SESAR		Active								ECAC+	
COM11.1		**Voice over Internet Protocol (VoIP) in En-Route**									
REG	**ASP**	**MIL**	**APO**	**USE**	**INT**	**IND**	**NM**	**MET**	**AIS**	**USP**

Subject matter and scope

This Implementation Objective aims at an efficient use of Voice over Internet Protocol (VoIP) by harmonised and coordinated implementation for ground/ground and ground part of ground/air aeronautical communications, ensuring network benefits from VoIP implementation.

The initiative covers inter-centre (encompassing all type of ATM Units) voice communication and the links with the ground radio stations. COM11.1 is applicable to 'En-Route' and 'Network' Operating Environments. Inter-centre voice communications not yet migrated to VoIP are currently performed via analogue and digital circuits.

This legacy ATM voice services will soon no longer be supported by the European telecommunication service providers, making the use of new technology necessary. At present and in order to follow the evolution of the communication technologies, ATM-VoIP is the global standard (ICAO DOC 9896 ed2, based on EUROCAE ED137) for ground telephony and ground segment of the Air-Ground voice. ATM-VoIP industrial standard (EUROCAE ED-137) is maintained and evolved over time to ensure that voice communication requirements are met. Transition towards VoIP is bringing interoperability.

Cross-border aspects need to be addressed appropriately within the network perspective. VoIP in ATM constitutes an essential part of Network Operational Excellence Programme WST13.5 – IP Services and VoIP.

This project aims at an efficient use of Voice over Internet Protocol by harmonised and coordinated implementation for ground/ground and ground part of ground/air aeronautical communications, ensuring network benefits from VoIP implementation.

NOTE FOR MILITARY AUTHORITIES: It is the responsibility of each military authority to review this Objective IN ITS ENTIRETY and address each of the SLoAs that the military authority considers RELEVANT for itself. This has to be done on top and above of the review of "MIL" SLoAs which identify actions EXCLUSIVE to military authorities.

Applicability Area(s) & Timescale(s)

Applicability Area		All ECAC+ States except: Armenia, Luxembourg		
Timescales:		**From:**	**By:**	**Applicable to:**
Initial operational capability		01/01/2013		Applicability Area
Full operational capability			31/12/2021	Applicability Area

References

European ATM Master Plan

OI step -	- No OI Link -							
	Enablers -	CTE-C05a	CTE-C05b					

Legend:	WXYZ-001	Covered by SLoA(s) in this objective	WXYZ-002 zzz	Covered by SLoA(s) in another objective Objective covering the enabler	WXYZ-003	Not covered in the Implementation Plan

Applicable legislation

-none-

Essential Operational Changes

CNS Infrastructure and Services

SESAR Solution

ICAO GANP - ASBUs

COMI-B2/1	Air-Ground ATN/IPS

Deployment Programme

- none -	

COM11.1	Voice over Internet Protocol (VoIP) in En-Route

European Plan for Aviation Safety

- none -	

Operating Environments

En-Route
Network

Stakeholder Lines of Action (SLoAs)

SloA ref.	Title	From	By
COM11.1-ASP01	Develop safety assessment for the changes	01/01/2012	31/12/2021
COM11.1-ASP03	Upgrade and put into service Voice Communication Systems to support VoIP inter-centre telephony	01/01/2013	31/12/2021
COM11.1-ASP04	Upgrade and put into service Voice Communication Systems to support VoIP links to the ground radio stations	01/01/2013	31/12/2021

Description of finalised and deleted SLoAs is available on the eATM Portal @ https://www.eatmportal.eu/working/depl/essip_objectives

Expected Performance Benefits

Safety:	Maintained or improved by providing enhanced signalisation functions. Improved by providing a more resilient infrastructure.
Capacity:	Maintained or improved by providing enhanced signalisation functions.
Operational Efficiency:	-
Cost Efficiency:	Reduced costs by enabling flexible and dynamic use of ANSP resources, leading to long term savings.
Environment:	-
Security:	-

Detailed SLoA Descriptions

COM11.1-ASP01	Develop safety assessment for the changes	From: 01/01/2012	By: 31/12/2021

Action by:	**ANS Providers**
Description & purpose:	Develop safety assessment of the changes, notably upgrades of voice communication systems to support VoIP both for inter-centre telephony and AG radio communication. The tasks to be done are as follows: - Conduct hazard identification, risk assessment in order to define safety objectives and safety requirements mitigating the risks; - Develop safety assessment; - Deliver safety assessment to the NSA, if new standards are applicable or if the severity class of identified risks is 1 or 2. This safety assessment shall be based on fully validated/recognised method.
Supporting material(s):	EC - COMMISSION IMPLEMENTING REGULATION (EU) 2017/373 - (OJ L 62, 8.03.2017, p. 1) - COMMISSION IMPLEMENTING REGULATION (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 03/2017 Url : https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0373&from=EN EUROCONTROL - EAM 4 - ESARR 4 - Risk Assessment and Mitigation in ATM - Edition 1.0 / 04/2001 Url : https://www.eurocontrol.int/publication/esarr-4-risk-assessment-and-mitigation-atm
Finalisation criteria:	1 - The Safety argument for all changes, generated by the deployment of VoIP, has been delivered by the ANSP to the NSA.

