REMOTE TOWER

Open Day

Introduction to PJ05 “Remote Tower for Multiple Airports”

PJ-05 EXE-05.02-V3-2.4a&b (HungaroControl, FREQUENTIS, DLR)

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29/04/2019

Founding Members
EUROPEAN UNION EUROCONTROL

DLR

SESAR JOINT UNDERTAKING

Past ‘Multiple’ Research

First DLR Multiple trials (2010)

SESAR P06.09.03 & P06.08.04 (2014)

3 Aerodromes in PJ05

SESAR2020 PJ05

SESAR2020

PJ05 Remote Tower for Multiple Airports

DLR (AT-One)

WP2 Solution PJ.05-02

Multiple Remote Tower Module

LFV/COOPANS

WP3 Solution PJ.05-03

RTC with Flexible Allocation of Aerodromes to MRTMs

DFS

Validation Phases & Exercises

today

End of Project Nov 2019

2017

PJ.05-02 Multiple Remote Tower Module (V2)

HC (Braunschweig, Germany)
ON (Braunschweig, Germany)
COOPANS (Sturup, Sweden)
AVINOR (Asker, Norway)

2018

PJ.05-02 Multiple Remote Tower Module (V3)

HC (Braunschweig & Budapest)
COOPANS (Växjö, Sweden)
AVINOR (Asker, Norway)
ENAV (Rome, Italy)

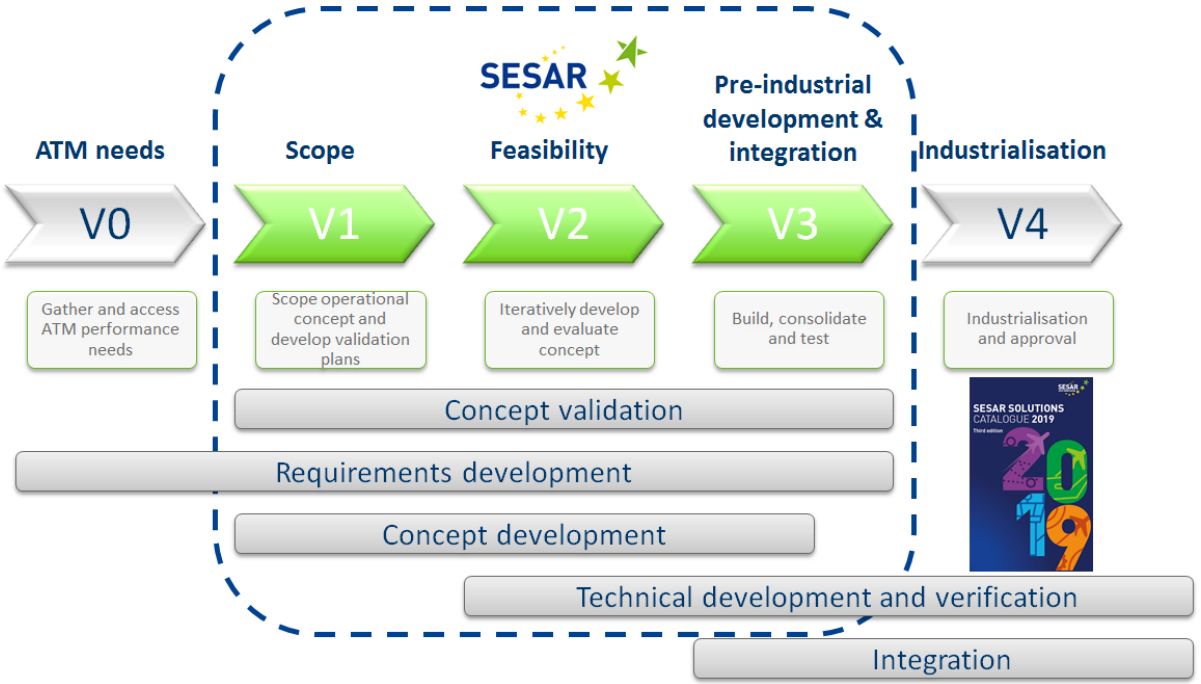
PJ.05-03 RTC with Flexible Allocation of Aerodromes to MRTMs (V2)

ON (Braunschweig, Germany)
COOPANS (Växjö, Sweden)
AVINOR (Asker, Norway)
DFS (Langen, Germany)

