



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**REPORT OF THE NINTH MEETING OF
CNS SUB-GROUP**

(CNS SG/9)

(Cairo, Egypt, 19 - 21 March 2019)

The views expressed in this Report should be taken as those of the MIDANPIRG CNS Sub-Group and not of the Organization. This Report will, however, be submitted to the MIDANPIRG and any formal action taken will be published in due course as a Supplement to the Report.

Approved by the Meeting
and published by authority of the Secretary General

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PART I – HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Ninth meeting of the MIDANPIRG Communication, Navigation and Surveillance Sub-Group (CNS SG/9) was held at the ICAO MID Regional Office, Cairo, Egypt, 19-21 March 2019.

2. OPENING

2.1 The meeting was opened by Ms. Muna Alnadaf, Regional Officer, Communication, Navigation and Surveillance (RO/CNS), ICAO Middle East Office, who welcomed the participants to Cairo. Ms. Alnadaf highlighted few subjects that will be addressed by the meeting, in particular, the outcome of the fourth meeting of the MIDAMC Steering Group, the ATM Cyber Security, and the AIDC/OLDI implementation.

2.2 Ms. Alnadaf indicated that the Draft MID Region Surveillance Plan will be further reviewed and updated, in order to be presented to the MIDANPIRG/17 for endorsement. Also, she highlighted that the recommendations emanating from the Surveillance /MICA Workshop will be reviewed to agree on necessary follow-up actions by the meeting.

2.3 In closing, Ms. Anadaf thanked the participants for their presence and wished the meeting every success in its deliberations.

3. ATTENDANCE

3.1 The meeting was attended by a total of forty eight (48) participants, from eleven (11) States (Bahrain, Egypt, Iraq, Jordan, Lebanon, Libya, Oman, Saudi Arabia, Syria, United Arab Emirates and United States of America) and two (2) International Organizations/Industry (Aerospace Industry Association and IATA). The list of participants is at the **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 The meeting was chaired by Mr. Saleh Abdullah Al-Harthy, Director of CNS, Public Authority for Civil Aviation (PACA), Oman.

4.2 Ms. Muna Alnadaf, RO/CNS was the Secretary of the meeting.

5. LANGUAGE

5.1 The discussions were conducted in English. Documentation was issued in English.

6. AGENDA

6.1 The following Agenda was adopted:

- Agenda Item 1: Adoption of the Provisional Agenda
- Agenda Item 2: Follow-up on MSG/6 Conclusions and Decisions relevant to CNS
- Agenda Item 3: Global Developments related to CNS
- Agenda Item 4: CNS planning and implementation in the MID Region
- Agenda Item 5: Review of Air Navigation Deficiencies in the CNS Field
- Agenda Item 6: Future Work Programme

7. CONCLUSIONS AND DECISIONS - DEFINITIONS

7.1 All MIDANPIRG Sub-Groups and Task Forces record their actions in the form of Conclusions and Decisions with the following significance:

- a) **Conclusions** deal with the matters which, in accordance with the Group's terms of reference, merit directly the attention of States on which further action will be initiated by ICAO in accordance with established procedures; and
- b) **Decisions** deal with matters of concern only to the MIDANPIRG and its contributory bodies.

8. LIST OF DRAFT CONCLUSIONS AND DRAFT DECISIONS

- DRAFT CONCLUSION 9/1: SITA INTEGRATION IN THE MID REGION*
- DRAFT CONCLUSION 9/2: PFA TO THE MID ANP VOLUME II-CNS*
- DRAFT CONCLUSION 9/3: AFTN/CIDIN/AMHS ROUTING TABLES*
- DRAFT DECISION 9/4: TERMS OF REFERENCE OF THE MIDAMC STG*
- DRAFT DECISION 9/5: FREQUENCY MANAGEMENT WORKING GROUP*
- DRAFT CONCLUSION 9/6: UPDATE OF THE GUIDANCE FOR AIDC/OLDI IMPLEMENTATION IN THE MID REGION (MID DOC 006)*
- DRAFT CONCLUSION 9/7: MID REGION PROCESS FOR MODE S IC CODES ALLOCATION*

DRAFT DECISION 9/8: ANS CYBER SECURITY WORKING GROUP

DRAFT CONCLUSION 9/9: B0-ASUR

DRAFT CONCLUSION 9/10: AFTN REQUIREMENTS IN THE MID ANP

PART II: REPORT ON AGENDA ITEMS**REPORT ON AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA**

1.1 The subject was addressed in WP/1 presented by the Secretariat. The meeting reviewed and adopted the Agenda as at paragraph 6 of the History of the Meeting.

REPORT ON AGENDA ITEM 2: FOLLOW-UP ON MIDANPIRG/16 AND MSG/6 CONCLUSIONS AND DECISIONS RELEVANT TO CNS

2.1 The subject was addressed in WP/2 presented by the Secretariat. The meeting noted the status of the MIDANPIRG/16 and MSG/6 Conclusions and Decisions relevant to CNS and the follow-up actions taken by concerned parties as at **Appendix 2A and 2B** respectively.

REPORT ON AGENDA ITEM 3: GLOBAL DEVELOPMENTS RELATED TO CNS***AN-Conf/13 Outcome***

3.1 The subject was addressed in WP/3 presented by the Secretariat. The meeting was apprised of the outcome of the Thirteenth Air Navigation Conference (AN-Conf/13) held in Montréal from 9 to 19 October 2018.

3.2 The meeting recalled that the MSG/6 meeting reviewed the AN-Conf/13 Recommendations related to air navigation and, through MSG Decision 6/1, 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.

3.3 The meeting reviewed the AN-Conf/13 Recommendations related to CNS and proposed follow-up actions, as at **Appendix 3A**.

Amendment to Annex 10 Volumes II & IV

3.4 The subject was addressed in WP/4 presented by the Secretariat. The meeting noted the adoption of Amendment 90 and 91 to Annex 10 Volumes II and IV, respectively.

3.5 The meeting noted the introduction of ADS-B OUT version II equipage on surface vehicles.

GPS Week Counter Rollover Event

3.6 The subject was addressed in WP/5 presented by the Secretariat. The meeting was apprised of the the GPS week counter rollover event that occur every 1024 weeks starting from 0000Z 6 January 1980. The next Week Number rollover will occur on 6 April 2019.

3.6 The meeting noted that ICAO issued an Electronic Bulletin (EB 2019/7) on the forthcoming GPS week counter rollover event, and urged States to disseminate the EB to the relevant authorities and take necessary actions to eliminate the impact of the GPS week number rollover on Aviation systems.

REPORT ON AGENDA ITEM 4: CNS PLANNING AND IMPLEMENTATION IN THE MID REGION**Outcome of the MIDAMC STG/4**

4.1 The subject was addressed in WP/6 presented by the the Secretariat. The meeting was apprised of the outcome of the MIDAMC STG/4 meeting that was held in Cairo, 18-19 March 2019, back-to-back with the CNS SG/9 meeting.

SITA Integration in the MID Region

4.2 The meeting noted that SITA Integration is a pre-requisite to any AMHS Inter-regional connection, in order to keep efficient and regular messages exchange. ICAO APAC, EUR/NAT and SAM Regions have completed the integration successfully; and the AFI Region is also progressing well.

4.3 The meeting recalled that the CNS SG/8 meeting developed SITA Type X Transition Action Plan. The transition date has been postponed several times and the transition could not be completed. The meeting underlined that lagging in SITA Integration may isolate the MID Region and keep operating the old obsolete AFTN protocol. Moreover, the meeting highlighted the operational and safety consequences of not having SITA Type X Integrated in the Region.

4.4 The meeting was apprised of the outcome of the special coordination meeting between Egypt, EUROCONTROL, ICAO MID and SITA held on 18 December 2018 to resolve the pending issues. The meeting noted that it was proposed to do the cutover on 28 February 2019 pending Egypt's confirmation; however, the transition could not be implemented.

4.5 The meeting noted the concern raised by the ICAO EUR/NAT AFSG meeting (held in Paris from 5 to 8 March 2019) regarding the lack of SITA AMHS Gateway into the MID Region, which may affect the exchange of ATS messages between the ICAO EUR and MID Regions, as well as inside the respective COM Centres of both Regions.

4.6 The meeting agreed that AMHS technical transition should not be impacted by bilateral specific issues to avoid any community impact. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 9/1: SITA INTEGRATION IN THE MID REGION

That, in order to finalize SITA Type X integration in the MID Region, and to ensure seamless and efficient messages exchange within the MID Region and with other ICAO Regions, States are urged to:

- a) implement necessary measures to enable SITA integration in the MID Region as soon as possible;*
- b) inform ICAO MID Office by 28 March 2019 about State's readiness to integrate SITA Type X;*
- c) be informed by ICAO MID Office about States that are not ready for SITA Type X Integration (if any) by 1 April 2019;*
- d) take necessary actions to avoid relaying messages through non-complied States;*
- e) use new routing tables published by MIDAMC by 10 April 2019; and*
- f) complete SITA Type X Integration by 25 April 2019.*

4.7 The meeting supported Saudi Arabia's request to establish additional Regional Type X connection in the MID Region, in order to improve the reliability and the availability of AMHS/SITA interconnection. SITA stated that the proposal will be discussed internally within SITA and report back by 31 March 2019.

4.8 The meeting raised a concern about validating SITA Users addressee in the MID Region, and the challenges faced by States when dealing with Airlines addresses. It was agreed that SITA supports States to identify SITA Users addresses when requested.

IWXXM Implementation and ROC Connectivity

4.9 The meeting recalled that the thirteen ICAO Air Navigation Conference (AN-Conf/13), through Recommendation 2.3/2, urged States to provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020, and requested ICAO to ensure that the IWXXM format is the only standard exchange format by 2026.

4.10 The meeting reviewed and updated the AMHS plan of the MID ROC connectivity plan at **Appendix 4A**, to enable the exchange of OPMET data in the new format between the MID and EUR Regions.

4.11 The meeting noted that most of the AMHS systems in the MID Region are capable to run the extended services and in particular the File Transfer Body Part (FTBP).

4.12 The meeting recalled MSG/6 Conclusions to enable exchange IWXXM messages:

MSG CONCLUSION 6/29: IMPLEMENTATION OF FILE TRANSFER BODY PART (FTBP)

That, States are urged to:

- a) implement FTBP capability at National COM Centres (AMHS is a prerequisite);*
- b) implement P3/P7 with FTBP capability at the National OPMET Centre (NOC);*
- and*
- c) set the maximum overall AMHS Message size to 4 MB.*

MSG CONCLUSION 6/30: THE COMMUNICATION NETWORK FOR IWXXM DATA EXCHANGE

That, the Main and Backup Regional OPMET Centres (Bahrain and Saudi Arabia) and the Main COM Centres in the MID Region be urged to join the CRV Project in order to enable the exchange of OPMET information in IWXXM format.

4.13 The meeting was apprised of the development of Appendix H of the EUR AMHS Manual; the FTBP implementation guidance and testing documents; that contains the AMHS Profile for OPMET IWXXM data exchange as well as guidance material for conducting conformance testing of the involved implementations. In the same vein, the meeting recalled that MIDANPIRG/16 endorsed the first Edition of the FTBP Testing Document.

4.14 The meeting agreed to monitor the FTBP capability through FICE Module Table in the ANP Vol III. The meeting agreed also to monitor the implementation of required communication infrastructure for the exchange of the XML-based messages (IWXXM, FIXM, AIXM,,etc.) over AMHS..

4.15 It was highlighted that the current communication systems used in States (AMHS) has the required capabilities to meet the performance requirements of exchanging XML-based messages in the MID Region. Furthermore, joining the CRV Network will reduce the complexity of the current mixed communication environment (AFTN/AMHS/CIDIN).

AMHS Capability in Iraq

4.16 The meeting was apprised of the status of AMHS implementation in Iraq, the system consists of MTA, P3/P7 User Agent, Message store, AFTN Gateway and email Gateway, and can supports AFTN over Telex, RS232, TCP/IP and X.25. with dual stack MTA (OSI and IPS protocols). Baghdad COM center is currently connected to Kuwait, Syria and Iran using AFTN, and planning to implement AMHS with Jordan, Kuwait, Turkey, Beirut, Tehran and Bahrain.

Inter-regional Connections and Missing Messages

4.17 The meeting recalled MIDANPIRG/15 Conclusion 15/30 regarding migration to AMHS:

CONCLUSION 15/30: AFTN/CIDIN AFS CONNECTIVITY AND AMHS IMPLEMENTATION

That, States be urged to:

- a) refrain from establishing new AFTN and CIDIN connections at the International level;*
- b) gradually phase out the current connections based on AFTN or CIDIN standards;*
- and*
- c) expedite their AMHS implementation.*

4.18 The meeting noted that all CIDIN connections have been removed within the MID Region and there is only one connection remaining between Bahrain and UAE. The meeting was apprised of the progress being done by Bahrain and UAE to migrate to AMHS. The other CIDIN links are the Inter-regional connections with Athens and Nicosia pending SITA integration in the MID Region.

