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Standardisation in Support of SES

R&D – Standardisation – Deployment

Agenda

Thursday, 14 March 2019

10:00-10:45

10:00 – 10:05

Welcome and Opening remarks

Christian Schleifer, Secretary General, EUROCAE

10:05 – 10:15

Remote Tower R&D – current status of SESAR activities

Jörn Jakobi, SESAR PJ.05 Coordinator, DLR

10:15 – 10:25

Standardisation of Remote Tower – the work of EUROCAE WG-100

Jörn Jakobi, WG-100 chairperson, DLR

10:25 – 10:35

Examples of deployment – challenges and success stories

Peter Gridling, Domain Sales Expert Remote TWR, Frequentis

10:35 – 10:40

Remote Tower: a potential opportunity for the military?

Denis Bouvier, Project Officer Single European Sky Policy, EDA

10:40 – 10:45

Q&A and Closing

Christian Schleifer, Secretary General, EUROCAE

R&D – Standardisation - Deployment

R&D



Standardisation & Regulation



Deployment



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European ATM Standards Coordination Group



- EASCG created in 2014/2015
- Objective:
 - Facilitate the sharing of work among the SDOs thus avoiding the risk of overlapping developments and gaps
 - Monitor all relevant processes, resource availability and other related risks and issues
 - Provide a forum to manage specific issues and resolution of conflicts
 - Advise the EC and other organisations on standardisation matters / issues
 - International coordination
- Deliverable: Standardisation Rolling Development Plan (RDP)

European ATM Standards Coordination Group



- Standardisation Rolling Development Plan (RDP)
 - Main instrument to materialise the outcome of EASCG monitoring activities
 - Maintained to reflect current and planned standardisation and regulatory activities

Change A=added D=deleted M=modified	Domains	Standardisation				Regulation			Master Plan reference	PCP AF	SDM reference Deployment Plan Families	Joint activity with RTCA	Link to ICAO A SBU	Comment
1	ATM ground system													
	Remote tower	MASPS for Remote Tower optical systems ED-240	EUROCAE	WG-100		Published							B1-RATS	
		MASPS for Remote Tower optical systems ED-240A	EUROCAE	WG-100	2018	Ongoing							B1-RATS	
		MASPS for Remote Tower optical systems ED-240B	EUROCAE	WG-100	2020	Planned							B1-RATS	
							Technical requirements for Remote TVR Operations RMT.0624	EASA	2019	Ongoing				



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Remote Tower

current status of SESAR JU activities

Jörn Jakobi, DLR
PJ05 Coordinator

SESAR2020

PJ05 Remote Tower for Multiple Airports

DLR (AT-One)

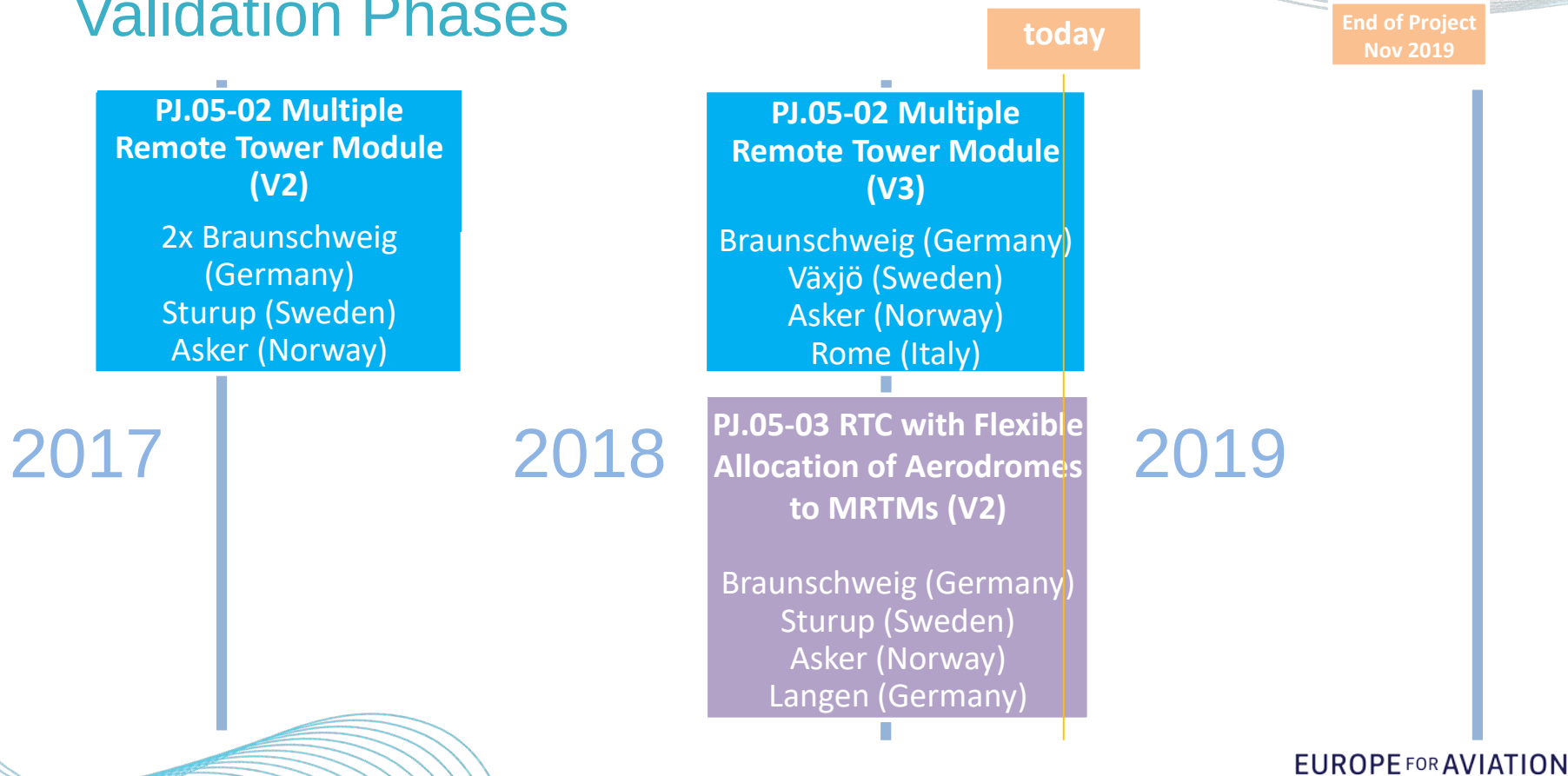
```
graph TD; A["SESAR2020  
PJ05 Remote Tower for Multiple Airports  
DLR (AT-One)"] --- B["WP2 Solution PJ.05-02  
Multiple Remote Tower  
Module"]; A --- C["WP3 Solution PJ.05-03  
RTC with Flexible Allocation of  
Aerodromes to MRTMs"]
```

