



International Civil Aviation Organization

MIDANPIRG Communication, Navigation and Surveillance Sub-Group

Ninth Meeting (CNS SG/9)  
(Cairo, Egypt, 19 – 21 March 2019)

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**Agenda Item 4: Global Developments related to CNS**

OUTCOMES OF THE 13th AIR NAVIGATION CONFERENCE

*(Presented by the Secretariat)*

**SUMMARY**

This paper presents the outcome of the 13th Air Navigation Conference (AN-Conf/13) for the follow-up on relevant recommendations by the CNS SG.

Action by the meeting is at paragraph 3.

**REFERENCES**

- AN-Conf/13 Report
- MSG/6 Report

**1. INTRODUCTION**

1.1 The Thirteenth Air Navigation Conference (AN-Conf/13) was held in Montréal from 9 to 19 October 2018. The Conference was attended by a total of 1022 participants from 116 Contracting States and 37 observer delegations. The list of the participants and the full report of the Conference can be found on the AN-Conf/13 website at: [www.icao.int/meetings/anconf13](http://www.icao.int/meetings/anconf13).

**2. DISCUSSION**

2.1 The meeting may wish to note that the AN-Conf/13 endorsed fifty-two (52) Recommendations, addressing a wide variety of subjects, such as Air Traffic Management (ATM), Communications, Navigation and Surveillance (CNS), Aeronautical Meteorology, Information Management, Aerodrome, Human Factors, Civil-Military Collaboration, Remotely Piloted Aircraft System (RPAS), Search and Rescue (SAR), Cyber resilience, new operations types, Global Aviation Safety Oversight System (GASOS), State Safety Programme (SSP), Safety Management, Universal Safety Oversight Audit Programme (USOAP), Continuous Monitoring Approach (CMA) and Regional Safety Oversight Organizations (RSOO). The list of the AN-Conf/13 recommendations relevant to CNS Sub-Group is in **Appendix A**.

2.2 The MSG/6 meeting reviewed the AN-Conf/13 Recommendations related to air navigation and agreed that the different MIDANPIRG subsidiary bodies should identify clearly the Recommendations related to their terms of reference and agree on the necessary follow-up actions. In addition, the MSG/6 meeting agreed that a Working Paper should be presented by the Secretariat to the MIDANPIRG/17 meeting to propose follow-up actions for assignment to States and the different actors/stakeholders. Accordingly, the meeting agreed to the following MSG Decision:

*MSG DECISION 6/1: FOLLOW-UP ON THE AN-CONF/13 RECOMMENDATIONS*

*That,*

- a) the Secretariat present a Working Paper to the MIDANPIRG/17 meeting to propose follow-up actions on relevant AN-Conf/13 Recommendations, for assignment to States and the different actors/stakeholders; and*
- b) the different MIDANPIRG subsidiary bodies should identify clearly the AN-Conf/13 Recommendations related to their terms of reference and agree on the necessary follow-up actions.*

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to identify the AN-Conf/13 Recommendations related to CNS SG terms of reference and agree on the necessary follow-up actions.

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**APPENDIX A**

Recommendations	Follow-up Actions
<p><b>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) agree that the future <i>Global Air Navigation Plan</i> (Doc 9750, GANP), based on the outcome of the Thirteenth Air Navigation Conference (AN-Conf/13), be available as a web-based platform, including a concise, executive summary (printable) which outlined its key policies, priorities and strategies to ensure that the GANP was easily accessible to all States and key decision makers;</li> <li>b) agree with the proposed multilayer structure for the Sixth Edition of the GANP;</li> <li>c) welcome the proposed vision, performance ambitions and conceptual roadmap for the Sixth Edition of the GANP, with the inclusion of the civil-military dimension;</li> <li>d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP);</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>e) consider the establishment of a GANP Study Group comprised of Member States from all regions and industry to undertake work on future editions of the GANP;</li> <li>f) make available the GANP global strategic level (printable) in the six ICAO languages;</li> <li>g) develop online training and organize regional seminars in conjunction with the planning and implementation regional groups (PIRGs), where possible, for the familiarization of the Sixth Edition of the GANP and support the deployment and implementation of regional and national air navigation plans;</li> <li>h) develop a national air navigation plan template available for voluntary use by States, as part of the Sixth Edition of the GANP, aligned with the global and regional air navigation plans and support States in developing their national air navigation plans while taking into consideration neighbouring requirements;</li> <li>i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and</li> <li>j) continue to work with States, international organizations, air traffic management (ATM) modernization programmes and other stakeholders on the development of the Sixth Edition of the GANP, as required for subsequent endorsement at the 40th Session of the ICAO Assembly.</li> </ul>	<p>For Information of CNS SG</p>

**Recommendation 1.2/1 — Global technical level of the Sixth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP)**

That States:

- a) agree with the proposed change management process to maintain an up-to-date aviation system block upgrade (ASBU) framework with the formal involvement of the ASBU Panel Project Team (ASBU PPT) to improve transparency, consistency and stability;
- b) welcome the updated ASBU framework and consider the initial version of the basic building block (BBB) framework;

That ICAO:

- c) map the global technical level of the *Global Air Navigation Plan* (Doc 9750, GANP) with the strategic level;
- d) make available the ASBU and proposed BBB frameworks in an interactive and simplified format, as part of the web-based GANP Portal, emphasizing the relationship between both frameworks, and between the frameworks and the regional air navigation plan (ANP) elements;
- e) enable the capability, within the GANP Portal, to upload relevant information related to the development and deployment of the ASBU and proposed BBB frameworks in order to allow States, regions and industry to share information;
- f) incorporate a flexible framework for emerging air navigation concepts such as unmanned aircraft systems (UAS), UAS traffic management (UTM), Big Data and the aviation Internet, into future editions of the GANP;
- g) include a Global Aeronautical Distress and Safety System (GADSS) thread in the Sixth Edition of the GANP in line with ICAO provisions;
- h) consider designing a thread for a Global Aviation Internet Network in the GANP, in coordination with aviation and non-aviation-related industries;
- i) emphasize and enhance a human-centric approach to system design and processes for change management;
- j) support the conduct of trials for new air navigation concepts as outlined in the ASBU framework within the GANP; and
- k) continue to work with States, international organizations, air traffic management (ATM) modernization programmes and other stakeholders on the development of the global technical level of the Sixth Edition of the GANP for subsequent endorsement at the 40th Session of the ICAO Assembly.