4.19 IATA raised a concern about the current performance of the Inter-regional connections between EUR and MID, and underlined the need to improve the Inter-regional connections to accommodate the increasing traffic.

4.20 In this context, the meeting reviewed the AFTN plan in the MID Air Navigation Plan (MID ANP) VOL II, and noted that the entry/exit points with adjacent Regions are as follow:

- 1) Bahrain, Iran, and Oman are the entry/exit points with ASIA/PAC Region
- 2) Egypt and Saudi Arabia are the entry/exit points with AFI Region
- 3) Egypt, Kuwait and Lebanon are the entry/exit points with EUR Region

4.21 The meeting was apprised of Sudan's request to consider Khartoum COM Centre as a Main COM Centre and third gateway with the AFI Region, which could offer more channel for the Inter-regional communications.

4.22 The meeting agreed that the MID Air Navigation Plan (MID ANP) VOL II table CNS-II should be updated to reflect the Conclusion 15/30 and fulfil the current needs. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 9/2: PFA TO THE MID ANP VOLUME II-CNS

That, a Proposal for Amendment to the MID ANP Volume II – Table CNS II-1 related to the Aeronautical Fixed Telecommunication Network Plan as at Appendix 4B be processed in accordance with the standard procedure.

4.23 The meeting discussed the issues related to missing messages, and noted that the following actions have been taken by the ICAO MID Office:

- a) requested the ICAO EUR/NAT Office to consider the establishment of new European Gateway (Rome) with the MID Region;
- b) invited Egypt and Lebanon to establish AMHS Inter-regional connection with the current European gateways (Athens and Cyprus);
- c) coordinated with ICAO ESAF Office to establish new Inter-regional AMHS connection between Cairo and South Africa;
- d) invited Bahrain – UAE to migrate their bilateral CIDIN connection to AMHS;
- e) requested all States in the MID Region to migrate to AMHS; and
- f) initiated communication with adjacent ICAO Regions (APAC and AFI) to review the performance of the inter-regional connections.

4.24 The meeting underlined that States should notify the airspace users and ATS Units in case of communication failure and no Communication routes are available. It was agreed to form a team from IATA, ICAO MID and the MIDAMC to coordinate and investigate missing messages once reported. The meeting recommended to investigate from origination to the destination to identify the source and reasons of the missing message(s) (whether they are operational or technical issues). States were requested to cooperate and support the investigation once initiated, as appropriate.

4.25 The meeting was apprised of the coordination taking place between Lebanon and Cyprus to migrate AMHS. It was noted that the work cannot be completed unless SITA Type X is integrated in the MID Region.

4.26 The meeting recalled the rationalised AFTN routing table document, and was informed that the AFTN/CIDIN/AMHS routing tables are managed centrally by the MIDAMC Web application. Therefore, the meeting urged States to keep the routing tables up-to-date and to implement these routing tables. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 9/3: AFTN/CIDIN/AMHS ROUTING TABLES

That, in order to eliminate the messages loop problem within the MID Region:

- b) States be urged to update the AFTN/CIDIN/AMHS Routing Tables; and*
- c) ICAO publish the updated rationale MID AFTN/CIDIN/AMHS Routing Tables.*

4.27 The meeting was apprised of the review of the Inter-regional connections performance with the APAC Region that has been done during the CRV OG/5 (Hong Kong, 23-25 January 2019). Among reported cases, causes were due to communication failures, unavailability of alternative routes, and delay in AFTN failure detection.

4.28 The meeting was informed that after conducting an investigation for the missing messages between Kuwait and Karachi, appropriate changes to the existing routing directory at Kuwait and Karachi COM Centres have been done, and the problem is resolved now.

CRV Project

4.29 The meeting noted that States selected different packages for the same connections. In order to request price revision from CRV service provider. The Secretariat prepared consolidated proposal with unified package for all MID States. Furthermore, the meeting recalled the MSG/6, through Conclusion 6/28, agreed that States should complete their CRV Network Requirements:

MSG CONCLUSION 6/28: MIDCRV REQUIREMENTS

That, in order to request price revision from the CRV's Service provider (PCCW Global) for the MID Region, States that have not done so, are urged to complete the MID CRV requirements at Appendix 5.3P, not later than 15 February 2019.

4.30 The meeting was informed that CRV service provider (PCCW) offered a bundle discount with around 10-15% less, if Six (6) States place order in the same period. However, CRV overall cost could be reduced if a high number of States join the project.

4.31 The meeting was apprised of the successful result of tests from the CRV Pilot Project, which was conducted through Pilot Project; and proved the concept of the CRV network against the 10 points of test plan established at CRV OG/2 meeting. Furthermore, it was highlighted that it is not necessary for other States to duplicate a similar testing.

4.32 The meeting noted that the establishment of such a common network within specific Region would require careful consideration of all issues involved, as well as the evaluation of common network proposal, as compared to the current point-to-point configuration. Several issues need to be considered including, but not limited to, the following factors:

- a) Technical requirements
- b) Cost, including arrangement for division/allocation of cost
- c) Process for contract award
- d) Responsibility for network administration
- e) Handling of network service issues
- f) Performance specifications
- g) Network security issues
- h) Network redundancy issues
- i) Capacity for growth and expansion
- j) Required lead time for implementation
- k) Performance management, measurement, monitoring, reporting and control
- l) Missing message issue faced by Bahrain, Kuwait and Oman.

4.33 Based on the above, the meeting agreed to conduct a special meeting on CRV project with Subject Matter Expert (SME), in the short term, to investigate the issues described above, study the appropriate CRV framework for the MID IP Network and develop detailed proposal for appropriate CRV Packages for States, System Design Document (SDD) and Implementation Plan.. Therefore, the meeting agreed to conduct the MIDAMC STG/5 meeting in the fourth quarter of 2019. The meeting will address only CRV project and will involve CRV service provider (PCCW Global).

4.34 The meeting was apprised of CRV Implementation in FAA. FAA has Package A (Hot Standby for voice service over CRV and Package C at separated Locations for AMHS Network). FAA can revert to International Dial Direct (IDD), when needed.

4.35 The meeting noted the following recommendations/lessons learnt from APAC experience on CRV Project:

- a) Change States/Administrations to join CRV to “ANSPs”, as States/Administrations’ term is not specific and will delay approval process. The CRV is designed to primarily support time sensitive ATC voice and AFTN/AMHS.
- b) Maintain the AMHS routing and expand routing with coordination to all impacted ANSPs.
- c) IWXXM traffic will be distributed by AMHS as adopted by ICAO. IWXXM traffic should be evaluated regularly to ensure CRV can provide support.
- d) SWIM over CRV should be regularly evaluated to ensure CRV bandwidth can be used efficiently.
- e) MID Region States to negotiate the price as a team in order to get better offer.
- f) ANSP should deploy their own security measures like security Gateway.

4.36 The meeting noted that CRV package can support both legacy voice and VOIP, however, the legacy Voice is limited to four lines. For additional voice channels, a voice gateway is required which can be supplied by CRV Service provider (PCCW).

4.37 The meeting agreed that States need to protect and secure their own internal networks by implementing proper security measures. The meeting highlighted the need to address the CRV security measures in relevant future ICAO events.

MIDAMC STG Terms of Reference

4.38 The meeting reviewed and updated the MIDAMC STG Terms of Reference as at **Appendix 4C**. Accordingly, the meeting agreed to the following Draft Decision:

DRAFT DECISION 9/4: TERMS OF REFERENCE OF THE MIDAMC STG

That, the Terms of Reference and Work Programme of the MIDAMC STG be updated as at Appendix 4C.

Frequency Management Issues

4.39 The subject was addressed in WP/7 and PPT/8 presented by the Secretariat and Oman, respectively. The meeting was informed that the Nineteenth World Radio Conference (WRC-19) meeting will be held in Sharm El-Sheikh, 28 October to 22 November 2019. ICAO position has been developed and coordinated with all MID States in June 2016.

4.40 The meeting recalled MSG Conclusion 6/24 that urged States to work closely with their States' Telecommunication Authorities to ensure that the ICAO Position is suitably reflected in the National position of the State and in the Regional position; and to support ICAO Position during the WRC-19 meeting. The meeting urged States to support the ICAO Position on issues of concern to International Civil Aviation.

4.41 The meeting recalled that the MSG/6 meeting agreed through Conclusion 6/27 that States should assign focal points for the frequency management issues in order to improve the coordination and respond to the interference occurrences in a timely manner. In this regard, the meeting updated the list of Frequency focal points as at **Appendix 4D**.

4.42 The meeting highlighted that actual day-to-day coordination of frequency assignments is being undertaken by ICAO, through the ICAO Regional Offices. To support this coordination, the ICAO Regional Offices have developed the necessary procedures, including the relevant frequency assignment planning criteria.

4.43 The meeting raised concern regarding the slow progress in developing the MID Region frequency assignment plan, which is due to lack of coordination from States with the ICAO Regional Office in updating the master list and reflecting all changes in the ICAO database. Accordingly, the meeting agreed to establish a Frequency Management Working Group composed of representatives from States (CAA and TRA) to support States in fulfilling ICAO Radio Frequency Spectrum Requirements, related to Frequency Management and Spectrum strategy; develop MID Region frequency assignment plan, including current and future spectrum usage of radio systems, policies on use of aeronautical spectrum to support the ICAO spectrum strategic objectives and ICAO position for ITU WRC-19. The Frequency Management Working Group is also expected to find solutions for the interference incidents between MID States in a timely manner; and develop an approach to transition to the new ICAO Global database. Accordingly, the meeting agreed to the following Draft Decision:

DRAFT DECISION 9/5: FREQUENCY MANAGEMENT WORKING GROUP

*That, the Frequency Management Working Group be established with Terms of Reference and Work Programme as at **Appendix 4E**.*

OLDI/ AIDC Implementation (B0-FICE)

4.44 The subject was addressed in WP/9 and WP/10 presented by the Secretariat and Oman, respectively. The meeting noted that the level of implementation of AIDC/OLDI in the MID Region is still far below the acceptable level.

4.45 The meeting recalled that the MSG/6 meeting agreed, through Conclusion 6/16, that a requirement for AIDC/OLDI implementation (priority 1 interconnections) should be included in the MID eANP Volume II Part IV-ATM, under Specific Regional Requirements. In this regard, the meeting reviewed the priority 1 interconnectivity as per Table ATM II-MID-3 MID Region AIDC/OLDI Applicability Area (Priority 1 and 2 for Implementation). Moreover, the meeting urged States that have not provided their comments/feedback to the PfA, to do so by 31 March 2019.

4.46 The meeting recalled that the MSG/6 meeting urged States to initiate communication for AIDC connection taking into consideration the guidance material in the MID DOC 006; MID Region Guidance for AIDC/OLDI Implementation in the MID Region, the document includes in addition to the implementation phases, guidance material and sample of script to be used for testing. In this respect, the

meeting reviewed and updated Details of the ATM systems table in the MID Doc 006, and updated the message types to be used in the MID Region. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 9/6: UPDATE OF THE GUIDANCE FOR AIDC/OLDI IMPLEMENTATION IN THE MID REGION (MID DOC 006)

*That, the ICAO MID Doc 006 - Guidance for AIDC/OLDI Implementation in the MID Region be updated as at **Appendix 4F**.*

4.47 The meeting recalled the reasons for non-implementation of AIDC/OLDI and the associated recommendations developed based on the challenges identified related to AIDC/OLDI implementation in MID Region.

4.48 Considering the slow progress in implementing AIDC/OLDI in the MID Region, the meeting discussed the need to establish an Implementation Support Team composed of Subject Matter Experts (SME) from the MID Region (Oman, Saudi Arabia, UAE and ICAO) to solve identified technical problems, if requested by concerned States.

GNSS Issues

4.49 The subject was addressed in WP/12 presented by the Secretariat. The meeting underlined the vital role of GNSS to the Air Navigation and noted that GNSS has been increasingly used by many Aviation applications.

4.50 The meeting recalled that MSG/6, through Conclusion 6/31, endorsed the Guidance on GNSS Implementation in the MID Region, published as ICAO MID Doc 011.

4.51 The meeting highlighted the high number of GNSS interference incidents in the MID Region. Furthermore, the meeting was informed that 180 interference incidents were reported to IATA in 2018. In this respect, the meeting reviewed the RASG-MID Safety Advisory (RSA) on GNSS vulnerabilities.

