



International Civil Aviation Organization

MIDANPIRG Communication, Navigation and Surveillance Sub-Group

Twelfth Meeting (CNS SG/12)
(Amman, Jordan, 2-4 May 2023)

Agenda Item 3: Global Developments related to CNS

CNS RELATED OUTCOMES OF THE 41st SESSION OF THE ICAO ASSEMBLY

(Presented by the Secretariat)

SUMMARY

This paper presents the main CNS-related outcomes of 41st Session of the ICAO Assembly.

Action by the meeting is at paragraph 3.

REFERENCES

- Resolutions adopted by the Assembly

1. INTRODUCTION

1.1 The 41st Session of the ICAO Assembly was successfully held in Montréal, from 27 September to 7 October 2022 during which Resolutions were adopted. Two Resolutions **A41-6**, **A41-7**, **A41-8** and **A41-19** would be of interest to the sub-group.

1.2 The Provisional Edition of the Resolutions Adopted by the Assembly is available at https://www.icao.int/Meetings/a41/Documents/Resolutions/a41_res_prov_en.pdf.

2. DISCUSSION

Resolution A41-6: ICAO Global Planning for Safety and Air Navigation

2.1 The ICAO Assembly, at its 39th Session, agreed on the expansion of the GANP lifecycle through three-year minor and six-year major updates, as relevant, in order to provide for stability.

2.2 The ICAO Assembly, at its 40th Session, endorsed the sixth edition of the Global Air Navigation Plan1 (GANP, Doc 9750) through Resolution A40-1: ICAO global planning for safety and air navigation. This edition recognizes that a performance-driven, service-oriented and technologically advanced global air navigation system is critical to achieve the sustainability of the aviation sector worldwide. Furthermore, it recognizes safety as one of the fundamental principles of aviation performance, together with environment, security and economic sustainability.

2.3 The seventh edition of the GANP focuses on the global technical level and is the result of the accomplishments made by the GANP Study Group (GANP-SG) and its working groups, the Aviation System Block Upgrades Panel Project Team (ASBU PPT) and the GANP Performance Expert Group (GANP-PEG), since the 40th Session of the ICAO Assembly.

2.4 The seventh edition of the GANP includes an update to the safety key performance area of GANP performance framework, as well as a maintenance process to keep it current. It highlights the importance of a robust air navigation system for achieving the expected levels of safety and resilience, and maps the essential services outlined in the Basic Building Block (BBB) framework to the Protocol Questions (PQs) of the Universal Safety Oversight Audit Programme (USOAP). Minor updates to the BBB and the Aviation System Block Upgrade (ASBU) frameworks are also included.

2.5 Recognizing safety as one of the fundamental principles of aviation performance as well as the increasing importance of resilience in a hyper connected aviation ecosystem, the seventh edition of the GANP presents an updated safety performance framework and maintenance process, reinforces the importance of having a robust foundation of the air navigation system and presents a minor update of the BBB and ASBU frameworks.

2.6 The Assembly, through Resolution A41-6 :

- endorses the 2023-2025 edition of the Global Aviation Safety Plan (GASP) and the seventh edition of the Global Air Navigation Plan (GANP) as the global strategic directions for safety and the evolution of the air navigation system, respectively;
- resolves that ICAO shall implement and keep current the GASP and the GANP to support the relevant Strategic Objectives of the Organization, while ensuring necessary stability;
- resolves that these global plans shall be implemented and kept current in close cooperation, collaboration and coordination with all concerned stakeholders;
- resolves that these global plans shall provide the frameworks in which regional, sub-regional and national plans will be developed and implemented, thus ensuring consistency, harmonization and coordination of efforts aimed at improving international civil aviation safety, capacity and efficiency;
- urges Member States to develop sustainable solutions to fully exercise their safety oversight and air navigation responsibilities which can be achieved by sharing resources, utilizing internal and/or external resources, such as regional and sub-regional organizations and the expertise of other States;
- urges Member States to demonstrate the political will necessary for taking remedial actions to address safety and air navigation deficiencies, including those identified by Universal Safety Oversight Audit Programme (USOAP), through the GASP, the GANP and the ICAO regional planning process;
- urges Member States, the industry and financing institutions to provide the needed support for the coordinated implementation of the GASP and GANP, as well as regional and national plans, avoiding duplication of efforts;
- calls upon States and invites other stakeholders to cooperate in the development and implementation of regional, sub-regional and national plans based on the frameworks of the GASP and GANP;
- instructs the Secretary General to promote, make available and effectively communicate the GASP and the GANP; and
- declares that this resolution supersedes Resolution A40-1 on ICAO global planning for safety and air navigation.

