



(Lima, Peru, from 18 to 22 September 2017)

Agenda Item 6: Emerging aspects of implementation

Analysis of SAM-PBIP MET Chapter and PFF

(Presented by the Secretariat)

SUMMARY	
This working paper presents the objective of SAM-PBIP and the contents of the MET Chapter and Performance Framework Form (PFF) of this document.	
REFERENCES	
<ul style="list-style-type: none"> • Doc 9750 – Global Air Navigation Plan • Doc 9883 - Manual on Global performance of the Air Navigation Plan • AIS to AIM Transition Roadmap • Report of the Eleventh Air Navigation Conference • Report of the Twelfth Air Navigation Conference • Summary of the ASBU Workshop and revision of the SAM-PBIP 	
ICAO strategic objectives:	<i>A – Safety</i> <i>B – Air navigation capacity and efficiency</i> <i>E – Environmental protection</i>

1. Background

1.1 The current *Performance Based Implementation Plan for the South American Region (SAM-PBIP)* has been drafted taking into consideration ICAO Global Air Navigation Plan (Doc. 9750) and is framed within the of Aviation System Blocks Upgrades (ASBU) methodology, with the aim of achieving a more efficient and interoperable airspace to meet future capacity demand, without compromising air navigation safety.

1.2 This Plan seeks to establish an implementation strategy so that benefits can be obtained for the air navigation community, based on the ATM-related infrastructure and available and foreseen aircraft capabilities. The document contains the Regional vision for the air navigation system AGA/AOP, AIM, ATM, CNS, MET, SAR, Human Resources and Safety, giving high priority to environmental protection, training and safety.

1.3 The scope of this implementation plan covers SAM Flight Information Regions (FIR), and considers the short-and medium-term implementations of the systems in support of the air navigation services, between 2017 and 2023, and the continuation of ASBU Block 0 modules implementation, as well as the beginning of selected ASBU Block 1 modules. The long-term initiatives required for the evolution to a global ATM system, as shown in the Global ATM Operational Concept, will be added to this Plan as they are developed and approved.

2. Analysis

2.1 The Global ATM Operational Concept was approved by the Eleventh Air Navigation Conference (AN-Conf/11) (Montreal, September-October 2003) and published as Doc. 9854-AN/458. In order to align global planning to the ATM Operational Concept, the AN-Conf/11, recommended States and Regional Planning and Implementation Groups (PIRG), through Recommendation 1/1, to consider the Concept as a common global framework to guide in the planning for the implementation of the systems in support of the air navigation services.

2.2 GREPECAS/15 approved Conclusion 15/1 for the development by the Group of a regional performance-based plan, in keeping with the Global Air Navigation Plan (GANP) and the Global ATM Operational Concept.

2.3 The *Air Navigation System Performance-Based Implementation Plan for the SAM Region* was completed in May 2011, and approved by the Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12) (Lima, Peru, October 2011).

2.4 The 37 Session of the International Civil Aviation Organization General Assembly (2010) directed the Organization to double its efforts to meet the global needs for airspace interoperability while maintaining its focus on safety. The block upgrades initiative was formalized at the Twelfth Air Navigation Conference (AN-Conf/12) (Montreal, November 2012) and were included in the new GANP, 4th Edition (Doc 9750). The block upgrades describe a way to apply the concepts defined in the GANP with the goal of implementing regional performance improvements. They include the development of technology roadmaps, to ensure that standards are mature and to facilitate synchronized implementation between air and ground systems and between regions. The ultimate goal is to achieve global interoperability. Safety demands this level of interoperability and harmonization, but it must be achieved at a reasonable cost with commensurate benefits.

2.5 Through Recommendation 6/1 - *Regional performance framework – planning methodologies and tools*, AN-Conf/12 urged States and PIRGs to harmonize the regional and national navigation plans with the ASBU methodology in response to this, and the *Air Navigation System Performance-Based Implementation Plan for the SAM Region* was aligned with the ASBU methodology (version May 2013). After this edition, an amendment was made in November 2013).