For Information of CNS SG

<p><b>Recommendation 1.3/1 – Air navigation roadmaps</b></p> <p>That States:</p> <p>a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users;</p> <p>That States and ICAO:</p> <p>b) work collaboratively to adopt a performance-based approach for developing performance requirements and acceptable means of compliance to support the implementation of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) while considering the need for global interoperability;</p> <p>That ICAO:</p> <p>c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:</p> <ol style="list-style-type: none"> <li>1) new airspace users and emerging technologies;</li> <li>2) greater flexibility where possible in the choice of technologies, based on performance needs; and</li> <li>3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;</li> </ol> <p>d) continue to explore practical means to make use of international standards, in particular through the Standards Roundtable work with recognized standards-making organizations, to expedite the efficient development of ICAO provisions; and</p> <p>e) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications.</p>	<p><b>For Information of CNS SG</b></p>
<p><b>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</b></p> <p>That States:</p> <p>a) perform a cost-benefit analysis (CBA) as part of all required impact assessments, in coordination with air navigation services providers (ANSPs) and among other relevant stakeholders, when defining optimum solutions for improvements in the performance of the air navigation system through the use of the aviation system block upgrades (ASBU) framework;</p> <p>b) use a simplified mechanism, if they do not have a process already in place, such as the checklist available on the Global Air Navigation Plan (GANP) Portal, for CBA of air</p>	<p><b>MID States: To take necessary actions from a – b</b></p> <p><b>ICAO: To organize a workshop on ASBU CBA methodologies</b></p>

<p>navigation infrastructure investment projects to support improvements as described in the ASBU framework; and</p> <p>That ICAO:</p> <p>c) support the implementation of applicable CBA methodologies through dedicated workshops.</p>	
<p><b>Recommendation 2.2/1 — Long-term evolution of communication, navigation and surveillance systems and frequency spectrum access</b></p> <p>That States:</p> <p>a) engage in the spectrum regulatory process to ensure the continued necessary access to and protection of safety-critical aeronautical communications, navigation, and surveillance (CNS) systems;</p> <p>b) ensure through the implementation of a safety oversight programme that the designated competent authorities are involved in safety case assessments of the radio frequency environment so as to adequately protect the operational availability of aeronautical CNS systems;</p> <p>That ICAO:</p> <p>c) launch a study, built on a multi-disciplinary view of the C, N and S elements and frequency spectrum, to evolve the required CNS and frequency spectrum access strategy and systems roadmap in the short, medium and long term, in a performance-based and service-oriented manner, to ensure that CNS systems remain efficient users of the spectrum resource; and</p> <p>d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum reutilization opportunities from State and military aviation technologies and to take advantage of opportunities arising from new entrants, such as unmanned aircraft systems (UAS) and suborbital vehicles.</p>	<p>MID States: To take necessary actions from a – b</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>
<p><b>Recommendation 2.2/2 — Global navigation satellite system (GNSS) evolution</b></p> <p>That States:</p> <p>a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC)</p>	<p>MID States: To take necessary actions from a – e</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<p>global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments;</p> <ul style="list-style-type: none"> <li>b) avoid, in principle, prohibiting the use of available GNSS elements if they perform according to ICAO Standards and Recommended Practices (SARPs) and can meet all safety and regulatory requirements for the intended operations;</li> <li>c) avoid mandating equipage or use of any particular GNSS core constellation or augmentation system unless clear operational benefits are offered in return and appropriate consultations have been made with the relevant airspace users;</li> <li>d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP);</li> <li>e) take timely action to meet the long-term goal whereby every State accepts for lateral navigation use all GNSS elements that are compliant with SARPs, thus creating a positive environment for DFMC GNSS.</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations;</li> <li>g) further develop provisions intended for States and organizations that provide GNSS services regarding publication of service performance standards, regular performance assessment and timely notification of events that may affect the service; and</li> <li>h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements.</li> </ul>	
<p><b>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM;</li> <li>c) in close coordination with the World Meteorological Organization (WMO); ensure that the IWXXM format is the only standard exchange format by 2026; <ul style="list-style-type: none"> <li>1) develop the policies and procedures necessary to ensure a smooth transition from traditional alpha numeric code (TAC) format to IWXXM format for the purpose of</li> </ul> </li> </ul>	<p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p>

<p>data exchange to support international air navigation, as an interim step toward full IWXXM implementation;</p> <p>2) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and</p> <p>3) monitor the status of implementation of IWXXM at State and regional levels.</p>	
<p><b>Recommendation 3.1/1 — System-wide information management (SWIM)</b></p> <p>That States:</p> <p>a) support developments and implementation of system-wide information management;</p> <p>b) via the mechanism of the planning and implementation regional groups (PIRGs), showcase regional system-wide information management (SWIM) demonstrations, highlighting the operational and economic benefits of SWIM, and evaluate possible transition and mixed-mode scenarios;</p> <p>c) share information, lessons learned and observations regarding SWIM development and implementation;</p> <p>d) develop national implementation plans in alignment with regional strategies and priorities and in accordance with the strategy outlined in the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) which would include SWIM;</p> <p>That ICAO:</p> <p>e) while making use of already developed Standards and best practices, continue the development of provisions related to information services, while including relevant guidance, governance aspects, information content and related information exchange models, and supporting technical infrastructure and governance for SWIM in sufficient detail to ensure safe, efficient and secure globally seamless operations;</p> <p>f) consider the concept of a global SWIM framework as part of the GANP and the aviation system block upgrades (ASBUs);</p> <p>g) consider security-by-design principles when developing interconnected trusted global SWIM frameworks;</p> <p>h) develop provisions related to the harmonization of information exchange models and globally interconnected registries;</p> <p>i) through regional events, and in collaboration with States and industry, promote SWIM and its benefits, as described in the <i>Manual on System-wide Information Management</i> (Doc 10039), as well as implementation best practices to the aviation community; and</p>	<p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: actions to be added</p>



