



Open Day

Introduction to PJ05 “Remote Tower for Multiple Airports”

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

Jörn Jakobi (AT-One/DLR PJ05 Project Coordinator)

DLR, Braunschweig

23/11/2018



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

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

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

2017

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

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

2018

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



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



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

Validation Set Up



FREQUENTIS
FOR A SAFER WORLD



Member of





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 | LHBP |
|-----------|----------|------|--------------------|---------|------|-------|-----|---------------------------|------|
| 08:05:00 | WZZ391 | A321 | Sofia (LBSF) | ERLOS1D | 2177 | 3 | 13R | | |
| 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 | | LHDC |
| 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 (LB BG) | 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

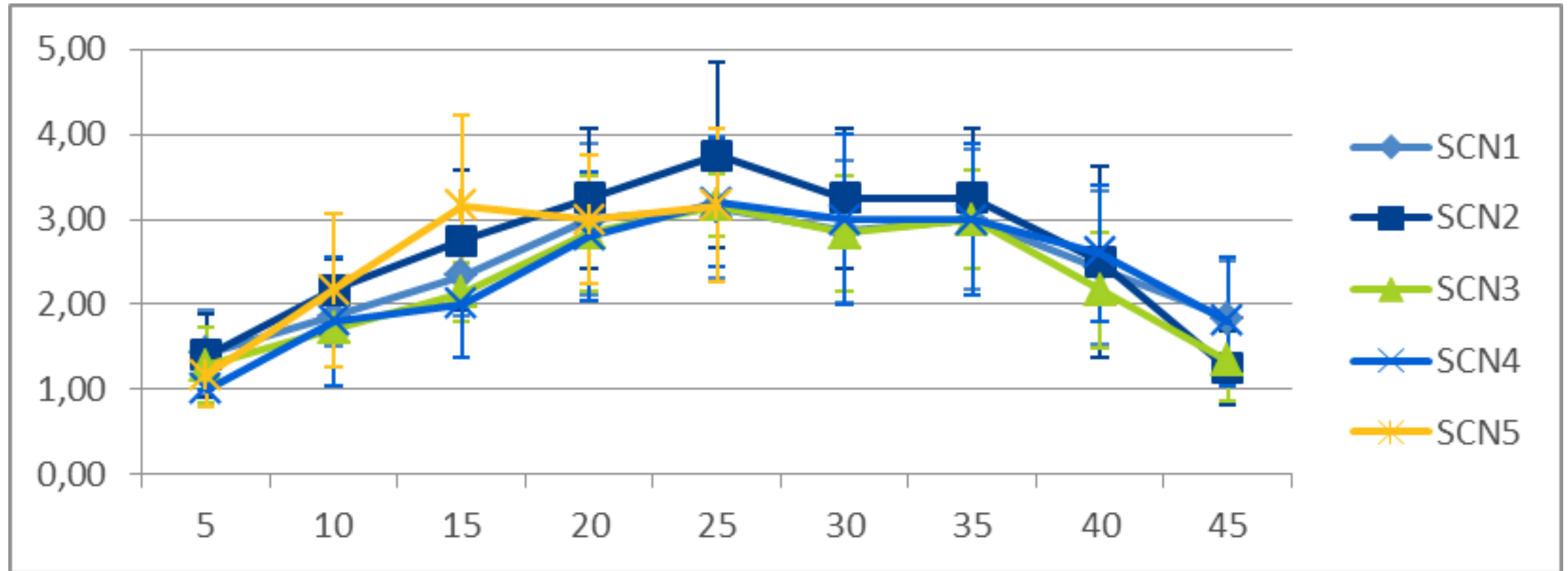
- NASA-TLX
- SASHA
- AIM
- Safety
- Tailored questions