2.6 On 1st December 2015, ICAO through State Letter AN 13/54-15/77 informed on proposal for amendment to the GANP (Fifth Edition) reflecting the changes made in accordance with the recommendations formulated in the Twelfth Air Navigation Conference (AN-Conf/12), as well as on some updates required. The Fifth Edition of GANP was endorsed by the Thirteenth period of ICAO Assembly.

2.7 Taking into account the progress in the implementation of air navigation systems in the SAM Region in the period 2012-2016, and the fifth edition of the GANP, the Air Navigation System Performance-Based Implementation Plan for the SAM Region was updated and the SAM-PBIP was reviewed during the ASBU Workshop carried out in Lima, from 14 to 18 August 2017.

2.8 During the Workshop, the review of the documents by the States was recommended in order to gather information regarding the contents and on the indicators for the assessment of the progress reached in the implementations programmed.

2.9 **Appendix A** to this working paper presents the MET Chapter, as well as the BO-AMET Performance Framework Forms (PFF) and Air Navigation Report Form (ANRF). The Meeting could

consider the creation of an Ad-hoc Commission for the analysis of the corresponding document and present its comments and proposals for amendment to the plenary for consideration. The document was prepared with a previous analysis as indicated in ICAO Doc 9883.

2.10 The final objective of this revision was to align the SAM-PBIP to the GANP in its fifth edition. The Meeting could as well consider to review the document from this approach.

3. **Conclusion**

3.1 The SAM-PBIP is a Plan based specifically in performance. It is necessary to take into account that for its elaboration an analysis of the initial conditions and projected implementations covering the period was made.

3.2 The alignment of the fifth edition of the GANP is very important so that the planning in the State is aligned with this document at a regional level.

4. **Suggested action**

4.1 The Meeting is invited to:

- a) analyze the information provided in this working paper;
- b) consider the creation of the Ad-hoc Commission for the review of the MET part contained in Appendix A; and
- c) take any other actions it may deem appropriate.

APPENDIX A

6.3.1 Chapter 6: Meteorology

1.1 Introduction

1.1.1 The ~~next-fifth~~ edition of the Global Air Navigation Plan (Doc 9750, GANP), ~~will be presented to the ICAO Assembly in 2013 for approval. The draft GANP, and~~ maintains the aviation system block upgrade (ASBU) strategy ~~it establishes, and~~ proposes that future air navigation technology and procedure improvements are organized and based on a consultative strategic approach that coordinates specific global performance capabilities and the flexible upgrade timelines associated with each component.

1.1.2 Meteorological information is an integral component of the tomorrow's system-wide information management (SWIM) environment, alongside aeronautical information, flight and flow information and other information sources. As meteorological information transitions from today's predominantly gridded, binary, alphanumeric and graphical formats to ~~tomorrow's~~ interoperable, non-proprietary code forms (such as XML/GML) within the SWIM environment using ~~new~~ exchange models like the weather exchange model (WXXM), tremendous potential exists to enhance the safety and the efficiency of the global air traffic management (ATM) system through enhanced availability and use of meteorological information. With this in mind, a planning threads promoting usage of integrated meteorological information to enhance operational decision making.

1.2 Meteorological information supporting enhanced operational efficiency and safety

1.2.1 ~~In the near term (Within~~ Block 0), improved utilization by ATM of products from world area forecast centres, volcanic ~~ash~~ advisory centres and tropical cyclone advisory centres ~~would~~ support dynamic and flexible management of airspace, dynamically optimized flight trajectory planning, improved situational awareness and collaborative decision making. A focus on local arrangements is intended to enhance utilization of aerodrome warnings as well as wind shear warnings and alerts.