<p>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services and Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p>	
<p><b>Recommendation 3.2/2 — Flight and flow information for a collaborative environment (FF-ICE)</b></p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> <li>a) work through ICAO to finalize ICAO provisions and guidance material, in support of the initial implementation of flight and flow information for a collaborative environment (FF-ICE) by providing the results of operational and technical performance validation and cost-benefit analysis (CBA);</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>b) develop a robust transition strategy to minimize any potential negative impacts during the mixed mode operations of current ICAO flight plan processing and FF-ICE; and</li> <li>c) continue its work concerning the investigation of necessary information exchange content and supporting processes for the next evolution of FF-ICE.</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>
<p><b>Recommendation 3.2/1 — Trajectory-based operations (TBO)</b></p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> <li>a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes;</li> <li>b) work through ICAO to identify and address, not only potential issues, but also opportunities such as the improved management of global traffic flows through a global network-centric approach to ensure the successful development and implementation of trajectory-based operations (TBO);</li> <li>c) through the mechanism of the planning and implementation regional groups (PIRGs), integrate current implementation efforts with regional transition plans for flight and flow information for a collaborative environment (FF-ICE), system-wide information management (SWIM) and TBO;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>d) finalize the global TBO concept and its elements in the Sixth edition of the Global Air Navigation Plan (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<p>e) develop guidance on transitioning to a globally interoperable TBO environment in the context of on-going ATM initiatives while addressing all domains of ATM systems and taking into consideration existing and new types of airspace users.</p>	
<p><b>Recommendation 3.3/1 — Network operations (NOPS):</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) implement collaborative decision-making (CDM) processes in support of effective airspace management in the provision of air navigation services, including cross-border operations and resource management;</li> <li>b) plan and implement, according to their operational needs, operational improvements related to network operations in a coordinated manner within and across regions;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) develop further provisions and guidance material on air traffic flow management (ATFM), supporting a global collaborative network management in support of trajectory-based operations (TBO); and</li> <li>d) support, through its Regional Offices, the sharing of best practices and the advancement of technical cooperation agreements between States in order to implement ATFM.</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>
<p><b>Recommendation 3.4/1 — Civil-military collaboration</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence;</li> <li>b) continuously inform their military authorities of the improvements to air navigation capacity and efficiency, safety, cyber threats and system resilience put forth by ICAO and advocate collaboration with ICAO at the global and regional levels;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) identify potential opportunities for civil-military collaboration, develop a mechanism to collaborate with the military community early in the development of global provisions and guidance, and establish guidance for collaboration with the military community at global and regional levels;</li> <li>d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the Global Air Navigation Plan (Doc 9750, GANP);</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<p>e) consider, with urgency and in collaboration with the military community, the interoperability and governance principles for the military community in system-wide information management (SWIM) and in the development of the ICAO trust framework; and</p> <p>f) consider, where possible, the inclusion of civil-military cooperation and collaboration subjects at ICAO events, and highlight the participation of military authorities in relevant State letter invitations.</p>	
<p><b>Recommendation 3.5/1 — ICAO location indicator system and database of significant points</b></p> <p>That States and industry stakeholders:</p> <p>a) urgently complete the population of the ICAO International Codes and Routes Designators (ICARD) database with all five-letter name codes (5LNC) used worldwide to ensure the accuracy of the database;</p> <p>b) ensure that whenever a 5LNC that is used for military purposes is published in an ICAO Aeronautical Information Publication (AIP) and consequently coded into aircraft flight management system (FMS), such 5LNCs are coordinated through the ICARD process;</p> <p>That ICAO:</p> <p>c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution;</p> <p>d) consider, when developing such solutions, the need for global harmonization and interoperability;</p> <p>e) continue with its efforts to improve awareness and training on the use of ICARD in the regions that do not actively use ICARD;</p> <p>f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and</p> <p>g) implement improvements to the ICARD database functionality, including the use of maps depicting flight information regions (FIRs), more information regarding 5LNC history and sound-like proximity checks for codes held in reserve but not yet allocated to a region.</p>	<p>MIDAMC STG: To monitor the Global development related to the Location indicators</p>
<p><b>Recommendation 3.5/3 — Certification of ANSPs</b></p> <p>That ICAO investigate the potential benefits, balanced against the associated costs of the development of provisions and guidance material for certification of air navigation services providers (ANSPs).</p>	<p>For Information of CNS SG</p>