2019

Validation Scope (V3):

Proof of operational & technical feasability for 1:3 multiple setting



2.4-V3a) Concept Validation through Simulation (Braunschweig)

2.4-V3b) Technical Performance Validation through PSM (Budapest)

Validation Set Up

FREQUENTIS FOR A SAFER WORLD
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LEONARDO
ON ORO NAVIGACIJA
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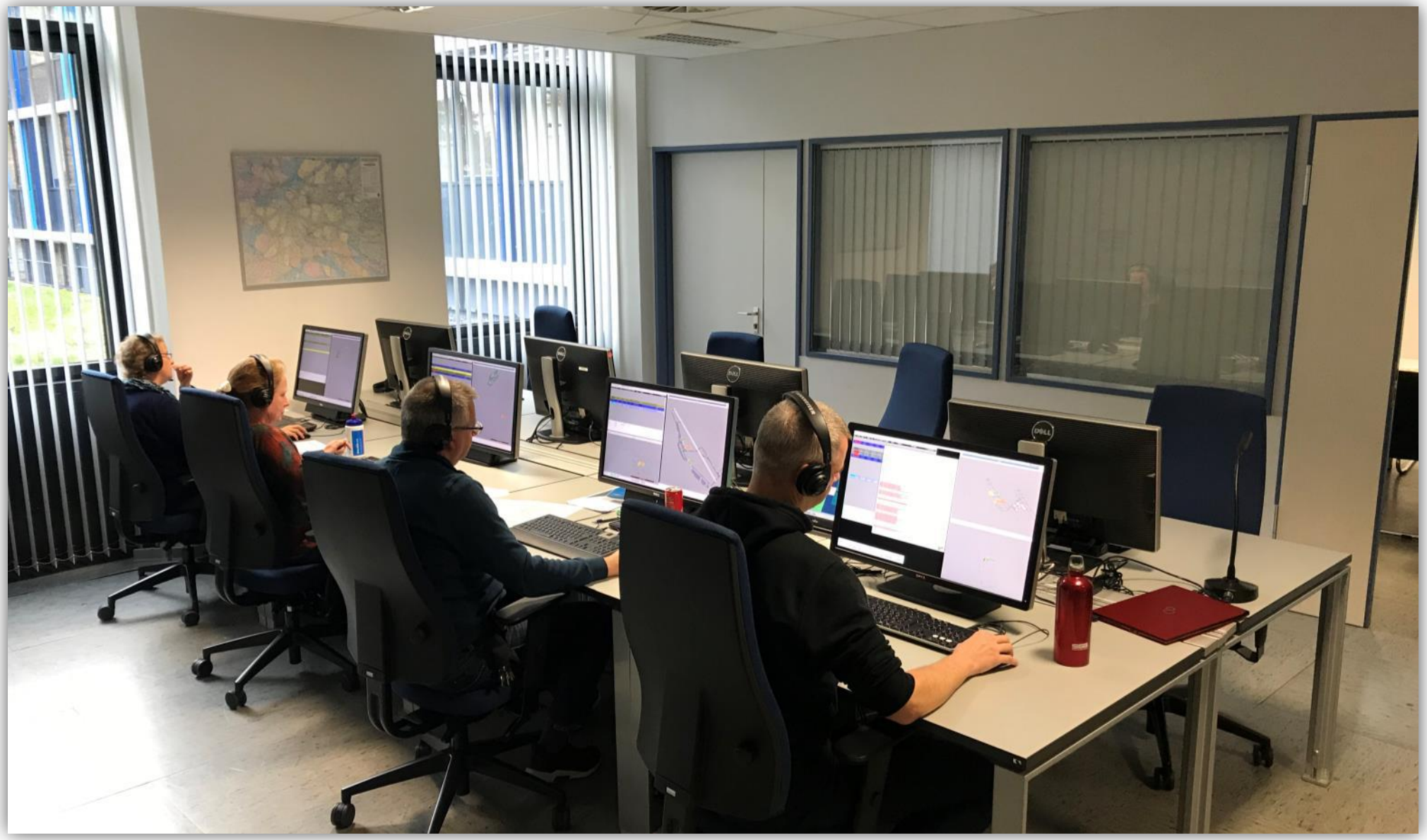