1.2.2 Meteorological challenges in routine operations often arise as a result of adverse and rapidly changing meteorological conditions. The proposed dynamic integration of ATM and meteorological (MET) information is expected to provide timely meteorological information to enable real-time identification, increased predictability and deployment of operationally effective ATM solutions to accommodate changing conditions, as well as facilitate tactical avoidance of hazardous meteorological conditions. Increasing use of airborne capabilities to detect and report meteorological parameters, and enhanced cockpit displays of meteorological information to enhance situational awareness, are additional elements of the strategy.

1.2.3 The Block 1 deployment includes initial ATM-MET integration, and actual and forecast meteorological information is compared with pre-characterized meteorological constraints on airspace or aerodrome threshold events using an ATM impact conversion process to identify near term capacity constraints. Total ATM-MET integration is required in order to incorporate meteorological information into the decision-making rationale and to automatically identify, understand and take into account the impact of meteorological conditions. ATM decision makers are increasingly assisted by decision support tools using integrated meteorological information, consisting of automated systems and processes that create ranked mitigation strategies for consideration and execution. It is also recognized that there is a need for space weather information in Block 1 for the sake of safety and efficiency of international air navigation, due to the sustained growth in the number of flights on transpolar routes where space weather, which affects the surface or the atmosphere of the earth (such as solar radiation storms), represents a

hazard to communication and navigation systems and, perhaps, a radiation risk to crew members and passengers.

6.2.4 For the implementation of B1-AMET, the establishment of standards for global exchange of MET information in line with other types of information and using a single reference (ICAO-AIRM) shall be encouraged. The enhancement of meteorological information on different aspects related to service quality, such as data accuracy and standardization, when used in interrelated operational decision-making processes, shall also be encouraged.

6.2.5 It is very important to become aware that, for the transition to the implementation of B1-AMET, States will have to invest in software infrastructure that is compatible with AMHS in order to translate OPMET messages—currently in alphanumeric format—to an interoperable format (XML/GML).

~~4.2.46.2.6~~ At the Block 3 stage, far greater reliance is placed on airborne capabilities to provide meteorological awareness and drive tactical decision making including avoidance of hazardous meteorological conditions. Enhanced meteorological information is dynamically available to support the evolution of 4D trajectory operations. The 4D representations of meteorological information that have replaced traditional gridded, binary, alphanumeric and graphic formats provide wide benefits including increased access to meteorologically constrained airspace. ATM decision-making processes make extensive use of decision support tools that dynamically integrate meteorological information and propose mitigation strategies for consideration. Enhanced interpretation and mitigation of hazardous meteorological conditions results in extended pre-flight and flow planning capabilities.

~~4.2.56.2.7~~ The ~~t~~technology requirements include the progressive establishment of an integrated 4D database capability of global meteorological information (observations and forecasts), as well as the deployment of automated systems to enable:

- a) translation of raw meteorological data into predefined ATM constraints on airspace and aerodromes;
- b) use of translated data to assess the impact on ATM operations, for traffic flows and individual flights; and
- c) decision support tools, for both air navigation service providers (ANSPs) and users, which use ATM impact information to generate proposed mitigation strategies.

~~4.2.66.2.8~~ In the ~~longer-medium~~ term, the availability of SWIM will enable further integration of meteorological information into both airborne and ground based tactical decision support tools.

~~4.2.76.2.9~~ The realization of globally interoperable, exchangeable meteorological information, including enhanced ground-to-air, air-to-ground and aircraft-to-aircraft meteorological reporting and exchange capabilities will be a significant undertaking.

~~4.2.86.2.10~~ The transition to integrated meteorological information will require agreement to, and development of, global standards for meteorological information exchange with an emphasis on the exchange of 4D (latitudinal, longitudinal, vertical and temporal) digitized meteorological information. Agreements are also necessary on what will constitute required meteorological information and graphical presentation in the digital information exchange era, to supersede the traditional gridded, binary, alphanumeric and graphic formats. Standardized meteorological information translation parameters and

ATM impact conversion parameters will also require global agreement and development. Ensuring the accurate, reliable and wide availability of meteorological information remains a continuing challenge.

