The European Organisation for Civil Aviation Equipment
L'Organisation Européenne pour l'Equipement de l'Aviation Civile

EUROCAE Technical Work Programme

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1. Introduction

The purpose of this document is to provide an overview of the ongoing technical standardization activities currently undertaken by EUROCAE together with the anticipated technical standardization activities to be potentially undertaken by EUROCAE during the next five years, in order to illustrate the extent of the current and future EUROCAE work.

The foreseen future activities cover

- new or revised tasks to be allocated to existing WGs in the short term - a 2 year time frame
- the establishment of specific new Working Groups (WGs)

This document is intended to be used as an input to the EUROCAE Business Plan and TAC work for starting new and strategically relevant Working Groups in order to appropriately size the future EUROCAE activities.

In general, the strategic environment of EUROCAE, although wide, has been found to be stable.

Nevertheless, there was influence on the technical domains that can be summarised as follows:

- There is not much change in the Avionics Domain Most aircraft manufacturers are upgrading their existing products through incremental innovation. Avionics equipment and systems are slowly continuing their evolution without experiencing significant breakthrough changes.
- In the CNS Domain in the Surveillance subdomain the focus is on performance-based Surveillance and alternatives to conventional systems, with the opportunity to rationalise the ground surveillance system. In Navigation, the focus is also on performance-based Navigation, especially on GBAS CAT II/III multiconstellation/multifrequency specification with enhanced DME-DME as a terrestrial backup network. The Communication subdomain will concentrate on work resulting from implementing the recommendations of the ELSA-study, as far as EUROCAE will be concerned, and on preparing the standardisation of a new terrestrial component (LDACS) and a SATCOM Datalink, both in the L-Band.
- Not much new work is expected for the ATM Domain. EUROCAE standards on digital Voice for ATM (VoIP) are expected to be globalised by ICAO.
- In the Airport Domain work on Remote Tower is well under way. A-SMGCS is a dynamic field, driven by new sensor technologies emerging from SESAR (video and non-cooperative surveillance) and by SESAR deployment mandates.
- In the SWIM Domain, the activities in the near future have been outlined by currently active WG-104. In the medium-term a to be created European SWIM Governance function may influence EUROCAE's activities in the standardisation of SWIM services.
- In the Security Domain, a substantial work programme is foreseen for WG-72, however in the medium- to long-term future. Work will be conducted in close cooperation with RTCA. Necessary input from certification authorities has to be awaited.
- AIS/MET Domain foresees medium- to long-term work to revise existing database standards. Standardisation of MET information services is expected to happen in the SWIM domain, also in support of MET Datalink services.
- UAS and General Aviation: with the creation of WG-105 a comprehensive work programme on UAS has been installed for at least the next three years within six Focus Areas. The UAS domain has the potential to be a disruptive market segment with high growth rates and high number of aircraft especially in the domain of smaller aircraft flying at lower altitudes. This segment of the domain may not follow the approach established for transport category aircraft. European coordination of standardisation is foreseen among this differing stakeholder community via the EUSCG.
- There is no work foreseen for General Aviation.

2. TWP development context

This Technical Work Programme (TWP) has been developed by the Technical Advisory Committee (TAC) with the support of the EUROCAE General Secretariat, in view of being presented to and approved by the EUROCAE Council.

2.1 TWP Contents

This document encompasses:

- Status of ongoing technical standardization activities has been provided by the EUROCAE General Secretariat
- Anticipated technical standardization activities to be initiated in the future by EUROCAE are resulting from an analysis performed by the Technical Advisory Committee of the overall aviation environment based on inputs provided by the following bodies: ICB, SJU, EASCG, EUSCG, EC, EUROCONTROL, ICAO, EASA, RTCA, FAA, IATA.
- Description of Working Groups in the frame of their activities
- Contribution from the General Secretariat through its participation to a number of various events (workshops, conferences, etc.) and working relations with partners
- Views of the Technical Advisory Committee (TAC) members together with the support of their parent companies

This document is structured according to the following domains:

- Avionics (Non-CNS)
- CNS (Communication, Navigation, Surveillance, Datalink Applications)
- ATM
- Airports
- SWIM (System Wide Information Management)
- Security
- AIS/MET Services
- UAS + General Aviation
- Miscellaneous.

2.2 EUROCAE Strategy

This TWP has been developed according to the EUROCAE strategy, which delineates the scope of standardisation activities to be undertaken by EUROCAE.

EUROCAE's focus is the production of standards for aircraft equipment/system. This scope is not confined to electronic systems and may include any aviation related equipment or process aspects. The domain of applications covered is basically air transport aircraft, but standards may also be developed with a view of them being applied to General Aviation and UASs as well.

EUROCAE also has activities that are producing standards for aviation related ground systems and equipment for both ATM and airports.

Therefore, the scope of standardization activities considered in this TWP relates to both airborne and ground systems, covering operational and functional considerations, systems architecture, hardware, software, data bases and process aspects.

2.3 EUROCAE technical activities

The main EUROCAE technical activities consist in developing standards:

- to support to future regulatory requirements (e.g. ICAO)
- which could be recognized as Acceptable Means of Compliance AMC within the Aviation Safety Regulations
- which could be used as Acceptable Means of Compliance in support of SES Regulations
- in support of the ATM research, development and validation in Europe

- in support of the industrialisation and deployment of SESAR solutions
- in support of the European Aeronautical Industry

Activities captured in this TWP are addressing those needs.

The expected start time of the work has been classified as:

- Current (meaning that a Working Group is currently active)
- Short Term (meaning that a Working Group is expected to be formed within one year)
- Medium Term (meaning that a Working Group is anticipated to be formed within five years)

2.4 EUROCAE document types

The types of document produced by EUROCAE are defined in the latest edition of the EUROCAE Handbook.

Guidance documents have been developed for the drafting of the different document types.

3. Major changes and evolutions shaping the environment of EUROCAE technical activities

3.1 Sources for defining 2018 EUROCAE technical activities

The technical standardisation activities to be initiated in the future by EUROCAE have been identified from inputs coming from a number of different sources, namely:

- ICAO
- European Commission
- EASA (and its international counterparts, e.g. the FAA)
- SESAR Joint Undertaking (SJU)
- SESAR Deployment Manager (SDM)
- EASCG/EUSCG
- EUROCONTROL
- RTCA and other standardisation organizations (e.g. SAE, ARINC, …)
- Aeronautical Industry (aircraft manufacturers, airborne and ground system manufacturers)
- Air Navigation Services Providers (ANSPs)
- Airports
- Accident investigators (such as BEA, NTSB)
- JARUS
- Military organisations (e.g. EDA)
- Airspace users

More generally, all concerned aviation stakeholders, and in particular EUROCAE Members, are free at any time to propose initiatives for EUROCAE technical work. These may result in additional inputs from industry, airspace users, service providers and regulators. Those proposals for new EUROCAE activities are submitted as Discussions Papers (DP). These are reviewed by the TAC and may result in amending existing standards or activities of existing WGs or in recommendations to the EUROCAE Council to set up a new WG.

The following paragraphs give an overview on the major changes and evolutions affecting the environment of the EUROCAE technical activities, which may drive the needs for new or updated standards in the short-term or long-term.

4. Ongoing and foreseen EUROCAE technical activities

4.1 Avionics (non-CNS)

4.1.1 Purpose & Scope of activities of this Domain

This Domain encompasses all standardization activities, which are related to on-board equipment and systems without those in interaction with the external world (which are part of the CNS Domain). In addition, this Domain also encompasses standardization activities related to the various system development activities.

Scope of activities therefore includes:

- Architecture and networks
- Sensors and displays
- Approach and Landing Systems
- Safety Systems
- System Engineering
- System Safety Assessment
- Environment
- Hydrogen Fuel Cells.

4.1.2 Architecture and networks

4.1.2.1 Current activities of this Sub-Domain

A EUROCAE Working Group (WG) is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-96 Wireless On-Board Avionics network	ED-246	Process Specification for Wireless On-board Avionics Networks	Q3 2017	Published	SC-236
	ED-xxx	MOPS for a Wireless Avionics Intra-Communication System.	2018	Draft	SC-236

4.1.2.2 Vision of future EUROCAE activities in this Sub-Domain

As EASA and FAA are updating their IMA guidance, it may be appropriate to review the IMA standard ED-124/DO-297 in the medium term.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
IMA	ED-124A	medium Term		RTCA

4.1.3 Sensors & Indications

4.1.3.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-68 Altimetry	ED-241	MOPS for AFE for RVSM	Q3 2017	published ED-241	In support of SAE-A4
	ED-140 rev A	MOPS for ADC for RVSM	Q3 2017	ongoing	In support of SAE-A4
WG-89 Pitot Tubes	ED-226	Guidance - explanation on docs	TBD	ongoing	SAE AC-9C
WG-95 In-Flight Ice Detection Systems	report	Ice crystals awareness with WXR	Q4/2017	Finished, to be published	In support of RTCA SC-230
	ED-103revA	MOPS Inflight Icing Detection Systems	Q4/2017	being finalized	

4.1.3.2 Vision of future EUROCAE activities in this Sub-Domain

The future activities will be determined in coordination with other standardisation organisations in particular in domains where EUROCAE has competencies.