Resolution A41-7: 7: Support of the ICAO policy on radio frequency spectrum matters

2.7 International Telecommunication Union (ITU) is the specialized agency of the United Nations regulating the use of the radio frequency spectrum.

2.8 ICAO position, as approved by the Council, for ITU World Radiocommunication Conferences (WRCs) is the result of the coordination of international aviation requirements for radio frequency spectrum.

2.9 The development and the implementation of the communications, navigation, and surveillance/air traffic management (CNS/ATM) systems and the safety of international civil aviation could be seriously jeopardized unless requirements for appropriate aviation safety spectrum allocations are satisfied and the continued protection of those allocations is achieved.

2.10 The unresolved spectrum issues relating to aeronautical safety services have resulted in flight cancellations, degradations of air traffic management services and interruptions of flight operation.

2.11 The Assembly:

1. Urges Member States, international organizations and other civil aviation stakeholders to support firmly the ICAO frequency spectrum strategy and the ICAO position at WRCs and in regional and other international activities conducted in preparation for WRCs, including by the following means:
 - a) working together to deliver spectrum-efficient aeronautical systems as well as frequency management that meet current “best practices”;
 - b) supporting ICAO activities relating to the aviation frequency spectrum strategy and policy through relevant expert group meetings and regional planning groups;
 - c) undertaking to provide for aviation interests to be fully integrated in the development of their positions presented to regional telecommunications fora involved in the preparation of joint proposals to the WRC;
 - d) including in their proposals to the WRC, to the extent possible, material consistent with the ICAO position;
 - e) supporting the ICAO position and the ICAO policy statements at ITU WRCs as approved by Council and incorporated in the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718);
 - f) undertaking to provide civil aviation experts to fully participate in the development of States’ and regional positions and development of aviation interests at the ITU; and
 - g) ensuring, to the maximum extent possible, that their delegations to regional conferences, ITU study groups and WRCs include experts from their civil aviation authorities and other civil aviation stakeholders who are fully prepared to represent aviation interests.

2. Urges Member States to consider, as a priority, public and aviation safety when deciding how to enable new or additional services, and to consult with aviation safety regulators, subject matter experts and airspace users, to provide all necessary considerations and to establish regulatory measures to ensure that incumbent aviation systems and services are free from harmful interference.
3. Requests the Secretary General to bring to the attention of ITU the importance of adequate radio frequency spectrum allocation and protection for the safety of aviation.
4. Instructs the Council and the Secretary General, as a matter of high priority within the budget adopted by the Assembly, to ensure that the resources necessary to support the development and implementation of a comprehensive aviation frequency spectrum strategy as well as increased participation by ICAO in international and regional spectrum management activities are made available.

Resolution A41-8: Consolidated Statement of continuing ICAO Policies and Practices related to a Global Air Traffic Management (ATM) System and Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) Systems

2.12 Progress in implementing PBN and ADS-B leads to an increasingly complex dependence on GNSS for both navigation and surveillance. Many ICAO regions are moving towards a PBN-based navigation environment while reducing procedures based on conventional navigation aids. Similarly, the use of ADS-B and its integration in the wider surveillance chain is advancing, enabling the realization of associated advanced air traffic control (ATC) capabilities. Furthermore, many surveillance and trajectory management applications are now designed to use GNSS timing to synchronize the associated air and ground systems.

2.13 While many air transport aircraft can maintain position and time information in the case of GNSS RFI, by using alternate navigation systems, other airspace users rely more heavily on GNSS. In some airspaces where PBN has been implemented, reversion to conventional procedures is no longer possible, meaning that an alternate contingency infrastructure needs to be provided (minimum operational network, (MON). Since ADS-B position and velocity information is derived from GNSS, any degradation or outage of GNSS also affects ADS-B performance. Therefore, CNS infrastructure must ensure that navigation and surveillance MON's support contingency operations in case of GNSS outage.