1.2.96.2.11 Meteorological information is recognized as a component of, ASBU modules concerning airport capacity, SWIM, flight and flow – information for a collaborative environment (FF-ICE), aeronautical information management (AIM), network operations, airborne separation, remotely-piloted aircraft (RPA), trajectory-based operations (TBO), continuous climb operations/continuous descent operations (CCO/CDO) and the global navigation satellite system (GNSS). Deployments from the meteorological information planning thread will need to take account of these wide interdependencies, therefore, States and users are urged to give due consideration to the potential added benefits which could result from the integration of a number of modules across a number of threads.

1.2.106.2.12 In this regard, the ASBU describe the way to apply the concepts defined in the Global Air Traffic Management Operational Concept (Doc 9854) in order to achieve local and regional performance improvements. The final target is to achieve global interoperability. Safety and efficiency require this level of interoperability and harmonization, which should be achieved at a reasonable cost and provide proportional benefits. This module promotes the establishment of standards for global exchange of MET information in line with other types of information and using a single reference (ICAO-AIRM). It also encourages the enhancement of meteorological information in various aspects related to service quality, such as data accuracy and standardization, when used in interrelated operational decision-making processes.

6.26.3 **Analysis of the current situation (2017)**

1.2.116.3.1 SAM States provide an aeronautical meteorological service that has been gradually improving in recent years. However, to ensure the availability accurate, reliable and comprehensive weather information, not all States have the necessary equipment, properly installed and / or maintained. In this respect it is essential that States have automated systems for data verification in accordance with the requirements set out in Annex 3 (thresholds). While quality management systems are in a good implementation process, the process ~~of that should have been the basis for the quality of meteorological data should be the structure of~~ Block 0 will need to be adjusted to the new requirements of ISO 9001:2015.

6.3.2 Likewise, the lack of compliance with ICAO and WMO standards and recommendations referred to personnel involved in MET units is a deficiency that should be corrected by the States of the Region.

6.3.3 ICAO, together with the World Meteorological Organization, has made a significant effort to accompany and support the States in the implementation of the MET/QMS, hoping it would bear good results. However, there are still some States that have not yet completed MET/QMS implementation. In order to achieve this goal, it is imperative that top management in the administrations and aeronautical meteorological service providers be committed and in compliance.

6.3.4 Regarding SIGMETs on meteorological phenomena at regional level, there is lack of continuity, homogeneity, and harmonization in FIR surveillance. There have been cases in which the availability of severe en-route weather information for the user has been disrupted, thus affecting safety and flight planning.

6.3.5 Regarding OPMET messages, there has been an improvement in data availability, in addition to a significant reduction of formatting errors. The implementation and use of AMHS templates has significantly improved formatting. The implementation of OPMET messages in XML/GML format is still in an early stage, and initial data exchange testing in this format is just starting.

~~1.2.12.6.3.6~~ An element that cuts across all these areas is personnel competency management (PFF SAM/HR 01), in accordance with the requirements of the World Meteorological Organization (WMM).

~~1.2.13~~ To obtain a mature QMS / MET in the region any effort by ICAO will be useless if there is not the commitment and performance of the senior management of the civil aviation administrations and providers of aeronautical meteorological services.

~~1.2.14~~ As a cross-curricular subject to all these axes, there is the personnel competencies management (PFF SAM/HR 01) in accordance with the World Meteorological Organization (WMO) requirements.

~~1.2.15~~ 6.4 Alignment with ASBU

6.4.1 Of the ASBU Block 0 modules taken under consideration of the SAM Region, the MET area contributes to PIA 1 modules B0-ACDM75 and B0-DATM80, and PIA 3 module B0-AMET. Within Block 1, the MET area contributes to modules B1-ACDM, B1-SURF, B1-DATM, B1-AMET, and B1-SWIM405.

