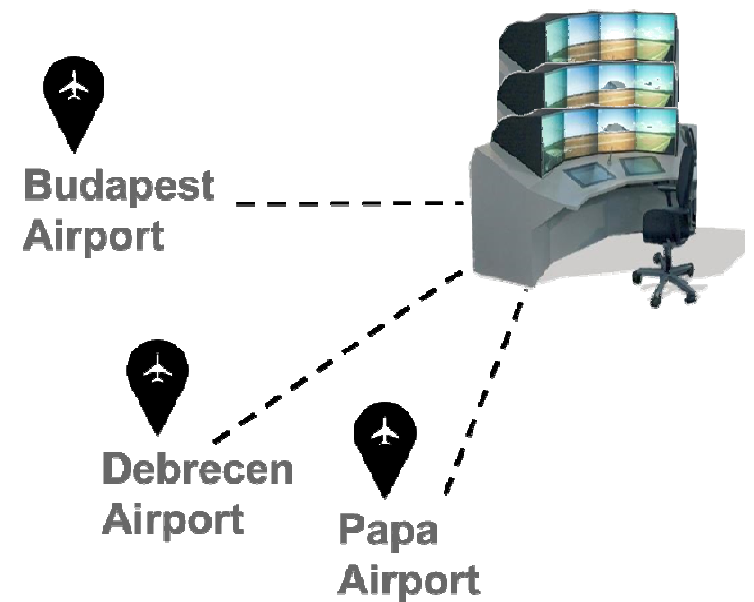


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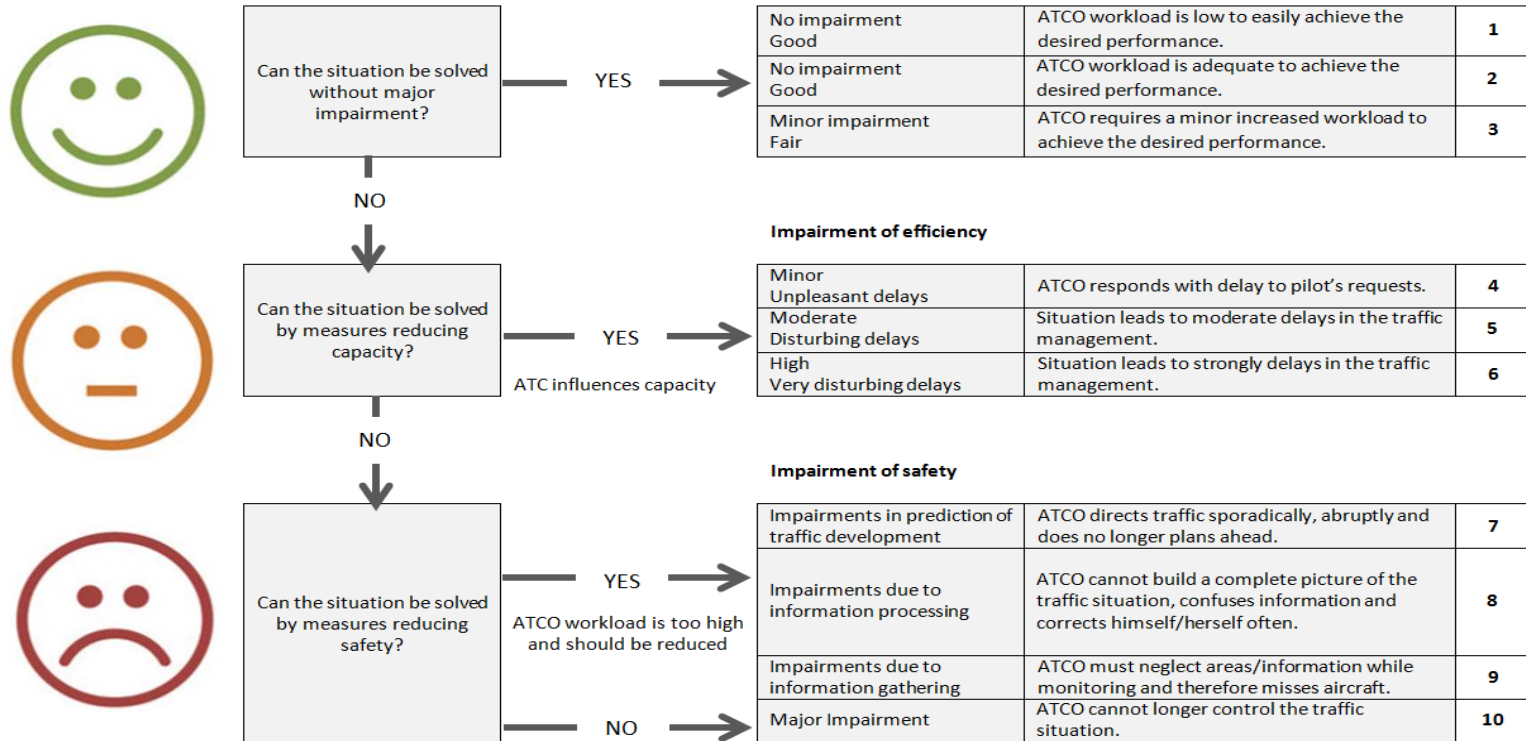