COM11.1-ASP03	Upgrade and put into service Voice Communication Systems to support VoIP inter-centre telephony	From: 01/01/2013	By: 31/12/2021

Action by:	**ANS Providers**

COM11.1	**Voice over Internet Protocol (VoIP) in En-Route**

Description & purpose:	Upgrade and put into service voice communication systems which support ED-137 compliant VoIP inter-centre telephony which will enable the deployment of system enablers listed in -References- section. The tasks to be done are as follows: - Define requirements which fit with operational/technical context and are based on relevant standards; - Upgrade voice communication systems to comply with defined requirements; - Implement or purchase IP network services to enable international communication exchange on IPS based protocol; - Purchase and install VCS equipment and/or gateways able to support VoIP in ATM; - Implement the necessary IPv4/IPv6 translation device if required; - Test voice required connectivity and performance; - Update VoIP addressing and connectivity information in the EUROCONTROL AGVN web-database; - Integrate upgraded voice communication systems into the operational network; - Put into service upgraded voice communication systems. The upgraded voice communication systems and their HMI shall enable the operators to perform the inter-centre communication using VoIP telephony at all types of ATS units. Report yearly the actual achieved performance for implemented VoIP in ATM to the EUROCONTROL Agency.
	Note :Completion of the finalisation criteria should be reflected by updating the VoIP connectivity information in the EUROCONTROL AGVN web-database. Previous versions of ED-137 standard and corresponding VOTER Test Tool are also valid.
Supporting material(s):	EUROCONTROL - VOTER 4.1.x Test Description - VOL 4 - Recorder Interface - Edition 3.6 / 12/2014
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - SIP v ATS-R2 Gateway Interworking Test Specification - Edition 2 / 12/2013
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - GUID-137 - EUROCONTROL Guidelines on conformity assessment for the interoperability Regulation of the single European sky - Edition 3.0 / 02/2012
	Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-conformity-assessment-interoperability-regulation-single
	EUROCONTROL - VoIP in ATM Cross-Reference Matrix for ED-137C – VOTER 4.x.x 12/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - SIP v ATS-QSIG Gateway Interworking Test Specification - Edition 2 / 12/2013
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - VOTER Test Tool - version 4.x.x (ED-137C)
	EUROCAE - ED-137/2C - Interoperability Standards for VoIP ATM Components - Volume 2: Telephone 03/2019
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-137/2C Addenda 1 to 8 - Interoperability Standards for VoIP ATM Components - Volume 2 Addenda: Telephone 03/2019
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-137/2C Change 1 - Interoperability Standards for VoIP ATM Components - Volume 2: Telephone 05/2020
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-137/4C - Interoperability Standards for VoIP ATM Components - Volume 4: Recording 03/2019
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-137/5C - Interoperability Standards for VoIP ATM Components - Volume 5: Supervision 03/2019
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCONTROL - VOTER 4.0.x Test Description - VOL 7 - Supervision - Edition 3.2 / 01/2020
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - VOTER 4.0.x Test Description - VOL 6 - Performance for GRS-VCS Interfaces - Edition 3.1 / 01/2020
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCAE - ED-136 - Voice over Internet Protocol (VoIP) Air Traffic Management (ATM) System Operational and Technical Requirements 02/2009
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-138 - Network Requirements and Performances for Voice over Internet Protocol (VoIP) Air Traffic Management (ATM) Systems - Part 2 Network Design Guideline 02/2009
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCONTROL - VOTER 4.1.x Test Description - VOL 3 - VCS Telephone Interface - Edition 3.9 / 10/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - VOTER 4.0.x Test Description - VOL 5 - Interoperability - Edition 3.1 / 12/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	ICAO - Doc 9896 - Manual for the ATN using IPS Standards and Protocols - Edition 2.0 / 2015
	Url : https://store1.icao.int/