This activity supports strategic development in EASA in response to recommendations from accident investigations.

4.1.4 Approach and Landing Systems

4.1.4.1 Current activities of this Sub-Domain

A EUROCAE Working Groups (WG) is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-79 EVS & SVS	ED-xxx	MASPS for CGVS	Q1 2018	depending on the result of deliverable 2	SC213 subgroup 4, WG-79 lead
	ED-yyy	MASPS for Vision System for take-off	Q1 2018	ongoing	SC213, SC-213 subgroup 2 lead
	ED-249	MASPS for SVS for aircraft state awareness	Q4 2017	Comment Resolution	

4.1.4.2 Vision of future EUROCAE activities in this Sub-Domain

There is a need for EUROCAE to conduct activities in response to the following drivers:

There is an EASA Rulemaking Activity and an FAA activity.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
SVS/EVS/CVS operational credit	MASPS	Short-term	Industry	RTCA SC-213
EVS sensors	MOPS	Short-term	Industry	

4.1.5 Safety systems

4.1.5.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-88 On Board Weight and Balance Systems	ED-xxx	MOPS for Weight & Balance	Q2 2018	ongoing	
WG-94 Take-off performance Monitoring Systems	No current activities (WG dormant)				
WG-98 Aircraft Emergency Locator Transmitters	ED-62A	MOPS ELT	Q1 2018	ongoing	RTCA SC-229
	ED-XXX	MASPS RLS	Q4 2019	starting	

4.1.5.2 Vision of future EUROCAE activities in this Sub-Domain

Depending on technologies maturity, there could be a need for the following EUROCAE standardization activities.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
TOPMS	MASPS	Medium term	Industry Airworthiness Authority	RTCA
Deployable ELT linked to FDR	MOPS	Short Term	Industry Airworthiness Authority Accident Investigator	RTCA
Deployable FDR	MOPS update	Short Term	Industry Airworthiness Authority Accident Investigator	
Offshore HTAWS improvements	MOPS	Short Medium Term	Industry Airworthiness Authority	RTCA

All activities respond to safety recommendations received from accident investigators.

The ELT and FDR related activity is linked to ICAO recommendations and corresponding equipage mandates in Europe.

TOPMS contributes to runway safety as reflected in the European Plan for Aviation Safety during departure while the Wrong Glide Slope Warning addresses the landing case.

HTAWS improvement for offshore operation contributes as well to the helicopter operation improvements as laid down in the EASp.

4.1.6 System Engineering

4.1.6.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-97 Interoperability of Virtual Avionics Components	report		Q4 2014	delivered	
	ED-247	TS Virtual Interoperable Simulation for Tests of Avionics Systems in Virtual or Hybrid Bench	Q4 2017	Council approval by 10 November 2017	
	ED-247A	Update to ED-247	Q2/2019	ongoing	
User Forum for Avionics Software	No specific deliverables			ongoing	

NOTE: *At the 14th meeting of WG-97 held at Dassault Aviation on 19-20 October 2016, the group has decided to submit the proposal for new ToR. This is the conclusion of the thorough assessment made and the agreement reached at industry level that the proposed deliverable will deliver the benefits in an effective way. There is no aim in this standard to oblige Airframe manufacturers or Suppliers to modify their development process or to require where virtualization should appear in the development process. Only an example of virtualization tasks in a process will be given in the document as an appendix.*

Consequently, the new ToR would provide for a Technical Specification that would be named VISTAS – WG-97 Standard of Virtual Interoperable Simulation for Tests of Avionics Systems in virtual or hybrid. The first release of the standard will cover main avionics interfaces. Further releases (i.e. Revision A) will be due in a second step, as the group will expand the scope to cover additional avionics interfaces and functionalities.

4.1.6.2 Vision of future EUROCAE activities in this Sub-Domain

No activities foreseen in the medium term.

4.1.7 System Safety Assessment

4.1.7.1 Current activities of this Sub-Domain

EUROCAE WG-63 is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-63 Complex Aircraft Systems	ED-135	Safety and assessment process	Q1 2018	ongoing	SAE S-18 ARP4761A
	ER-008	Neutron Single Event Effects Analysis	Q4 2017	ongoing	SAE S-18 AIR6219
	ED-79revB	Guidelines for Development of Civil Aircraft and Systems	Q3/2018	ongoing	SAE S-18 ARP4754B

4.1.7.2 Vision of future new EUROCAE activities in this Sub-Domain

Industry has requested to EASA and FAA to extract the objectives from ED-79/ARP-4754. ED-79/ARP-4754 is accused to be too prescriptive and contains best practice instead of defining objectives. This may lead to the development of a new standard extracting the objectives from the document.

There is probably a need to monitor MBSE processes so as to be ready for standardization activities when mature enough.

4.1.8 Environment

4.1.8.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-14 Environment	ED-14H	Environmental conditions and test procedures for airborne equipment	Q4 2019	ongoing	RTCA SC-135 SAE AE-4
	ED-234A	User Guides to ED-14H	Q4 2019	ongoing	RTCA SC-135 SAE AE-4
WG-31 Lightning	ED-158	User Manual - Indirect lightning effects	Q4 2017	ongoing	SAE AE-2
	ED-xxx	User Guide - fuel tank lightning protection	Q4 2017	ongoing	SAE AE-2
	ED-248	User Manual - EMC	Q4 2017	ongoing	SAE AE-2

			OC in 05/06 2017		
	ED-91A	Lightning zoning	Q4 2017	ongoing	SAE AE-2
	ER-xxx	ED-105 evolutions on test methods	Q4 2017	ongoing	SAE AE-2
	ER-yyy	ED-14 sect 22-23 improvements	Q4 2017	ongoing	SAE AE-2

4.1.8.2 Vision of future new EUROCAE activities in this Sub-Domain

No new activities are foreseen beyond those already ongoing, which will already require quite a lot of resources over the coming years.

4.1.9 Hydrogen Fuel Cells

4.1.9.1 Current activities of this Sub-Domain

One EUROCAE Working Group (WG) is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-80 Hydrogen Fuel Cell Systems	ED-xxx	MASPS for design and integration of Fuel Cell Technologies of Liquid Hydrogen (LH2)	Q2/2018	Ongoing	SAE AE-7

The Hydrogen Fuel Cell activity is part of the more electrical aircraft strategy. The joint activity is run in parallel to an FAA Aviation Rulemaking Committee (ARC) created in 2015. The ARC is looking into hydrogen fuel cell technology use cases and certification objectives. The recommendation report is expected by end of 2017. The recommendations from this report will detail the further work in this domain.

For the storage of electrical energy currently several activities for standardisation are running at RTCA or SAE. This includes lithium battery requirements, development of specifications for electrical actuators, traditionally powered by hydraulic systems, electrical aircraft engines, or solar cells etc. The EUROCAE role in this sector depends on the willingness of European industry and EUROCAE stakeholders to engage in this domain.

4.1.9.2 Vision of future new EUROCAE activities in this Sub-Domain

Nothing anticipated at the moment.

4.2 CNS

4.2.1 Purpose & Scope of activities of this Domain

This Domain encompasses all standardization activities which are related to on-board and ground equipment and systems which are in interaction with the external world for Communications, Navigation and Surveillance (CNS). Activities related to Datalink are also considered as part of this Domain.

Scope of activities therefore includes:

- Navigation including ground and space navigation infrastructure
- Surveillance including ACAS
- Communications means
- Datalink applications

4.2.2 CNS – Navigation

4.2.2.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-28 Global Navigation Satellite Systems	ED-114B	MOPS for the GBAS ground subsystem (Cat II/III L1)	Q4/2018	ongoing	RTCA SC-159
	Report on GBAS MC/MF	GBAS Multi-Constellation Multi-Frequency	Q4/2019	starting	RTCA SC-159
WG-62 GALILEO	ED-rrr	Guidance document on status of single constellation GALILEO OS receiver MOPS and way forward	Q4/2017	ongoing	RTCA SC-159
	ED-aaa	MOPS on GPS/GALILEO L1/L5 E1/E5a Antenna	Q4/2017	ongoing	RTCA SC-159
	ED-xxx	Receiver using Dual Frequency GPS/GALILEO, with multi constellation SBAS	Initial 12/2018 Final 2020 (joint with RTCA)	Ongoing	RTCA SC-159

WG-107 RNP Reversion based on DME / DME	Revised ED-57	Minimum Performance Specification for Distance Measuring Equipment (DME/N and DME/P) - Ground Equipment	Q4/2019	ongoing	
	ED-xxx	New ED: Minimum Aviation Systems Performance Specification (MASP) for RNP reversion using DME/DME Positioning	Q4/2019	ongoing	
WG-85 4D Navigation	Working Group dormant				

NOTE: *It has to be ensured that the ToRs of WG-62 and SC-159 are aligned.*

4.2.2.2 Vision of future new EUROCAE activities in this Sub-Domain

There is a need for EUROCAE to conduct activities in response to the following drivers:

- Standardisation activities for Satellite positioning
- Multi-constellation/Multi-frequency GNSS

GBAS CAT II/III multiconstellation/multifrequency, addressing for System level, Ground station and Airborne equipment.