WP2 Solution PJ.05-02
Multiple Remote Tower
Module

WP3 Solution PJ.05-03
RTC with Flexible Allocation of
Aerodromes to MRTMs

DES

Validation Phases



Mid - Run

- ISA – Scale

Post – Run

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

Debriefing

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



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

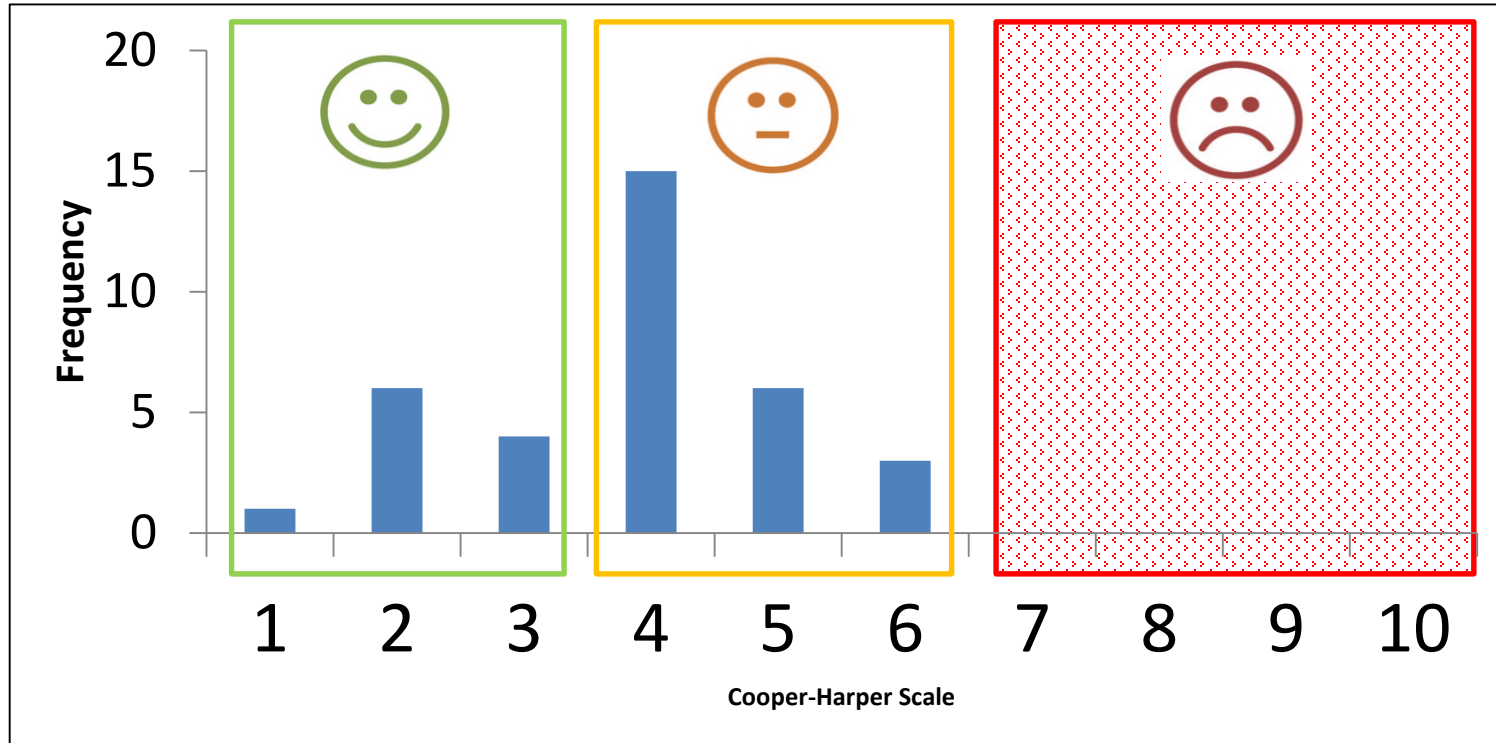
ATCO workload is too high and should be reduced