Debriefing

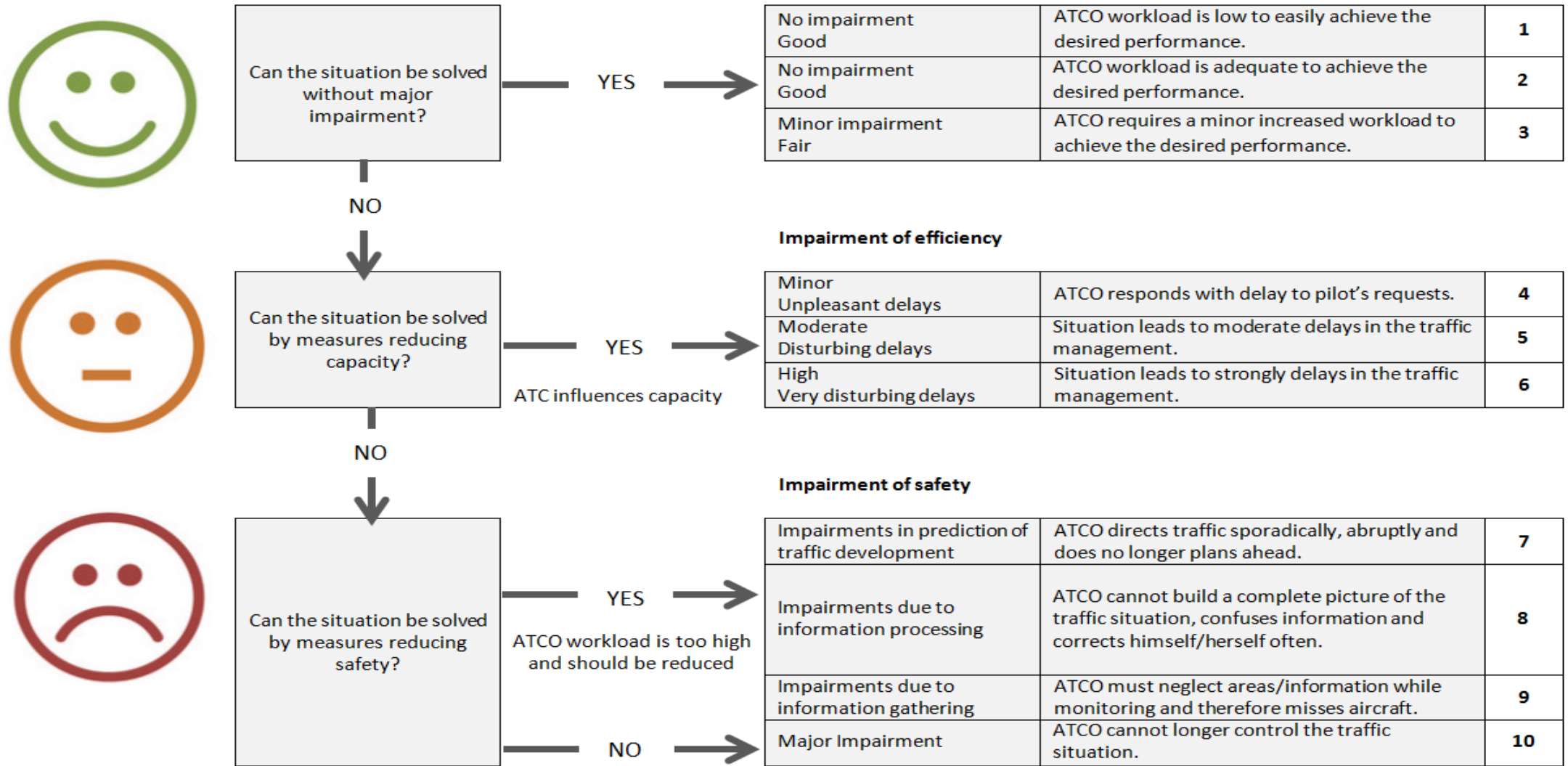
- open questions to:
 - acceptance and
 - recommendations for improvement