4.52 The meeting was apprised of the interference reporting procedure, and the coordination between ITU and ICAO through the Memorandum of Cooperation (MoC) regarding the protection of the GNSS from Harmful interference with potential impact on Aviation Safety. Furthermore, the meeting urged States to strengthen cooperation with their National Telecommunication Authorities in protecting GNSS signal, and for the timely identification of the source of interference.

4.53 The meeting noted the content of a video provided by Oman on using Drones to locate the source of interference.

Outcome of the Surveillance/MICA Workshop

4.54 The subject was addressed in WP/13 presented by the Secretariat. The meeting recalled that the Mode S Interrogator Code Allocation (MICA) process in the MID Region is managed by the EUROCONTROL MICA web application since 2011.

4.55 The meeting noted that some MICA users were not familiar with the MICA procedures and process. Therefore, the MSG/6 meeting, through Conclusion 6/32, agreed that a Surveillance/MICA Workshop be organized in 2019.

4.56 The meeting was apprised of the outcome of the Surveillance/MICA Workshop that was held in Cairo, 26-28 February 2019. The Summary of Discussion is at **Appendix 4G**.

4.57 The meeting reviewed the Recommendations of the Surveillance/MICA Workshop and agreed to the following:

- a) ICAO MID Office to coordinate with IATA to provide statistics on the percentage of SI equipped aircraft in the MID Region;
- b) ICAO MID Office to coordinate with MICA Cell to allocate Mode S II code and matching SI code for Military Radars in the MID Region; and
- c) Mandate that all Mode S Radars in the MID Region to support the SI/II code operation by developing PfA to the MID ANP Vol II, CNS Specific Regional Requirements.

4.58 The meeting reviewed thoroughly and updated the Draft MID Region Surveillance Plan as at **Appendix 4H**.

4.59 The meeting recalled that MIDANPIRG/15, through Conclusion 15/32, agreed that, the Eurocontrol Document “Requirements process for the coordinated allocation and use of Mode S Interrogator Codes in the ICAO Middle East Region” (Edition 1.02 dated August 2014), be used for the allocation of the Mode S IC Codes. Furthermore, the meeting noted that the Document is a working draft and that the MID Region IC Code process does not involve Operators from MID States. Accordingly, the meeting updated the Document and agreed to the following Draft Conclusion:

***DRAFT CONCLUSION 9/7: MID REGION PROCESS FOR MODE S IC CODES
ALLOCATION***

*That, the Eurocontrol Document “Requirements process for the coordinated allocation and use of Mode S Interrogator Codes in the ICAO Middle East Region” (Edition 1.0 dated March 2019) at **Appendix 4I**, be used for the allocation of the Mode S IC Codes.*

Surveillance Mode S Implémentation in Sedan

4.58 The subject was addressed in WP/14 presented by Oman on behalf of Sudan. The meeting was apprised of the Mode S Radar implementation in Sudan. The meeting noted with appreciation that 6 Mode S Radars and 4 ADS-B Stations have been installed. Furthermore, 9 additional ADS-B stations are being installed.

ATM Cyber Security

4.60 The subject was addressed in WP/11, WP/18 and WP/19 presented by the Secretariat, UAE and Iraq, respectively. The meeting was apprised of the Cyber Security activities in the MID Region.

4.61 The MSG/6 meeting agreed that the CNS SG/9 might develop detailed Terms of Reference for the ADSAG or Action Plan for the development of the MID Region ATM Data Security Plan.

4.62 The meeting was apprised of the AN-Conf/13 Recommendation (5.4/1) regarding the

Cyber Resilience. The meeting agreed that the Group Work should cover the Cyber Information Security for all Air Navigation System, such as SWIM, ADS-B, and AMHS. Therefore, the meeting agreed that the ADSAG be renamed to ANS Cyber Security Working Group (ACS WG). Accordingly, the meeting agreed to the following Draft Decision:

DRAFT DECISION 9/8: ANS CYBER SECURITY WORKING GROUP

*That, the ATM Data Security Action Group be renamed to ANS Cyber Security Working Group (ACS WG) with Terms of Reference as at **Appendix 4J**.*

4.62.1 The meeting recalled that UAE developed and hosted the ATM Data Security Portal (ADCS) in order to strengthen the Regional collective ability to detect and defend against malicious activities, by sharing information about adversaries and their behaviours. The meeting urged Users to register on the ADCS. UAE provided demonstration on the ADCS website.

4.62.2 The meeting recalled MSG Conclusion 6/34 regarding the Cyber Security and Resilience Symposium:

MSG CONCLUSION 6/34: CYBER SECURITY AND RESILIENCE SEMINAR

That, in order to enrich the cyber security awareness and strengthen the cyber resilience in the MID Region, ICAO organize a Cyber Security and Resilience Seminar in 2019 jointly with ACAO.

4.63 The meeting urged States to actively participate in the security initiatives within the Region and to attend the Cybersecurity & Resilience Symposium 15-17 October 2019.

4.64 The meeting was apprised of Iraq GCANS plans to implement ISO 27001:2013 to achieve confidentiality, integrity and availability of information and data service by applying risk management process, giving confidence to the stakeholders, which will achieve GCANS future security policy. The meeting requested Iraq to provide further details in the CNS SG/10.

Status of CNS in Libya

4.65 The subject was addressed in WP/15 presented by Libya. The meeting was apprised of the current status of CNS infrastructure in Libya, challenges, the GAP Analysis and CNS Plans and Strategies.

4.66 The meeting noted that many Air Navigation facilities are unserviceable: ILSs, Radars and HF Communication. Libya has 6 operational AFTN Connections using NAFISAT. Extended VHF is used for remote areas. However, many sites and facilities are not accessible due to security reasons.

Oman VHF and Radar Network

4.67 The subject was addressed in PPT/1 presented by Oman. The meeting noted with appreciation Oman's experience in improving the reliability and availability of VHF and Surveillance Services.

4.68 The meeting was apprised of the challenges faced by Oman to ensure continuity of the VHF and Surveillance Services specially in remote areas. All sector sites stations in Oman are connected to PACA ATM/CTC by a standardized dual network of fiber optics and V-SAT services provided by Omantel.

Review and update of the MID eANP and MID Region Air Navigation Strategy Parts related to CNS

4.69 The subject was addressed in WP/20 and WP/17 presented by the Secretariat and Egypt, respectively. The meeting recalled that MSG/6 endorsed an updated version of the MID Air Navigation Strategy.

4.70 The meeting agreed that, to monitor the States' readiness to enable exchange of XML data messages over AMHS (like IWXXM, FIXM and AIXM), the FTBP capability of the AMHS be added to the Table B0-FICE in the eANP Vol III, furthermore, the meeting reviewed and updated the CNS related parts in eANP Vol III as at **Appendix 4K**.

4.71 The meeting recalled that the CNS SG/8 meeting proposed to change the B0-ASUR from priority 2 to priority 1. However, the ANSIG/3 meeting decided that the CNS SG should prepare a complete proposal including the elements, applicability area, performance indicators/supporting metrics and their associated targets. In this context, the meeting developed B0-ASUR monitoring table as at **Appendix 4L**. Accordingly, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 9/9: B0-ASUR

That, in order to enhance the Surveillance capabilities in the MID Region:

- a) the B0-ASUR Module be changed from priority 2 to priority 1 in the MID Region Air Navigation Strategy; and*
- b) the Table at **Appendix 4L** be added to the MID eANP Vol III for the monitoring of B0-ASUR implementation in the MID Region.*

4.73 The meeting reviewed and updated the targets and timelines of the module B0-FICE as at **Appendix 4M**.

REPORT ON AGENDA ITEM 5: REVIEW OF AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD

5.1 The subject was addressed in WP/20 presented by the Secretariat. The meeting recalled that, the MIDANPIRG/15, through Conclusion 15/35, urged States to use the MID Air Navigation Deficiency Database (MANDD) for the submission of requests for addition, update and elimination of Air Navigation Deficiencies. It was underlined that specific Corrective Action Plan (CAP) should be submitted for each deficiency; and the elimination of deficiency(ies) should be supported by a Formal Letter to the ICAO MID Office containing the evidence(s) that mitigation measures have been implemented.

5.2 The meeting urged States to implement the provisions of MIDANPIRG Conclusion 15/35 related to the elimination of Air Navigation Deficiencies, in particular, the submission of a specific Corrective Action Plan (CAP) for each deficiency.

5.3 The meeting reviewed and updated the list of deficiencies in the CNS field as at **Appendix 5A**. Three (3) new deficiencies have been identified. With regard to Table CNS II-1, the meeting noted with concern that many Communication Links have not been implemented. Accordingly, the meeting agreed that the requirements in the MID eANP Vol II Table CNS II-1 need to be reviewed before adding new deficiencies to the MANDD.

5.4 Based on the above, the meeting agreed to the following Draft Conclusion:

DRAFT CONCLUSION 9/10: AFTN REQUIREMENTS IN THE MID ANP

That, in order to ensure that the AFTN requirements in the MID eANP Vol II meet the operational needs in terms of availability and efficiency:

- a) the requirements for the implementation of Communication Links in the MID eANP Vol II Table CNS II-1, be reviewed in coordination with concerned States by **15 June 2019**; and a Proposal for amendment to the MID eANP be processed, as appropriate;*
- b) any non-implementation of a required Communication Links be reflected as a deficiency in the MANDD.*

REPORT ON AGENDA ITEM 6: FUTURE WORK PROGRAMME

6.1 The subject was addressed in WP/21 presented by the Secretariat. The meeting reviewed and updated the CNS SG Terms of References (TORs) as at **Appendix 6A**.

6.2 The meeting agreed that the CNS SG/10 be tentatively scheduled in the second quarter of 2020. The venue will be the ICAO MID Regional Office in Cairo, unless a State is willing to host the meeting.

REPORT ON AGENDA ITEM 7: ANY OTHER BUSINESS

7.1 Nothing has been discussed under this Agenda Item.

APPENDICES

APPENDIX 2A

FOLLOW-UP ACTION PLAN ON MIDANPIRG/16 CONCLUSIONS AND DECISIONS

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|--|--|--|------------------------------|-------------------------------------|--|
| <p>CONCLUSION 16/15: MID IP NETWORK PROJECT (CRV)</p> <p>That,</p> <p>a) States that have already committed to join CRV, are invited to engage with the recommended supplier to establish individual service contracts; and</p> <p>b) States that have not yet done so, are urged to carry out a comprehensive CBA related to the implementation of an IP Network under the CRV framework; and inform the ICAO MID Office, as soon as possible, about their decision related to the joining of CRV.</p> | <p>States to join CRV Project</p> | <p>State Letter</p> <p>Engage with the recommended supplier</p> | <p>ICAO</p> <p>States</p> | <p>May 2017</p> <p>Dec 2017</p> | <p>Actioned/Ongoing</p> <p>SL Ref.: AN 6/31.4-17/160 dated 29 May 2017 (Egypt)</p> |
| <p>CONCLUSION 16/22: MODE S INTERROGATOR CODE (IC) ALLOCATION</p> <p>That, States, that have not yet done so, be urged to:</p> <p>a) provide the ICAO MID Office with their Mode S Interrogator Code (IC) Focal Points; and</p> <p>b) register to the MICA application for the allocation of the Mode S Interrogator Code (IC) at: https://ext.eurocontrol.int/mica/Index.action</p> | <p>States to use MICA web application for Mode S code allocation process</p> | <p>State Letter</p> <p>Focal Point(s) MICA Registration</p> | <p>ICAO</p> <p>States</p> | <p>Sep 2017</p> <p>Dec. 2017</p> | <p>Actioned/Completed</p> <p>SL Ref.: AN 7/27 – 17/329 dated 26 Nov. 2017 (Egypt, Jordan, Kuwait, Saudi Arabia, Sudan)</p> |
| <p>DECISION 16/23: MID REGION SURVEILLANCE PLAN</p> <p>That, the MID Region Surveillance Plan be developed by the CNS SG, based on the operational needs identified by the ATM SG.</p> | <p>To develop comprehensive Surveillance plan in the MID Region.</p> | <p>MID Region Surveillance Plan</p> | <p>CNS SG</p> | <p>Q1 2018</p> | <p>Completed</p> <p>Superseded by MSG Conclusion 6/32</p> |