Impairment of safety

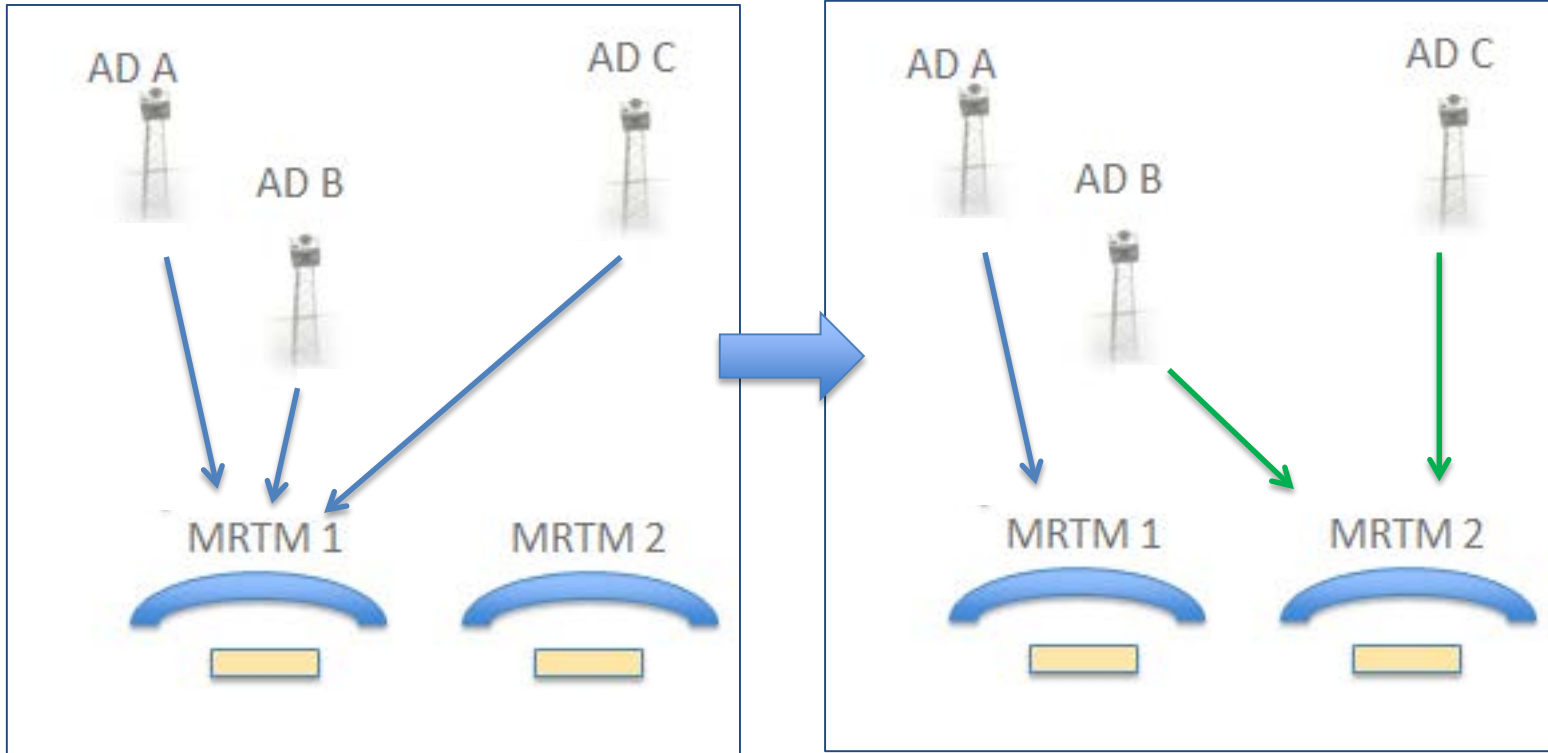
Impairments in prediction of traffic development	ATCO directs traffic sporadically, abruptly and does no longer plans ahead.	7
Impairments due to information processing	ATCO cannot build a complete picture of the traffic situation, confuses information and corrects himself/herself often.	8
Impairments 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

NO

Safety Results

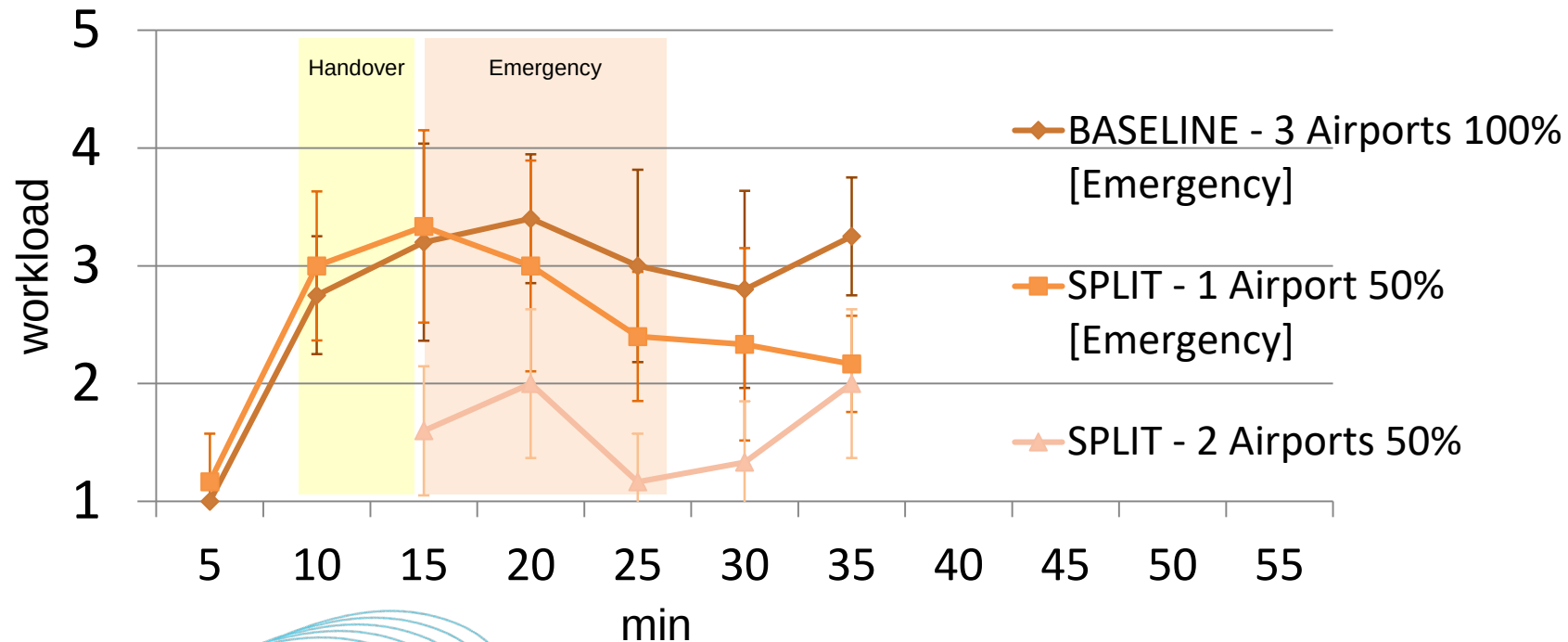


Splitting & Merging





I.S.A. Workload over the time





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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Standardisation of Remote Tower

the work of EUROCAE WG-100

Jörn Jakobi, DLR
WG-100 chairperson

ICAO Consideration 1/4

Establishment of an aerodrome control service does not necessarily imply the immediate provision of a special ATC facility (control tower)

...adequately qualified ATC personnel, having means and facilities at their disposal appropriate for the given situation. (ICAO doc 9426*)

*ICAO Doc 9426 (Dez. 1992) - Air Traffic Services Planning Manual
PART 1 – SECTION 2 – Establishment of Air Traffic Services
Chapter 1 – Need for Air Traffic Services / Paragraph 1.5.3

ICAO Consideration 2/4

The tower must permit the controller to survey those portions of the aerodrome and its vicinity over which he exercises control;

The tower must be equipped so as to permit the controller rapid and reliable communications with aircraft with which he is concerned.