- MOPS on Galileo OS Receiver and MOPS on GPS/Galileo antenna
- MOPS on GPS/GALILEO + multi-constellation and multi-frequency SBAS

Standardisation for more advanced applications, such as A-PNT as GNSS backup and Advanced RAIM may be necessary in the medium-term, but the need will have to be assessed at a later stage. This activity supports strategic development towards PBN operations in the ICAO context.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
GBAS Cat II/III multiconstellation/ multifrequency *System level*	MASPS	Medium Term (2020 TBC)	Industry	RTCA SC-159
GBAS Cat II/III multiconstellation/ multifrequency *Ground Station*	MOPS for the GBAS ground subsystem to support precision approach and lending in the context of GBAS CATII/III L1	Medium Term (2020 TBC)	Industry	RTCA SC-159
GBAS Cat II/III multiconstellation/ multifrequency	Updated ED-88 MOPS	Medium Term (2020 TBC)	Industry	RTCA SC-159

Airborne Equipment (Multi-Mode Receiver)				
Alternative Position, Navigation and Time solution (A-PNT) as GNSS backup	TBD	Medium Term	Industry	RTCA SC-159
Advanced Receiver Autonomous Integrity Monitoring (ARAIM)	TBD	Medium Term	Industry	RTCA SC-159

4.2.3 CNS – Surveillance

4.2.3.1 Current activities of this Sub-Domain

In the Surveillance Subdomain five EUROCAE WGs are active:

- WG-41 A-SMGCS
- WG-49 Mode-S Transponder, which was reactivated in January 2016
- WG-51 Automatic Dependent Surveillance-Broadcast (ADS-B)
- WG-75 Traffic Alert and Collision Avoidance System (TCAS)
- WG-102 GEN-SUR SPR
- WG-103 Independent Non-Cooperative Surveillance Systems

These WGs are currently working on the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-49 Mode S Trans-ponders	ED-73E	MOPS Mode S Trans-ponder	Q4 2019	ongoing	RTCA SC-209 "Combined Surveillance Committee"
	ED-115A	MOPS for Light Trans-ponder	Q4 2019	ongoing	
WG-51 ADS-B	ED-102B	MOPS for 1090 MHz Extended Squitter ADS-B/ TIS-B	Q4 2019	ongoing	SC-186 "Combined Surveillance Committee"
	ED-142A	TS for WAM and Composite (ADS-B and WAM)	Q4 2018 (expected Q3 2017Q4 2018)	ongoing	"Combined Surveillance Committee"

WG-75 Traffic Alert and Collision avoidance System (TCAS)	ED-xxx	Interoperability requirements between ACAS	Q1 2018	ongoing	RTCA SC-147
	ED-xxx	MOPS for ACAS Xa with ACAS Xo functionality	Q4 2018	ongoing	RTCA SC-147
	ED-224A	MASPS AFGCS coupled to TCAS	Q4 2018	ongoing	RTCA SC-147
	ED-XXX	MOPS for ACAS Xu	03/2020	ongoing	RTCA SC-147
WG-102 Generic Surveillance	ED-xxx	GEN SUR SPR	Q3 2017 ToR update Q1/2018	ongoing	
WG-103 Independent Non-Cooperative Surveillance Ground System	ED-xxx	MOPS for INCS systems	Q4 2018	ongoing	

4.2.3.2 Vision of future EUROCAE activities in this Sub-Domain

As ground ATC surveillance is being supported by ADS-B as well as Mode S, there is the need to ensure that future needs (e.g., tactical controller tools) are equally supported by airborne data. and therefore, coordination with WG-41 is important. Close coordination between WG-49- and WG-51 is necessary to develop new versions of transponders as the concept of operations is evolving.

Concerning the UAS Collision Avoidance capability, WG-75 TCAS has taken that task into its remit, working together with WG-105, coordinating with RTCA SC-147. WG-75 has also to ensure that with the emergence of a number of distinct collision avoidance systems (TCAS II, ACAS XA, Collision Avoidance for UAS) any two collision avoidance systems interoperate effectively.

A European led initiative (Airbus, Honeywell Europe) is ongoing towards the development of tailored SURF IA SPR provisions (based on DO-323) and towards related MOPS material. Whilst it is desired that this is ultimately run as a Joint activity, the initial SPR activity will be executed as a EUROCAE activity (providing the baseline for negotiating the joint MOPS activity with RTCA at a later stage).

Satellite-based ADS-B is currently under development. This may demand to clarify expected performances of such a system in relation to the expected separation services.

This activity supports strategic development in the domains of stakeholders, in particular ANSPs and Military organisations.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
SURF IA	SPR for SURF-IA	short term	Industry	RTCA (?)
	MOPS for SURF-IA	short term	Industry	RTCA (?)
ADS-B Ground System	ED-129C	short term	Industry	

4.2.4 CNS – Communication means

4.2.4.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-82 New Air/Ground Technologies	ED-242	MASPS SATCOM Class B	Q2 2017	Published	RTCA SC-222 ESA
	ED-243	MOPS SATCOM Class B	Q3 2017	Published	RTCA SC-222 ESA
	ED-xxx version A	MASPS SATCOM Class A	TBD		RTCA SC-222 ESA
	ED-yyy version A	MOPS SATCOM Class A	TBD		RTCA SC-222 ESA
WG-92 VDL Mode 2	ED-92 companion document	Ground VDL Mode 2 systems expected behaviour	End 2018	ongoing	RTCA SC-214
	ED-92C ED-92 update	MOPS for an Airborne VDL Mode-2 System Operating in the Frequency Range 118-136.975 MHz – Revision C MOPS	Mid 2018	ongoing	RTCA SC-214
	ED-92D Ground reference material	MOPS for an Airborne VDL Mode-2 System Operating in the Frequency Range 118-136.975 MHz – Revision D	Mid 2019		

4.2.4.2 Vision of future EUROCAE activities in this Sub-Domain

In the medium-term timeframe, the terrestrial component of Air-Ground communication in L-Band needs standards.

1. For VDL2 ELSA recommendations need to be implemented.
2. For LDACS, the capacity study has demonstrated that the European ATM will require a new high bandwidth media around 2030. The solution will be developed under S2020 and will require EUROCAE support.

A second area of activities in mid-term timeframe would be standardization of an RPAS Command and Control Data-Link.

The satellite component is foreseen long-term, depending on the ESA Iris programme.

This activity supports strategic development in SESAR Deployment and cooperation with RTCA.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
L Band Air Ground Communication *System*	MASPS	Medium Term	Industry	SESAR RTCA
System level L Band Air Ground Communication System *Ground System*	Ground MOPS	Medium Term	Industry	SESAR RTCA
L Band Air Ground Communication System *Airborne Equipment*	MOPS	Medium Term	Industry	SESAR RTCA
UAS New control and command data-link *System level*	System level TS	Medium Term	Industry	
UAS New control and command data-link *Ground System*	Ground MOPS	Medium Term	Industry	
UAS New control and command data-link Airborne Equipment	MOPS	Medium Term	Industry	
VDL Mode 2 Avionics Equipment	MOPS	Medium Term	Industry	SESAR RTCA

In the long-term, “Beyond Line of sight” communications means in the C Band may also be considered for use.

“The Future Aviation Spectrum Strategy and Vision” could also result in some new standards or updates.

4.2.5 CNS – Datalink Applications

4.2.5.1 Current activities of this Sub-Domain

Several EUROCAE Working Groups (WGs) are already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-78 Air Traffic Data Communications Services	Currently dormant				
WG-76 AIS/MET Datalink Applications	ED-175A	SPR for AIS/MET Datalink Service	Q4 2017	ongoing	RTCA SC-206
	ED-xxx	MASPS for AIS/MET Datalink Service	Q1 2019	ongoing	RTCA SC-206

4.2.5.2 Vision of future EUROCAE activities in this Sub-Domain

After finalization of the Revision A of Baseline 2 standards, the WG-78 is now in a dormant phase, allowing first industrializations of Data Link systems, on aircraft and on ground, to take place.

These implementations and the associated entry into service (either for validation or for deployment) may provide feedback to EUROCAE WG-78 and RTCA SC-214 committees.

The date when the committee would reconvene, should the need to provide a revision B of the standards be confirmed, mostly depends on the progress of Baseline 2 validation and implementations in coming years. A likely scenario could see a publication of Baseline 2 Revision B in 2020 timeframe.

In the latest SC-223 ToRs (22 Sep 2015), new tasks have been approved by RTCA PMC to work on ATN/IPS standards:

- Aviation Profiles for Internet Protocol Suite: Certification profiles for TCP/UDP/IP/DHCP/Routing/Mobility/Multilink protocols based on IETF RFCs; Jun 2017
- MOPS for the Internet Protocol Suite used in Aviation A-G Communication System: MOPS for the Internet Protocol Suite for avionics certification. MOPS will be based on the Aeronautical Profiles developed by RTCA; Dec 2018.