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|--|-------------------------------------|---|---------------------------|--------------------------|---|
| CONCLUSION 16/24: FTBP TESTING DOCUMENT That, the First Edition of File Transfer Body Part (FTBP) Testing Document at Appendix 5.2.2N is endorsed. | To provide guidance on FTBP testing | FTBP Testing Document | MIDANPIRG/16 | Feb 2017 | Completed |
| DECISION 16/25: TERMS OF REFERENCE OF THE MIDAMC STG That, the Terms of Reference and Work Programme of the MIDAMC STG be updated as at Appendix 5.2.2O . | Updated TORs | MIDAMC STG TORs | MIDANPIRG/16 | Feb 2017 | Completed |
| DECISION 16/26: ATM DATA SECURITY ACTION GROUP That, the ATM Data Security Action Group (ADSAG) be: <ul style="list-style-type: none"> a) established to develop the MID Region ATM Data Security Plan, to be presented to the CNS SG/8. b) composed of members from Bahrain, Iran, Kuwait, Oman, Saudi Arabia, UAE (Rapporteur), ICAO and IFAIMA. | | State Letter MID Region ATM Data Security Plan | ICAO ADSAG members | June 2017 Q1-2018 | Completed SL Ref: AN 6/38 – 17/334 dated 29 Nov. 2017 (Bahrain, Egypt, Jordan, Kuwait, UAE) |

APPENDIX 2B

FOLLOW-UP ACTION PLAN ON MSG/6 CONCLUSIONS AND DECISIONS

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|---|--|--|---------------------------|-----------------------------------|--|
| <p>MSG CONCLUSION 6/24: SUPPORT ICAO POSITION TO WRC-19</p> <p>That, States be urged to:</p> <ul style="list-style-type: none"> a) work closely with the States Telecommunication Authorities to support the ICAO Position to the WRC-19; b) make necessary arrangements for the designated Civil Aviation Personnel to participate actively in the preparatory work for WRC-19 at the national level; and c) attend the preparatory regional spectrum management groups meetings and WRC-19 to support and protect aviation interests. | <p>To protect Aeronautical Spectrum for all radiocommunication and radionavigation systems</p> | <p>ICAO position is supported in the WRC-19</p> | <p>States</p> | <p>2019</p> | <p>Ongoing</p> |
| <p>MSG CONCLUSION 6/25: FREQUENCY MANAGEMENT WORKSHOP</p> <p>That, ICAO consider the organization of a Workshop on the Frequency Finder Tool jointly with ACAO in 2020.</p> | <p>To build capacity on frequency management</p> | <p>Frequency Management workshop</p> | <p>ICAO</p> | <p>2020</p> | <p>Ongoing</p> |
| <p>MSG CONCLUSION 6/26: REGISTERED FREQUENCY UPDATE</p> <p>That, for an optimized frequency assignment process and in order to ensure that assigned frequencies to MID States are not interfering, States that have not yet done so, be urged to:</p> <ul style="list-style-type: none"> a) verify and update existing registered frequencies in the COM list; b) add any missing frequencies with the full details, where applicable; c) delete unused frequencies; d) send the changes in excel format generated by the FF export function; and e) provide the ICAO MID Office with feedback before 15 February 2019. | <p>To optimize frequency assignment process and reduce interferences</p> | <p>State Letter</p> <p>Registered frequency database is up to date</p> | <p>ICAO</p> <p>States</p> | <p>Dec. 2018</p> <p>Feb. 2019</p> | <p>Actioned/Completed</p> <p>SL Ref. AN 7/5.7 – 18/410 dated 19 December 2019.</p> <p>Replies received from Bahrain, Egypt, Iraq, Kuwait, Qatar, Saudi Arabia, Sudan, and UAE</p> |

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|---|--|---|-----------------------------|-------------------------------------|---|
| <p>MSG CONCLUSION 6/27: FREQUENCY MANAGEMENT FOCAL POINTS</p> <p>That, States, that have not yet done so, be invited to assign Frequency Management Focal Points by 15 February 2019, for a better coordination of frequency management issues, including harmful interference.</p> | <p>To resolve frequency interferences incidents in a timely manner</p> | <p>Frequency focal points State letter</p> | <p>States ICAO</p> | <p>Feb. 2019 Dec. 2018</p> | <p>Actioned/Completed</p> <p>SL Ref. AN 7/5.7 – 18/411 dated 19 December 2019</p> <p>Replies received from Bahrain, Egypt, Iraq, Iran, Jordan, Lebanon, Kuwait, Qatar, Oman, Saudi Arabia, Sudan and UAE</p> |
| <p>MSG CONCLUSION 6/28: MID CRV REQUIREMENT</p> <p>That, in order to request price revision from the CRV's Service provider (PCCW Global) for the MID Region, States that have not done so, are urged to complete the MID CRV requirements at Appendix 5.3P, not later than 15 February 2019.</p> | <p>To request price revision from CRV supplier (PCCW)</p> | <p>consolidated Network requirements</p> | <p>States</p> | <p>Feb. 2019</p> | <p>Actioned/ Ongoing</p> <p>SL Ref. AN 6/31.4 – 18/412 dated 19 December 2019</p> <p>Replies received from Iran</p> |
| <p>MSG CONCLUSION 6/29: IMPLEMENTATION OF FILE TRANSFER BODY PART (FTBP)</p> <p>That, States are urged to:</p> <ul style="list-style-type: none"> a) implement FTBP capability at National COM Centres (AMHS is a pre-requisite); b) implement P3/P7 with FTBP capability at the National OPMET Centre (NOC); and c) set the maximum overall AMHS Message size to 4 MB. | <p>To enable IWXXM implementation</p> | <p>FTBP implemented State letter</p> | <p>States ICAO</p> | <p>Nov. 2020 Dec 2018</p> | <p>Actioned /Ongoing</p> <p>SL Ref. AN 7/31 – 18/413 dated 19 December</p> |

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|--|---|--|---|------------------------------------|--|
| <p>MSG CONCLUSION 6/30: THE COMMUNICATION NETWORK FOR IWXXM DATA EXCHANGE</p> <p>That, the Main and Backup Regional OPMET Centres (Bahrain and Saudi Arabia) and the Main COM Centres in the MID Region be urged to join the CRV Project in order to enable the exchange of OPMET information in IWXXM format.</p> | <p>To reduce the network complexity</p> | <p>Main and Backup Regional OPMT Centres join CRV</p> <p>State letter</p> | <p>Bahrain and Saudi Arabia</p> <p>ICAO</p> | <p>Nov. 2020</p> <p>Dec 2018</p> | <p>Actioned/Ongoing</p> <p>SL Ref. AN 7/31 – 18/413 dated 19 December</p> |
| <p>MSG CONCLUSION 6/31: GUIDANCE ON GNSS IMPLEMENTATION</p> <p>That, the Guidance on GNSS Implementation in the MID Region at Appendix 5.3Q is endorsed and be published as ICAO MID Doc 011.</p> | <p>To provide guidance material to States on GNSS implementation</p> | <p>Guidance on GNSS implementation in the MID Region</p> | <p>CNS SG</p> | <p>Dec. 2018</p> | <p>Completed</p> <p>MSG Conclusion 6/31</p> |
| <p>MSG CONCLUSION 6/32: MID REGION SURVEILLANCE PLAN AND WORKSHOP</p> <p>That, with a view to provide MICA Operator with necessary knowledge to implement MICA processes efficiently, and in order to develop a comprehensive Surveillance Plan in the MID Region:</p> <p>a) a Surveillance/MICA Workshop with support of EUROCONTROL be organised in February 2019);</p> <p>b) States invited to participate actively in the Workshop; and</p> <p>c) the Draft MID Region Surveillance Plan be reviewed/updated during the Surveillance/MICA Workshop and presented to the CNS SG/9 meeting for further review, before presentation to the MIDANPIRG/17 meeting for endorsement.</p> | <p>To define surveillance roadmap in the MID Region.</p> <p>To build capacity on Surveillance and MICA usage.</p> | <p>MID Region Surveillance Plan</p> <p>Organise Surveillance/MICA workshop</p> | <p>CNS SG</p> <p>ICAO</p> | <p>April 2019</p> <p>Feb. 2019</p> | <p>Actioned/Ongoing</p> |

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|---|--|---|--------------------------------------|------------------|--|
| <p>MSG CONCLUSION 6/33: ATM DATA CYBER SECURITY (ADCS) PORTAL</p> <p>That,</p> <p>a) the ADCS Portal be used as a prototype platform for ATM cyber security; and</p> <p>b) States be encouraged to:</p> <p>i) assign ADCS focal point(s) to register on the ADCS Portal;</p> <p>ii) provide feedback to the ADCS Admin by 15 February 2019 for further enhancements; and</p> <p>iii) share their experience related to cyber security, through the ADCS Portal.</p> | <p>To facilitate sharing experience on ATM Data cyber security</p> | <p>State Letter</p> <p>ADCS focal points</p> | <p>ICAOMID Office</p> <p>States</p> | <p>Feb. 2019</p> | <p>Actioned/Completed</p> <p>Ref. AN 7/36 – 19/042 dated 11 February 2019</p> |
| <p>MSG CONCLUSION 6/34: CYBER SECURITY AND RESILIENCE SEMINAR</p> <p>That, in order to enrich the cyber security awareness and strengthen the cyber resilience in the MID Region, ICAO organise a Cyber Security and Resilience Seminar in 2019 jointly with ACAO.</p> | <p>To build capacity on Cyber security and resilience in the MID Region</p> | <p>Organize Cyber Security & resilience Symposium</p> | <p>ICAOMID Office</p> | <p>Oct. 2019</p> | <p>Ongoing</p> |
| <p>MSG CONCLUSION 6/35: CYBER SECURITY SUBJECT MATTER EXPERT</p> <p>That, to strengthen States' Cyber-resilience capabilities in the MID Region, States be invited to ensure that they have qualified/trained Cyber Security Subject Matter Experts.</p> | <p>To ensure availability of required competencies on cyber security in States</p> | <p>State Letter</p> <p>Cyber Security SME</p> | <p>ICAO MID Office</p> <p>States</p> | <p>Feb. 2019</p> | <p>Actioned/Completed</p> <p>Ref. AN 7/36 – 19/042 dated 11 February 2019</p> |

| CONCLUSIONS AND DECISIONS | CONCERNS/ CHALLENGES (RATIONALE) | DELIVERABLE/ TO BE INITIATED BY | | TARGET DATE | STATUS/REMARKS |
|---|---|------------------------------------|--|----------------|----------------|
| DRAFT CONCLUSION 6/2: KHARTOUM COM CENTRE That, in order to establish a third Gateway to the AFI Region, Khartoum COM Centre be changed to a main Centre. | To improve the data communication between AFI and MID Regions | | | April 2019 | Ongoing |

APPENDIX 3A

FOLLOW UP ON ANC/13 RECOMMENDATIONS

| Recommendations | Follow-up Actions |
|---|----------------------------------|
| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none">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; <p>That ICAO:</p> <ul style="list-style-type: none">c) map the global technical level of the <i>Global Air Navigation Plan</i> (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; andk) 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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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 navigation infrastructure investment projects to support improvements as described in the ASBU framework; and <p>That ICAO:</p> <ul style="list-style-type: none"> c) support the implementation of applicable CBA methodologies through dedicated workshops. | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p> |
| <p>Recommendation 2.2/1 — Long-term Evolution of Communication, Navigation and Surveillance Systems and Frequency Spectrum Access</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> 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 d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: to organize Workshop/seminars on new changes once finalized</p> <p>CNS SG: to followup CNS evolution and take necessary actions as required</p> |

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| <p>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>Recommendation 2.2/2 — Global Navigation Satellite System (GNSS) Evolution</p> <p>That States:</p> <ul style="list-style-type: none"> a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC) global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments; 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; 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; d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP); 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. <p>That ICAO:</p> <ul style="list-style-type: none"> f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations; 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 h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements. | <p>MID States: To take necessary actions from a – e</p> <p>CNS SG: keep abreast of GNSS evolution keep GNSS guidance material up to date.</p> |

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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <ul style="list-style-type: none"> a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020; <p>That ICAO:</p> <ul style="list-style-type: none"> b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM; c) in close coordination with the World Meteorological Organization (WMO); <ul style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</p> <p>That States:</p> <ul style="list-style-type: none"> a) support developments and implementation of system-wide information management; 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; c) share information, lessons learned and observations regarding SWIM development and implementation; 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>That ICAO:</p> <ul style="list-style-type: none"> e) while making use of already developed Standards and best practices, continue the development of provisions related to information services, while including relevant | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services</i> and <i>Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p> | |
| <p>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</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: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
| <p>Recommendation 3.4/1 — Civil-Military Collaboration</p> <p>That States:</p> <ul style="list-style-type: none"> a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; | <p>MID States: To take necessary actions as a</p> <p>ICAO: to consider addressing frequency management issues with MIL authorities</p> <p>CNS SG: to invite military authorities to CNS SG when needed</p> |

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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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>Recommendation 4.2/1 – Implementation of Essential Air Navigation Services</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; 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; 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 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. | <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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
| <p>Recommendation 5.3/1 — Remotely Piloted Aircraft Systems (RPAS)</p> <p>That States:</p> <ul style="list-style-type: none"> a) collect and share information on remotely piloted aircraft systems (RPAS) operations; b) actively engage | <p>MID States: To take necessary actions as a</p> <p>ICAO: to address the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment</p> <p>CNS SG: address RPAS Communications</p> |