<p><b>Recommendation 4.2/1 – Implementation of essential air navigation services</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) consider the use of more advanced technologies and procedures, in coordination with international organizations and industry stakeholders, to provide the essential air navigation services for international civil aviation, taking into account the principles of global interoperability and performance specification compliance;</li> <li>b) include planning for the implementation of the essential services outlined in the proposed basic building blocks (BBB) framework within their national air navigation plans;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) in coordination with the planning and implementation regional groups (PIRGs) and by making use of existing reporting mechanisms, verify the provision of the essential air navigation services for international civil aviation, as outlined in the proposed BBB framework, through the methodology for the identification of air navigation deficiencies against the regional air navigation plans;</li> <li>d) develop the necessary tools to support the PIRGs in the verification of the provision of the proposed basic building block (BBB) services at the regional and national levels;</li> <li>e) coordinate the interoperability of systems and harmonization of procedures at a regional level, through the PIRGs, in relation to the use of advanced technologies and concepts of operations, taking into account global requirements;</li> <li>f) in line with the No Country Left Behind (NCLB) initiative, provide the necessary technical assistance to States for the provision of essential air navigation services as identified by the PIRGs and as reflected in State national air navigation plans; and</li> <li>g) urge the aviation manufacturing industry to create a testing environment for States to justify procurement decisions which guaranty interoperability and system functionality within local specific environments, as a follow-up to the provision of essential air navigation services.</li> </ul>	<p>MID States: to ensure that the essential CNS services are provided, as per the BBBs</p> <p>CNS SG: to continue monitoring availability of essential CNS Services provided by States, through the air navigation deficiencies</p>
<p><b>Recommendation 4.3/1 – Improving the performance of the air navigation system</b></p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> <li>a) required navigation performance-authorization required departure navigation specification;</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<ul style="list-style-type: none"> <li>b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches;</li> <li>c) assessment of the need for ICAO provisions on the use of a ground-based augmentation system to support standard instrument arrival and standard instrument departure procedures to approach and landing trajectory;</li> <li>d) development of separation minima to support all performance-based navigation specifications and which will also allow for operations where mixed performance requirements are in effect;</li> <li>e) advanced use of performance-based navigation to support aviation system block upgrade modules;</li> <li>f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and</li> <li>g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training.</li> </ul>	
<p><b>Recommendation 5.2/1 — Very low altitude operations</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) collect and share information regarding very low altitude operations, including on unmanned aircraft systems traffic management (UTM) systems, autonomous operations initiatives and tactical risk assessment models;</li> <li>b) ensure that UTM systems are interoperable with existing air traffic management (ATM) systems;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) contribute to the development of operational solutions and guidance, including on UTM systems, autonomous operations and tactical risk assessment models, to support the safe and coordinated implementation of aviation activities at very low altitude, particularly in urban and suburban environments, including in the vicinity of, and into, aerodromes;</li> <li>d) continue serving as the global and regional facilitator and forum for States, industry, academia and other interested stakeholders in the development of UTM systems, including developing guidance for the identification, structuring and implementation of necessary financing mechanisms such as public-private partnerships (PPPs);</li> <li>e) continue developing provisions and guidance material for the development, harmonization and implementation of UAS regulations, consistent with the key policy principles set forth in the Global Air Navigation Plan (GANP);</li> </ul>	<p><b>MID States: To take necessary actions as a</b></p> <p><b>ICAO: actions to be determined</b></p> <p><b>CNS SG: actions to be determined</b></p>

<ul style="list-style-type: none"> <li>f) develop a solution to enable States to authorize operations of non-certificated UAS over the high seas, using parameters to be defined in a transparent manner, including investigating the maximum altitude at which these operations would be allowed;</li> <li>g) develop Standards and Recommended Practices (SARPs), guidance or “best practices” related to UTM, including autonomous operations, after States and regions have had sufficient time to test and validate concepts;</li> <li>h) encourage UTM providers to implement the highest level of cyber security standards that are consistent with aviation community expectations and guidelines for very low altitude airspace operations;</li> <li>i) support and coordinate the implementation of core airspace management services including, but not limited to, geofencing and geo-referencing, as well as ensuring ATM and UTM interfaces;</li> <li>j) actively cooperate with States at the regional level for the development and implementation of UTM;</li> <li>k) continue the development of a global aircraft registration network (ARN); and</li> <li>l) continue conducting awareness and educational activities amongst users, and facilitate the exchange of information amongst States regarding their UAS regulations.</li> </ul>	
<p><b>Recommendation 5.3/1 — Remotely piloted aircraft systems (RPAS)</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) collect and share information on remotely piloted aircraft systems (RPAS) operations;</li> <li>b) actively engage industry stakeholders to collect and provide technical data to ICAO on RPAS operations needed to support the development of SARPs for RPAS, including those SARPs required for detect and avoid (DAA) and C2 Link;</li> <li>c) support the cross-disciplinary development of RPAS-related SARPs and guidance material across expert groups of ICAO;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>d) continue development of the regulatory framework necessary to support the integration of RPAS into non-segregated airspace and aerodromes, and facilitate related implementation roll-out activities;</li> <li>e) continue developing guidance material to support safe RPAS operations, to facilitate implementation through regional training activities, to conduct awareness and educational activities amongst users, and to facilitate the collection and sharing of information amongst States regarding their RPAS operations and regulations;</li> </ul>	<p><b>MID States: To take necessary actions as a</b></p> <p><b>ICAO: actions to be determined</b></p> <p><b>CNS SG: actions to be determined</b></p>