Development of MOPS on ATN/IPS and all the associated activities will be undertaken only after the publication of the technical report by the AEEC SC “Internet Protocol Suite (IPS) for Aeronautical Safety Services” (mid 2017).

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
IPS	tbd	Medium Term	Industry	SESAR RTCA

This activity also supports strategic development in SESAR Deployment and cooperation with RTCA.

4.3 ATM

4.3.1 Purpose & Scope of activities of this Domain

In the ATM-Domain following EUROCAE WGs are concerned:

- WG-59 Flight Data Processing (FDP) Interoperability
- WG-67 Voice on Internet Protocol (VoIP) for ATM
- WG-81 Interoperability of ATM Validation Platforms.

WG-59 is concentrating on a new release of ED-133 (Flight Object Interoperability Specification) to include outcomes/findings from SESAR and other implementation/validation projects. This new release constitutes the baseline for implementation of the Pilot Common Projects (PCP) in the SESAR Deployment.

Currently WG-59 is waiting for input from SESAR, that has taken over the coordination and development of requirements and validation activities.

The current activities are shown in tabular form below.

WG-81 will focus its work on ED-148. The objectives are to identify the overall process and associated activities allowing two or more ATM Validation Platforms to interoperate. The WG is further developing a new release of the Interoperability of ATM Validation Platforms ED-147A.

4.3.2 ATM – Flight Data processing

4.3.2.1 Current activities of this Sub-Domain

A EUROCAE Working Group (WG) is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-59 Flight Data Processing (FDP) Interoperability	ED-133 roadmap		Q4 2015	published	
	ED-133 rev x	Flight Object	2019-2020	To be confirmed according to industry needs	SJU

It must be pointed out that these activities must be operationally driven. In particular, the functions must be validated operationally before being derived in system requirements. For this reason, the SJU launched at the end of 2015 an analysis team within SESAR to develop operational and technical requirements aiming at achieving the required level of maturity (EOCVM V2) for the Initial IOP SESAR related solution, representing the baseline for the work to be done in SESAR2020 to validate (at EOCVM V3 maturity) the full IOP solution.

This solution would be made available for all stakeholders in time to implement PCP ATM functionalities related to ground-ground flight plan exchange (e.g. AF5).

Thanks to several common members of SESAR and EUROCAE, each outcome of the SJU work (in particular validation results) is input to WG-59 to develop updates of ED-133 (due by 2017-2018 and 2020 as per the table above). It is noted that the basic principles of ED-133 are confirmed and maintained in the foreseen revisions.

The Council has decided that WG-59 shall suspend all activities on ED-133 until the results of the SJU activities are available.

4.3.2.2 Vision of future EUROCAE activities in this Sub-Domain

Possible future standardisation activities could be envisaged in the area of virtual centre concepts.

This activity would support strategic development in SESAR (and in SESAR2020). It appears in the Rolling Development Plan as a possible follow-up of architecture work initiated in SESAR and further developed in SESAR2020.

As expressed in the ATM Master Plan (Edition 2015), the technology evolution is enabling the modernisation of the infrastructure as well as the virtualisation of centres supported by common support services providing the required information when and where needed.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
Virtual Centre Concepts	INTEROP	Medium Term	ANSPs Industry	SESAR

4.3.3 ATM – Digital Voice communications

4.3.3.1 Current activities of this Sub-Domain

A EUROCAE Working Group (WG) is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-67 Voice on Internet protocol (VoIP) for ATM	ED-137C Volume 1 Volume 2 Volume 4 Volume 5	Interoperability for VoIP ATM Components Radio Telephone Recording Supervision	 Q2 2017 Q2 2018 Q2 2018 Q2 2018	 complete ongoing ongoing ongoing	VOTE (EUROCONTROL team)

4.3.3.2 Vision of future EUROCAE activities in this Sub-Domain

The whole VoIP standard suite will be revisited, including new findings from worldwide VoIP implementation and SESAR, support for sectorless operation, and possibly restructuring it for use by ICAO.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
Voice over IP Ground/Ground Communication	TS	Short Term	Industry EUROCONTROL ANSPs	ICAO SESAR

4.3.4 ATM – Requirements Development Methodology

4.3.4.1 Current activities of this Sub-Domain

No current activities in this sub-domain.

4.3.4.2 Vision of future EUROCAE activities in this Sub-Domain

No concrete activities envisaged for the time being.

4.3.5 ATM – Simulators

4.3.5.1 Current activities of this Sub-Domain

One EUROCAE Working Group (WG) is already active in this Sub-Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-81 Interoperability of ATM Validation Platforms	ED-147A	Specs on simulator interoperability	Q2/2017	released	
	ED-147B	Specs on simulator interoperability	Q4/2019	ongoing	
	ED-148	Guidance - interoperability process	Q4/2017	ongoing	

4.3.5.2 Vision of future EUROCAE activities in this Sub-Domain

ATM Validation Platforms from different domains will be the driver in SESAR 2020 projects to support validation activities. In order to provide the required functionalities those ATM Validation Platforms need to be interoperable and might require enhancement of the standards, e.g.:

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
Enhanced Guidance Assistance to Aircraft and Vehicles on the Airport Surface Combined with Routing	OSED / SPR / INTEROP TS / IRS	Medium term	ANSPs Industry	SESAR

Airport Safety Nets	OSED / SPR / INTEROP TS / IRS	Medium term	ANSPs Industry	SESAR
Remote Tower	OSED / SPR / INTEROP TS / IRS	Medium term	ANSPs Industry	SESAR
4D Trajectory Management	INTEROP / TS / IRS	Medium term	ANSPs Industry	SESAR
Virtual Centre Concept such as CWP / FDP Interface	OSED / SPR / INTEROP TS / IRS	Medium term	ANSPs Industry	SESAR

4.4 Airports

4.4.1 Purpose & Scope of activities of this Domain

As airports are now considered as an important stakeholder in the ATM system, it is necessary to facilitate the integration of airports in the ATM system in support of the European concept of operations. In addition, airports are also key economical players in their region where modernisation of their infrastructure is expected together with their expansion.

4.4.2 A-SMGCS

4.4.2.1 Current activities of this Sub-Domain

A EUROCAE Working Group (WG) is already active in this Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-41 Advanced Surface Movement Guidance and Control System	ED-87D	MASPS ASMGCS incl. Airport Safety Support and Routing Services	Q2 2018	ongoing	SESAR, EUROCONTROL
	ED-87E	MASPS ASMGCS incl. Guidance Service	Q4/2018	Not started	SESAR EUROCONTROL
	ED-116A	MOPS surveillance movement radar	Q4/2019		
	ED-128A	Guidelines A-SMGCS surveillance data fusion	Q2/2018		

4.4.2.2 Vision of future EUROCAE activities in this Sub-Domain

The development of new technologies and associated regulations will bring the need for the development of further standards.

New operational requirements for the A-SMGCS will continue to demand improvements in the quality of the A-SMGCS and the existing or new sensor systems for A-SMGCS. In order to meet those A-SMGCS quality requirements the standards for such support systems will need to be continuously improved or newly developed.

The border between different aerodrome systems and procedures such as A-SMGCS, A-CDM, flight data processing, data link etc. will blur more and more in the future, which requires the alignment of the standards for the respective products and close inter-disciplinary collaboration of the working groups.

This activity supports strategic development in Airport Domain.

The main part of the work on A-SMGCS that is ahead is to draft and finish the Minimum Aviation System Performance Standard (MASPS) of the A-SMGCS Services “Airport Safety Support”, “Routing” and “Guidance” and include them into ED-87 (D, E). These first specifications will align with findings from SESAR (I) and the upcoming operational EUROCONTROL A-SMGCS Services Specification. Due to a lack of experience with deployed systems, an update of the specifications based on systems that will get deployed within the next 5 years is anticipated due to the mandate of the PCP. An ED-87F will be the consequence. SESAR 2020 findings need to be considered here as well.

For the same reasons as above it may be necessary to transform the guidance document on Sensor Data Fusion of an A-SMGCS (ED-128) into a MOPS document and enrich it with functional and performance requirements on functionalities of services “Airport Safety Support”, “Routing” and “Guidance”. ED-128A (or a new ED) may be the consequence. Another reason to look into that work is the increasing complexity of A-SMGCS. Data link capabilities for route information transfer, Map Data integration and interfaces to airfield lighting to enable concepts like “follow the greens” and “runway status lights” are some major examples for that.

4.4.3 Foreign Object Detection

4.4.3.1 Current activities of this Sub-Domain

A EUROCAE Working Group (WG) Is already active in this Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-83 Airport Foreign Object Debris (FOD) Detection Systems	OSED / ED-xxx	Ops requirements for FOD detection	To + 18M estimated Q2/2018	Starting	

4.4.3.2 Vision of future EUROCAE activities in this Sub-Domain

EUROCAE will monitor the development of new technologies and concepts of operations for enhancement of FOD systems.