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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| <p>available to Member States; and 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.</p> | |
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| Recommendations | Follow-up Actions |
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| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; <p>That ICAO:</p> <ul style="list-style-type: none"> c) map the global technical level of the <i>Global Air Navigation Plan</i> (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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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 navigation infrastructure investment projects to support improvements as described in the ASBU framework; and <p>That ICAO:</p> <ul style="list-style-type: none"> c) support the implementation of applicable CBA methodologies through dedicated workshops. | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p> |
| <p>Recommendation 2.2/1 — Long-term Evolution of Communication, Navigation and Surveillance Systems and Frequency Spectrum Access</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> 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 d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: to organize Workshop/seminars on new changes once finalized</p> <p>CNS SG: to followup CNS evolution and take necessary actions as required</p> |

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| <p>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>Recommendation 2.2/2 — Global Navigation Satellite System (GNSS) Evolution</p> <p>That States:</p> <ul style="list-style-type: none"> a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC) global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments; 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; 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; d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP); 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. <p>That ICAO:</p> <ul style="list-style-type: none"> f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations; 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 h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements. | <p>MID States: To take necessary actions from a – e</p> <p>CNS SG: keep abreast of GNSS evolution keep GNSS guidance material up to date.</p> |

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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <p>a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020;</p> <p>That ICAO:</p> <p>b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM;</p> <p>c) in close coordination with the World Meteorological Organization (WMO);</p> <ol style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</p> <p>That States:</p> <ol style="list-style-type: none"> a) support developments and implementation of system-wide information management; 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; c) share information, lessons learned and observations regarding SWIM development and implementation; 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>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</p> | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services</i> and <i>Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p> | |
| <p>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</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: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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>Recommendation 4.2/1 – Implementation of Essential Air Navigation Services</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; 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; 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 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. | <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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
| <p>Recommendation 5.3/1 — Remotely Piloted Aircraft Systems (RPAS)</p> <p>That States:</p> <ul style="list-style-type: none"> a) collect and share information on remotely piloted aircraft systems (RPAS) operations; b) actively engage | <p>MID States: To take necessary actions as a</p> <p>ICAO: to address the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment</p> <p>CNS SG: address RPAS Communications</p> |

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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| <p>available to Member States; and</p> <p>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.</p> | |
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| Recommendations | Follow-up Actions |
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| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; <p>That ICAO:</p> <ul style="list-style-type: none"> c) map the global technical level of the <i>Global Air Navigation Plan</i> (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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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 navigation infrastructure investment projects to support improvements as described in the ASBU framework; and <p>That ICAO:</p> <ul style="list-style-type: none"> c) support the implementation of applicable CBA methodologies through dedicated workshops. | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p> |
| <p>Recommendation 2.2/1 — Long-term Evolution of Communication, Navigation and Surveillance Systems and Frequency Spectrum Access</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> 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 d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: to organize Workshop/seminars on new changes once finalized</p> <p>CNS SG: to followup CNS evolution and take necessary actions as required</p> |

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| <p>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>Recommendation 2.2/2 — Global Navigation Satellite System (GNSS) Evolution</p> <p>That States:</p> <ul style="list-style-type: none"> a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC) global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments; 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; 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; d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP); 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. <p>That ICAO:</p> <ul style="list-style-type: none"> f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations; 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 h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements. | <p>MID States: To take necessary actions from a – e</p> <p>CNS SG: keep abreast of GNSS evolution keep GNSS guidance material up to date.</p> |

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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <ul style="list-style-type: none"> a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020; <p>That ICAO:</p> <ul style="list-style-type: none"> b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM; c) in close coordination with the World Meteorological Organization (WMO); <ul style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</p> <p>That States:</p> <ul style="list-style-type: none"> a) support developments and implementation of system-wide information management; 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; c) share information, lessons learned and observations regarding SWIM development and implementation; 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>That ICAO:</p> <ul style="list-style-type: none"> e) while making use of already developed Standards and best practices, continue the development of provisions related to information services, while including relevant | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services</i> and <i>Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p> | |
| <p>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</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: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
| <p>Recommendation 3.4/1 — Civil-Military Collaboration</p> <p>That States:</p> <ul style="list-style-type: none"> a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; | <p>MID States: To take necessary actions as a</p> <p>ICAO: to consider addressing frequency management issues with MIL authorities</p> <p>CNS SG: to invite military authorities to CNS SG when needed</p> |

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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| <p>available to Member States; and 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.</p> | |
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| Recommendations | Follow-up Actions |
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| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; <p>That ICAO:</p> <ul style="list-style-type: none"> c) map the global technical level of the <i>Global Air Navigation Plan</i> (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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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 navigation infrastructure investment projects to support improvements as described in the ASBU framework; and <p>That ICAO:</p> <ul style="list-style-type: none"> c) support the implementation of applicable CBA methodologies through dedicated workshops. | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p> |
| <p>Recommendation 2.2/1 — Long-term Evolution of Communication, Navigation and Surveillance Systems and Frequency Spectrum Access</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> 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 d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: to organize Workshop/seminars on new changes once finalized</p> <p>CNS SG: to followup CNS evolution and take necessary actions as required</p> |

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| <p>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>Recommendation 2.2/2 — Global Navigation Satellite System (GNSS) Evolution</p> <p>That States:</p> <ul style="list-style-type: none"> a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC) global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments; 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; 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; d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP); 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. <p>That ICAO:</p> <ul style="list-style-type: none"> f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations; 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 h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements. | <p>MID States: To take necessary actions from a – e</p> <p>CNS SG: keep abreast of GNSS evolution keep GNSS guidance material up to date.</p> |

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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <p>a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020;</p> <p>That ICAO:</p> <p>b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM;</p> <p>c) in close coordination with the World Meteorological Organization (WMO);</p> <ol style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</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</p> | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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> <ul style="list-style-type: none"> f) consider the concept of a global SWIM framework as part of the GANP and the aviation system block upgrades (ASBUs); g) consider security-by-design principles when developing interconnected trusted global SWIM frameworks; h) develop provisions related to the harmonization of information exchange models and globally interconnected registries; 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 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>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> 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>That ICAO:</p> <ul style="list-style-type: none"> 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 c) continue its work concerning the investigation of necessary information exchange content and supporting processes for the next evolution of FF-ICE. | <p>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
| <p>Recommendation 3.4/1 — Civil-Military Collaboration</p> <p>That States:</p> <ul style="list-style-type: none"> a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; | <p>MID States: To take necessary actions as a</p> <p>ICAO: to consider addressing frequency management issues with MIL authorities</p> <p>CNS SG: to invite military authorities to CNS SG when needed</p> |

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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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>Recommendation 4.2/1 – Implementation of Essential Air Navigation Services</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; 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; 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 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. | <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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
| <p>Recommendation 5.3/1 — Remotely Piloted Aircraft Systems (RPAS)</p> <p>That States:</p> <ul style="list-style-type: none"> a) collect and share information on remotely piloted aircraft systems (RPAS) operations; b) actively engage | <p>MID States: To take necessary actions as a</p> <p>ICAO: to address the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment</p> <p>CNS SG: address RPAS Communications</p> |

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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| <p>n) available to Member States; and 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.</p> | |
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| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; <p>That ICAO:</p> <ul style="list-style-type: none"> c) map the global technical level of the <i>Global Air Navigation Plan</i> (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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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 navigation infrastructure investment projects to support improvements as described in the ASBU framework; and <p>That ICAO:</p> <ul style="list-style-type: none"> c) support the implementation of applicable CBA methodologies through dedicated workshops. | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p> |
| <p>Recommendation 2.2/1 — Long-term Evolution of Communication, Navigation and Surveillance Systems and Frequency Spectrum Access</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> 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 d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: to organize Workshop/seminars on new changes once finalized</p> <p>CNS SG: to followup CNS evolution and take necessary actions as required</p> |

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| <p>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>Recommendation 2.2/2 — Global Navigation Satellite System (GNSS) Evolution</p> <p>That States:</p> <ul style="list-style-type: none"> a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC) global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments; 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; 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; d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP); 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. <p>That ICAO:</p> <ul style="list-style-type: none"> f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations; 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 h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements. | <p>MID States: To take necessary actions from a – e</p> <p>CNS SG: keep abreast of GNSS evolution keep GNSS guidance material up to date.</p> |

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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <ul style="list-style-type: none"> a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020; <p>That ICAO:</p> <ul style="list-style-type: none"> b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM; c) in close coordination with the World Meteorological Organization (WMO); <ul style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</p> <p>That States:</p> <ul style="list-style-type: none"> a) support developments and implementation of system-wide information management; 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; c) share information, lessons learned and observations regarding SWIM development and implementation; 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>That ICAO:</p> <ul style="list-style-type: none"> e) while making use of already developed Standards and best practices, continue the development of provisions related to information services, while including relevant | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services</i> and <i>Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p> | |
| <p>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</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: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
| <p>Recommendation 3.4/1 — Civil-Military Collaboration</p> <p>That States:</p> <ul style="list-style-type: none"> a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; | <p>MID States: To take necessary actions as a</p> <p>ICAO: to consider addressing frequency management issues with MIL authorities</p> <p>CNS SG: to invite military authorities to CNS SG when needed</p> |

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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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>Recommendation 4.2/1 – Implementation of Essential Air Navigation Services</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; 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; 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 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. | <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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
| <p>Recommendation 5.3/1 — Remotely Piloted Aircraft Systems (RPAS)</p> <p>That States:</p> <ul style="list-style-type: none"> a) collect and share information on remotely piloted aircraft systems (RPAS) operations; b) actively engage | <p>MID States: To take necessary actions as a</p> <p>ICAO: to address the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment</p> <p>CNS SG: address RPAS Communications</p> |

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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| <p>available to Member States; and 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.</p> | |
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| Recommendations | Follow-up Actions |
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| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; <p>That ICAO:</p> <ul style="list-style-type: none"> c) map the global technical level of the <i>Global Air Navigation Plan</i> (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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>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> | |
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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <p>a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020;</p> <p>That ICAO:</p> <p>b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM;</p> <p>c) in close coordination with the World Meteorological Organization (WMO);</p> <ol style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</p> <p>That States:</p> <ol style="list-style-type: none"> a) support developments and implementation of system-wide information management; 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; c) share information, lessons learned and observations regarding SWIM development and implementation; 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>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</p> | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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> <ul style="list-style-type: none"> f) consider the concept of a global SWIM framework as part of the GANP and the aviation system block upgrades (ASBUs); g) consider security-by-design principles when developing interconnected trusted global SWIM frameworks; h) develop provisions related to the harmonization of information exchange models and globally interconnected registries; 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 j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services</i> and <i>Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM). | |
| <p>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> 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>That ICAO:</p> <ul style="list-style-type: none"> 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 c) continue its work concerning the investigation of necessary information exchange content and supporting processes for the next evolution of FF-ICE. | <p>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
| <p>Recommendation 3.4/1 — Civil-Military Collaboration</p> <p>That States:</p> <ul style="list-style-type: none"> a) actively collaborate with their military authorities, including at the regional level, and encourage greater civil-military interoperability and appropriate use of performance equivalence; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; | <p>MID States: To take necessary actions as a</p> <p>ICAO: to consider addressing frequency management issues with MIL authorities</p> <p>CNS SG: to invite military authorities to CNS SG when needed</p> |

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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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>Recommendation 4.2/1 – Implementation of Essential Air Navigation Services</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; 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; 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 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. | <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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
| <p>Recommendation 5.3/1 — Remotely Piloted Aircraft Systems (RPAS)</p> <p>That States:</p> <ul style="list-style-type: none"> a) collect and share information on remotely piloted aircraft systems (RPAS) operations; b) actively engage | <p>MID States: To take necessary actions as a</p> <p>ICAO: to address the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment</p> <p>CNS SG: address RPAS Communications</p> |

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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| <p>available to Member States; and 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.</p> | |
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| Recommendations | Follow-up Actions |
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| <p>Recommendation 1.1/1 — Vision and overview of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) agree with the proposed multilayer structure for the Sixth Edition of the GANP; 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; d) recognize the importance of a separate but aligned GANP and <i>Global Aviation Safety Plan</i> (Doc 10004, GASP); <p>That ICAO:</p> <ul style="list-style-type: none"> 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; f) make available the GANP global strategic level (printable) in the six ICAO languages; 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; 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; i) strengthen the relationship between the GASP, the GANP and the newly developed Global Aviation Security Plan (GASeP); and 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. | <p>For Information of CNS SG</p> |