<ul style="list-style-type: none"> <li>f) assess the work underway in its expert groups and identify additional activities required to implement RPAS-related SARPs and guidance such as DAA and C2 Link;</li> <li>g) provide an update on a fully integrated approach for ICAO's RPAS-related work programme to the 40th Session of the Assembly in 2019;</li> <li>h) in coordination with States and military stakeholders, propose the best selection for the establishment of a secondary surveillance radar (SSR) code for lost C2 Link events within appropriate Annexes, Procedures for Air Navigation Services (PANS), regional air navigation plans and other relevant documents; and</li> <li>i) consider the use of gender-neutral RPAS-related terminology, following appropriate research.</li> </ul>	
<p><b>Recommendation 5.4/1 – Cyber resilience</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) in coordination with stakeholders, provide the necessary support for ICAO to evolve the global trust framework as an enabler of flight operations in a digitally connected environment;</li> <li>b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders;</li> <li>c) recognize the need to be prepared to respond to cyber events;</li> <li>d) in coordination with industry and international organizations, work with ICAO to increase awareness of cyber threats and system resilience processes, and coordinate cyber-related incident information sharing and training activities;</li> <li>e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>f) establish a formal project involving States, international organizations and relevant stakeholders for the urgent and transparent development of a globally harmonized aviation trust framework through a group of experts. Priority should be given to governance principles;</li> <li>g) coordinate with both aviation and non-aviation technical experts in the development of the trust framework, and in particular with the governing bodies of the Internet;</li> <li>h) incorporate the trust framework into the Global Air Navigation Plan (Doc 9750) in an appropriate manner to highlight its urgent need, its importance and to improve its visibility;</li> </ul>	<p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<ul style="list-style-type: none"><li>i) develop, as a matter of priority, and promote high-level policies and management frameworks for cyber resilience to help mitigate cyber threats and risks to civil aviation based on international industry standards and preferably aligned or integrated with existing management systems;</li><li>j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events;</li><li>k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels;</li><li>l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing;</li><li>m) promote tabletop exercises and maintain a repository of lessons learned and scenarios available to Member States; and</li><li>n) promote a unified framework for an integrated risk management approach (safety, security, environment, financial, etc.) to cyber resilience, taking into account all hazards and threats to the air navigation system.</li></ul>	
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Recommendations	Follow-up Actions
<p><b>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) agree that the future <i>Global Air Navigation Plan</i> (Doc 9750, GANP), based on the outcome of the Thirteenth Air Navigation Conference (AN-Conf/13), be available as a web-based platform, including a concise, executive summary (printable) which outlined its key policies, priorities and strategies to ensure that the GANP was easily accessible to all States and key decision makers;</li> <li>b) agree with the proposed multilayer structure for the Sixth Edition of the GANP;</li> <li>c) welcome the proposed vision, performance ambitions and conceptual roadmap for the Sixth Edition of the GANP, with the inclusion of the civil-military dimension;</li> <li>d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP);</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>e) consider the establishment of a GANP Study Group comprised of Member States from all regions and industry to undertake work on future editions of the GANP;</li> <li>f) make available the GANP global strategic level (printable) in the six ICAO languages;</li> <li>g) develop online training and organize regional seminars in conjunction with the planning and implementation regional groups (PIRGs), where possible, for the familiarization of the Sixth Edition of the GANP and support the deployment and implementation of regional and national air navigation plans;</li> <li>h) develop a national air navigation plan template available for voluntary use by States, as part of the Sixth Edition of the GANP, aligned with the global and regional air navigation plans and support States in developing their national air navigation plans while taking into consideration neighbouring requirements;</li> <li>i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and</li> <li>j) continue to work with States, international organizations, air traffic management (ATM) modernization programmes and other stakeholders on the development of the Sixth Edition of the GANP, as required for subsequent endorsement at the 40th Session of the ICAO Assembly.</li> </ul>	<p>For Information of CNS SG</p>

**Recommendation 1.2/1 — Global technical level of the Sixth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP)**

That States:

- a) agree with the proposed change management process to maintain an up-to-date aviation system block upgrade (ASBU) framework with the formal involvement of the ASBU Panel Project Team (ASBU PPT) to improve transparency, consistency and stability;
- b) welcome the updated ASBU framework and consider the initial version of the basic building block (BBB) framework;

That ICAO:

- c) map the global technical level of the *Global Air Navigation Plan* (Doc 9750, GANP) with the strategic level;
- d) make available the ASBU and proposed BBB frameworks in an interactive and simplified format, as part of the web-based GANP Portal, emphasizing the relationship between both frameworks, and between the frameworks and the regional air navigation plan (ANP) elements;
- e) enable the capability, within the GANP Portal, to upload relevant information related to the development and deployment of the ASBU and proposed BBB frameworks in order to allow States, regions and industry to share information;
- f) incorporate a flexible framework for emerging air navigation concepts such as unmanned aircraft systems (UAS), UAS traffic management (UTM), Big Data and the aviation Internet, into future editions of the GANP;
- g) include a Global Aeronautical Distress and Safety System (GADSS) thread in the Sixth Edition of the GANP in line with ICAO provisions;
- h) consider designing a thread for a Global Aviation Internet Network in the GANP, in coordination with aviation and non-aviation-related industries;
- i) emphasize and enhance a human-centric approach to system design and processes for change management;
- j) support the conduct of trials for new air navigation concepts as outlined in the ASBU framework within the GANP; and
- k) continue to work with States, international organizations, air traffic management (ATM) modernization programmes and other stakeholders on the development of the global technical level of the Sixth Edition of the GANP for subsequent endorsement at the 40th Session of the ICAO Assembly.

For Information of CNS SG

<p><b>Recommendation 1.3/1 – Air navigation roadmaps</b></p> <p>That States:</p> <p>a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users;</p> <p>That States and ICAO:</p> <p>b) work collaboratively to adopt a performance-based approach for developing performance requirements and acceptable means of compliance to support the implementation of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) while considering the need for global interoperability;</p> <p>That ICAO:</p> <p>c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:</p> <ol style="list-style-type: none"> <li>1) new airspace users and emerging technologies;</li> <li>2) greater flexibility where possible in the choice of technologies, based on performance needs; and</li> <li>3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;</li> </ol> <p>d) continue to explore practical means to make use of international standards, in particular through the Standards Roundtable work with recognized standards-making organizations, to expedite the efficient development of ICAO provisions; and</p> <p>e) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications.</p>	<p>For Information of CNS SG</p>
<p><b>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</b></p> <p>That States:</p> <p>a) perform a cost-benefit analysis (CBA) as part of all required impact assessments, in coordination with air navigation services providers (ANSPs) and among other relevant stakeholders, when defining optimum solutions for improvements in the performance of the air navigation system through the use of the aviation system block upgrades (ASBU) framework;</p> <p>b) use a simplified mechanism, if they do not have a process already in place, such as the checklist available on the Global Air Navigation Plan (GANP) Portal, for CBA of air</p>	<p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p>