New systems and data protocols for runway friction measurement and the corresponding data exchange may require the creation of MASPS in this domain.

4.4.4 Remote and Virtual Tower (RVT)

4.4.4.1 Current activities of this Sub-Domain

One EUROCAE Working Group (WG) is already active in this Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-100 Remote and Virtual Towers (RVT)	ED-240revA	MASPS for Remote Tower Optical Systems plus target tracking	Q3 2018		

4.4.4.2 Vision of future EUROCAE activities in this Sub-Domain

More visionary concepts that could affect the work of WG-100 are technology solutions like ADS-B, which could revolutionise current optical remote tower solution, when becoming a mandatory, reliable, integer, cooperative surveillance sensor for ground operations.

Another technology vision that could reconfigure remote tower technology standards could be the transmission from sensor to the visual presentation with a broader bandwidth performance and or via radio, terrestrially or even via satellite.

The scope of work in the subdomain could possibly go into the supporting area of guidance on HMI standardisation and best practices.

Adaptation of presentation and HMI input technologies from other industries with full integration of all ATC tools presented on HUD or using VR technology with safe and intuitive HMI input technology. With proven cost-effective optical and radar target tracking technologies and remote provision of ATS to Multiple Aerodromes, the application of artificial intelligence and increased automation are visionary concepts for RVT.

This activity supports strategic development in High Performing Airports as expressed in section 3.17 on Airport environment evolution.

4.5 SWIM (System Wide Information Management)

4.5.1 Purpose & Scope of activities of this Domain

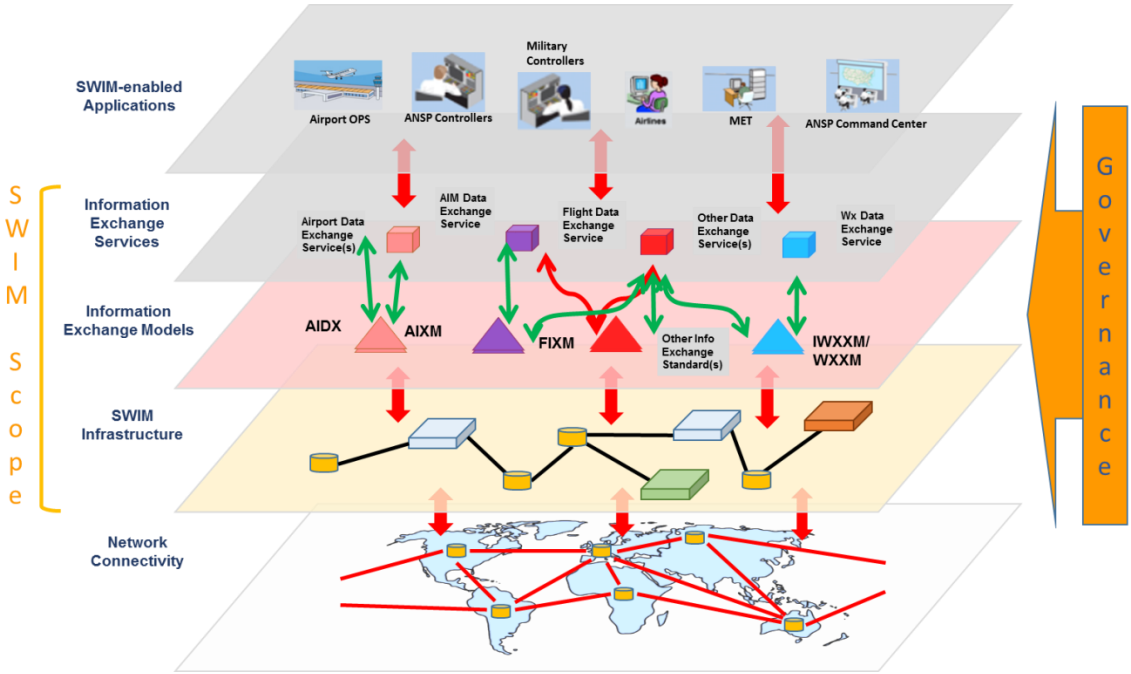
Through the SESAR Programme, Europe has made great progress on defining, developing and validating SWIM.

A key document hereby has been the SESAR SWIM Concept of Operations which includes the SWIM definition, SWIM principles, the rationale for change and the associated benefits. It also captures practical examples of SWIM pioneers (e.g. Network Manager B2B) that explain their gradual evolution towards SWIM. Some initial ideas on governance are described, covering the full lifecycle from participating in SWIM to providing or consuming services on SWIM. All this is documented with use-cases to better illustrate how SWIM works in practice.

The agreed SWIM definition: “SWIM consists of standards, infrastructure and governance enabling the management of ATM information and its exchange between qualified parties via interoperable services”.

This definition brings several elements:

- It structures SWIM (see also attached picture) into several layers: Services, Information and technical Infrastructure.
- It focuses on the need to have standards for all layers.
- It identifies the need for governance.



Further the SESAR SWIM Concept of Operations has also become the main source of the (being finalised for publication) ICAO manual on system wide information management (SWIM) Concept (Doc 10039) as developed through the ICAO ATM Requirements and Performance Panel (ATMRPP).

This ICAO document is the basis for the ICAO Information Management Panel (IMP), which has been set-up. An essential element of the ICAO SWIM manual is the so-called Global Interoperability Framework that identifies the need for all SWIM standardisation actors to act together in a globally harmonised way.

SWIM services are defined to operate on a defined technical infrastructure as foundation, which is SWIM technical services are organised in so-called SWIM profiles. A SWIM profile is a particular set of standards tailored at meeting specific functional and non-functional requirements.

The latest SESAR definition is: “a SWIM profile is a coherent, appropriately-sized grouping of middleware functions/services for a given set of technical constraints/requirements that permit a set of stakeholders to realize Information sharing. It will also define the mandated open standards and technologies required to realize this coherent grouping of middleware functions/services.” Two profiles have been defined so far: one around web services (yellow profile, fully based on open and mature industry standards), one around the data distribution service -DDS (blue profile). A third profile (still draft) for air-ground SWIM exchanges (purple profile) is also being developed.

4.5.2 Current activities of this Domain

The following EUROCAE WG is already active in this Domain with several ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-104 SWIM services	ED-xxx	MASPS Arrival Management Sequence Service	Q4 2017	ongoing	
	Report	Potential work programme for future SWIM service standards	Q3 2017	delivered	
	Report	Lessons learned	Q4 2017	ongoing	
	Report	Guidelines for service standardisation	Q4 2017	ongoing	

Within the context of the Work Programme WG-104 has developed a list of services for future standardisation from 2018 onwards. This included the following steps:

- Development of criteria how to prioritise the available services
- Definition of different areas where services are applicable like MET, AIM, A-CDM, … (Services from different areas could be standardised in parallel by different groups of experts)
- Prioritisation of services within these areas
- Provision of the prioritised list of services to TAC

NOTE: *The prioritisation of services was done in close cooperation with the SDM in order to align the future work of EUROCAE Working Groups with the proposed deployment programme. In addition, dedicated EUROCAE Working Groups were consulted by the various teams dealing with specific areas, such as*

- *WG-44: Aeronautical databases*
- *WG-59: Flight data processing interoperability*
- *WG-76: AIS/MET Datalink Applications*
- *WG-81: Interoperability of ATM Validation Platforms*

As a result, the following services groupings have been identified as potential candidates for standardisation:

- MET Services
- A-CDM Services
- AIM Services
- AMAN Services

The Governance aspect of SWIM is currently developed by the SWIM stakeholders in a project by the SESAR Deployment Manager. Close cooperation with this group is envisaged to support the standardisation and interoperability needs.

Furthermore, EUROCONTROL is fulfilling the task from EASCG to develop functional information exchange service implementation specifications – a SWIM Standards Package consisting of three EUROCONTROL Specifications: for SWIM Service Description, for SWIM Information Definition, and for SWIM Technical Infrastructure Yellow Profile.

Furthermore, a close cooperation is envisaged with the SWIM governance group and with the EUROCONTROL standardisation Task Force.

WG-104 is currently elaborating a concept how to standardise SWIM compliant services by using the Extended horizon AMAN service as a first candidate.

Having reached a first specification of a SWIM compliant standard of a service, a guideline will be produced supporting the standardisation of future SWIM services needed. This will go along with a lessons learned report about standardising a service.

4.5.3 Vision of future EUROCAE activities in this Domain

Not all SWIM services deserve standardization activities: EUROCAE activities regarding SWIM are most relevant for services that will be provided by more than one provider and where service provision is regulated.

SWIM services in need for standardisation will in the future be identified by the prospective SWIM Governance function, where a close coordination with EUROCAE is already foreseen.

SWIM services in the airport domain and for information exchange in Air Traffic Control Centres (“Virtual Centre services”) may be future candidates for standardisation.