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| <p>Recommendation 1.2/1 — Global technical level of the Sixth Edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP)</p> <p>That States:</p> <ul style="list-style-type: none"> 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; <p>That ICAO:</p> <ul style="list-style-type: none"> c) map the global technical level of the <i>Global Air Navigation Plan</i> (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. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.3/1 – Air Navigation Roadmaps</p> <p>That States:</p> <ul style="list-style-type: none">a) provide ICAO with timely information on their modernization plans and the equipage plans of airspace users; <p>That States and ICAO:</p> <ul style="list-style-type: none">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>That ICAO:</p> <ul style="list-style-type: none">c) provide air navigation roadmaps, linked to the aviation system block upgrade (ASBU) elements, within the GANP which support:<ul style="list-style-type: none">1) new airspace users and emerging technologies;2) greater flexibility where possible in the choice of technologies, based on performance needs; and3) earlier adoption of new technologies and operational capabilities as they emerge, linked to the performance needs;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; ande) expedite the work on the Global Data Link Implementation Strategy and develop harmonized solutions to support air-ground data link communications. | <p>For Information of CNS SG</p> |
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| <p>Recommendation 1.4/1 — Cost-benefit analysis (CBA) in support of assets deployment</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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 navigation infrastructure investment projects to support improvements as described in the ASBU framework; and <p>That ICAO:</p> <ul style="list-style-type: none"> c) support the implementation of applicable CBA methodologies through dedicated workshops. | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: To organize a workshop on ASBU CBA methodologies</p> |
| <p>Recommendation 2.2/1 — Long-term Evolution of Communication, Navigation and Surveillance Systems and Frequency Spectrum Access</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> 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 d) develop provisions, in collaboration with States and regional modernization programmes, to support increased civil-military interoperability and synergies with the optimum | <p>MID States: To take necessary actions from a – b</p> <p>ICAO: to organize Workshop/seminars on new changes once finalized</p> <p>CNS SG: to followup CNS evolution and take necessary actions as required</p> |

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| <p>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>Recommendation 2.2/2 — Global Navigation Satellite System (GNSS) Evolution</p> <p>That States:</p> <ul style="list-style-type: none"> a) when defining their air navigation strategic plans, take advantage of the improved robustness and performance offered by dual-frequency, multi constellation (DFMC) global navigation satellite system (GNSS) to deliver incremental operational benefits and encourage related industry developments; 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; 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; d) ensure implementation of ICAO provisions for publication of information related to the use of GNSS elements in aeronautical information publications (AIP); 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. <p>That ICAO:</p> <ul style="list-style-type: none"> f) continue the development of SARPs and guidance material for existing and future GNSS elements in coordination with recognized standards-making organizations; 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 h) develop additional guidance addressing technical and regulatory aspects to assist States in their acceptance and use of existing and future GNSS elements. | <p>MID States: To take necessary actions from a – e</p> <p>CNS SG: keep abreast of GNSS evolution keep GNSS guidance material up to date.</p> |

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| <p>Recommendation 2.3/2 — Further Development of IWXXM for the Exchange of Aeronautical Meteorological Information</p> <p>That States:</p> <ul style="list-style-type: none"> a) provide ICAO with their ICAO Meteorological Information Exchange Model (IWXXM) implementation plans before 2020; <p>That ICAO:</p> <ul style="list-style-type: none"> b) promote the importance of exchanging meteorological information for aeronautical purposes in compliance with the IWXXM; c) in close coordination with the World Meteorological Organization (WMO); <ul style="list-style-type: none"> 1) ensure that the IWXXM format is the only standard exchange format by 2026; 2) 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 data exchange to support international air navigation, as an interim step toward full IWXXM implementation; 3) promote awareness of the changes brought about by the IWXXM data format, production, dissemination and data exchange among operators; and 4) monitor the status of implementation of IWXXM at State and regional levels. | <p>CNS SG: to monitor and support the implementation of required Communication infrastructure for IWXXM Implementation</p> |
| <p>Recommendation 3.1/1 — System-wide Information Management (SWIM)</p> <p>That States:</p> <ul style="list-style-type: none"> a) support developments and implementation of system-wide information management; 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; c) share information, lessons learned and observations regarding SWIM development and implementation; 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>That ICAO:</p> <ul style="list-style-type: none"> e) while making use of already developed Standards and best practices, continue the development of provisions related to information services, while including relevant | <p>MID States: to take necessary action(s) on items a) to d)</p> <p>CNS SG: to address the communication requirements for SWIM to address transition from AMHS to SWIM in near future.</p> |

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| <p>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>j) provide assistance to States to support the implementation of Annex 15 — <i>Aeronautical Information Services</i> and <i>Procedures for Air Navigation Services — Aeronautical Information Management</i> (Doc 10066, PANS-AIM).</p> | |
| <p>Recommendation 3.2/2 — Flight and Flow Information for a Collaborative Environment (FF-ICE)</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: to organize a workshop on FIXM inviting industries</p> <p>CNS SG: to address FIXM</p> |

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| <p>Recommendation 3.2/1 — Trajectory-Based Operations (TBO)</p> <p>That States, along with stakeholders:</p> <ul style="list-style-type: none"> a) continue to provide ICAO with the developments and lessons learned from air traffic management (ATM) modernization programmes; 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); 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>That ICAO:</p> <ul style="list-style-type: none"> d) finalize the global TBO concept and its elements in the Sixth edition of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP) and the aviation systems block upgrade (ASBU) framework; and 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>MID States: To take necessary actions as a</p> <p>ICAO: to organize a workshop on PBCS/datalink application</p> <p>CNS SG: address data link applications</p> |
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| <ul style="list-style-type: none"> d) incorporate the military dimension, including civil-military cooperation and collaboration, in future editions of the <i>Global Air Navigation Plan</i> (Doc 9750, GANP); 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 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>Recommendation 3.5/1 — ICAO Location Indicator System and Database of Significant Points</p> <p>That States and industry stakeholders:</p> <ul style="list-style-type: none"> 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; 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>That ICAO:</p> <ul style="list-style-type: none"> c) continue to address the limitations of both location indicator and 5LNC availabilities in the short-term and determine a long-term solution; d) consider, when developing such solutions, the need for global harmonization and interoperability; e) continue with its efforts to improve awareness and training on the use of ICARD in the Regions that do not actively use ICARD; f) continue to work towards removing duplicated 5LNCs and sound-like conflicts; and 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>MIDAMC STG: To monitor/address the Global development related to the Location indicators</p> |

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| <p>Recommendation 3.5/3 — Certification of ANSPs</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>Recommendation 4.2/1 – Implementation of Essential Air Navigation Services</p> <p>That States:</p> <ul style="list-style-type: none"> 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; 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; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; 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; 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 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. | <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> |
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| <p>Recommendation 4.3/1 – Improving the Performance of the Air Navigation System</p> <p>That ICAO study and make appropriate additions where required to the ICAO provisions, including:</p> <ul style="list-style-type: none"> a) required navigation performance-authorization required departure navigation specification; b) the application of performance-based navigation standard terminal arrival routes for en-route independent simultaneous approaches; 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; 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; e) advanced use of performance-based navigation to support aviation system block upgrade modules; f) continued development of provisions, guidance and training material in support of performance-based navigation implementation; and g) development and availability of the minimum qualification requirements for personnel to attend performance-based navigation procedure design training. | <p>MID States: To take necessary actions as a</p> <p>ICAO: organize GNSS workshop in 2020/2021 including GBAS</p> <p>CNS SG: address GNSS /GBAS issues Keep GNSS guidance material in the MID Region up to date</p> |
| <p>Recommendation 5.3/1 — Remotely Piloted Aircraft Systems (RPAS)</p> <p>That States:</p> <ul style="list-style-type: none"> a) collect and share information on remotely piloted aircraft systems (RPAS) operations; b) actively engage | <p>MID States: To take necessary actions as a</p> <p>ICAO: to address the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment</p> <p>CNS SG: address RPAS Communications</p> |

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| <p>Recommendation 5.4/1 – Cyber Resilience</p> <p>That States:</p> <ul style="list-style-type: none"> 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; b) recognize that the cyber resilience of the aviation system depends on continued coordination amongst all relevant aviation and non-aviation stakeholders; c) recognize the need to be prepared to respond to cyber events; 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; e) recognize the need to share information related to cyber events with other States and international organizations through appropriately designated channels; <p>That ICAO:</p> <ul style="list-style-type: none"> 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; 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; h) incorporate the trust framework into the <i>Global Air Navigation Plan (Doc 9750)</i> in an appropriate manner to highlight its urgent need, its importance and to improve its visibility; 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; j) recognize the need for the aviation community to be prepared for and be able to respond to cyber events; k) encourage States and international organizations to facilitate information sharing through appropriately designated channels at the global and regional levels; l) promote multidisciplinary State and relevant aviation and non-aviation stakeholders collaboration on cyber information sharing; m) promote tabletop exercises and maintain a repository of lessons learned and scenarios | <p>MID States: To take necessary actions as on items A to F</p> <p>ICAO: organize cyber security events annually.</p> <p>CNS SG: monitor the work of ANSCS working group</p> |
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| n) available to Member States; and 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. | |
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APPENDIX 4A

| <i>AMHS Plan for ROC in Jeddah and Bahrain</i> | | | | | |
|--|---|------------------------------------|-------------------------|-------------------|---|
| | Task | Timeframe | Assigned to | Champion | Status |
| <i>AMHS Intra-regional Trunk Connections</i> | | | | | |
| 1 | Establish Jeddah – Beirut IP Network. | Jul 2015 | Saudi Lebanon | IM MS | Completed |
| 2 | Establish Bahrain – Beirut IP Network. | Feb 2016 | Bahrain Lebanon | YH MS | Completed |
| 3 | Establish Cairo – Beirut IP Network. | July 2016 | Egypt Lebanon | AF//MR MS | Completed |
| 4 | Establish Bahrain – Jeddah IP Network. | Mar 2016 | Bahrain Saudi | IM YH | |
| 5 | Perform the Interoperability test between Jeddah and Beirut COM Centers. | July 2015 | Saudi Lebanon | IB MS | Completed |
| 6 | Perform the Interoperability test between Bahrain and Beirut COM Centers. | July 2016 | Bahrain Lebanon | MS YH | Completed |
| 7 | Perform the Interoperability test between Cairo and Beirut COM Centers | July 2016 | Egypt Lebanon | AF/TZ/MR MS/EK | Depends on IP network availability. Ongoing completed |
| 8 | Perform the Interoperability test between Bahrain and Jeddah COM Centers. | July 2016 | Bahrain Saudi | YH IM | |
| 9 | Perform the Pre-operational test between Jeddah and Beirut COM Centers. | July 2015 | Saudi Lebanon | IM MS | Completed |
| 10 | Perform the Pre-operational test between Bahrain and Beirut COM Centers. | July 2016 | Bahrain Lebanon | YH MS | Completed |
| 11 | Perform the Pre-operational test between Cairo and Beirut COM Centers. | July 2016 March 2017 | Egypt Lebanon | AF//MR MS/EK | Completed |
| 12 | Perform the Pre-operational test between Bahrain and Saudi COM Centers. | July 2016 | Bahrain Saudi | YH IM | |
| 13 | Place the AMHS link into operation between Jeddah and Beirut COM centers, and updating the Routing tables. | July 2015 | Saudi Lebanon MID AMC | IM MS/EK MN | Completed July, 2015 |
| 14 | Place the AMHS link into operation between Bahrain and Beirut COM centers, and updating the Routing tables. | July 2016 | Bahrain Lebanon MID AMC | YH MS/EK MN | Completed On 3/5/2016 |
| 15 | Place the AMHS link into operation between Cairo and Beirut COM centers, and updating the Routing tables. | Aug 2016 April 2017 | Egypt Lebanon MID AMC | AF/TZ/MR MS/EK MN | Completed |

