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WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 1: Strategic issues that address the challenge of integration, interoperability and harmonization of systems in support of the concept of "One Sky" for international civil aviation
1.1: Global Air Navigation Plan (GANP) – framework for global planning

METEOROLOGICAL SERVICE FOR AIR NAVIGATION TAKING INTO ACCOUNT THE MODERNIZATION OF THE AIR NAVIGATION SYSTEM

(Presented by the Russian Federation)

EXECUTIVE SUMMARY

This paper presents proposals to expedite the development of SARPs concerning the meteorological information service. As justification for the proposals, information is presented about work being done in the Russian Federation to improve the system of meteorological service for aviation, the main areas being upgraded, and problems in implementing new systems.

Action: The Conference is invited to agree to the recommendation in paragraph 3.

1. INTRODUCTION

1.1 Meteorological service for air navigation in the Russian Federation is being developed on the basis of the Russian conception of the creation and development of the air navigation system and takes into account the provisions of the Global Air Traffic Management (ATM) Operational Concept, the Global Air Navigation Plan, the Meteorological Service Strategy for Western Europe and, to some extent, takes into account the requirements of the aviation system block upgrade (ASBU) meteorological service modules concerning the integration of meteorological data into ATM processes, the transition to new digital weather models, and the management of an air-to-ground meteorological information exchange using digital data transmission lines.

2. UPGRADING THE RUSSIAN FEDERATION'S METEOROLOGICAL SERVICE SYSTEM

2.1 The upgrade of the Russian Federation's meteorological service system takes into

account, on the whole, the CNS/ATM service and technology development roadmaps presented in the Global Air Navigation Plan, draft Fourth Edition, and includes the components described below.

2.2 Improve the meteorological information of aerodrome meteorological offices and meteorological watch offices capable of enhancing operational performance and flight safety, including:

a) improving the accuracy of hazardous weather warnings at the aerodrome by improving forecasting methods for particular weather phenomena and SIGMET information wind and temperature forecasts by level, based on numerical forecasting models in accordance with ICAO Standards;

b) conducting applied research to detect volcanic ash clouds using radar and satellite equipment; and

c) activities to centralize and optimize meteorological service systems for aviation.

2.3 Improving meteorological service for aviation, including:

a) optimization of meteorological service for aviation, envisioning the use of new informational sources, upgrading equipment and integrating higher quality meteorological information into the ATM system;

b) retrofitting of aviation meteorological service subdivisions with modern equipment at nearly 170 aerodromes;

c) development of an automated Doppler weather radar network based on commercial DMRL-S radar, which provides radar data to ATC centers and aerodromes in the Russian Federation and exchanges radar data with neighboring States;

d) installation of lidar wind profilers, which are designed to determine wind direction and speed at altitudes ranging from 3 to 300 m, at Category II and III aerodromes in the Russian Federation, and the determination of the low-altitude wind shift and turbulence, in order to then transfer this information to the aircraft;

e) the practical use, in meteorological service, of an informational and analytical portal that enables the quality of meteorological service in class G airspace to be improved;

f) implementation of an automated informational system (AIS), which enables decoding and provides users with cartographic satellite data that makes it possible to transmit, in real time and with a spatial accuracy of 0.1º, maps of the radiation temperature of the Earth, the height of top of cumulonimbus clouds, meteorological phenomena, and altitude limits of icing in clouds; and

g) work performed to enable the satellite data to be used in conjunction with information from weather radar at air traffic controllers' workstations, which is particularly relevant in low-light areas, including seas and oceans.

2.4 Integration of ATM information and meteorological information, including:

a) the conduct of basic and applied scientific research to create and improve technologies and methods for meteorological service for air navigation, which are compliant with ICAO Standards, in the integrated regions of the Unified ATM System of the Russian Federation.

b) implementation of new, and the improvement of existing high-speed telecommunication technologies using satellite systems that make use of the resources of global communications satellite systems and Internet technologies; also, the transition to interoperable, standardized information formats as part of the SWIM implementation;

c) work to create the Roshydromet (Russian Federal Service for Hydrometeorology and Environmental Monitoring) integrated information and telecommunications system (IITS), which is based on the modern principles of service-oriented architecture (SOA) that form the foundation for SWIM. The system will make it possible to implement qualitatively new principles in meteorological service for aviation;

d) transition to system-wide control of SWIM information using XML/GML data display formats. The Russian Federation has now conducted successful tests of OPMET (METAR and TAF) data transfer in XML format through Roshydromet data transfer networks; and

e) transition to the use of infrastructure, which is presently being created, for a digital integrated aeronautical fixed communications network, which ensures the management of meteorological services with the required characteristics of service quality, the integration of service data in a single digital communications network, and a decrease in the cost to users of the Russian Federation’s air navigation system.

2.5 The integration of ATM systems and meteorological service in large ATM centres of the Russian Federation is based on the implementation of a dual-component automated meteorological service system that provides data exchange with an automated ATM system. A 4D weather cube is also kept.

2.6 It should be noted that ICAO, RTCA, EUROCAE and EUROCONROL documents currently define only certain aspects of the interaction between meteorological systems and ATM systems. At the same time, the development of a single document defining the principles of integrating meteorological information into automated ATM systems has not been completed, which creates difficulties in the development and implementation of forward-looking air navigation service technologies.

2.7 The development of an integrated package of meteorological information to be provided to aviation users, and means for supporting decision-making processes that take into account the impact of weather factors, including:

a) the creation of technical means for receiving and transmitting meteorological information onboard an aircraft to improve the crew's situational awareness;

b) the integration of new types of meteorological information into automated ATM systems (satellite information, DMRL information, lidars and other distance measuring tools);

c) the creation of integrated databases of 4-dimensional meteorological information;

d) an increase in flight safety and enhancement of ATM system performance by improving the accessibility and timeliness of meteorological information for airspace users and ATM service providers, and by using integrated meteorological information in an automated ATM system.

3. CONCLUSION

3.1 The Russian Federation supports the use of ASBU for the improvement of the processing, transfer and use of meteorological information.

3.2 The implementation of a service-oriented, network-centric information exchange system and the use, to these ends, of the capabilities offered by ASBU will create the foundation for providing meteorological data to users of the air navigation system in a reliable, effective, safe and timely manner. It will also prevent the duplication of meteorological data and guarantee the use of consistent meteorological information and excellent service quality within the air navigation system.

3.3 The lack of SARPs that define the requirements for integrating meteorological data into automated ATM processes creates difficulties for the development and implementation of forward-looking air navigation service technologies as envisioned by the ASBU.

3.4 The Conference is invited to agree to the following recommendation:

Recommendation 1/x – Need for the development of Standards and Recommended Practices concerning meteorological information services

That the Conference:

a) take the materials and conclusions contained in this document into consideration in its work; and

b) recommend that ICAO expedite the development of SARPs that define the principles and requirements for integrating meteorological data into automated ATM processes.

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