Airports will be connected to the ATM Network as defined by SESAR through the NOP/AOP integration using the “Yellow Profile”. SWIM A-CDM Service should define the interoperability between the ATM and Airport domain. Impact to the definition of CDM may require WG-69 to be re-activated and develop versions of MASPS and/or Guidance documents reflecting the latest developments in this domain.

ACI World has defined standards for B2B Communication developed by the Airport Community. Recommended Information Services (ACRIS) Working Group of the ACI World Airport IT Standing Committee (WAITSC). The ACRIS WG has developed an A-CDM Webservice based on the Aviation Information Data Exchange (AIDX).

4.6 Security

4.6.1 Purpose & Scope of activities of this Domain

The Aeronautical Systems Security (ASS) Working Group (WG) shall address the cybersecurity for Aeronautical Information Systems (AIS) from an air-ground and end-to-end perspective from information production, processing, management, communication to operational usage and to maintenance. AIS cybersecurity therefore encompasses the aircraft, supporting infrastructure including communication and the supply chain.

WG-72 will develop Aeronautical Information System Security guidelines addressing the cybersecurity objectives and specifying the cybersecurity requirement including the operational concept rather than technological solutions in order to ensure their stability over time.

WG-72 will adopt a holistic approach, addressing cybersecurity and safety-related topics throughout the entire lifecycle of products/services developed, manufactured, operated and maintained by many different civil aviation stakeholders in both the air and ground segments.

Within the scope described above WG-72 will therefore address both the airborne systems and ground systems in their end-to-end interdependence from the operational and cybersecurity standpoints recognizing however, that cybersecurity requirements may apply differently for airborne and ground systems.

WG-72 shall serve as a resource and coordinator for Aeronautical and ATM information security-related matters with all EUROCAE Working Groups. As part of its performance-based rulemaking, and in light of the emerging competency as per the new Basic regulation, EASA will increasingly rely on industry standards, including the ones on Cybersecurity in Aviation. Due to its long-term experience, WG-72 will play a pivotal role in this realm of industry standards.

4.6.2 Current activities of this Domain

The purpose is to develop and maintain acceptable processes and methods of compliance addressing security issues in support of existing safety processes and analytical methods (e.g. ED-79, ED-135), including associated methods/processes for ground-based systems.

- Develop and maintain guidelines and objectives for evaluating security architectures and security procedures, demonstrating their compliance with security and safety objectives.
- Determine and maintain design and operational compliance methods appropriate and adequate for the application of security solutions to safety-related functions.
- Address the necessity and objectives for the management of security “events” and guidelines for “response” to detected or suspected attacks.
- Address requirements and guidance for post-response recovery, including identification of affected systems, restoration of system configurations, notification requirements, and other related activities.

A EUROCAE Working Group (WG) is already active in this Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-72 Aeronautical Information System Security	ED-203A	Airworthiness security methods	Q1 2018	ongoing	RTCA SC-216
	ED-205	Security accreditation ATM systems	Q2/2018	ongoing	

	ER	Activity mapping	Q4/2017	ongoing	

4.6.3 Vision of future EUROCAE activities in this Domain

The need for the WG-72 to work on the ConOps for Security Logging (potentially only the top-level objectives) could arise.

This action should be coordinated with the RTCA-216 roadmap.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
Security Event Management (incl. Logging and Auditing) (WG-72)	Guidance? Conops/ specification	Short term	Manufact., Operators, ANSPs, CAAs	Arinc (TBC)
Vulnerability Management (WG-72)	Specification	Medium term	CAAs, Operators, Manufact., ANSPs, , Airports	Arinc (TBC)
Incidence Response and recovery Management (WG-72)	Guidance	Medium term	CAAs, Operators, Manufact., ANSPs, Airports	Arinc (TBC)
Supply Chain Security (WG-72)	Guidance	Medium term	Manufact. CAAs, Operators, ANSPs	TBD
Forensic Analyses and Accident Investigation (WG-72)	specification	Medium Term	FAIs, CAAs, Operators, Manufact.	TBD
Maintenance Security (WG-72)	Guidance	Medium term	CAAs, Operators, Manufact.	TBD
Development & Production Security (WG-72)	Guidance	Medium Term	CAAs, Manufact.	TBD
Cybersecurity Testing	Guidance	Long Term	Manufact. CAAs, Operators, ANSPs, Airports	
Risk assessment methodology	Specification	Mid Term		
Cyber resilience requirements (overarching & per domain)				

4.7 Aeronautical Information Services (AIS) / Meteorological (MET) Services

4.7.1 Purpose & Scope of activities of this Domain

The scope of the activities within this domain includes the establishment of user requirements for aeronautical data as well as standard generic data format for the transfer of geographic information/data in digital form between different users, systems and locations.

4.7.2 AIS/MET – Aeronautical Information services

4.7.2.1 Current activities of this Sub-Domain

At present, the active EUROCAE groups in this domain are WG-44 Aeronautical Databases. In addition, WG-76 works on the specification of AIS/MET Datalink Services.

The work aims at providing a framework to enable the development of aviation-specific applications using geographic and appropriate aeronautical information/data as it relates to terrain, obstacles, and aerodrome mapping.

WG-44 completed the work on ED-76A, ED-98C, ED-99D and ED-119C. These documents were published in 2015.

Ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-44 Aeronautical databases	ED-77revA	User requirements for Navigation data	Q2 2018	ongoing	RTCA SC-217

4.7.2.2 Vision of future EUROCAE activities in this Sub-Domain

EUROCAE activities in the domain of AIS need to be in line with and support the evolution from AIS to AIM.

Recently, the ToR of WG-44 were revised to include the activity to update ED-77/ DO-201A. The objective is to bring ED-77 up-to-date with developments in the navigation domain over the past years in general and in particular with the PBN concept.

The update will consider the requirements of new ATM applications as well as changes suggested by industry and derived from authorities' experience feedback. The focus of the work will be on data quality requirements for navigation data, with a view to cover new operational needs such as PBN.

WG-44 is expected to continue to work on the update to the family of standards related to terrain, obstacle and aerodrome data supporting evolving user requirements and new envisaged applications. This could lead to new updates to ED-98/99/119 in the medium term.

The increased emphasis on digital data exchange and distribution will result in an increased capability to present data and information in graphical form. In this context, digital NOTAM is planned to be implemented in Europe as of 2018, thus improving the Pre-flight Information Briefing (PIB) by providing graphical presentation of dynamic data. This is not an isolated European development, the United States Federal Aviation Administration having already deployed an operational Digital NOTAM system at more than 300 US airports. To achieve a harmonised digital NOTAM implementation, an agreed standardised graphical symbol library (primarily targeted to ground operations, such as Digital NOTAM encoding and pre-flight briefing in the ARO environment) is needed. An activity should be foreseen in the Medium Term to address this standardisation need in order to avoid diverging implementations, which could lead to different interpretations and eventually safety issues. SAE International has published the standard "Human Factors Minimum Requirements and Recommendations for the Flight Deck Display of Data Linked Notices to Airmen (NOTAMs)" (Document

ARP6467). This SAE standard is mostly a human factors standard. The EUROCAE work, which can be performed in partnership with SAE International, could build upon the SAE document, in order to develop a complete standard for representation of digital NOTAM in PIB.

This activity supports the transition from AIS to AIM.

Activities	Deliverables	Time frame	Interested parties	Cooperation Body
User Requirements for Terrain and Obstacle Data	Revised ED-98C	TBD (Medium/ Long Term)	Industry	RTCA SC-217
User Requirements for Aerodrome Mapping Databases	Revised ED-99D	TBD (Medium/ Long Term)	Industry	RTCA SC-217
Interchange standards for Terrain, Obstacle, Aerodrome Mapping Data	Revised ED-119C	TBD (Medium/ Long Term)	Industry	RTCA SC-217
Standard for graphical symbol library for representation of dynamic AIS data and information	ED-xx	Medium Term	ANSPs Pre-flight Briefing Offices Industry	SAE RTCA

4.7.3 AIS/MET – MET services

4.7.3.1 Current activities of this Sub-Domain

Apart from the ongoing work of WG-76 AIS/MET Datalink Applications (addressed in the CND 6 communications sub-domain), there are no other current activities in this sub-domain.

RTCA activity SC-206: weather information upload using TIS-B.

There is an ongoing discussion between WG-76 and SC-206 to join again.

4.7.3.2 Vision of future EUROCAE activities in those Sub-Domains

The work of WG-104 on SWIM Services has delivered a report on a potential work programme for future SWIM service standards. This report should include an analysis of the possible future standardisation needs in the MET Information Services domain.

With respect to any standardisation activities on MET sensors, the rationale for possible EUROCAE work needs to be further elaborated.

EASA is working to promote that weather information is brought in current and graphical format into the cockpit for strategic decision making. This will be reflected in the currently updated safety promotion plan. Resulting standard work has more a long-term character today.

4.8 UAS & General Aviation

4.8.1 Purpose & Scope of activities of this Domain

It has been realised that the specific needs of General Aviation have been left aside when developing or updating the aviation system. Now it has been recognised that a strong GA is as well of value and several activities are on their way to better adopt some systems and regulations to the needs of the GA community. This may lead to the development of specific derivate of existing standards or the inclusion of specific classes. The new approach for more high level, non-prescriptive regulation may drive as well the creation of industry best practise standards.