COM11.1	**Voice over Internet Protocol (VoIP) in En-Route**

ATM Master Plan relationship:	[CTE-C05a]-VoIP for ground telephony		
Finalisation criteria:	1 - Voice communications equipment has been upgraded. 2 - The technical file (TF) with evidences of compliance and the EC declaration of verification of systems (DoV) has been delivered to the competent National Supervisory Authority (NSA). 3 - Upgraded voice communication equipement has been put into operational service.		
COM11.1-ASP04	**Upgrade and put into service Voice Communication Systems to support VoIP links to the ground radio stations**	From: 01/01/2013	By: 31/12/2021
Action by:	**ANS Providers**		
Description & purpose:	Upgrade and put into service voice communication systems which support ED137 compliant VoIP links to the ground radio stations which will enable the deployment of system enablers listed in -References- section. The tasks to be done are as follows: - Define requirements which fit with operational/technical context and are based on relevant standards; - Upgrade voice communication systems to comply with defined requirements; - Implement or purchase IP network services to enable international communication exchange on IPS based protocol; - Purchase and install VCS and GRS equipment and/or gateways able to support VoIP in ATM; - Implement the necessary IPv4/IPv6 translation device if required; - Test voice required connectivity and performance including AG ground segment voice application; - Updating VoIP addressing and connectivity information in the EUROCONTROL AGVN web-database; - Integrate upgraded voice communication systems into the operational network; - Put into service upgraded voice communication systems. The upgraded voice communication systems shall enable the operators to perform A/G radio communication using VoIP links between VCS and ground radio stations. Report yearly the actual achieved performance for implemented VoIP in ATM to the EUROCONTROL Agency.		
	Note :Completion of the finalisation criteria should be reflected by updating the VoIP connectivity information in the EUROCONTROL AGVN web-database. Previous versions of ED-137 standard and corresponding VOTER Test Tool are also valid.		

COM11.1	Voice over Internet Protocol (VoIP) in En-Route

Supporting material(s):	EUROCONTROL - VOTER 4.1.x Test Description - VOL 4 - Recorder Interface - Edition 3.6 / 12/2014
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCAE - ED-137/1C - Interoperability Standards for VoIP ATM Components - Volume 1: Radio 04/2017
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCONTROL - VOTER 4.1.x Test Description -VOL 1- GRS Radio Interface - Edition 3.9 / 10/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - GUID-137 - EUROCONTROL Guidelines on conformity assessment for the interoperability Regulation of the single European sky - Edition 3.0 / 02/2012
	Url : https://www.eurocontrol.int/publication/eurocontrol-guidelines-conformity-assessment-interoperability-regulation-single
	EUROCONTROL - VoIP in ATM Cross-Reference Matrix for ED-137C – VOTER 4.x.x 12/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - VOTER Test Tool - version 4.x.x (ED-137C)
	EUROCAE - ED-137/4C - Interoperability Standards for VoIP ATM Components - Volume 4: Recording 03/2019
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-137/5C - Interoperability Standards for VoIP ATM Components - Volume 5: Supervision 03/2019
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCONTROL - VOTER 4.0.x Test Description - VOL 7 - Supervision - Edition 3.2 / 01/2020
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCAE - ED-137/1C Change 1 - Interoperability Standards for VoIP ATM Components - Volume 1: Radio 05/2020
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCONTROL - VOTER 4.0.x Test Description - VOL 6 - Performance for GRS-VCS Interfaces - Edition 3.1 / 01/2020
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCAE - ED-136 - Voice over Internet Protocol (VoIP) Air Traffic Management (ATM) System Operational and Technical Requirements 02/2009
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCAE - ED-138 - Network Requirements and Performances for Voice over Internet Protocol (VoIP) Air Traffic Management (ATM) Systems - Part 2 Network Design Guideline 02/2009
	Url : https://eshop.eurocae.net/eurocae-documents-and-reports
	EUROCONTROL - VOTER 4.1.x Test Description - VOL 3 - VCS Telephone Interface - Edition 3.9 / 10/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - VOTER 4.0.x Test Description - VOL 5 - Interoperability - Edition 3.1 / 12/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	EUROCONTROL - VOTER 4.1.x Test Description - VOL 2 - VCS Radio Interface - Edition 3.7 / 10/2021
	Url : https://ost.eurocontrol.int/sites/VOTE/Shared Documents/Reference Documents
	ICAO - Doc 9896 - Manual for the ATN using IPS Standards and Protocols - Edition 2.0 / 2015
	Url : https://store1.icao.int/
ATM Master Plan relationship:	[CTE-C05b]-Digital Voice / VoIP for ground segment of Air-Ground voice
Finalisation criteria:	1 - Voice communications equipment upgraded. 2 - The technical file (TF) with evidences of compliance and the EC declaration of verification of systems (DoV) has been delivered to the competent National Supervisory Authority (NSA). 3 - Upgraded voice communication equipment put into operational service.