Validation Scope (V3)

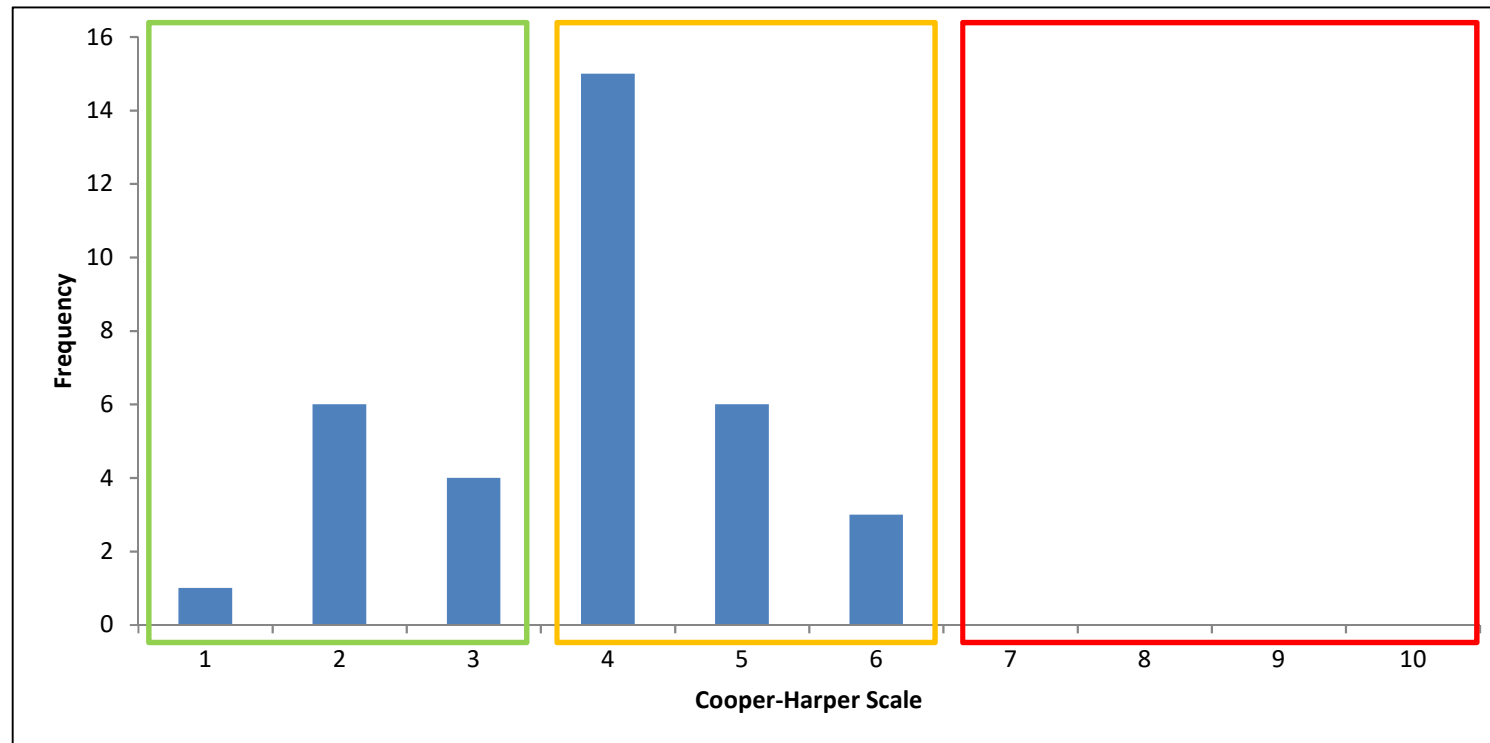
- Proof of oper. feasibility for 1:3 multiple setting
 - Very realistic CWP & Traffic Scenarios
 - Emergency Situations / RWY changes
 - Approach, MET & Airport Coordination
 - Integration of Enhanced Met Warnings



Safety Assessment



Safety Results



$N = 35$
 $M = 3.80$
 $SD = 1.24$



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www.remote-tower.eu

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