(ICAO doc 9426*)

ESSENTIAL OPERATIONAL REQUIREMENT

*ICAO Doc 9426 - Air Traffic Services Planning Manual
PART III – Section 2 – Facilities required by Air Traffic Services
Chapter 2 - Specific Requirements for an Aerodrome Control Tower / Paragraph 2.1.1

ICAO Consideration 3/4

The controller must be able to discriminate between aircraft and between aircraft and vehicles while they are on the same or different runways and/or taxiways.

(ICAO doc 9426*)

ESSENTIAL OPERATIONAL REQUIREMENT

*ICAO Doc 9426 - Air Traffic Services Planning Manual
PART III – Section 2 – Facilities required by Air Traffic Services
Chapter 2 - Specific Requirements for an Aerodrome Control Tower / Paragraph 2.1.2

ICAO Consideration 4/4



ICAO ATMOPSP/WG/3 Proposal for PANS-ATM, Doc 4444 7.1.1.2.1

*Visual observation shall be achieved through direct out of the window observation or through indirect observation **utilizing a visual surveillance system...***

EUROCAE WG100

„Remote and Virtual Tower“



Launch of
EUROCAE WG-100

2014

EASA RMG.0624
ED Decision 2015/014/R

2015

2016

MINIMUM AVIATION SYSTEM PERFORMANCE
SPECIFICATION FOR REMOTE TOWER OPTICAL
SYSTEMS
ED-240

2017

EASA NPA
2017-21

ED Decision 2015/014/R with
updated GM & AMC to EU
2015/340

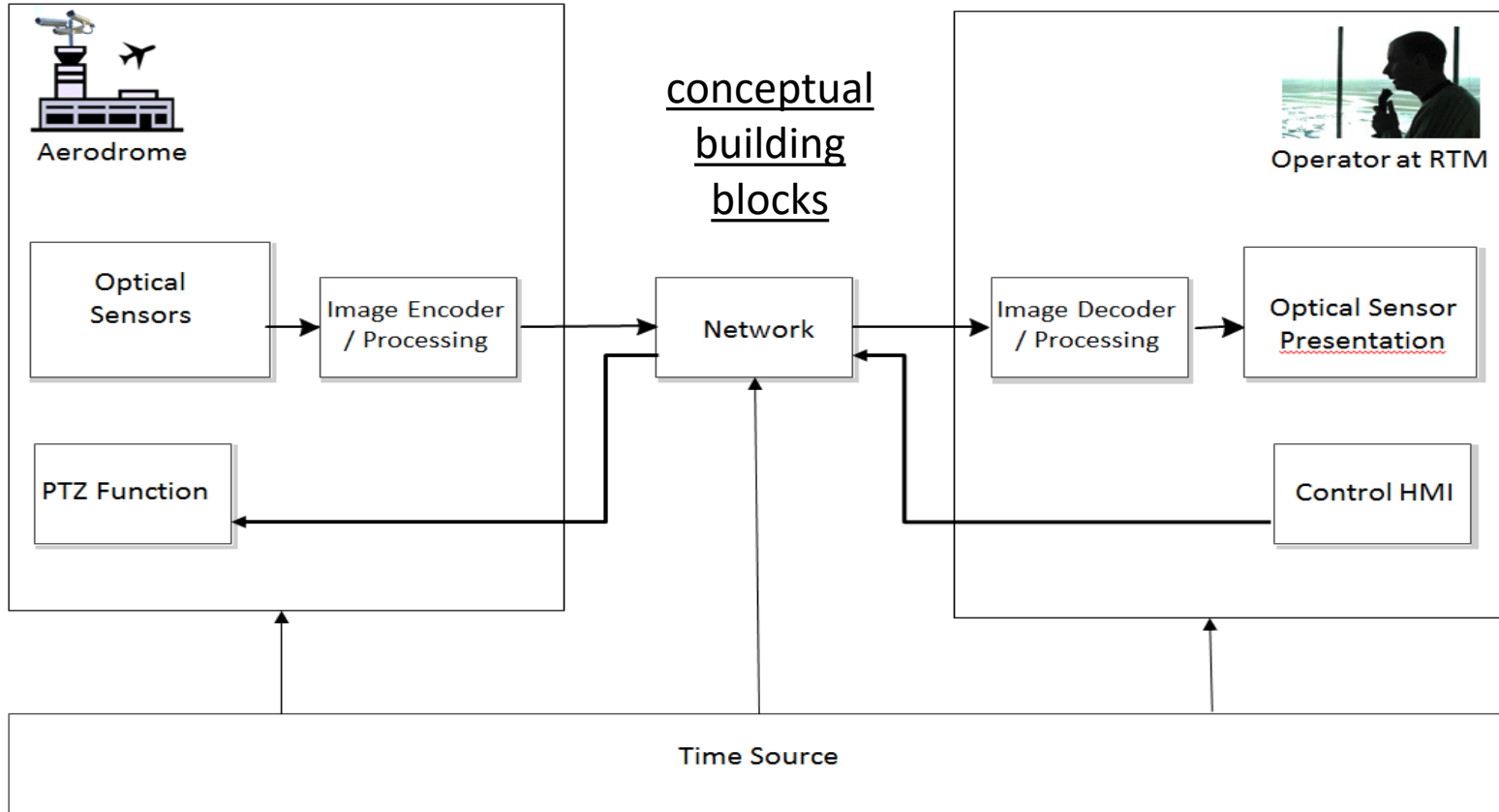
2018

ICAO Doc4444
amendment
proposal

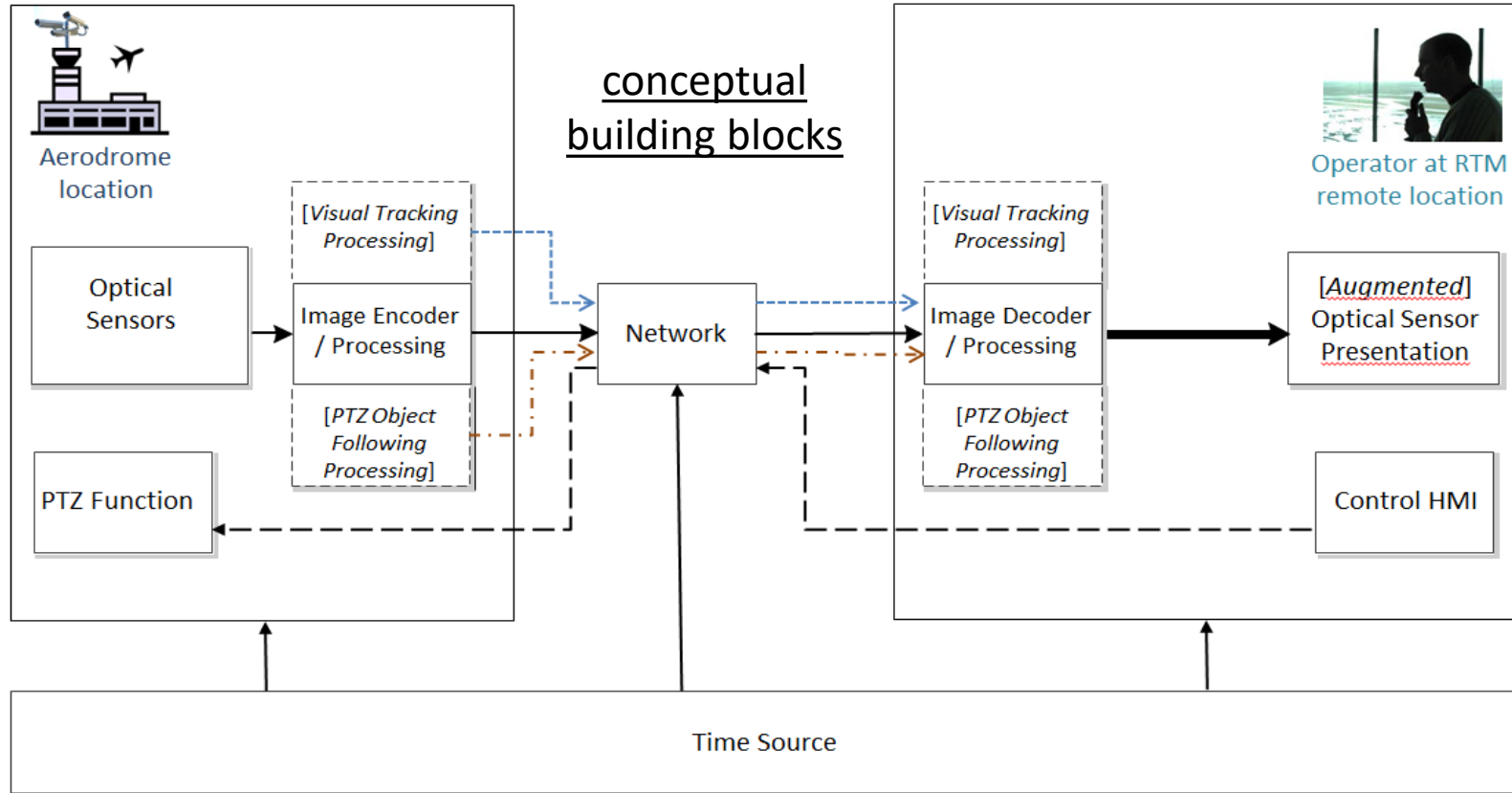
MINIMUM AVIATION SYSTEM PERFORMANCE
SPECIFICATION FOR REMOTE TOWER OPTICAL
SYSTEMS
ED-240A

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EUROCAE ED-240: “Remote Tower Optical System”

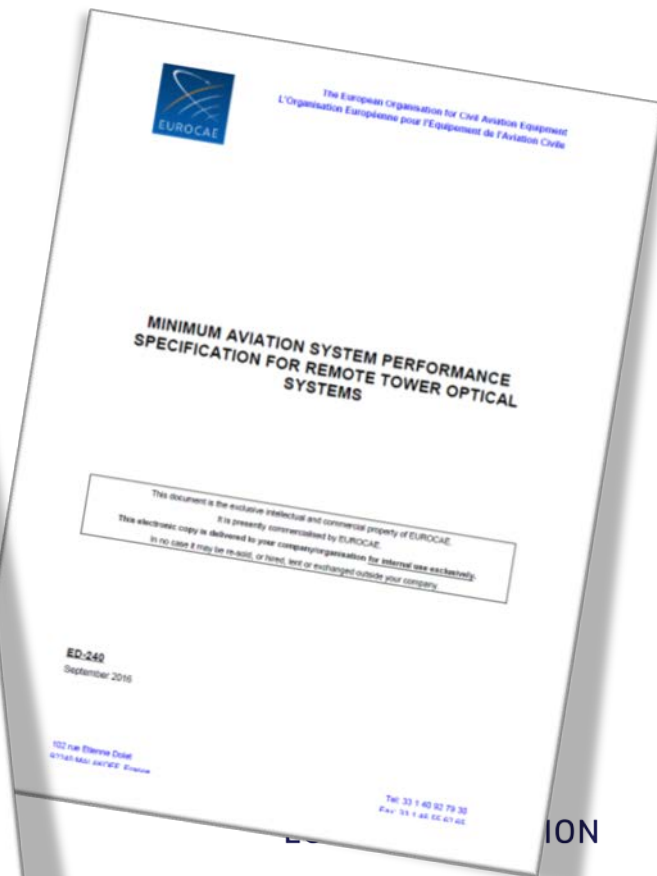


EUROCAE ED-240A: “Remote Tower Optical System”