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|---|--|-------------------------------|--------------------------------------|----------------------------|---|
| 16 | Evaluate the Trunks connections bandwidth and increase it if required between (Bahrain, Beirut, Cairo and Jeddah). | July 2016 | Bahrain Beirut Cairo Jeddah | YH MS/EK AF/TZ IM | Depends on testing of digital data exchanged Beirut and Cairo increased the bandwidth to 128 kbps |
| <i>The AMHS Interconnection with EUR Region Depends on Nicosia and Athens – pending SITA Type X transition</i> | | | | | |
| 17 | Establish Cairo – Tunis IP Network. | March 2016 July 2016 | | AF/TZ/MR IB/MA | Completed |
| 18 | Establish Nicosia – Beirut IP Network. | Awaiting reply from EUR | | MS/EK | Pending SITA Type X Transition |
| 19 | Establish Nicosia – Jeddah IP Network. | Dec 2016 | | IM | Pending SITA Type X Transition |
| 20 | Establish Bahrain – Nicosia IP Network. | Dec 2016 | | YH | Pending SITA Type X Transition |
| 21 | Establish Cairo – Athens IP Network. | Dec 2016 | | AF/TZ/MR | Pending SITA Type X Transition |
| 22 | Perform the Interoperability test between Cairo and Tunis COM Centers. | April 2016 August 2016 | | AF/ /MR IB/MA | Completed |
| 23 | Perform the pre operational test between Cairo and Tunis COM Centers. | Q3 2016 | | AF/ /MR IB/MA | Completed |
| 24 | Place the AMHS link into operation between Cairo and Tunis COM Centers, and updating the Routing tables. | Aug 2016 | | AF/ /MR IB/MA | Completed |
| 25 | Perform the Interoperability test between Athens and Cairo COM Centers. | Mar 2017 | | AF/TZ/MR IB/MA | Pending SITA Type X Transition |
| 26 | Perform the Interoperability test between Bahrain and Nicosia COM Centers. | Q1 2017 | | YH | Pending SITA Type X Transition |
| 27 | Perform the Interoperability test between Nicosia and Jeddah COM Centers. | Q1 2017 | | IM | Pending SITA Type X Transition |
| 28 | Perform the Interoperability test between Nicosia and Beirut COM Centers. | Q1 2017 | | MS/EK | Pending SITA Type X Transition |
| 29 | Perform the Pre-operational test between Athens and Cairo COM Centers. | Mar 2017 | | AF/TZ/MR | Pending SITA Type X Transition |
| 30 | Perform the Pre-operational test between Bahrain and Nicosia COM Centers. | Q1 2017 | | YH | Pending SITA Type X Transition |
| 31 | Perform the Pre-operational test between Nicosia and Beirut COM Centers. | Q1 2017 | | MS/EK | Pending SITA Type X Transition |

| | | | | | |
|----|--|---------|----------------|----------------|---|
| 32 | Perform the Pre-operational test between Nicosia and Jeddah COM Centers. | Q1 2017 | | IM | Pending SITA Type X Transition |
| 33 | Place the AMHS link into operation between Athens and Cairo COM Centers, and updating the Routing tables. | Q1 2017 | | MIDAMC AF/ /MR | Pending SITA Type X Transition |
| 34 | Place the AMHS link into operation between Bahrain and Nicosia COM Centers, and updating the Routing tables. | Q1 2017 | | MID AMC YH | Pending SITA Type X Transition |
| 35 | Place the AMHS link into operation between Nicosia and Jeddah COM Centers, and updating the Routing tables. | Q1 2017 | | MID AMC IM | Pending SITA Type X Transition |
| 36 | Place the AMHS link into operation between Nicosia and Beirut COM Centers, and updating the Routing tables. | Q1 2017 | | MS/EK | Pending SITA Type X Transition |
| 37 | Evaluate the inter-region connections bandwidth and increase it if required. | Q1 2017 | | MID AMC | |
| 38 | Transition of all regional AFTN/CIDIN Connections to AMHS. | Q2 2017 | All MID States | | 2 CIDIN connections between Bahrain and UAE, Bahrain and Saudi Arabia |

APPENDIX 4B

TABLE CNS II-1 - AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK (AFTN) PLAN

EXPLANATION OF THE TABLE

Column

- 1 The AFTN Centres/Stations of each State are listed alphabetically. Each circuit appears twice in the table. The categories of these facilities are as follows:
M - Main AFTN COM Centre
T - Tributary AFTN COM Centre
S - AFTN Station
- 2 Category of circuit:
M - Main trunk circuit connecting Main AFTN communication centres.
T - Tributary circuit connecting Main AFTN communication centre and Tributary AFTN Communications Centre.
S - AFTN circuit connecting an AFTN Station to an AFTN Communication Centre.
- 3 Type of circuit provided:
LTT/a - Landline teletypewriter, analogue (e.g. cable, microwave)
LTT/d - Landline teletypewriter, digital (e.g. cable, microwave)
LDD/a - Landline data circuit, analogue (e.g. cable, microwave)
LDD/d - Landline data circuit, digital (e.g. cable, microwave)
SAT/a/d - Satellite link, with /a for analogue or /d for digital
- 4 Circuit signalling speed in bits/s.
- 5 Circuit protocols
- 6 Data transfer code (syntax):
ITA-2 - International Telegraph Alphabet No. 2 (5-unit code).
IA-5 - International Alphabet No. 5 (ICAO 7-unit code).
CBI - Code and Byte Independency (ATN compliant).
- 7 Remarks

| State/Station | Category | Requirement | | | | Remarks |
|----------------|----------|-------------|------------------|----------|------|-------------------|
| | | Type | Signalling Speed | Protocol | Code | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| BAHRAIN | | | | | | |
| BAHRAIN | | | | | | |
| ABU DHABI | M | | 64 —9.6Kbps | CIDIN | IA-5 | All: AMHS by 2017 |
| ANKARA | M | | 64Kbps | AFTN | IA-5 | |
| BEIRUT | M | | 64 —9.6Kbps | AMHS | IA-5 | |
| DOHA | T | | 64 —9.6Kbps | AMHS | IA-5 | |
| JEDDAH | M | | 64 —9.6Kbps | AMHS | IA-5 | |
| KUWAIT | M | | 64 —9.6Kbps | CIDIN | IA-5 | |
| MUSCAT | M | | 64 —9.6Kbps | None | IA-5 | |
| NICOSIA | M | | 649.6Kbps | CIDIN | IA-5 | |
| SINGAPORE | M | | 64 —9.6Kbps | None | IA-5 | |
| TEHRAN | M | | 64 —9.6Kbps | None | IA-5 | |

| State/Station | Category | Requirement | | | | Remarks |
|--|---|-------------|---|--|--|----------------------|
| | | Type | Signalling Speed | Protocol | Code | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| EGYPT CAIRO AMMAN ATHENS BEN GURION BEIRUT JEDDAH KHARTOUM NAIROBI TUNIS TRIPOLI TRIPOLI DAMASCUS ASMARA | M M M M M T M M M T T T T | | 64-9.6Kbps 64-9.6Kbps 64-9.6Kbps 9.6 Kbps 128-9.6Kbps 9.6Kbps 9.6Kbps 64-9.6Kbps 64-9.6Kbps 9.6Kbps 64-9.6Kbps 9.6Kbps | AMHS AMHSCIDIN AMHSNone AMHSCIDIN AMHS AMHSNone AMHSNone AMHS AMHSNone AMHSNone AMHSNone AMHSNone | IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 | STNDBY |
| IRAN TEHRAN BAHRAIN KUWAIT ABU-DHABI KARACHI ANKARA MUSCAT DAMASCUS BAGHDAD | M M M M M M T T | | 64 Kbps 64 Kbps 9.6 Kbps 64Kbps 64Kbps 64Kbps 50 BD 64Kbps | AMHSNone AMHSNone AMHSNone AMHSNone AMHSAFTN AMHSNone AMHSNone AMHSNone | IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 ITA-2 IA-5 | Planned |
| IRAQ BAGHDAD AMMAN BEIRUT KUWAIT ANKARA | T T T T T | SAT | 2MBps 2MBps 9.6Kbps | AMHSNone AMHSNone AMHSNone AMHS | IA-5 IA-5 IA-5 IA-5 | VPN VPN Planed |

| State/Station | Category | Requirement | | | | Remarks |
|----------------|----------|-------------|------------------|-----------|---------|------------------------------|
| | | Type | Signalling Speed | Protocol | Code | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| JORDAN | | | | | | |
| AMMAN | | | | | | |
| ABU DHABI | T | | 2MBps | AMHS | IA-5 | VPN |
| ANKARA | M | | 64Kpbs | AMHSAFTN | IA-5 | Land |
| BAGHDAD | T | | 2MBps | AMHS | IA-5 | Line |
| BEIRUT | T | | 2MBps | AMHS | IA-5 | VPN |
| BEN GURION | M | | 9.6 Kbps | AMHSNone | IA-5 | Planed |
| CAIRO | T | | 64 – 9.6Kbps | AMHS | IA-5 | VPN |
| DAMASCUS | T | | 64 – 9.6Kbps | AMHSNone | IA-5 | Planed |
| JEDDAH | M | | 64Kbps | AMHS | X400 | |
| NICOSIA | T | | 64Kbps | AMHSAFTN | IA-5 | |
| KUWAIT | T | | | | | |
| KUWAIT | M | LDD/d | 64 – 9.6Kbps | AMHSNone | IA-5 | Back-up |
| BAHRAIN | M | LDD/a | 64- 9.6 Kbps | AMHSNone | IA-5 | |
| DAMASCUS | T | LDD/a | 64-9.6 Kbps | AMHSNone | IA-5 | |
| BEIRUT | T | LDD/a | 64 – 9.6Kbps | AMHSNone | IA-5 | |
| DOHA | M | | 256Kbps | AMHSNone | IA-5 | |
| Hamad-Airport | M | LDD/d | 64-9.6 Kbps | AMHSNone | IA-5 | |
| KARACHI | T | LDD/d | 64 – 9.6Kbps | AMHSNone | IA-5 | |
| TEHRAN | | SAT/ad | 64 9.6Kbps | AMHSNone | IA-5 | |
| BAGHDAD | | | | | | |
| LEBANON | | | | | | |
| BEIRUT | M | | | | | VPN in process VPN planed |
| AMMAN | M | | 2Mbps | AMHS | IA-5 | |
| BAGHDAD | T | | 2Mbps | AMHSCIDIN | IA-5 | |
| BAHRAIN | M | | 64-9.6Kbps | AMHSCIDIN | A-5IA-5 | |
| CAIRO | M | | 649.6Kbps | AMHSNone | IA-5 | |
| DAMASCUS | T | | 649.6Kbps | AMHSNone | IA-5 | |
| JEDDAH | M | | 649.6Kbps | AMHSNone | IA-5 | |
| KUWAIT | M | | 64-9.6Kbps | AMHSCIDIN | IA-5 | |
| NICOSIA | M | | 649.6-Kbps | AMHS | IA-5 | |
| LIBYA | | | | | | |
| TRIPOLI | T | | | AMHS | IA-5 | |
| MALTA | T | | | AMHS | IA-5 | |
| TUNIS | M | | 649.6Kbps | AMHSNone | IA-5 | |
| BENGHAZI | T | | 64 Kpbs | AMHS | IA-5 | |
| CAIRO | M | | 649.6Kbps | AMHSNone | IA-5 | |
| KHARTOUM | T | | 649.6Kbps | AMHSNone | IA-5 | |

| State/Station | Category | Requirement | | | | Remarks |
|--|--|---|---|--|--|--|
| | | Type | Signalling Speed | Protocol | Code | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| OMAN MUSCAT ABU DHABI BAHRAIN MUMBAI JEDDAH SANA'A KARACHI TEHRAN | T M M M T M M | | 64Kbps 64Kbps 64Kbps 64Kbps 64 kbps+100-BD 64Kbps 64Kbps | AMHS AMHSNone AMHSNone AMHSNone AMHSNone AMHSNone AMHSNone | IA-5 IA-5 IA-5 IA-5 ITA-2 IA-5 IA-5 | |
| QATAR DOHA BAHRAIN KUWAIT ABU DHABI | M M T | | 2Mbps 2Mbps 2Mbps | AMHSAFTN AMHS AMHS | IA-5 (TCP) x400(TCP) IA-5 x400(TCP) IA-5 | |
| SAUDI ARABIA JEDDAH ADDIS-ABABA BAHRAIN BEIRUT CAIRO MUSCAT SANA'A AMMAN KHARTOUM ABUDHABI NICOSIA | M M M M M M T M T T T M | SAT SAT SAT | 649.6Kbps 649.6Kbps 649.6Kbps 128 9.6Kbps 64 Kbps 64 9.6Kbps 64Kbps 64Kbps 64Kbps 64Kbps | AMHSNone AMHSCIDIN AMHSNone AMHS AMHSNone AMHSNone AMHS AMHS AMHS AMHSCIDIN | IA-5 IA-5 IA-5 x400 IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 | AMHS (2015) AMHS (2015) AMHS (2015) AMHS EUR/ MID OPMET |

| State/Station | Category | Requirement | | | | Remarks |
|---|---------------------------------|------------------------|--|--|--|---------|
| | | Type | Signalling Speed | Protocol | Code | |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| SUDAN KHARTOUM ADDIS ABABA ASMARA CAIRO JEDDAH TRIPOLI NDJAMENA | T M T M M T M | | 649.6Kbps 649.6Kbps 649.6Kbps 64Kbps 649.6Kbps 649.6Kbps | AMHSNone AMHSNone AMHSNone AMHS AMHSNone AMHSNone | IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 | |
| SYRIA DAMASCUS ATHENS AMMAN BEIRUT CAIRO KUWAIT TEHRAN | M T M M M T | | 2 X 50 BD 649.6Kbps 649.6Kbps 649.6Kbps 649.6Kbps 64 Kbps-50 BD | AMHSNone AMHSNone AMHSNone AMHSNone AMHSNone AMHSNone | IA-5 ITA-2 IA-5 IA-5 IA-5 IA-5 ITA-2 | |
| UAE ABU DHABI BAHRAIN AMMAN MUSCAT DOHA TEHRAN JEDDAH | M T M T M T | VPN SAT | 649.6Kbps 2 Mbps 64Kbps 128Kbps 649.6Kbps 64Kbps | AMHSCIDIN AMHS AMHS AMHS AMHSNone AMHS | IA-5 IA-5 IA-5 IA-5 IA-5 IA-5 | VPN |
| YEMEN SANA'A JEDDAH MUSCAT | T T | | 649.6Kbps 649.6Kbps | AMHSNone AMHSNone | IA-5 IA-5 | |