~~1.2.16.4.2~~ Following are the MET PFF indicated in paragraph 6.3.2 contributing with ASBU Block 0 modules indicated in paragraph 5.4.1:

- a) SAM MET/01 PFF - *Implementation of the MET information quality management system*, with module B0-AMET and B1-AMET405;
- b) SAM MET/02 PFF - *Improvements in MET facilities*, with modules B0-ACDM, B1-ACDM, and75 and B0-SURF405;
- c) SAM MET/03 PFF - *Improvements in the implementation of the international airways volcano watch (IAVW), in the surveillance of the accidental release of radioactive material, and in the issuance of SIGMET(s)*, with modules B0-ACDM, B0-AMET, B1-ACDM, and B1-AMET80 and B0-105; and
- d) SAM/MET 04 PFF - *Improvements in OPMET data exchange; follow-up of the evolution of WAFS; and implementation and follow-up of the evolution of the WAFS of MET and AIM data interoperability*, with modules B0-DATM, B0-ACDM, B0-AMET, B1-DATM, B1-ACDM, B1-AMET, and B1-SWIM-0-80; and B0-105.

REGIONAL PERFORMANCE OBJECTIVE: <u>SAM MET/01</u> IMPLEMENTATION OF THE MET INFORMATION QUALITY MANAGEMENT SYSTEM				
Benefits				
Safety	<ul style="list-style-type: none"> • Ensure the quality of meteorological data and products provided to all the users of the ATM community • Improve the trust of the user with respect to meteorological data used for flight planning and re-planning. 			
Metrics				
<ul style="list-style-type: none"> • Number of international aerodromes with implemented-QMS/MET <u>implemented and updated to ISO 9001:2015</u>. • Number of international aerodromes with certified-QMS/MET <u>certified under ISO 9001:2015</u>. 				
201 7 ² – 2020 18 ¹⁸ Strategy				
ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
	a) Ensure the implementation <u>and updating</u> of the MET information quality management system (QMS/MET)	(*) 201 7 ² -2020 15 ¹⁸	Regional Project States	Valid
	b) Certify and maintain the certification of the QMS/MET quality management system by an approved organisation in all AOP aerodromes.	(*) 201 9 ⁵	States	Valid
	c) Monitor the process of QMS/MET implementation <u>and updating process</u>	201 7 ² -2020 18 ¹⁸	GREPECAS	Valid
Relationship with GPIs	GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: <u>SAM MET/02</u> IMPROVEMENTS IN MET FACILITIES				
Benefits				
Safety	<ul style="list-style-type: none"> • Provide more reliable MET information to all the ATM community. • Assistance in decision-making for ATM. • Assurance of availability of MET information for the user • Contribute to situational awareness of aeronautical users for all weather operations (AWO). 			
Metrics				
<ul style="list-style-type: none"> • Number of international aerodromes with operative AWOS. • Number of MWOs with the required equipment and systems. • Number of AOP aerodromes with -updated summaries and climatological tables. 				
2017 - 2018 Strategy				
ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM DCB AO AUO ATM-SDM CM	a) Establish-Monitor thea regional plan for the automation of meteorological data at all AOP aerodromes.	201 72 -201 9	Regional Project States	Valid
	b) Establish a regional plan to strengthen Meteorological Watch Offices (MWOs) with the infrastructure required for the effective watch in the FIRs.	2017 -2020 8	Regional Project States	Valid
	c) Establish programmes-a regional plan to give continuity, spatial homogeneity, and harmonization to FIR surveillance, for periodic inspection and calibration of meteorological instruments of EMA(s)	201 82 -2021 14	States	Valid
	d) Develop and implement a Monitor the programme for the update of the S summaries and climatological tables of AOP aerodromes.	201 72 -201 94	States	Valid
	e) Monitor the implementation of the different programmes	201 72 -2020 14	GREPECAS States	Valid
Relationship with GPIs	GPI/9: Situational awareness, GPI/14: Runway operations, GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