2.14 A recent analysisⁱ conducted by EUROCONTROL concludes that 38 per cent of traffic in the European network passes through regions subject to extensive and regular GNSS RFI. This traffic is exposed to reduced safety margins for long periods, making the handling of other system faults more difficult.

2.15 Much of the GNSS RFI is geographically linked to conflict zones, and drone defense. Aircraft will continue to be exposed to such RFI, even if efforts are maximized by ICAO and the International Telecommunication Union (ITU) to encourage States to limit harmful RFI to the greatest extent possible. However, even when far away from conflict zones, RFI events can occur at any moment and affect significant volumes of airspace RFI sources may also include the use of counter-UAS (unmanned aircraft systems) systems by authorized State security actors – either in a planned or tactical deployment.

2.16 To make it imperative that GNSS RFI is mitigated, and that CNS system resilience is strengthened, in particular through improved integration of complementary positioning capabilities, the Assembly resolved through Resolution A41-8 that the Appendices attached constitute the consolidated statement of continuing ICAO policies and practices related to CNS/ATM.

Resolution A41-19: Addressing Cybersecurity in Civil Aviation

2.17 The aviation sector is increasingly reliant on the availability, integrity and confidentiality of information, data, and systems; Mindful that cyber threats to civil aviation are rapidly and continuously evolving, that aviation continues to be a target for perpetrators in the cyber domain as in the physical one, and that cyber threats can evolve to affect critical civil aviation systems worldwide.

2.18 The multi-faceted and multi-disciplinary nature of cybersecurity challenges and solutions and noting that cyber risks can simultaneously affect a wide range of aviation areas and spread rapidly.

2.19 The Assembly:

- 1) Urges Member States to adopt and ratify the Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation (Beijing Convention) and Protocol Supplementary to the Convention for the Suppression of Unlawful Seizure of Aircraft (Beijing Protocol) as a means for dealing with cyberattacks against Civil Aviation.
- 2) Calls upon States and industry stakeholders to take the following actions to address cyber threats to civil Aviation:
 - a. implement the ICAO Aviation Cybersecurity Strategy, and make use of the ICAO Cybersecurity Action Plan as a tool to support the implementation of the Aviation Cybersecurity Strategy;
 - b. designate the authority competent for aviation cybersecurity, and define the interaction between that authority and concerned national agencies;
 - c. define the responsibilities of national agencies and industry stakeholders with regard to cybersecurity in civil aviation;
 - d. develop and implement a robust cybersecurity risk management framework that draws on relevant safety and security risk management practices, and adopt a risk-based approach to protecting critical civil aviation systems, information, and data from cyber threats;
 - e. establish policies and instruments, and allocate resources to ensure that, for critical aviation systems: system architectures are secure by design; systems are protected and resilient; data is secured and available in storage and while in transfer; system monitoring, and incident detection and reporting, methods are implemented; incident recovery plans are developed and practiced; and forensic analysis of cyber incidents is carried out;
 - f. encourage government/industry coordination with regard to aviation cybersecurity strategies, policies, and plans, as well as sharing of information to help identify critical vulnerabilities that need to be addressed;
 - g. encourage civil/military cooperation with regard to identifying, protecting, and monitoring common vulnerabilities and data flows at interfaces between civil and military aviation systems, and collaborate in response to common cyber threats and recovery from cyber incidents;

- h. develop and participate in government/industry partnerships and mechanisms, nationally and internationally, for the systematic sharing of information on cyber threats, incidents, trends and mitigation efforts;
- i. design and implement a robust cybersecurity culture across the civil aviation sector;
- j. encourage States to continue contributing to ICAO in the development of international Standards, strategies, and best practices to support advancing aviation cybersecurity and cyber resilience; and
- k. continue collaborating in the development of ICAO's cybersecurity framework according to a horizontal, cross-cutting and functional approach involving aviation safety, aviation security, facilitation, air navigation, communication, surveillance, air traffic management, aircraft operations, airworthiness, and other relevant disciplines.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the CNS-related outcomes of the 41st Session of the ICAO Assembly and take actions as required; and
- b) urge States to implement the Assembly Resolutions, in particular Assembly Resolution A41-6, Assembly Resolution A41-7, Assembly Resolution A41-8 and Assembly Resolution A41-19.