Experimental Design

Scenario ID	N° AD	Duration	Mvmt/h	Time of day	Traffic Distribution	Type of Incident	IFR/VFR
SCN 1	3	50 min	20	Day	Uneven	Unplanned closure of AD (hydraulics leakage)	Mainly IFR
SCN 2	3	50 min	20	Day	Uneven	RWY Direction Change	Mainly IFR
SCN 3	3	50 min	20	Day	Even	Unplanned closure of AD (hydraulics leakage)	Mainly IFR
SCN 4	3	50 min	20	Day	Even	RWY Direction Change	Mainly IFR
SCN5	3	30 min	20	Day	Even	AC emergency (engine failure, no fire)	Mainly IFR

Traffic Scenario (SCN 1)

EOBT/ELDT	CALLSIGN	AC	DESTINATION	SID	SQK	STAND	RWY	REMARKS	
08:05:00	WZZ391	A321	Sofia (LBSF)	ERLOS1D	2177	3	13R		LHBP
08:07:00	EIN7EA	A320	Budapest (LHBP)		1733	4	13R		
08:11:00	9AJIM	C550	Budapest (LHBP)		1516	R115	13R		
08:10:00	TRA72Q	B737	Rotterdam (EHRD)	GILEP1D	1514	R110	13R		
08:20:00	WZZ1PU	A320	Budapest (LHBP)		3772	107	13R	Oil leak	
08:15:00	DLH4TN	A320	Frankfurt (EDDF)	BADOV1D	1515	2	13R		
08:22:00	AIRSIDE1	FOL1	Budapest (LHBP)		2100	26		RWY check, after oil leak	
08:30:00	AEG550	SF34	Timișoara (LRTR)	ERLOS1D	2170	109	13R		
08:35:00	WZZ17BA	A321	Budapest (LHBP)		1517	107	13R		
08:35:00	HBVPA	C550	Paris (CDG) (LFPG)	GILEP1D	2203	R116	13R		
08:50:00	SWR225Z	A320	Zurich (LSZH)	GILEP1D	2172	R114	13R		
08:05:00	WZZ559	A320	Santa Cilia de Jaca (LECI)	VERIG5D	3102	2	05R		LHDC
08:15:00	FHY631	A320	Debrecen (LHDC)		3105	15	05R		
08:19:00	IFA1483	FA50	Debrecen (LHDC)		3107	14	05R		
08:20:00	BRU8925	CRJ2	Minsk (UMMS)	PERIT5D	3104	14	05R		
08:35:00	WZZ2338	A320	Debrecen (LHDC)		3106	3	05R		
08:35:00	BUC1182	MD83	Burgas (LBBG)	NARKA5D	3110	1	05R		
08:57:00	TVL5021	B738	Debrecen (LHDC)		3112	1	05R		
08:20:00	WZZ701	A320	Pápa (LHPA)		3504		34	Touch&Go	LHPA
08:15:00	CHECK1	FOL1	Pápa (LHPA)		3514	M3	34	RWY check, back to Stand, delete	
08:20:00	HACIY	BE35	Pápa (LHPA)		3512	M2	34	Landing	
08:31:00	WZZ701	A320	Pápa (LHPA)		3506		34	Touch&Go, delete	
	DECEC	P28A	Győr-Pér (LHPR)		3507			Crossing	
08:44:00	COBO27	A310	Pápa (LHPA)		3510	M3	34	Backtrack and vacate via A to M	
08:50:00	HACIZ	BE35	Győr-Pér (LHPR)		3505	M1	34		