REGIONAL PERFORMANCE OBJECTIVE: <u>SAM MET/03</u> IMPROVEMENTS IN THE IMPLEMENTATION OF INTERNATIONAL AIRWAYS VOLCANO WATCH (IAVW), SURVEILLANCE OF THE ACCIDENTAL RELEASE OF RADIOACTIVE MATERIAL AND THE ISSUANCE OF SIGMETs				
Benefits				
Safety	<ul style="list-style-type: none"> Increased flight safety with the provision of information on volcanic ash and severe phenomena 			
Environmental protection and sustainable	<ul style="list-style-type: none"> Support pre-flight planning, optimising air routes with respect to volcanic ash and the accidental release of radioactive material. Support the planning of new air routes in a safe and sustainable manner. 			
Metrics				
<ul style="list-style-type: none"> Number of States with IAVW and their implemented evolutions. Number of States with contingency plan for volcanic ash and accidental release of radioactive material, approved. 				
2016 2 – 2022 18 Strategy				
ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
	a) Develop a <u>Update the</u> Guide for IAVW implementation in the Region, based on ICAO Document 9766.	2017 2 -2019 3	Regional Project States	Valid
	b) Update the letters of agreement between CAAs/MET/State vulcanologic bodies, describing the responsibilities of each institution (including VONA format)	(*) 2018 2	States	Valid
	c) Where applicable, develop written agreements with national meteorological services (NMS) in case of accidental release of radioactive material.	(*) 2018 2	States	Valid
	d) Update the letters of operational agreement between ATS/MET units,	(*) 2018 2	States	Valid
	e) Develop <u>Monitor the implementation of the</u> regional contingency plan for cases of volcanic activity	(*) 2012 2 -2020 13	Regional Project	Valid
	f) Develop a regional contingency plan for cases of accidental release of radioactive material.	2017 2 -2020 13	Regional Project	Valid
	g) Update the procedures in MWOs and VAACs according to Amendments 77 6 and 78 7 of Annex 3	2017 3 -2020 18	States	Valid
Relation-ship with GPIs	GPI/9: Situational awareness, GPI/14: Runway operations, GPI/16: Decision support and alerting systems, GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: <u>SAM MET/04</u> IMPROVEMENTS IN OPMET INFORMATION EXCHANGE, AND FOLLOW-UP OF WAFS EVOLUTION <u>AND IMPLEMENTATION OF MET AND AIM DATA</u> <u>INTEROPERABILITY</u>				
Benefits				
Safety	<ul style="list-style-type: none"> Timely provision of duly coded OPMET information to the ATM community Increased regional use of meteorological forecasts (upper wind, turbulence, icing, convective clouds and others). 			
Environmental protection and development of air transport	<ul style="list-style-type: none"> Increased efficiency of operations and reduced carbon emissions. 			
Metrics				
<ul style="list-style-type: none"> Increased availability of OPMET information (in percentage) at regional and international level. <u>Number of States that have implemented WAFS and its evolutions.</u> <u>Number of States where meteorological services are involved in CDM and A-CDM processes.</u> <u>Number of States that transmit OPMET data in XML/GML format.</u> <u>Number of States with data available for interoperability.</u> 				
2017 2 - 2024 18 Strategy				
ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM DCB AO AUO ATMSDM CM	a) Establish <u>Update</u> the regional procedure <u>according to Amendments 77 and 78</u> to ensure timely availability of duly coded OPMET information	(*) 2018	States / Brasilia OPMET database	Valid
	b) Develop contingency procedures for the dissemination of OPMET information through the Internet in case of communication system failure.	2017 2 - 2019 3	States	Valid
	c) Develop and implement a transition plan for OPMET information coding in XML format	2017 3 - 2019 8	Regional Project States	Valid
	d) Establish <u>Develop plans and implement regional procedures in support of ATM for the migration from ISCS to WIFS.</u>	(*) 2017 - 2019 4	ICAO States	Valid
	e) Develop <u>Establish a plan to implement the participation of meteorological services in CDM and A-CDM processes, together with COM units, a migration plan that permits WAFS products to be compatible with the future NextGEN/SESAR environment.</u>	2018 3 - 2021 18 +	Regional Project State	Valid
	f) Develop <u>and together with COM units, a migration plan to make WAFS products compatible with the NextGEN/SESAR environment in the future implement regional procedures in support of ATM.</u>	(*) 2017 - 2019	ICAO Regional Project	Valid