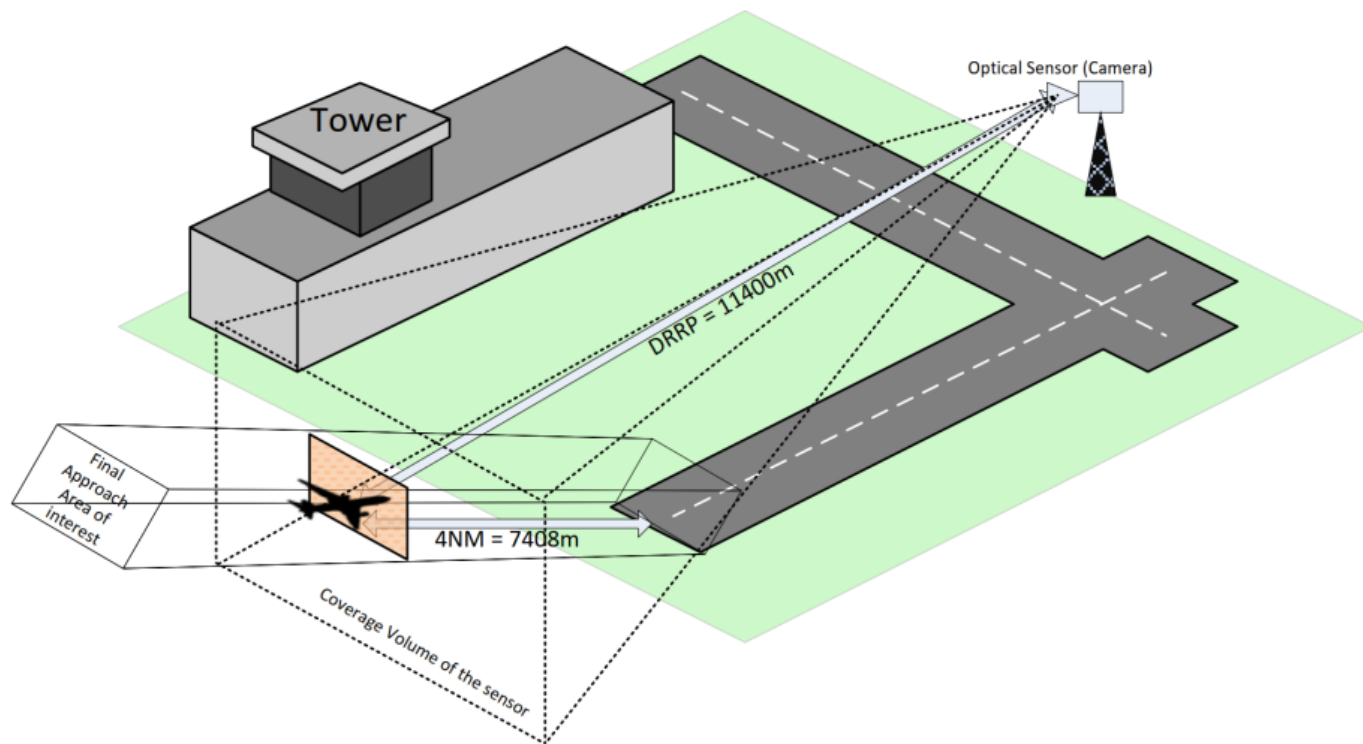


ED-240A Requirements

Section [REQ]	Name	Value
3.2.1 [REQ 01]	Detection and Recognition Range (DRRP)	Operator Acceptance
3.2.2 [REQ 02]	Latency	≤ 1 s
3.2.3 [REQ 03]	Video Update Rate	> 1 fps
3.2.3 [REQ 04]	Video Update Rate	Operator Acceptance
3.2.4 [REQ 05]	Video Failure Notification Time	≤ 2 s
3.2.5 [REQ 06]	PTZ Function Control Latency	≤ 250 ms
3.2.6 [REQ 07]	PTZ Pan Speed	$\geq 60^\circ/\text{s}$
3.2.6 [REQ 08]	PTZ Tilt Speed	$\geq 60^\circ/\text{s}$
3.2.6 [REQ 09]	PTZ Pan Positioning	≤ 2 s
3.2.6 [REQ 10]	PTZ Tilt Positioning	≤ 2 s
3.2.7 [REQ 11]	Time Synchronisation	≤ 100 ms
3.2.8 [REQ 12]	Video Jitter Buffer	N/A
3.2.8 [REQ 13]	Video Jitter Threshold	Operator Acceptance
3.2.9 [REQ 14]	Packet Loss Monitoring	N/A
3.2.9 [REQ 15]	Packet Loss Threshold	Operator specified
3.3.1 [REQ 16]	Visual Tracking Range (VTRP)	Operator specified
3.3.2 [REQ 17]	Number of unwanted Object Indications (NUOI)	Operator Acceptance
3.3.3 [REQ 18]	Object Indication Tracking Update Rate (OITUR)	≥ 1 Hz
3.3.4 [REQ 19]	Position Renewal Time-out Period (PRTOP)	Operator specified
3.3.5 [REQ 20]	Object Augmentation Initiation Time (OAIT)	Operator specified
3.4.1 [REQ 21]	Probability of PTZ Object Following Loss (POL)	Operator specified
4.1.1 [REQ 22]	Integrity Monitor Response Time (IMRT)	≤ 10 s
	Mean Time Between Critical Failures (MTBCF)	$\geq 20\,000$ hrs
	Mean Time To Repair (MTTR)	≤ 2 hrs



Detection & Recognition Requirements Performance (DRRP)



Detection & Recognition Range Performance (DRRP)