<p>navigation infrastructure investment projects to support improvements as described in the ASBU framework; and</p> <p>That ICAO:</p> <p>c) support the implementation of applicable CBA methodologies through dedicated workshops.</p>	
<p><b>Recommendation 2.2/1 — Long-term evolution of communication, navigation and surveillance systems and frequency spectrum access</b></p> <p>That States:</p> <p>a) engage in the spectrum regulatory process to ensure the continued necessary access to and protection of safety-critical aeronautical communications, navigation, and surveillance (CNS) systems;</p> <p>b) ensure through the implementation of a safety oversight programme that the designated competent authorities are involved in safety case assessments of the radio frequency environment so as to adequately protect the operational availability of aeronautical CNS systems;</p> <p>That ICAO:</p> <p>c) launch a study, built on a multi-disciplinary view of the C, N and S elements and frequency spectrum, to evolve the required CNS and frequency spectrum access strategy and systems roadmap in the short, medium and long term, in a performance-based and service-oriented manner, to ensure that CNS systems remain efficient users of the spectrum resource; and</p> <p>d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum reutilization opportunities from State and military aviation technologies and to take advantage of opportunities arising from new entrants, such as unmanned aircraft systems (UAS) and suborbital vehicles.</p>	<p>MID States: To take necessary actions from a – b</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>
<p><b>Recommendation 2.2/2 — Global navigation satellite system (GNSS) evolution</b></p> <p>That States:</p> <p>a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC)</p>	<p>MID States: To take necessary actions from a – e</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<p>global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments;</p> <ul style="list-style-type: none"> <li>b) avoid, in principle, prohibiting the use of available GNSS elements if they perform according to ICAO Standards and Recommended Practices (SARPs) and can meet all safety and regulatory requirements for the intended operations;</li> <li>c) avoid mandating equipage or use of any particular GNSS core constellation or augmentation system unless clear operational benefits are offered in return and appropriate consultations have been made with the relevant airspace users;</li> <li>d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP);</li> <li>e) take timely action to meet the long-term goal whereby every State accepts for lateral navigation use all GNSS elements that are compliant with SARPs, thus creating a positive environment for DFMC GNSS.</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations;</li> <li>g) further develop provisions intended for States and organizations that provide GNSS services regarding publication of service performance standards, regular performance assessment and timely notification of events that may affect the service; and</li> <li>h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements.</li> </ul>	
<p><b>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM;</li> <li>c) in close coordination with the World Meteorological Organization (WMO); ensure that the IWXXM format is the only standard exchange format by 2026; <ul style="list-style-type: none"> <li>1) develop the policies and procedures necessary to ensure a smooth transition from traditional alpha numeric code (TAC) format to IWXXM format for the purpose of</li> </ul> </li> </ul>	<p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p>

<p>data exchange to support international air navigation, as an interim step toward full IWXXM implementation;</p> <p>2) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and</p> <p>3) monitor the status of implementation of IWXXM at State and regional levels.</p>	
<p><b>Recommendation 3.1/1 — System-wide information management (SWIM)</b></p> <p>That States:</p> <p>a) support developments and implementation of system-wide information management;</p> <p>b) via the mechanism of the planning and implementation regional groups (PIRGs), showcase regional system-wide information management (SWIM) demonstrations, highlighting the operational and economic benefits of SWIM, and evaluate possible transition and mixed-mode scenarios;</p> <p>c) share information, lessons learned and observations regarding SWIM development and implementation;</p> <p>d) develop national implementation plans in alignment with regional strategies and priorities and in accordance with the strategy outlined in the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) which would include SWIM;</p> <p>That ICAO:</p> <p>e) while making use of already developed Standards and best practices, continue the development of provisions related to information services, while including relevant guidance, governance aspects, information content and related information exchange models, and supporting technical infrastructure and governance for SWIM in sufficient detail to ensure safe, efficient and secure globally seamless operations;</p> <p>f) consider the concept of a global SWIM framework as part of the GANP and the aviation system block upgrades (ASBUs);</p> <p>g) consider security-by-design principles when developing interconnected trusted global SWIM frameworks;</p> <p>h) develop provisions related to the harmonization of information exchange models and globally interconnected registries;</p> <p>i) through regional events, and in collaboration with States and industry, promote SWIM and its benefits, as described in the <i>Manual on System-wide Information Management</i> (Doc 10039), as well as implementation best practices to the aviation community; and</p>	<p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: actions to be added</p>