Mid - Run

- ISA – Scale

Post – Run

- NASA-TLX
- SASHA
- AIM
- Safety
- Tailored questions

Debriefing

- open questions to:
  - acceptance and
  - recommendations for improvement

DLR Member of AT-One

MEMBER OF SESAR JOINT UNDERTAKING

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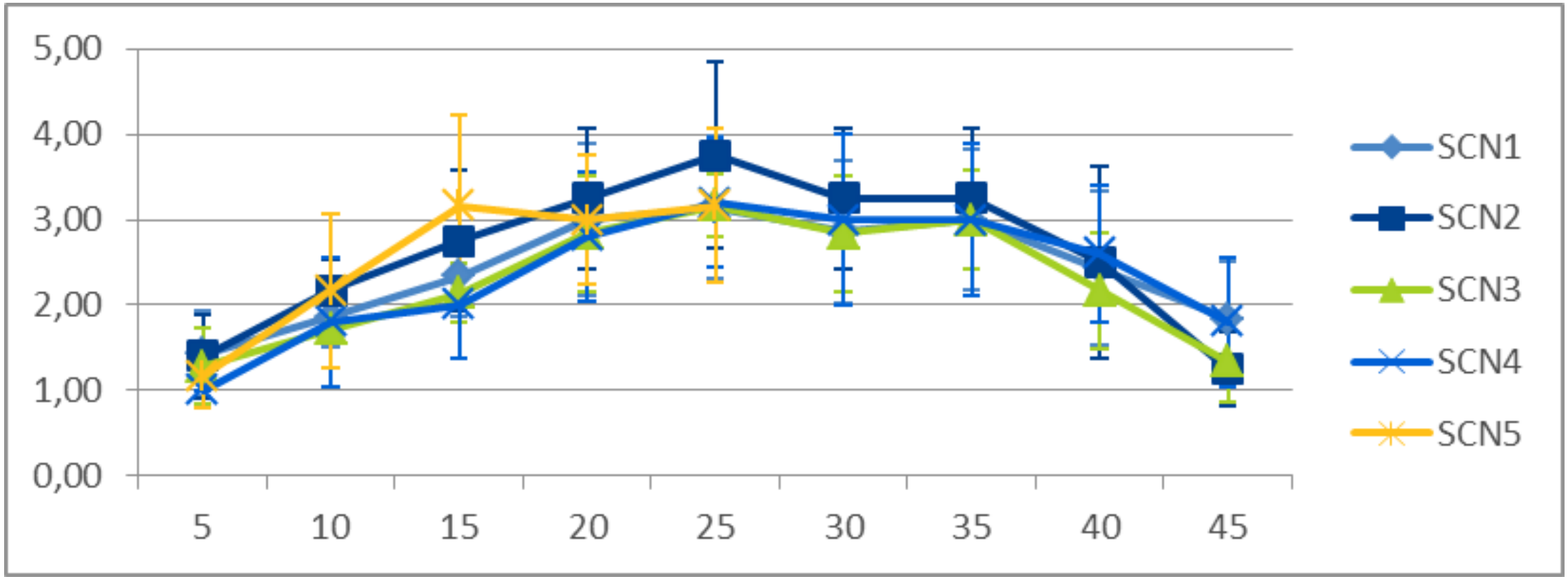
I.S.A. Workload over the time



Safety Assessment

Can the situation be solved without major impairment?

YES →

No impairment Good	ATCO workload is low to easily achieve the desired performance.	1
No impairment Good	ATCO workload is adequate to achieve the desired performance.	2
Minor impairment Fair	ATCO requires a minor increased workload to achieve the desired performance.	3

NO ↓

Can the situation be solved by measures reducing capacity?

YES → ATC influences capacity

Impairment of efficiency

Minor Unpleasant delays	ATCO responds with delay to pilot's requests.	4
Moderate Disturbing delays	Situation leads to moderate delays in the traffic management.	5
High Very disturbing delays	Situation leads to strongly delays in the traffic management.	6

NO ↓

Can the situation be solved by measures reducing safety?

