International Civil Aviation Organization

WORKING PAPER

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ASSEMBLY — 38TH SESSION

TECHNICAL COMMISSION

Agenda Item 33: Air Navigation — Standardization

IMPLEMENTING THE GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) FOR AIR NAVIGATION

(Presented by the Russian Federation)

EXECUTIVE SUMMARY

This document contains information about some aspects of implementing the Global Navigation Satellite System (GNSS) that require revision of ICAO documents.

Action: The Assembly is invited to recommend that the ICAO Council:

a) draft instructions on how to assess the use of GNSS systems and elements according to four primary criteria: accuracy, integrity, continuity and availability of service to provide assistance to States when implementing GNSS; and

b) consider the issue of elevating the status of requirements that define the obligations levied on a State that approves GNSS flights, as set forth in items 2.5 and 2.6 of this document, while at the same time establishing requirements for GNSS flight-related data recording and monitoring equipment.

Strategic Objectives:	This working paper relates to the Safety and the Environmental Protection and Sustainable Development of Air Transport Strategic Objectives.
Financial implications:	Funding within ICAO regular programme budget.
References:	Annex 10 — *Aeronautical Telecommunications*, Volume I — *Radio Navigation Aids* Doc 9849, *Global Navigation Satellite System (GNSS) Manual*

1. INTRODUCTION

1.1 When permitting access to the use of the Global Navigation Satellite System (GNSS) in its sovereign airspace, a contracting State has a choice of which GNSS system scenario to use, depending on the flight stage (flights en-route, near the aerodrome, non-precision and precision approach, landing and take-off, and ground operations at the aerodrome), which will be cleared for operations with GNSS.

[1] Russian version provided by the Russian Federation.

(2 pages)

Meanwhile, various constellations and functional add-ons may be used, which may be used both separately, and in various combinations, based on the needs and economic feasibility for States and aviation users.

2. DISCUSSION

2.1 Government aviation authorities make the decision about clearance for using GNSS in a State's airspace in each of the typical flight stages based on an assessment of how this navigation system complies with ICAO requirements for accuracy, integrity, continuity, and availability of service.

2.2 In making a decision about access to the use of GNSS, the State assumes responsibility to guarantee its safe operation, which makes it imperative that there are instruction materials on how to conduct an assessment of whether the navigation system is adequate to meet said criteria. Their absence in current ICAO documentation complicates decision-making about access to GNSS.

2.3 Taking into account the information above, it seems necessary to ask that ICAO draft instruction materials to assist States as they implement GNSS; possibly, by revising the *Global Navigation Satellite System (GNSS) Manual* (Doc 9849) which will, to a significant degree, expedite the implementation of GNSS in various States and regions.

2.4 In addition, it must be noted that there is a lack of clarity in the provisions establishing the obligations of a State making a decision about granting access for operations that require system performance be confirmed, but not possessing current monitoring and data collection capabilities for GNSS.

2.5 Annex 10, *Aeronautical Telecommunications,* Volume I — *Radio Navigation Aids,* contains Recommendation 2.1.4.2, in accordance with which “A State that approves GNSS-based operations should ensure that GNSS data relevant to those operations are recorded”. In accordance with Note 1 to this Recommendation, “These recorded data are primarily intended for use in accident and incident investigations. They may also support periodic confirmation that accuracy, integrity, continuity and availability are maintained within the limits required for the operations approved”. In this way, current ICAO Standards and Recommended Practices (SARPs) establish that it is desirable for the State to record GNSS data and monitor GNSS data for approved operations. This makes it possible to consider the State's capabilities in arranging for that type of monitoring, but not to consider the consequences if that capability is allowed to be absent.

2.6 At the same time, monitoring GNSS flight data is a factor that has a significant effect on assuring flight safety. Taking into account current the global schedule of providing GNSS service and the subsequent technical development of the system itself, it would seem necessary for GNSS data recording and monitoring requirements to be mandatory as GNSS service is implemented. To that end, the requirement to provide GNSS data recording and monitoring shall be established as an ICAO Standard, with respect to a State making a decision on whether to give clearance for operations requiring confirmation of system performance, but the system must be evaluated all the time according to four primary criteria. Meanwhile, as a help to States, requirements shall be developed for GNSS flight data recording and monitoring equipment. This approach satisfies general principles of flight safety and contributes to greater confidence in GNSS navigation.

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