<p>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services and Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p>	
<p><b>Recommendation 3.2/2 — Flight and flow information for a collaborative environment (FF-ICE)</b></p> <p>That States, along with stakeholders:</p> <p>a) work through ICAO to finalize ICAO provisions and guidance material, in support of the initial implementation of flight and flow information for a collaborative environment (FF-ICE) by providing the results of operational and technical performance validation and cost-benefit analysis (CBA);</p> <p>That ICAO:</p> <p>b) develop a robust transition strategy to minimize any potential negative impacts during the mixed mode operations of current ICAO flight plan processing and FF-ICE; and</p> <p>c) continue its work concerning the investigation of necessary information exchange content and supporting processes for the next evolution of FF-ICE.</p>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>
<p><b>Recommendation 3.2/1 — Trajectory-based operations (TBO)</b></p> <p>That States, along with stakeholders:</p> <p>a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes;</p> <p>b) work through ICAO to identify and address, not only potential issues, but also opportunities such as the improved management of global traffic flows through a global network-centric approach to ensure the successful development and implementation of trajectory-based operations (TBO);</p> <p>c) through the mechanism of the planning and implementation regional groups (PIRGs), integrate current implementation efforts with regional transition plans for flight and flow information for a collaborative environment (FF-ICE), system-wide information management (SWIM) and TBO;</p> <p>That ICAO:</p> <p>d) finalize the global TBO concept and its elements in the Sixth edition of the Global Air Navigation Plan (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and</p>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<p>e) develop guidance on transitioning to a globally interoperable TBO environment in the context of on-going ATM initiatives while addressing all domains of ATM systems and taking into consideration existing and new types of airspace users.</p>	
<p><b>Recommendation 3.3/1 — Network operations (NOPS):</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) implement collaborative decision-making (CDM) processes in support of effective airspace management in the provision of air navigation services, including cross-border operations and resource management;</li> <li>b) plan and implement, according to their operational needs, operational improvements related to network operations in a coordinated manner within and across regions;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) develop further provisions and guidance material on air traffic flow management (ATFM), supporting a global collaborative network management in support of trajectory-based operations (TBO); and</li> <li>d) support, through its Regional Offices, the sharing of best practices and the advancement of technical cooperation agreements between States in order to implement ATFM.</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>
<p><b>Recommendation 3.4/1 — Civil-military collaboration</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence;</li> <li>b) continuously inform their military authorities of the improvements to air navigation capacity and efficiency, safety, cyber threats and system resilience put forth by ICAO and advocate collaboration with ICAO at the global and regional levels;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) identify potential opportunities for civil-military collaboration, develop a mechanism to collaborate with the military community early in the development of global provisions and guidance, and establish guidance for collaboration with the military community at global and regional levels;</li> <li>d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the Global Air Navigation Plan (Doc 9750, GANP);</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>



<p>e) consider, with urgency and in collaboration with the military community, the interoperability and governance principles for the military community in system-wide information management (SWIM) and in the development of the ICAO trust framework; and</p> <p>f) consider, where possible, the inclusion of civil-military cooperation and collaboration subjects at ICAO events, and highlight the participation of military authorities in relevant State letter invitations.</p>	
<p><b>Recommendation 3.5/1 — ICAO location indicator system and database of significant points</b></p> <p>That States and industry stakeholders:</p> <p>a) urgently complete the population of the ICAO International Codes and Routes Designators (ICARD) database with all five-letter name codes (5LNC) used worldwide to ensure the accuracy of the database;</p> <p>b) ensure that whenever a 5LNC that is used for military purposes is published in an ICAO Aeronautical Information Publication (AIP) and consequently coded into aircraft flight management system (FMS), such 5LNCs are coordinated through the ICARD process;</p> <p>That ICAO:</p> <p>c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution;</p> <p>d) consider, when developing such solutions, the need for global harmonization and interoperability;</p> <p>e) continue with its efforts to improve awareness and training on the use of ICARD in the regions that do not actively use ICARD;</p> <p>f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and</p> <p>g) implement improvements to the ICARD database functionality, including the use of maps depicting flight information regions (FIRs), more information regarding 5LNC history and sound-like proximity checks for codes held in reserve but not yet allocated to a region.</p>	<p>MIDAMC STG: To monitor the Global development related to the Location indicators</p>
<p><b>Recommendation 3.5/3 — Certification of ANSPs</b></p> <p>That ICAO investigate the potential benefits, balanced against the associated costs of the development of provisions and guidance material for certification of air navigation services providers (ANSPs).</p>	<p>For Information of CNS SG</p>

<p><b>Recommendation 4.2/1 – Implementation of essential air navigation services</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) consider the use of more advanced technologies and procedures, in coordination with international organizations and industry stakeholders, to provide the essential air navigation services for international civil aviation, taking into account the principles of global interoperability and performance specification compliance;</li> <li>b) include planning for the implementation of the essential services outlined in the proposed basic building blocks (BBB) framework within their national air navigation plans;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) in coordination with the planning and implementation regional groups (PIRGs) and by making use of existing reporting mechanisms, verify the provision of the essential air navigation services for international civil aviation, as outlined in the proposed BBB framework, through the methodology for the identification of air navigation deficiencies against the regional air navigation plans;</li> <li>d) develop the necessary tools to support the PIRGs in the verification of the provision of the proposed basic building block (BBB) services at the regional and national levels;</li> <li>e) coordinate the interoperability of systems and harmonization of procedures at a regional level, through the PIRGs, in relation to the use of advanced technologies and concepts of operations, taking into account global requirements;</li> <li>f) in line with the No Country Left Behind (NCLB) initiative, provide the necessary technical assistance to States for the provision of essential air navigation services as identified by the PIRGs and as reflected in State national air navigation plans; and</li> <li>g) urge the aviation manufacturing industry to create a testing environment for States to justify procurement decisions which guaranty interoperability and system functionality within local specific environments, as a follow-up to the provision of essential air navigation services.</li> </ul>	<p>MID States: to ensure that the essential CNS services are provided, as per the BBBs</p> <p>CNS SG: to continue monitoring availability of essential CNS Services provided by States, through the air navigation deficiencies</p>
<p><b>Recommendation 4.3/1 – Improving the performance of the air navigation system</b></p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> <li>a) required navigation performance-authorization required departure navigation specification;</li> </ul>	<p>MID States: To take necessary actions as a</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