	<p>g) <u>g) Establish a programme for the implementation of standards and recommended practices and IT infrastructure related to OPMET exchange in an interoperable format so that the OPMET data generated and coded by the States may access the SWIM environment.</u></p>	<p><u>2018 - 20218+</u></p>	<p><u>Regional Project</u> <u>States</u> <u>States</u></p>	<p><u>Valid</u></p>
<p>Relation-ship with GPIs</p>	<p>GPI/9: Situational awareness, GPI/14: Runway operations, GPI/18: Aeronautical information and GPI/19: Meteorological systems.</p>			

(*) Indicates that the task has been started before the date contemplated in this planning.

<u>REGIONAL PERFORMANCE OBJECTIVE: SAMMET/05 IMPLEMENTATION OF SPACE WEATHER SURVEILLANCE</u>				
<u>Benefits</u>				
<u>Safety</u>	<ul style="list-style-type: none"> • <u>Provision of information on space weather conditions</u> • <u>Availability of OPMET messages related to space weather on aeronautical meteorological information networks.</u> 			
<u>Environmental protection and sustainable development of air transport</u>	<ul style="list-style-type: none"> • <u>Increased efficiency of operations and reduced carbon emissions.</u> 			
<u>Metrics</u>				
<ul style="list-style-type: none"> • <u>Percentage increase in availability of both regional and international OPMET information.</u> • <u>Number of States that have implemented WAFS and its evolutions.</u> • <u>Number of States that prepare space weather forecasts, after 2020.</u> • <u>Number of States where meteorological services are involved in CDM and A-CDM processes.</u> • <u>Number of States that transmit OPMET data in XML/GML format.</u> • <u>Number of States with data available for interoperability.</u> 				
<u>2018 – 2022 Strategy</u>				
<u>ATM OC COMPONENTS</u>	<u>TASKS</u>	<u>PERIOD</u>	<u>RESPONSIBILITY</u>	<u>STATUS</u>
<u>AOM DCB AO AUO ATMSDM CM</u>	a) <u>Insert everything related to space weather surveillance in the Guide for drafting and dissemination of SIGMET messages.</u>	<u>2018-2020</u>	<u>Regional Project State</u>	<u>Valid</u>
	b) <u>Develop and implement a space weather forecast interpretation training plan for MET personnel.</u>	<u>2018 - 2022</u>	<u>Regional Project State</u>	<u>Valid</u>
	c) <u>Develop and implement a training plan on coding of OPMET space weather information in XML format</u>	<u>2019 - 2021</u>	<u>Regional Project State</u>	<u>Valid</u>
	d) <u>Conduct space weather event drills to check codings and response by States</u>	<u>2019-2022</u>	<u>Regional Project State</u>	<u>Valid</u>
	e) <u>Establish a programme for the implementation of standards and recommended practices and IT structure related to space weather so that the data generated and coded by the States may access a SWIM environment .</u>	<u>2020-2022</u>	<u>Regional Project States</u>	<u>Valid</u>
<u>Relationship with GPs</u>	<u>GPI/9: Situational awareness, GPI/18: Aeronautical information and GPI/19: Meteorological systems</u>			

SAM AIR NAVIGATION REPORT FORM (ANRF)

SAM Regional Planning for ASBU Modules

REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – Module N° B0-AMET105: Meteorological information supporting enhanced operational efficiency and safety					
Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management					
ASBU B0-AMET105: Impact on Main Key Performance Areas (KPA)					
	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	Y	Y	Y	Y

ASBU B0-AMET05: Implementation Progress	
Elements	Implementation Status (Ground and Air)
1. WAFS	In process of improvement
2. IAVW	In process of improvement
3. Tropical cyclone watch	In process of improvement
4. Space weather watch	In process of improvement
5. Aerodrome warnings	In process of improvement
6. Wind shear warnings and alerts	MET provider services / 2015
7. SIGMET	MET provider services / 2020 15
8. QMS/MET	MET provider services / 2019 18