A similar situation exists for the integration of Unmanned Aircraft Systems (UAS). The integration of those aircraft into the existing ATM system needs industry standards to achieve worldwide harmonisation.

4.8.2 UAS

4.8.2.1 Current activities of this Sub-Domain

Unmanned Aircraft Systems (UAS) is a wide domain ranging from a small 300 g remotely controlled drone up to a big transport category aircraft, which may even carry passengers. In the current EU regulation proposal a classification into the open, specific and certified category is planned to allow a proportional approach. This classification is reflected in the activities.

Similarly, the airspace in which UAS are planned to be operated ranges from dedicated airspace blocks, low level operation, to full integration into the ATM system. At EUROCAE, the UAS related activities are successfully integrated into one working group having six Focus Teams to deal with the various stakeholder demands. Two EUROCAE Working Groups (WGs) were active in this Sub-Domain. In 2016 one new WG under a revised ToR was started in order to develop the necessary standards to enable safe integration of all classes of UAS into all classes of airspace. That ToR contain the following activities/deliverables to be developed in parallel work in six dedicated Focus Areas. The focus areas are:

- Command, Control, Communication, Spectrum and Security (C3S);
- Detect and Avoid (DAA);
- Enhanced RPAS Automation (ERA);
- UAS Traffic Management (UTM);
- Specific Operations Risk Assessment (SORA);
- Design & Airworthiness Standards (D&AW).

This structure allows that the Focus Teams (FT) are working in parallel, but with a coordinated view and exhaustive harmonisation with external stakeholders (EASA, JARUS, EDA, SESAR JU, EUROCONTROL) and other standardisation organisations like RTCA SC-228, ASTM F38, ISO TC20 SC16 (their focussed UAS subcommittees).

Focus Area 1: Detect and Avoid (DAA)

	SG Title	Deliverable	Target date	Document Project Nr
WG-105 Sub-Group 11	DAA against conflicting traffic for RPAS operating under IFR in Class A-C airspaces	Minimum Aviation System Performance Specification for Detect & Avoid [Traffic] in Class A-C airspaces under IFR	12/2017	WG-105 SG-11 DP-001
		Minimum Operational Performance Specification for Detect & Avoid [Traffic] in Class A-C airspaces under IFR	12/2018	WG-105 SG-11 DP-002

WG-105 Sub-Group 12	DAA against conflicting traffic for RPAS operating under IFR and VFR in all airspace classes	Operational Services and Environment Description for Detect & Avoid [Traffic] in Class D-G airspaces under VFR/IFR	12/2017	WG-105 SG-12 DP-001
		Minimum Aviation System Performance Specification for Detect & Avoid [Traffic] under VFR/IFR	12/2018	WG-105 SG-12 DP-002
		Minimum Operational Performance Specification for Detect & Avoid [Traffic] under VFR/IFR	06/2020	WG-105 SG-12 DP-003
WG-105 Sub-Group 13	DAA for UAS operating in VLL	Operational Services and Environment Description for Detect & Avoid in Very Low Level Operations	06/2018	WG-105 SG-13 DP-001
		Minimum Operational Performance Specification for Detect & Avoid in Very Low Level Operations	12/2019	WG-105 SG-13 DP-002

Focus Area 2: Command, Control and Communication, Spectrum and Security (C3&S)

	SG Title	Deliverable	Target date	Document Project Nr
WG-105 Sub-Group 21	RPAS C2 Datalink	Minimum Operational Performance Specification for RPAS Command and Control Data Link (Terrestrial)	12/2017	WG-105 SG-21 DP-001
		Minimum Operational Performance Specification for RPAS Command and Control Data Link (C-Band Satellite)	04/2018	WG-105 SG-21 DP-002
		Minimum Aviation System Performance Specification for RPAS Command and Control Data Link	06/2018	WG-105 SG-21 DP-003
WG-105 Sub-Group 22	Spectrum	RPAS 5030-5091 MHz CNPC LOS and BLOS compatibility study	09/2017	WG-105 SG-22 DP-001
		Minimum Aviation System Performance Specification for management of the C-Band Spectrum in support of RPAS C2 Link services	12/2018	WG-105 SG-22 DP-002
		Guidance on Spectrum Access, Use and Management for UAS	11/2017	WG-105 SG-22 DP-003
WG-105 Sub-Group 23	Security	Minimum Aviation System Performance Specification on RPAS C3 Security	06/2019	WG-105 SG-23 DP-001
		Guidance on UAS C3 Security	12/2019	WG-105 SG-23 DP-002

Focus Area 3: UAS Traffic Management (UTM)

	SG Title	Deliverable	Target date	Document Project Nr
WG-105 Sub-Group 31	General	Support Work Plan on UTM (internal report)	09/2017	WG-105 SG-31 DP-001
WG-105 Sub-Group 32	Identification	Minimum Aviation System Performance Specification for UAS e-identification	11/2018	WG-105 SG-32 DP-001
		Minimum Operational Performance Specification for UAS e-identification	06/2019	WG-105 SG-32 DP-002
WG-105 Sub-Group 33	Geo-Fencing	Minimum Aviation System Performance Specification for UAS geo-fencing	11/2018	WG-105 SG-33 DP-001
		Minimum Operational Performance Specification for UAS geo-fencing	06/2019	WG-105 SG-33 DP-002

Focus Area 4: Design & Airworthiness (D&AW)

	SG Title	Deliverable	Target date	Document Project Nr
WG-105 Sub-Group 41	RPAS System Safety Assessment Criteria	Inputs to RPAS AMC 1309	03/2018	WG-105 SG-41 DP-001
WG-105 Sub-Group 42	Remote Pilot Stations	Minimum Aviation Systems Performance Specification for Remote Pilot Stations supporting IFR operations into non-segregated airspace	06/2019	WG-105 SG-42 DP-001

Focus Area 5: Enhanced RPAS Automation (ERA)

	SG Title	Deliverable	Target date	Document Project Nr
WG-105 Sub-Group 51	Automatic Take-off and Landing	Operational Services and Environment Definition for RPAS Automatic Take-off and Landing	11/2017	WG-105 SG-51 DP-001
		Minimum Aviation Systems Performance Specification for RPAS Automatic Take-off and Landing	06/2020	WG-105 SG-51 DP-002
WG-105 Sub-Group 52	Automatic Taxiing	Operational Services and Environment Definition for RPAS Automatic Taxiing	11/2017	WG-105 SG-52 DP-001
		Minimum Aviation Systems Performance Specification for RPAS Automatic Taxiing	06/2020	WG-105 SG-52 DP-002
WG-105 Sub-Group 53	Automation & Emergency Recovery	Operational Services and Environment Definition for RPAS Automation & Emergency Recovery functions	11/2017	WG-105 SG-53 DP-001
		Minimum Aviation Systems Performance Specification for RPAS Automation & Emergency Recovery functions	06/2020	WG-105 SG-53 DP-002

Focus Area 6: Specific Operational Risk Assessment (SORA)

	SG Title	Deliverable	Target date	Document Project Nr
WG-105 Sub-Group 61	SORA	SORA Support Work Plan (internal report)	03/2018	WG-105 SG-61 DP-001

4.8.2.2 Vision of future EUROCAE activities in those Sub-Domains

The vision for future activities will be defined based mainly on the developments related to the EASA rulemaking activities, the developments in JARUS and of the SESAR Exploratory Research programme SESAR 2020. Activities performed in the ICAO RPAS Panel may in future also have an impact on the EUROCAE Work Programme.

This activity is driven by developments in EASA, JARUS, EDA, SJU and ICAO.

4.8.3 General Aviation

4.8.3.1 Current activities of this Sub-Domain

At present, no activities related to General Aviation have been handled by EUROCAE. The development of standards recording the industry best practices in the domain of aircraft certification and supporting the revised performance based certification standard CS-23 is performed by ASTM.

4.8.3.2 Vision of future EUROCAE activities in those Sub-Domains

No GA-related standardisation activities by EUROCAE are foreseen in the upcoming future.

4.9 Miscellaneous

4.9.1 Purpose & Scope of activities of this Domain

The scope of this section is to work as a home for activities that do not fit 100% into other domains but are clearly within the scope of EUROCAE.

Currently this domain hosts the Electronic Flight Bag (EFB) activity, which is shared by aircraft certification aspects and flight operation aspects.

4.9.2 Current activities of this Domain

Following EUROCAE Working Groups (WGs) are already active in this Domain with the following ongoing activities:

WG	Deliverables	Title	Delivery date	Status	Cooperating bodies
WG-106 Electronic Flight Bag	ED-XX	EFB applications	Q4/2018	ongoing	

4.9.3 Vision of future EUROCAE activities in this Domain

Nothing is currently foreseen for the time being since this Domain is the home for activities which are within the scope of EUROCAE, but do not fit 100% into other domains.

