Agenda Item 4: Study the new project related to MET Services improvement in support of the ATM

Analysis of ATM Requirements and ASBU methodology

(Presented by the Secretariat)

SUMMARY

This working paper describes the importance of the transmission of meteorological products with quality and opportunity to support the operations of Air Traffic Management (ATM) community and its relationship with the requirements of the Global Air Navigation Plan, the ATM operational concept and the Aviation System Block Upgrades (ASBU), which were related in the Air Navigation Performance Based Implementation Plan (PBIP). It also concludes with the suggestion to prepare a project to generate new products for the ATM, based on the discussions.

References:

- Annex 3 – *Meteorological Service for International Civil Aviation*
- Doc 9750 – Global Air Navigation Plan
- Doc 10045 - Report of MET/Divisional Meeting (2014)
- Doc 9854 – ATM Operational Concept
- Air Navigation Performance Based Implementation Plan (PBIP), version 1.4

ICAO strategic objectives:	*A - Safety* *B – Air navigation capacity and efficiency* *E – Environmental protection*

1. Introduction

1.1 Doc 9750 – Global Air Navigation Plan, in its fourth edition, presents the ASBU methodology.

1.1.1 During the Meteorology Divisional Meeting (2014) (MET/14), several issues of ASBU modules in which MET information is important, were discussed.

1.1.2 ICAO Doc 9854, regarding operational concept components, highlights that the provision of meteorological information represents an integrated function of the ATM system, and the information to satisfy ATM requirements should consider both the contents and the format and its opportunity.

1.1.3 The SAM Region prepared a Performance Based Air Navigation System Implementation Plan for the SAM Region, taking into consideration the ICAO Global Air Navigation Plan (GANP) (DOC 9750), under the framework of the Aviation System Block Upgrades (ASBU) methodology, in order to

reach a more efficient and interoperable airspace, which will allow to attend the future capacity demand, without comprising safety.

2. Analysis

ATM Operational Concept and Meteorological Information

2.1 In accordance with the ATM operational concept, the main benefits of meteorological information for the ATM system are related with the following:

a) availability of more precise and timely meteorological information will allow to optimize the planning and forecasting of the flight path, which will improve ATM system safety and efficiency;

b) a greater availability of meteorological information shared aboard the aircraft will allow to define in real time the preferred path;

c) a better identification, forecasting and presentation of adverse meteorological conditions will allow to confront the effects more efficiently, which will improve safety and flexibility; i.e., precise and timely information on the need to make a deviation or a re-routing will be available;

d) the improvement of aerodrome reports and forecasts will facilitate the optimum utilization of the capacity available at aerodromes;

e) a greater availability of meteorological information (air-reports), originated from the meteorological sensors aboard, will contribute to improve the information of meteorological forecasts and the display of these information in real time; and

f) meteorological information will contribute to reduce to the minimum the effect of air traffic in the environment.

Aviation System Block Upgrades (ASBU)

2.2 Meteorological information is an integral component of the information management environment of all the future system, together with the aeronautical information, flight and flow information and other information sources. While the meteorological information transits from the current formats, mostly gridded, binary, alphanumeric and graphic, to the future non-registered and interoperable codes (as XML/GML) using new aeronautical information exchange models (WXXM), there is a great potential to improve safety and efficiency of the global air traffic management (ATM) system through a greater availability and use of meteorological information.

2.3 Taking this into account, the inclusion within ASBU framework of a planning thread that promotes the use of integrated meteorological information to improve operational decisions has been proposed. This schedule by blocks is developed in a period from 2013 to 2028 in four blocks, where Block 0 duration is from 2013 to 2018.

2.4 All this arrangement will be useful to support a dynamic and flexible airspace management, a dynamically optimized planning of flight paths, a greater awareness of the situation and a collaborative decision making.

2.5 It is expected that the proposal or the dynamic integration of ATM and meteorological information (MET) provide timely meteorological information to allow the identification in real time, a greater possibility of forecasting and the integration of ATM solutions operationally efficient to adjust to changing conditions, as well as to facilitate the tactical avoidance of hazard meteorological conditions.

2.4 The MET Divisional Meeting (MET/14) identified the ASBU modules in which MET information is important. **Appendix A** presents the different modules identified for all the blocks.

3. **Discussion**

3.1 The Meeting should consider that some modules as A-CDM, CDM and those related to flights by path, will need the greatest coordination between ATS and MET services.

3.2 The Meeting should consider that, according to statistical studies, the aeronautical movement is duplicating each 15 years. The global ATM system will continue subject to the same vagaries of meteorological phenomena which are currently affecting air transport. The additional and significant air traffic volume forecasted for the next years will result in a much more sensible system to the interruptions of the service and to greater consequent costs associated to them. Historically, aeronautical meteorological services have taken care mainly of safety problems. Nowadays, within the context of ATM system in evolution, it is necessary to give more importance to the impact of meteorological conditions in capacity and efficiency and to the possibility of reducing some of the aviation environmental impacts and, at the same time, continue operating in a safely manner.

3.3 The Meeting could consider a project through which the meteorological services necessary within the ATM Concept of Operations is evaluated.

3.4 The Meeting could also note that some of the tasks for a tentative project should have a starting point through a survey to aeronautical users and operators in order to determine the MET services required within a CDM and A-CDM environment.

4. **Suggested action**

4.1 The Meeting is invited to:

a) take note of the information provided in this working paper;

b) review and analyze Appendix A; and

c) agree on other actions as necessary.

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APPENDIX A

NON-MET SPECIFIC ASBU MODULES WHERE AERONAUTICAL MET SERVICE WILL BE OF RELEVANCE

Performance improvement area	*Module reference*	*Module scope*
Airport operations	B0-ACDM	Improved Airport Operations through Airport-CDM
	B0-APTA	Optimization of Approach Procedures including Vertical Guidance
	B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation
	B1-WAKE	Increased Runway Throughput through Dynamic Wake Turbulence Separation
	B2-WAKE	Advanced Wake Turbulence Separation (Time-based)
Globally interoperable systems and data	B1-DATM	Service Improvement through Integration of all Digital ATM Information
	B1-FICE	Increased Interoperability, Efficiency and Capacity through Flight and Flow Information for a Collaborative Environment Step-1 (FF-ICE/1) application before Departure
	B1-SWIM	Performance Improvement through the Application of System-Wide Information Management (SWIM)
	B2-FICE	Improved Coordination through multi-centre Ground-Ground Integration (FF-ICE/1 and Flight Object, SWIM)
	B2-SWIM	Enabling Airborne Participation in collaborative ATM through SWIM
	B3-FICE	Improved Operational Performance through the introduction of Full FF-ICE
Optimum capacity and flexible flights — through global collaborative ATM	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories
	B1-FRTO	Improved Operations through Optimized ATS Routing
	B1-NOPS	Enhanced Flow Performance through Network Operational Planning
	B3-NOPS	Traffic Complexity Management

Performance improvement area	*Module reference*	*Module scope*
Efficient flight path — through trajectory-based operations	B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)
	B0-CCO	Improved Flexibility and Efficiency in Departure Profiles — Continuous Climb Operations (CCO)
	B1-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs) using VNAV
	B1-TBO	Improved Traffic Synchronization and Initial Trajectory-Based Operation
	B2-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs) using VNAV, required speed and time at arrival
	B3-TBO	Full 4D Trajectory-based Operations

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