ASBU B0-AMET105: Meteorological information supporting enhanced operational efficiency and safety				
Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. WAFS	Connection to the AFS satellite and public Internet distribution systems	Nil	Prepare a contingency plan in case of public Internet failure	N/A
2. IAVW	Connection to the AFS satellite and public Internet distribution systems	Nil	Prepare a contingency plan in case of public Internet failure	N/A
3. Tropical cyclone watch	Connection to the AFS satellite and public Internet distribution systems	Nil	Prepare a contingency plan in case of public Internet failure	N/A

ASBU B0-<u>AMET105</u>: Meteorological information supporting enhanced operational efficiency and safety				
Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
<u>4. Space weather and radioactive material watch</u>	<u>Connection to AMHS</u>	<u>Nil</u>	<u>Prepare a contingency plan in case of failure of public Internet.</u>	<u>N/A</u>
<u>54. Aerodrome warnings</u>	Connection to the <u>AFTNAMHS</u>	Nil	Local arrangements for reception of aerodrome warnings	N/A
<u>65. Wind shear warnings and alerts</u>	Connection to the <u>AFTNAMHS</u>	Nil	Local arrangements for reception of wind shear warning and alerts	N/A
<u>76. SIGMET</u>	Connection to the <u>AFTNAMHS</u>	Nil	N/A	N/A
<u>87. QMS/MET</u>	Nil	Commitment of top management	N/A	N/A

ASBU B0-<u>AMET105</u>: Performance Monitoring and Measurement (Implementation)	
Elements	Performance Indicators/Supporting Metrics
1. WAFS	Indicator: States implementation of WAFS Internet File Service (WIFS) Supporting metric: Number of States implementation of WAFS Internet File Service (WIFS)
2. IAVW	Indicator: Percentage of international aerodromes/MWOs with IAVW procedures implemented Supporting metric: Number of international aerodromes/MWOs with IAVW procedures implemented
3. Tropical cyclone watch	Indicator: Percentage of international aerodromes/MWOs with tropical cyclone watch procedures implemented Supporting metric: Number of international aerodromes/MWOs with tropical cyclone watch
<u>4. Space weather and radioactive material watch</u>	<u>Indicator: Percentage of MWO with space weather and radioactive material watch procedures implemented.</u> <u>Supporting metric: Number of international aerodromes with space weather and radioactive material watch.</u>
4. Aerodrome warnings	Indicator: Percentage of international aerodromes/AMOs with Aerodrome warnings implemented Supporting metric: Number of international aerodromes/AMOs with Aerodrome warnings implemented
5. Wind shear warnings and alerts	Indicator: Percentage of international aerodromes/AMOs with wind shear warnings procedures implemented Supporting metric: Number of international aerodromes/AMOs with wind shear warnings and alerts implemented

ASBU B0-<u>AMET105</u>: Performance Monitoring and Measurement (Implementation)	
Elements	Performance Indicators/Supporting Metrics
6. SIGMET	Indicator: Percentage of international aerodromes/MWOs with SIGMET procedures implemented Supporting metric: Number of international aerodromes/MWOs with SIGMET procedures implemented
7. QMS/MET	Indicator: Percentage of MET Provider Sates with QMS/MET implemented Supporting metric: Number of MET Provider Sates with QMS/MET certificated

ASBU B0-<u>AMET105</u>: Performance Monitoring and Measurement (Benefits)	
Key Performance Areas	Benefits
Access & Equity	Not applicable
Capacity	Optimized usage of airspace and aerodrome capacity due to MET support
Efficiency	Reduced arrival/departure holding time, thus reduced fuel burn due to MET support
Environment	Reduced emissions due to reduced fuel burn due to MET support
Safety	Reduced incidents/accidents in flight and at international aerodromes due to MET support.