TABLE 3: EXAMPLE MATRIX FOR CREATING AERODROME SPECIFIC DRRP

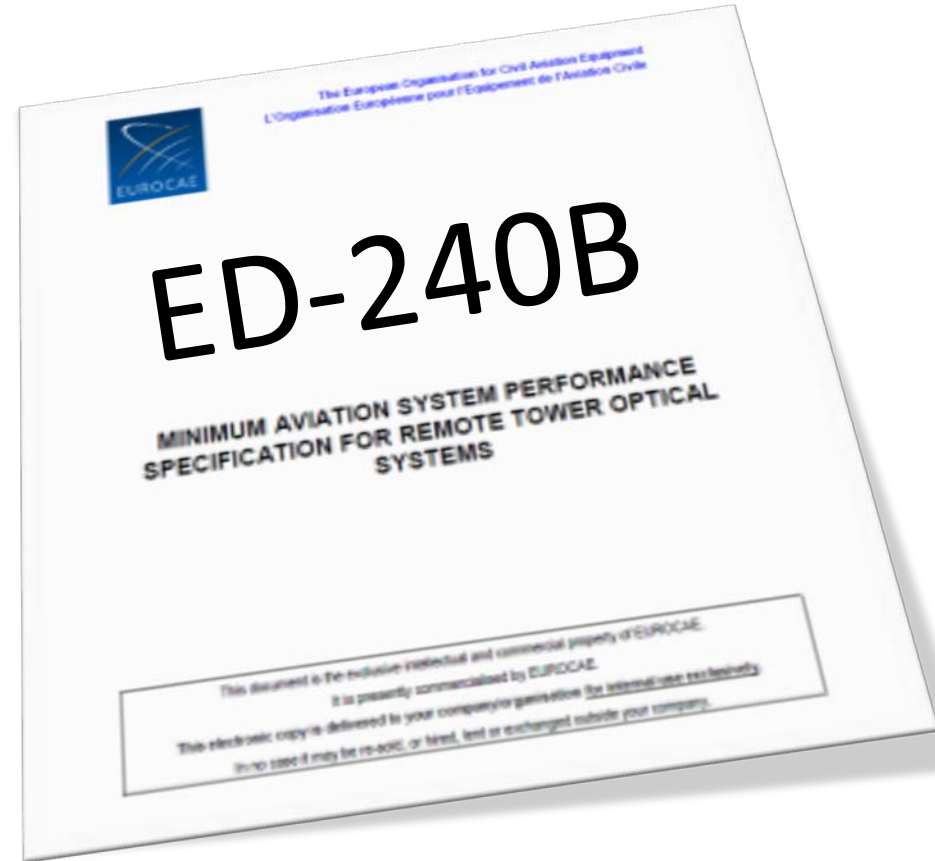
ID	Area of Interest	Targets	Profile Size (m)	Range (m) for Detection (D) and Recognition (R)			
				Panorama		PTZ	
				D	R	D	R
[DRRP REQ 1]	Final Approach	Medium Aircraft	7.0 x 7.0 x 27,2				
[DRRP REQ 2]	Traffic Circuit	Light Aircraft	2.25 x 2.25 x 8.2				
[DRRP REQ 3]	Manoeuvring Area	Persons / Animals	1.8 x 0.5 x 0.5				
[DRRP REQ 4]	Manoeuvring Area	Vehicle	2.5 x 1.5 x 5.0				
[DRRP REQ 5]	Manoeuvring Area	Obstructions	0.3 x 0.3 x 0.3				
[DRRP REQ 6]	Apron	Light aircraft	2.25 x 2.25 x 8.2				
[DRRP REQ 7]	Apron	Obstructions	0.3 x 0.3 x 0.3				
[DRRP REQ 8]	Apron	Vehicle	2.5 x 1.5 x 5.0				
		Persons / Animals	1.8 x 0.5 x 0.5				

Jörn Jakobi (WG-100 chairperson)

DLR Institute of Flight Guidance

Braunschweig, Germany

Joern.Jakobi@dlr.de





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Examples of deployment

Challenges and success stories

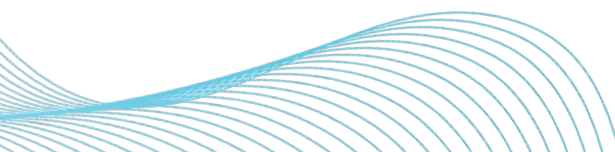
Peter Gridling
Head of Sales Remote Tower





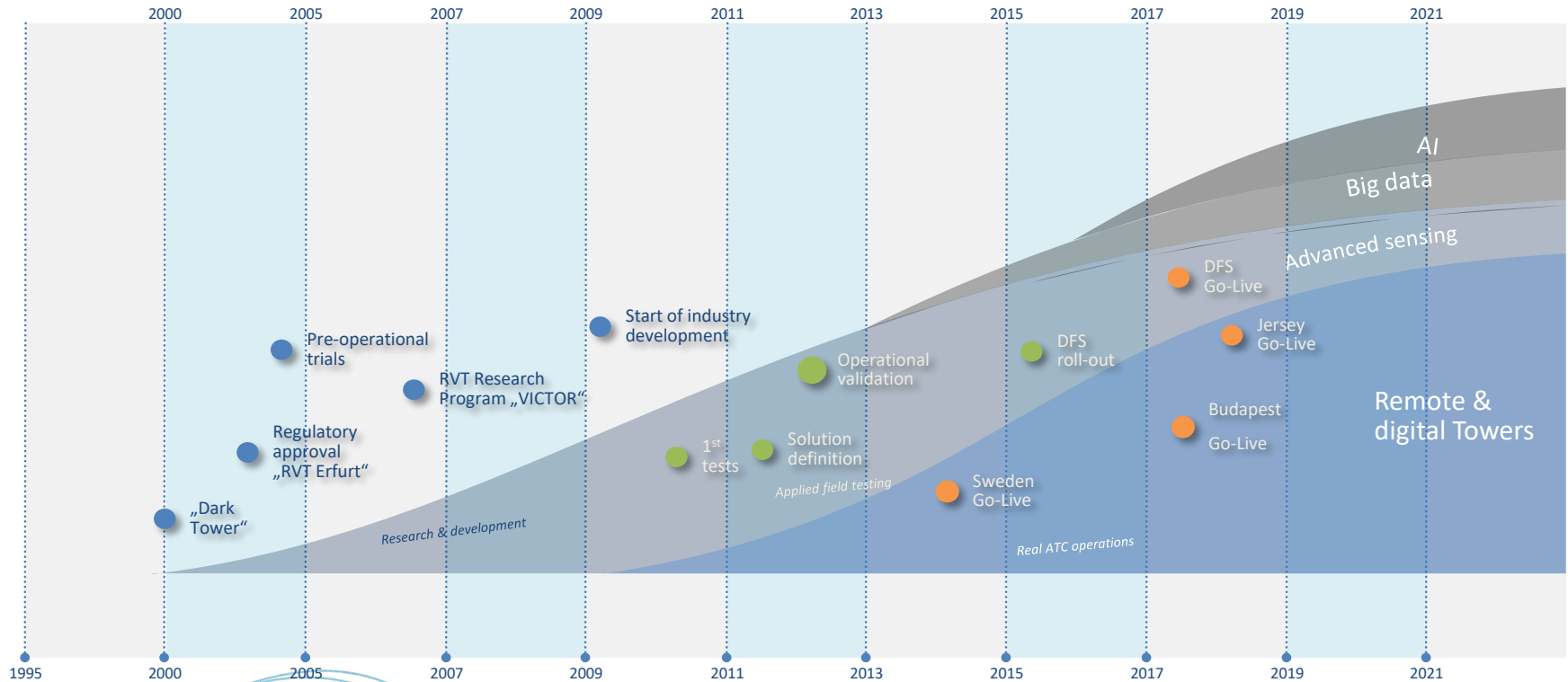
STREAMLINE
SAFETY

?