<ul style="list-style-type: none"> <li>b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches;</li> <li>c) assessment of the need for ICAO provisions on the use of a ground-based augmentation system to support standard instrument arrival and standard instrument departure procedures to approach and landing trajectory;</li> <li>d) development of separation minima to support all performance-based navigation specifications and which will also allow for operations where mixed performance requirements are in effect;</li> <li>e) advanced use of performance-based navigation to support aviation system block upgrade modules;</li> <li>f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and</li> <li>g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training.</li> </ul>	
<p><b>Recommendation 5.2/1 — Very low altitude operations</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) collect and share information regarding very low altitude operations, including on unmanned aircraft systems traffic management (UTM) systems, autonomous operations initiatives and tactical risk assessment models;</li> <li>b) ensure that UTM systems are interoperable with existing air traffic management (ATM) systems;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>c) contribute to the development of operational solutions and guidance, including on UTM systems, autonomous operations and tactical risk assessment models, to support the safe and coordinated implementation of aviation activities at very low altitude, particularly in urban and suburban environments, including in the vicinity of, and into, aerodromes;</li> <li>d) continue serving as the global and regional facilitator and forum for States, industry, academia and other interested stakeholders in the development of UTM systems, including developing guidance for the identification, structuring and implementation of necessary financing mechanisms such as public-private partnerships (PPPs);</li> <li>e) continue developing provisions and guidance material for the development, harmonization and implementation of UAS regulations, consistent with the key policy principles set forth in the Global Air Navigation Plan (GANP);</li> </ul>	<p><b>MID States: To take necessary actions as a</b></p> <p><b>ICAO: actions to be determined</b></p> <p><b>CNS SG: actions to be determined</b></p>

<ul style="list-style-type: none"> <li>f) develop a solution to enable States to authorize operations of non-certificated UAS over the high seas, using parameters to be defined in a transparent manner, including investigating the maximum altitude at which these operations would be allowed;</li> <li>g) develop Standards and Recommended Practices (SARPs), guidance or “best practices” related to UTM, including autonomous operations, after States and regions have had sufficient time to test and validate concepts;</li> <li>h) encourage UTM providers to implement the highest level of cyber security standards that are consistent with aviation community expectations and guidelines for very low altitude airspace operations;</li> <li>i) support and coordinate the implementation of core airspace management services including, but not limited to, geofencing and geo-referencing, as well as ensuring ATM and UTM interfaces;</li> <li>j) actively cooperate with States at the regional level for the development and implementation of UTM;</li> <li>k) continue the development of a global aircraft registration network (ARN); and</li> <li>l) continue conducting awareness and educational activities amongst users, and facilitate the exchange of information amongst States regarding their UAS regulations.</li> </ul>	
<p><b>Recommendation 5.3/1 — Remotely piloted aircraft systems (RPAS)</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) collect and share information on remotely piloted aircraft systems (RPAS) operations;</li> <li>b) actively engage industry stakeholders to collect and provide technical data to ICAO on RPAS operations needed to support the development of SARPs for RPAS, including those SARPs required for detect and avoid (DAA) and C2 Link;</li> <li>c) support the cross-disciplinary development of RPAS-related SARPs and guidance material across expert groups of ICAO;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>d) continue development of the regulatory framework necessary to support the integration of RPAS into non-segregated airspace and aerodromes, and facilitate related implementation roll-out activities;</li> <li>e) continue developing guidance material to support safe RPAS operations, to facilitate implementation through regional training activities, to conduct awareness and educational activities amongst users, and to facilitate the collection and sharing of information amongst States regarding their RPAS operations and regulations;</li> </ul>	<p><b>MID States: To take necessary actions as a</b></p> <p><b>ICAO: actions to be determined</b></p> <p><b>CNS SG: actions to be determined</b></p>

<ul style="list-style-type: none"> <li>f) assess the work underway in its expert groups and identify additional activities required to implement RPAS-related SARPs and guidance such as DAA and C2 Link;</li> <li>g) provide an update on a fully integrated approach for ICAO's RPAS-related work programme to the 40th Session of the Assembly in 2019;</li> <li>h) in coordination with States and military stakeholders, propose the best selection for the establishment of a secondary surveillance radar (SSR) code for lost C2 Link events within appropriate Annexes, Procedures for Air Navigation Services (PANS), regional air navigation plans and other relevant documents; and</li> <li>i) consider the use of gender-neutral RPAS-related terminology, following appropriate research.</li> </ul>	
<p><b>Recommendation 5.4/1 – Cyber resilience</b></p> <p>That States:</p> <ul style="list-style-type: none"> <li>a) in coordination with stakeholders, provide the necessary support for ICAO to evolve the global trust framework as an enabler of flight operations in a digitally connected environment;</li> <li>b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders;</li> <li>c) recognize the need to be prepared to respond to cyber events;</li> <li>d) in coordination with industry and international organizations, work with ICAO to increase awareness of cyber threats and system resilience processes, and coordinate cyber-related incident information sharing and training activities;</li> <li>e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels;</li> </ul> <p>That ICAO:</p> <ul style="list-style-type: none"> <li>f) establish a formal project involving States, international organizations and relevant stakeholders for the urgent and transparent development of a globally harmonized aviation trust framework through a group of experts. Priority should be given to governance principles;</li> <li>g) coordinate with both aviation and non-aviation technical experts in the development of the trust framework, and in particular with the governing bodies of the Internet;</li> <li>h) incorporate the trust framework into the Global Air Navigation Plan (Doc 9750) in an appropriate manner to highlight its urgent need, its importance and to improve its visibility;</li> </ul>	<p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: actions to be determined</p> <p>CNS SG: actions to be determined</p>

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| <ul style="list-style-type: none"><li>i) develop, as a matter of priority, and promote high-level policies and management frameworks for cyber resilience to help mitigate cyber threats and risks to civil aviation based on international industry standards and preferably aligned or integrated with existing management systems;</li><li>j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events;</li><li>k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels;</li><li>l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing;</li><li>m) promote tabletop exercises and maintain a repository of lessons learned and scenarios available to Member States; and</li><li>n) promote a unified framework for an integrated risk management approach (safety, security, environment, financial, etc.) to cyber resilience, taking into account all hazards and threats to the air navigation system.</li></ul> |  |
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