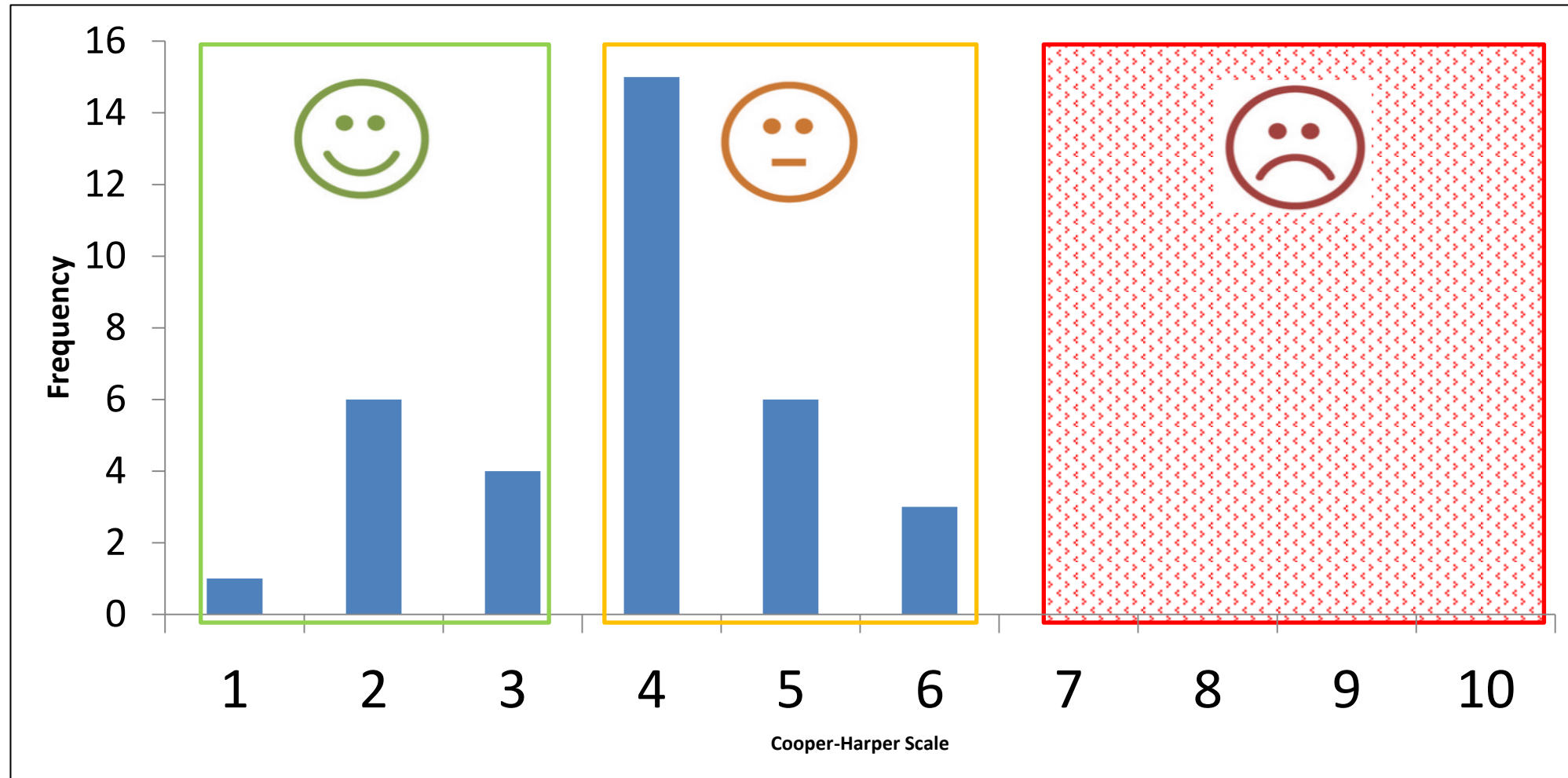
I.S.A. Workload over the time



Safety Assessment



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 !



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 cost-efficient and service-tailored air traffic services.

Jörn Jakobi (PJ05 Project Coordinator)

DLR Institute of Flight Guidance

Braunschweig, Germany

Joern.Jakobi@dlr.de

www.remote-tower.eu



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