4.9.3.1 Space

Space applications and space travel are emerging and very fast-growing markets, which have some influence and parallels to civil aviation. Industry is already today seeking for harmonisation and a predictable environment to develop, produce and operate solutions. Today launches of rockets are done through the traditional airspace structure, fully segregated by closing huge amount or airspace, proper integration in the ATM, handed over to STM (space traffic management) and re-enter into ATM back to land at the space- or airport. The European Commission (DG grow) wants to strengthen Europe as global actor, not only in Aviation, also with a tailored space strategy to foster innovation and entrepreneurship and to encourage applications as well as to reinforce autonomy and security. This is divided in three main sectors:

1. Space based solutions, CNS
    a. EGNOS
    b. Galileo
    c. Copernicus
    d. Space based surveillance and tracking
        i. Re-entry
        ii. Space weather
        iii. Near Earth objects
2. Rocket launches
    a. Increasing need of launching pay-loads
        i. Launch through traditional ATM structure –
        ii. Integration into ATM structure
3. Commercial Space transportation
    a. regulatory framework for orbital and suborbital activities
        i. Licensing
        ii. Authorisation
        iii. Supervision
        iv. Acceptable level of safety

All this is foreseen as performance-based regulation, supported by standards. Industry and operator are calling already today for more harmonisation and standardisation in order to develop quick and innovative in a predictable environment worldwide.

ANNEX 1

ACRONYMS

AC: [FAA]: Advisory Circular

ACAS: airborne collision avoidance system

A-CDM: Airport Collaborative Decision Making

CP: [ICAO] Communication Panel

AD: Airworthiness directive

ADS-B: Automatic Dependent Surveillance-Broadcast

Adv-IM: Advanced Interval Management

AEEC: Airlines Electronic Engineering Committee

AEH: Airborne Electronic Hardware

AeroMAcs: Aeronautical Mobile Aircraft Communication System

AF: ATM Functionalities

AIA: Aerospace Industries Association

AIM: Aeronautical Information Management

A-SMGCS: Advanced Surface Movement Guidance and Control System

PANS AIM: Aeronautical Information Manual - Procedures for Air Navigation Services

AIMSG: Aeronautical Information Manual Sub Group

AIS: Aeronautical Information Services

AMAN: Arrival Manager

AMC: [EASA]: Acceptable Means of Compliance

AMS(R)S: Aeronautical Mobile-Satellite (R) Service

ANC: [ICAO] Air Navigation Conference

ANSP: Air Navigation Service Provider

A-PNT: Alternative Positioning, Navigation, and Timing

ARAC: [FAA] Aviation Rulemaking Advisory Committee

ARAIM: Advanced Receiver. Autonomous Integrity Monitoring

ARINC: aeronautical Radio Inc

ARO: Aviation Recreational Organization

ARP: [SAE] aviation Recommended Practice

ASBU: [GANP] Aviation System Block Upgrades

ASD: AeroSpace and Defence Industries Association of Europe

ASD-STAN: ASD-Standards

ASISP: [FAA ARAC] Aircraft Systems Information Security/ Protection

ASTM: American society for testing and materials

ATC: Air Traffic Control

ATFCM: Air Traffic Flow and Capacity Management

ATFM: Air Traffic Flow Management

ATM: Air Traffic Management

ATM MP: ATM Master Plan

AVSECP: [ICAO] Aviation Security Panel

BEA: Bureau d'Enquetes et d'Analyses

CA: Collision Avoidance

CAA: Civil Aviation Authority

CAP: Civil Aviation Publication

CCO: Continuous Climb Operation

CDO: Continuous Descent Operation

CEN: European Committee for Standardization

CENELEC: Comité Européen de Normalisation Électrotechnique

CFIT: controlled flight into terrain

CNS: Communications Navigation Surveillance

CONOPS: concept of operations

COTS: Commercial off-the-shelf

CPDLC: Controller–pilot data link communication

[SES] CS: Community Specifications

CWP: Council Work Paper

DCL: Departure Clearance

DCT: Direct route Trajectory

DG: [EC] Directorate General

DME: Distance Measuring Equipment

DO: [RTCA] Document

DOA: Design Organisation Approval

DP: [EUROCAE TAC] Discussions Paper

DP: [SES] Deployment Programme

D-RNP: Dynamic - Required navigation Performance

D-TAXI: Data link taxi

E-AMAN: extended Arrival Management

EASA: European Aviation Safety Agency

EASCG: European ATM Standards Coordination Group

EASp: [EASA] European Aviation Safety Plan

EATMN: European Air Traffic Management Network

EC: European Commission

ED: Eurocae Document

EDA: European Defence Agency

EFVS: Enhanced Flight Vision System

ELSA: VDL Mode 2 measurement, analysis, testing and simulation campaign Study

ELT: Emergency Locator Transmitters

EPP: Extended Projected Profile

ER: Essential Requirements

ERA : Enhanced RPAS Automation

ESA : European Space Agency

ESO: European Standardisation Organisations : i.e. CEN, CENELEC, ETSI

ETSI: European Telecommunications Standards Institute

ETSO: European Technical Standard Orders

EUROCONTROL: the European Organisation for the Safety of Air Navigation

EUSCG: European UAV Standards Coordination Group

EVS: Enhanced Vision System

FAA: Federal Aviation Administration

FDP: flight data processing

FMS: Flight management System

GA: General Aviation

GADSS: [ICAO] Global Aeronautical Distress & Safety System

GALILEO: Europe's own global navigation satellite system

GAMA: General Aviation Manufacturers Association

GANP: [ICAO] Global Air Navigation Plan

GASP: [ICAO] Global Aviation Safety Plan

GBAS: Ground-Based Augmentation System

GEN: Generic

GNSS: Global Navigation Satellite System

GPS: Global Positioning System

HTAWS: Helicopter Terrain Awareness System

HUD: Head-up display

HW: hardware

ICAO: International Civil Aviation Organization

ICB: Industry Consultation Body

IEEE: Institute of Electrical and Electronics Engineers

IM: Interval Management

INCS: Independent Non-Cooperative Surveillance

INTEROP: Interoperability Requirements

IOP: Interoperability

IPS: Internet Protocol Suite

IR: Interoperability Regulation

ISO: International Organization for Standardization

ITU: International Telecommunication Union

I4D: Initial 4D

JARUS: Joint Authorities for Rulemaking on Unmanned Systems

KPA: Key Performance Area

LOA: Letter of Acceptance

LPV: Localizer performance with vertical guidance

LVP: Low visibility procedures

MASPS: Minimum Aviation System Performance Specifications

MBSE: Model Based System Engineering

MET: Meteorological

MOC: Means of Compliance

MOPS: Minimum Operational Performance Specifications

MoU: Memorandum of Understanding

NAC: [RTCA] NextGen Advisory Committee

NextGen: Next Generation Air Transportation System

NPA: Notice of Proprosed Amendment

NOP: Network Operations Plan

NOTAM: Notice To Airmen

NSA: National Security Agency

NTSB: National Transportation Safety Board

OEM: Original Equipment Manufacturer

OJEU: Official Journal of the European Union

PANS: [ICAO] Procedures for Air Navigation Services

PBN: Performance Based Navigation

PCP: [SES] Pilot Common Project

PED: Portable Electronic Devices

PIB: Pre-flight Information Briefing

PUR: Passive Underwater Resonator

RAIM: Receiver autonomous integrity monitoring

RBDM: Risk Based Decision Making

RDP: ATM Standardisation Rolling Development Plan

RMP: RuleMaking Programme

RNP: Required navigation performance

ROAAS: Runway Overrun Awareness and Alerting System

RPAS: Remotely Piloted Aircraft Systems

RTA: Required Time of Arrival

R&D: Research and Development

SAE: Society of Automotive Engineers

SARPs: Standards and Recommended Practices

SBAS: Satellite-based augmentation systems

SCB: [JARUS] Stakeholder Consultation Board

SDM: SESAR Deployment Manager

SDO: Standard Developing Organization

SDR: System Design Review

SES: Single European Sky

SESAR: Single European Sky ATM Research

SJU: SESAR Joint Undertaking

SPR: Safety and Performance Requirements

SUR: Surveillance

SURF-IA: Surface - Indications and Alerts

SVS: Synthetic vision system

SW: Software

SWIM: System Wide Information Management

TAC: [EUROCAE] Technical Advisory Committee

TAWS: Terrain Awareness System

TBS: Timed-Based Separation

TCAS: Traffic alert and Collision Avoidance System

TIAM: Technology Independent Assurance Method

TMA: Terminal Manoeuvring Area

TOPMS: Take Off Performance Monitoring System

ToR: Terms of Reference

TS: Technical specification

TSO: Technical Standard Order

TWP: Technical Work Programme

UAS: Unmanned Aircraft System

UAV: Unmanned Aerial Vehicle

US: United States

VDL: VHF Digital Link

VHF: Very High Frequency

VoIP: Voice over IP

WAIC: Wireless Avionics Intra-Communications

WG: Working Group

WIMAX: Worldwide Interoperability for Microwave Access

WRC: World Radio Conference

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