APPENDIX A

General Policy

The Assembly:

- 1) resolves that nothing should deprive a Contracting State from its right to benefit from the ICAOCNS/ATM systems or cause discrimination between provider and user States;
- 2) resolves that States' sovereignty and borders should not be affected by the ICAO CNS/ATM systems implementation;
- 3) urges that provisions and guidance material relating to all aspects of the ICAO CNS/ATM systems should be sought and developed through the convening of adequate meetings, conferences, panels and workshops with the participation of Contracting States; and
- 4) urges that the proposed provisions covering all aspects of the ICAO CNS/ATM systems be presented to all Contracting States well in advance to give them enough opportunity to prepare themselves as far as practicable.

APPENDIX B**Harmonization of the Implementation of the ICAO CNS/ATM Systems**

The Assembly:

- 1) calls upon States, PIRGs and the aviation industry to use the ICAO Global ATM Operational Concept as the common framework to guide planning and implementation of CNS/ATM systems and to focus all such development work on the Global ATM Operational Concept;
- 2) calls upon States and regional safety oversight organizations (RSOOs) to establish a framework for joint planning and cooperation at the sub-regional level for joint development of CNS/ATM systems;
- 3) urges the Council to ensure that ICAO develop the transition strategies, ATM requirements and SARPs necessary to support the implementation of a global ATM system;
- 4) urges the Council to continue considering without delay the economic, institutional, legal and strategic aspects related to the implementation of the ICAO CNS/ATM systems;
- 5) urges the Council to take the steps necessary to ensure that the future global ATM system is performance-based and that the performance objectives and targets for the future system are developed in a timely manner;
- 6) calls upon States, in a position to do so, and invites international organizations concerned, users and service providers to:
 - a) spare no effort in cooperating in and facilitating the execution of the research, development, trials and demonstrations (RDT&D) programme in close cooperation with States with limited resources; and
 - b) validate the concept components identified in the Global ATM Operational Concept;
- 7) requests the Council, as a matter of high priority within the budget adopted by the Assembly, to ensure that adequate resources are made available to the ICAO Regional Offices, particularly those which are accredited to the developing States, taking into account the increased support they will be called upon to provide to the regional planning and implementation groups, which are the main bodies for the regional planning of the transition to the ICAO CNS/ATM systems; and
- 8) further requests the Council to continue to urge States, international organizations and financial institutions to mobilize resources in order to assist States requiring technical cooperation in the planning and implementation of the ICAO CNS/ATM systems.

APPENDIX C

Ensuring the Resilience of ICAO CNS/ATM Systems and Services

The Assembly:

- 1) encourages States to transition towards optimized, secure CNS systems based on complementary integration of suitable and independent aircraft capabilities, satellite- and ground-based infrastructure which maximize resiliency and robustness to any type of interference;
- 2) encourages standardization bodies and industry to develop appropriate interference detection, mitigation and reporting capabilities for the aircraft on-board, satellite- and ground-based CNS system components, in order to ensure higher CNS resiliency, continuity of operations and prevent any cascading effects from the use of compromised position, velocity or time data;
- 3) encourages States to ensure that sufficient terrestrial CNS capabilities remain available to ensure safe operations and complement aircraft-level integration of position, velocity and time with independent surveillance information;
- 4) invites ICAO to develop high-level principles on how to integrate CNS ground, space and on-board systems and capabilities to obtain more resilient positioning and timing services;
- 5) urges States to apply necessary measures to avoid the commercialization/proliferation and the use of illegal transmitters such as jammers and the misuse of test and maintenance equipment which may impact CNS systems;
- 6) urges States to ensure close collaboration between aviation authorities, military authorities, service providers, radio regulatory and spectrum enforcement authorities to put in place any special measures required to ensure that spectrum used by all CNS systems, and GNSS in particular, is free from harmful interference;
- 7) urges States to refrain from any form of jamming, or spoofing affecting Civil Aviation;
- 8) urges States to coordinate and notify to the maximum extent possible in advance with the air navigation services provider (ANSP) responsible for the affected airspace in case of military or other State authorized security or defense-related operations or training, potentially causing any form of jamming, or spoofing affecting Civil Aviation; and
- 9) urges States and operators, when assessing the interference risks associated with conflict zones, to consider that the use of satellite-based CNS systems can potentially be impacted beyond those zones.

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