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Remote Tower - A long journey!



A point of view – Customer vs. Industry

Customer

- Human Factors
- Security
- Safety

Industry

- Competition
- Innovation
- Profit

What is standardization for?

- Joint understanding
- Minimum standards
- Competitive advantage

Basic Business Models

- Tower replacement
- Contingency operations
- Staffing flexibility

A door opener for new business models

- ATC as a Service
- Multi Remote Tower Service
- Temporary ATC Service



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Thank you for your attention

Peter Gridling
Head of Sales Remote Tower

STANDARDISATION – Remote Towers

The MILITARY in Single European Sky -
Partnering for Excellence in global aviation



EDA'S REINFORCED MISSION

In May 2017, after EDA's LONG TERM REVIEW,
Defence ministers agreed to reinforce the Agency's role and mission

- ▶ as the **main instrument**
for intergovernmental capability planning & prioritisation in Europe
- ▶ as the **prime forum and coordinator**
for the whole lifecycle of capability development
- ▶ as Member States' **central interface & gateway**
towards EU institutions & stakeholders

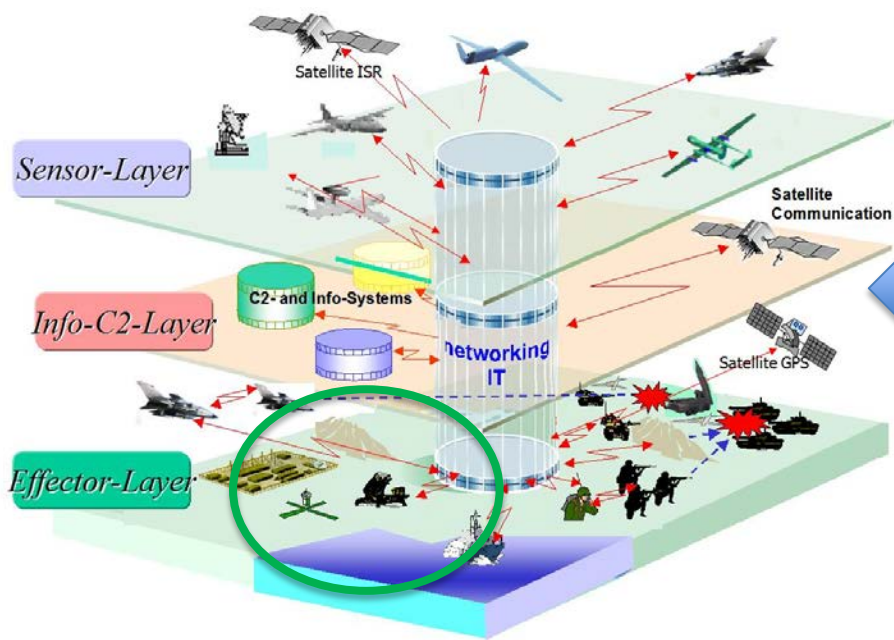


The Fleet and the ground systems – The Stakeholder

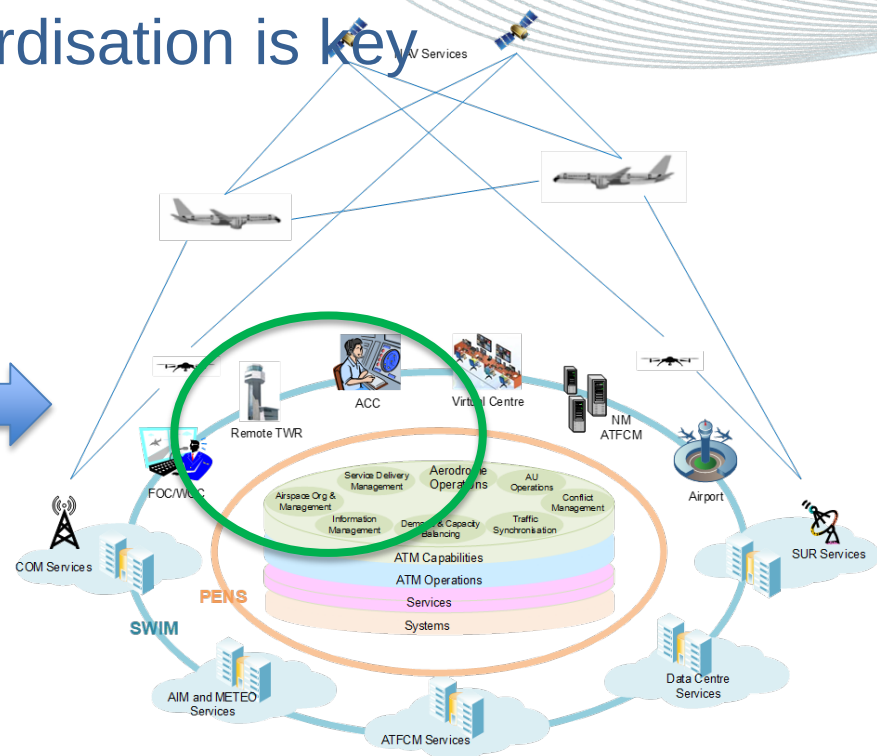


Type of assets	Number
Combat Aircraft	3365
Helicopters	3733
Light Transport Aircraft	1390
Heavy Transport Aircraft	949
RPAS (All types)	420 <i>10% of MALE/HALE</i>
Airfield	220

Interoperability is a must - Standardisation is key



TODAY: Military crisis/Operations environment
"core mission"



TOMORROW: SES peace Time environment
"Train as you fight"

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Military Deployable Towers are not remote but inter-connected towers



TODAY: Military crisis/Operations
environment
“core mission”

TOMORROW: SES peace Time
environment
“Train as you fight”
Towards a Sustainable System

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Conclusion

- Let's move forward together
- Civil-Military collaboration is crucial
- Interoperability is a must and Standardisation key
- SES shall accommodate the needs of all stakeholders
- Defence and Security is a common responsibility



Q&A and closing



Thank you very much for your attention!

Christian Schleifer

Secretary General, EUROCAE

Phone: +33 1 49 46 19 66 | christian.schleifer@eurocae.net | info@eascg.eu