

SESAR		Initial							LOC	
INF11.1		Enhanced Ground Weather Management System (GWMS) as local 4DWxCube								
REG	ASP	MIL	APO	USE	INT	IND	NM	MET	AIS	USP

Subject matter and scope

The Enhanced Ground Weather Management System (GWMS) is an evolution of the GWMS developed for the first time in SESAR 1. The Enhanced GWMS is compliant to specifications of the 4DWxCube instance in Aerodrome ATM MET CC. MET for Total Airport Management, which comprises the bulk of local MET information, is developed and integrated into GWMS as a SWIM service (METForTAM). This validates its general capability for the provision of both existing standard and future MET SWIM services dedicated to particular operational environments like Wake Turbulence Separations.

The provision of METForTAM by GWMS has been designed and validated to be SWIM Technical Infrastructure Yellow Profile compliant using AMQP1.0 messaging. This information service may be used to provide enhanced local MET information (e.g. METEO forecasts and observations) to a specific airport (airport operational centre, APOC).

The new capability Glide Wind Profile has also been developed to provide glide wind data into the GWMS using sources like Radar and Lidar sensors. The purpose of these observations is to enhance separation procedures based on the collected glide slope wind data.

These developed capabilities and information services aim to provide enhanced MET data capabilities, in order to improve the accuracy and timely delivery of certain Meteorological conditions at an airport. Specifically, supporting the airport operator and other local stakeholders and, in turn, airspace users to improve their situation awareness and decision making.

NOTE 1: SESAR recommends development of additional SWIM services centred around local MET capabilities and requirements, in addition to a long-term validation exercise to test handling several services at more than one airport to demonstrate the full capabilities of 4DWxCube. This would serve to demonstrate the benefits compared with currently available meteorological information and data provision.

NOTE 2: It should be noted that the implementation of new MET information services, including high resolution wind profiling, are not mandatory for deployment at all airports, but should be considered if there is an operational need for such enhancements.

Applicability Area(s) & Timescale(s)

Applicability Area (Not yet defined)					
Timescales:		From:	By:	Applicable to:	
IOC used for Analytics functioning only - not for implementation planning		01/07/2022			
FOC used for Analytics functioning only - not for implementation planning			31/12/2030		

References

European ATM Master Plan

OI step -	<a href="#">[POI-0044-MET]-MET Service provision for TAM</a>									
Enablers -	METEO-08c	METEO-11a	METEO-11b	METEO-12a	METEO-13	METEO-17	METEO-18	METEO-19		
	METEO-21	METEO-23	SVC-037	SWIM-APS-06b						

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
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Applicable legislation

None
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Essential Operational Changes

Digital AIM and MET Services
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SESAR Solution

PJ.18-04b-01 - Enhanced Ground Weather Management System (GWMS) as local 4DWxCube
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#### ICAO GANP - ASBUs

- none -	
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#### Deployment Programme

- none -	
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#### European Plan for Aviation Safety

- none -	
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#### Operating Environments

Airport
Terminal Airspace

### Stakeholder Lines of Action (SLoAs)

SLoA ref.	Title	From	By
INF11.1-APO01	Consume METForTAM Service		
INF11.1-MET01	Upgrade systems to provide METForTAM Service		
INF11.1-MET02	Upgrade systems to provide METForTAM Service		
INF11.1-MET03	Provide METForTAM Service		

Description of finalised and deleted SLoAs is available on the eATM Portal @ [https://www.eatmportal.eu/working/depl/essip\\_objectives](https://www.eatmportal.eu/working/depl/essip_objectives)

### Expected Performance Benefits

<b>Safety:</b>	Enhanced safety.
<b>Capacity:</b>	-
<b>Operational Efficiency:</b>	-
<b>Cost Efficiency:</b>	Increased cost efficiency.
<b>Environment:</b>	-
<b>Security:</b>	Enhanced security.