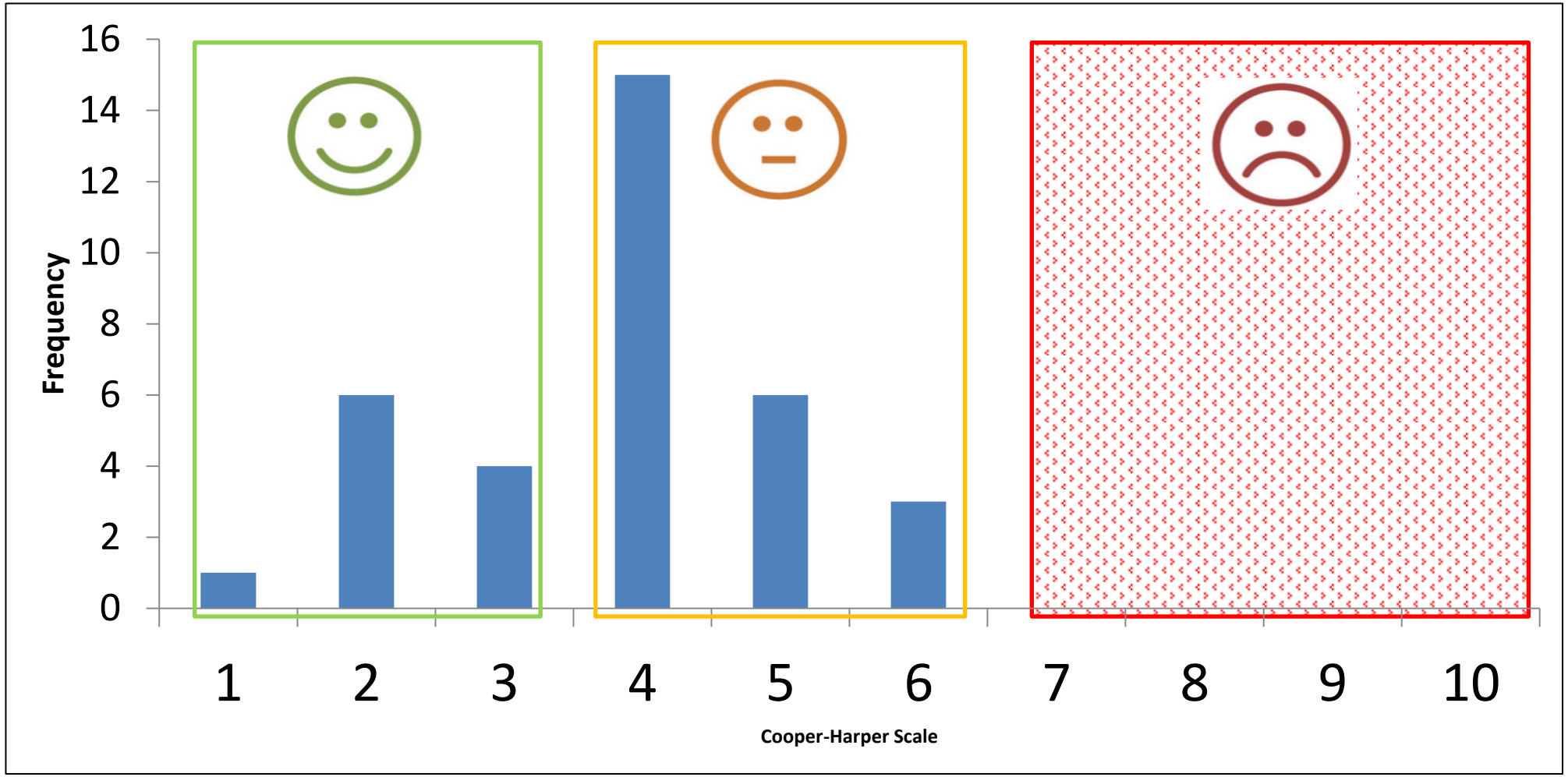
YES → ATCO workload is too high and should be reduced

NO →

Impairment of safety

Impairments in prediction of traffic development	ATCO directs traffic sporadically, abruptly and does no longer plans ahead.	7
Impairments due to information processing	ATCO cannot build a complete picture of the traffic situation, confuses information and corrects himself/herself often.	8
Impairments due to information gathering	ATCO must neglect areas/information while monitoring and therefore misses aircraft.	9
Major Impairment	ATCO cannot longer control the traffic situation.	10

Safety Results



N = 35
M = 3.80
SD = 1.24

Myths to Multiple Remote Tower

- An ACTO is not able to work multiple
- *Multiple* needs new procedures
- *Multiple* only works with additional ground surveillance
- ATCOs do not like working *multiple*


Be prepared for
the future !

REMOTE TOWER

www.remote-tower.eu

Home

The modernisation of air traffic management is one of the main challenges of current aeronautics research.The Single European Sky ATM Research (SESAR) project defines, develops and deploys what is needed to increase ATM performance and build Europe's intelligent air transport system. The current programme is SESAR 2020, running from 2016 to 2024 with a budget of 1.6 billion Euro, supports projects to deliver solutions in four key areas, namely airport operations, network operations, air traffic services and technology enablers.

Part of SESAR 2020 is the Project **PJ05 "Remote Tower for Multiple Airports"** with focus on the safe and efficient airport of the future. By bringing the concept of remotely controlling multiple airports to a higher maturity level, the SESAR project aims at providing small and medium sized airports with more

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