### Detailed SLoA Descriptions

INF11.1-APO01	Consume METForTAM Service	From:	By:
		-	-
<b>Action by:</b>	<b>Airport Operators</b>		
<b>Description &amp; purpose:</b>	Where there is a determined operational need for enhanced MET provision at an airport, and METForTAM id deemed an appropriate solution, Airport Operators would in parallel need to upgrade their systems to be able to consume the METForTAM service.		
<b>Supporting material(s):</b>	SJU - SESAR Solution PJ.18-04b-01: Data pack for GWMS Url : <a href="https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms">https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[SVC-037]-METForTAM Service</a>		
<b>Finalisation criteria:</b>	1 - METForTAM Service is consumed via SWIM.		
INF11.1-MET01	Upgrade systems to provide METForTAM Service	From:	By:
		-	-
<b>Action by:</b>	<b>Airport MET Providers</b>		
<b>Description &amp; purpose:</b>	Where there is a determined operational need for enhanced weather observations at an airport, the airport together with their MET Service Provider may consider the following types of new equipment : <ul style="list-style-type: none"> <li>• An integrated system of 3D scanning Doppler X-Band radar and long range Doppler lidar to monitor the wind situation around the airport in rainy and dry weather.</li> <li>• A ground based Doppler Weather Radar installed at the Airport for ATM dedicated purpose for wind monitoring in wet conditions and precipitation monitoring.</li> <li>• Ground based Scanning Doppler Lidar installed at the Airport for ATM dedicated purpose for wind monitoring in dry conditions.</li> <li>• Passive Microwave Receiver used for deriving vertical temperature information.</li> </ul>		

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<b>Supporting material(s):</b>	SJU - SESAR Solution PJ.18-04b-01: Data pack for GWMS		
<b>ATM Master Plan relationship:</b>	Url : <a href="https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms">https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-08c]-Integrated system of 3D scanning Doppler X-Band radar and long range Doppler lidar for all-weather wind monitoring</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-11a]-Precipitation and Wind monitoring in wet conditions using data from Doppler Weather Radar</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-11b]-Wind monitoring in dry conditions using data from Scanning Doppler Lidar</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-12a]-Compile data for METForTAM service</a>		
<b>Finalisation criteria:</b>	1 - Systems are upgraded		
<b>INF11.1-MET02</b>	<b>Upgrade systems to provide METForTAM Service</b>	From:	By:
		-	-
<b>Action by:</b>	<b>Airport MET Providers</b>		
<b>Description &amp; purpose:</b>	Where there is a determined operational need for enhanced systems at an airport, to process and exchange MET information, the airport together with their MET Service provider may consider the following measures to ensure that systems are able to process the MET data and in particular:		
	<ul style="list-style-type: none"> <li>• Reception of basic MET parameters (e.g. temperature, humidity) and translation into aviation relevant topics.</li> <li>• Deriving products related to precipitation and precipitation probability, e.g. rain cells identification and tracking and estimation of rain amount including also output of NWP models.</li> <li>• Analysis of temperature profiles for the detection of inversions.</li> </ul>		
	Based on the output of one or several NWP model runs for the same forecast period, forecasts and/or probabilities can be given for parameters included in the model and requested for ATM operations.		
<b>Supporting material(s):</b>	SJU - SESAR Solution PJ.18-04b-01: Data pack for GWMS		
<b>ATM Master Plan relationship:</b>	Url : <a href="https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms">https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-13]-C06 Local MET Information</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-17]-Standard MET Parameter processing</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-18]-Microwave Radiometer</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-19]-Precipitation processing</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-21]-Temperature Inversion Detection</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[METEO-23]-(Ensemble) Forecast based on NWP model output</a>		
<b>Finalisation criteria:</b>	1 - MET information is processed based on local requirements and needs.		
<b>INF11.1-MET03</b>	<b>Provide METForTAM Service</b>	From:	By:
		-	-
<b>Action by:</b>	<b>Airport MET Providers</b>		
<b>Description &amp; purpose:</b>	Where there is a determined operational need for enhanced MET provision at an airport, the deployment of METForTAM Service for the exchange between Aerodrome ATM-MET and the Airport via SWIM Yellow Profile could be considered.		
<b>Supporting material(s):</b>	SJU - SESAR Solution PJ.18-04b-01: Data pack for GWMS		
<b>ATM Master Plan relationship:</b>	Url : <a href="https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms">https://sesarju.eu/sesar-solutions/ground-weather-management-system-gwms</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[SVC-037]-METForTAM Service</a>		
<b>ATM Master Plan relationship:</b>	<a href="#">[SWIM-APS-06b]-Provision of SWIM enabled G/G and initial Ground to Air Meteorological Information services</a>		
<b>Finalisation criteria:</b>	1 - METForTAM Service is available via SWIM Yellow Profile.		