APPENDIX 4C

MIDAMC Steering Group

(MIDAMC STG)

1. TERMS OF REFERENCE (TOR)

1.1 The Terms of Reference of the MIDAMC Steering are:

- a) to promote the efficiency and safety of aeronautical fixed services in the MID Region through the operation and management, on a sound and efficient basis, of a permanent MID Regional ATS Messaging Management Center (MIDAMC);
- b) foster the implementation of the Air traffic service Message handling service in the MID Region through provision of the guidance materials and running facilitation tools, utilizing the MIDAMC;
- c) MIDAMC Steering Group will consist of a focal point from each Participating MID State who would represent the State and acts as the Steering Group Member;
- d) MIDAMC Steering Group will be responsible for overall supervision, direction, evaluation of the MIDAMC project and will review/update the MIDAMC work plan whenever required;
- e) the MID Region is considering the establishment of Regional MID IP Network; the MIDAMC STG will drive the project which is called Common aeRonautical VPN (CRV), until the Operation Group is established; and
- f) provide regular progress reports to the CNS SG, ANSIG and MIDANPIRG concerning its work programme.

1.2 In order to meet the Terms of Reference, the MIDAMC Steering Group shall:

- a) develop/update the accreditation procedure for all users on the MIDAMC;
- b) develop and maintain guidance materials for MIDAMC users;
- c) discuss and identify solution for operational problems may be arising;
- d) provide support/guidance to States for AMHS Implementation, and monitor the AMHS activities;
- e) assist and encourage States to conduct trial on Implementation of the ATS extended services, and identify operational requirements;
- f) provide guidance/support to States on implementation of XML based data models (IWXXM, FIXM, AIXM,...etc) over AMHS;
- g) monitor States' readiness to implement XML based data models over extended AMHS;
- h) identify the need for any enhancement for the MIDAMC and prepare functional and technical specifications, and define its financial implications;

- i) follow-up on ICAO standards and recommendations on the ATS messaging management;
- j) define future liabilities and new participating States and ANSPs;
- k) follow-up and review the work of similar groups in other ICAO Regions;
- l) follow-up the implementation of CRV Project IP Network in the MID Region, through joining relevant projects, like CRV and act as project manager; and
- m) proposes appropriate actions for the early implementation also support the IP Network until the Operational Group is establish.

2. COMPOSITION

- a) ICAO MID Regional Office;
- b) Members appointed by the MIDANPIRG member States; and
- c) other representatives, who could contribute to the activity of the Steering Group , could be invited to participate as observers, when required .

APPENDIX 4D

FREQUEECNY MANAGEMENT FOCAL POINTS

| State | Name | Title | Tel. | Mobile | Email |
|---------------------|-----------------------------|---|---------------|-------------------|--|
| Bahrain | Aly Abdellatif Tulefat | Head of Communications and Meteorology Systems | | +973 17329067 | a.tulefat@mtt.gov.bh |
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| Iran | Mojtaba Chatrooz | Senior expert of Aeronautical Frequency Affairs | +982144544013 | +989 195150239 | mchatrooz@airport.ir |
| Iraq | Ali Nasrullah | Mobile Communication Supervisor | | +964 780 624 0757 | alinasrullah.gcans@gmail.com |
| Jordan | Neveen Askar | Chief of Communication & Navigation at QAA | | +962 79 5973591 | n.askar@carc.gov.jo |
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| Libya | | | | | |
| Oman | Said Hussain Al Bulushi | | | | |
| | Musleh Abdullah Al Jahdhami | | | | |
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| | | | | | |
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APPENDIX 4E

**Frequency Management Working Group
(FMWG)**

1. TERMS OF REFERENCE (TOR)

The FMWG will undertake the following tasks in the work required to manage the MID Region frequency assignments in order to ensure sufficient access to the resource for the provision of aeronautical communication, navigation and surveillance services (CNS) in an efficient and safe manner:

- a) develop MID Region frequency assignment plan including long term spectrum usage of radio systems;
- b) validate the ICAO Global database and keep it up to date;
- c) resolve current frequency assignments conflict in the ICAO Global database;
- d) develop recommendation or proposal for improvement to the existing regional VHF frequency assignment process based on the ICAO Global Spectrum Management tool, ICAO 9718 Volume II Handbook provision and current coordination issues;
- e) propose solutions for the interference incidents occurred in MID Region states in a timely manner;
- f) escalate the intentional frequency interference matters and coordinate with other relevant international organizations, as and when required;
- g) provide guidance/support to States to protect the GNSS signals;
- h) collaborate with ITU and other relevant international organization to address frequent interference incidents;
- i) support for ICAO Position at World Radio Communication Conference (WRC) and ensure MID States' support ICAO at ITU meetings;
- j) collaborate with Regional Groups; Arab Spectrum Management Group (ASMG) and African Telecommunication Union (ATU), to support ICAO position at WRC;
- k) ensure the continuous and coherent development of the relevant sections of the MID eANP, taking into account the evolving operational requirements in the MID Region and the need for harmonization with the adjacent regions in compliance with the Global Air Navigation Plan;
- l) develops recommendations for CNS SG about how to address the future operational needs and limitations in VHF voice communications, aiming at avoiding introduction of 8.33 kHz spacing in the MID Region for as long as practicable; and
- m) Frequency Management Working Group will be responsible for overall supervision of the frequency issues in the MID Region and will review/update the FMWG work plan whenever required.

2. COMPOSITION

- a) ICAO MID Regional Office;
- b) MIDANPIRG CNS Sub Group Chairpersons;
- c) Members appointed by the MIDANPIRG member States; and
- d) c) other representatives, who could contribute to the activity of the Working Group, could be invited to participate as observers.



MID Doc 006

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)**

**MID REGION GUIDANCE FOR THE IMPLEMENTATION OF
AIDC/OLDI**

**EDITION 1.1
JUNE, 2015**

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontier or boundaries.

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RECORD OF AMENDMENTS

The following table records the history of the successive editions of the present document:

| Edition Number | Edition Date | Description | Pages Affected |
|-----------------------|---------------------|--|-----------------------|
| 0.1 | 03 February 2014 | Initial version | All |
| 0.2 | 09 September 2014 | CNS SG/6 update | All |
| 1.0 | 26 November 2014 | MSG/4 endorsement | All |
| 1.1 | June 2015 | Deletion of the planning parts and change of title of the Document. MIDANPIRG/15 endorsement. | All |
| <u>1.2</u> | <u>April 2019</u> | <u>Update the table - Details of the ATM systems to support Implementation Table</u> | <u>13-15</u> |

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1. INTRODUCTION

1.1 Seeking to ensure continuous Safety improvement and Air Navigation modernization, the International Civil Aviation Organization (ICAO) has developed the strategic systems approach termed Aviation System Block Upgrade (ASBU). The latter, defines programmatic and flexible global systems, allows all States to advance their Air Navigation capacities based on their specific operational requirements.

1.2 The ASBU approach has four Blocks, namely Block 0, Block 1, Block 2 and Block 3. Each block is further divided into Modules. Block 0 is composed of Modules containing technologies and capabilities that are implemented currently.

1.3 Module FICE in Block 0 is introduced to improve coordination between air traffic service units (ATSUs) by using ATS inter-facility data communication (AIDC). The transfer of communication in a data link environment improves the efficiency of this process. The data link environment enhances capacity, efficiency, interoperability, safety and reduces cost.

1.4 The AIDC and the OLDI are tools to coordinate flight data between Air Traffic Service Units (ATSU) and both satisfies the requirements of basic coordination of flight notification, coordination and transfer of control.

1.5 Various items concerning MID Region Implementation of AIDC/OLDI have been detailed in this document.

2. BACKGROUND AND ASBU B0-FICE

Module B0-FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration:

| | | |
|--|--|---|
| Summary | To improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by the ICAO <i>Manual of Air Traffic Services Data Link Applications</i> (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs. | |
| Main performance impact as per Doc 9883 | KPA-02 – Capacity, KPA-04 – Efficiency, KPA-07 – Global Interoperability, KPA-10 – Safety. | |
| Operating environment/ Phases of flight | All flight phases and all type of ATS units. | |
| Applicability considerations | Applicable to at least two area control centres (ACCs) dealing with en-route and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits. | |
| Global concept component(s) as per Doc 9854 | CM – conflict management | |
| Global plan initiatives (GPI) | GPI-16: Decision support systems | |
| Main dependencies | Linkage with <i>B0-TBO</i> | |
| Global readiness checklist | | Status (ready now or estimated date) |
| | Standards readiness | √ |
| | Avionics availability | No requirement |
| | Ground systems availability | √ |
| | Procedures available | √ |
| | Operations approvals | √ |

2.1 General

2.1.1 Flights which are being provided with air traffic services are transferred from one air traffic services (ATS) unit to the next in a manner designed to ensure safety. In order to accomplish this objective, it is a standard procedure that the passage of each flight across the boundary of the areas of responsibility of the two units is co-ordinated between them beforehand and that the control of the flight is transferred when it is at, or adjacent to, the said boundary.

2.1.2 Where it is carried out by telephone, the passing of data on individual flights as part of the coordination process is a major support task at ATS units, particularly at area control centres (ACCs). The operational use of connections between flight data processing systems (FDPSs) at ACCs replacing phone coordination (on-line data interchange (OLDI)) is already proven in Europe.

2.1.3 This is now fully integrated into the ATS interfacility data communications (AIDC) messages in the *Procedures for Air Navigation Services – Air Traffic Management*, (PANS-ATM, Doc 4444) which describes the types of messages and their contents to be used for operational communications between ATS unit computer systems. This type of data transfer (AIDC) will be the basis for migration of data communications to the aeronautical telecommunication network (ATN).

2.1.4 The AIDC module is aimed at improving the flow of traffic by allowing neighboring air traffic services units to exchange flight data automatically in the form of coordination and transfer messages.

2.1.5 With the greater accuracy of messages based on the updated trajectory information contained in the system and where possible updated by surveillance data, controllers have more reliable information on the conditions at which aircraft will enter in their airspace of jurisdiction with a reduction of the workload associated to flight coordination and transfer. The increased accuracy and data integrity permits the safe application of reduced separations.

2.1.6 Combined with air-ground data link applications, AIDC also allows the transfer of aircraft logon information and the timely initiation of establishing controller-pilot data link communications (CPDLC) by the next air traffic control (ATC) unit with the aircraft.

2.1.7 These improvements outlined above translate directly into a combination of performance improvements.

2.1.8 Information exchanges between flight data processing systems are established between air traffic services units for the purpose of notification, coordination and transfer of flights and for the purpose of civil/military coordination. These information exchanges rely upon appropriate and harmonized communication protocols to secure their interoperability.

2.1.9 Information exchanges apply to:

- a) communication systems supporting the coordination procedures between air traffic services units using a peer-to-peer communication mechanism and providing services to general air traffic; and
- b) communication systems supporting the coordination procedures between air traffic services units and controlling military units, using a peer-to-peer communication mechanism.

Baseline

2.1.10 The baseline for this module is the traditional coordination by phone, and procedural and/or radar distance/time separations.

Change brought by the module

2.1.11 The module makes available a set of messages to describe consistent transfer conditions via electronic means across ATS units' boundaries. It consists of the implementation of the set of AIDC messages in the flight data processing systems (FDPS) of the different ATS units involved and the establishment of a Letter of Agreement (LoA) between these units to set the appropriate parameters.

2.1.12 Prerequisites for the module, generally available before its implementation, are an ATC system with flight data processing functionality and a surveillance data processing system connected to each other.

Other remarks

2.1.13 This module is a first step towards the more sophisticated 4D trajectory exchanges between both ground/ground and air/ground according to the ICAO *Global Air Traffic Management Operational Concept* (Doc 9854).

2.2 Intended Performance Operational Improvement

2.2.1 Metrics to determine the success of the module are proposed in the *Manual on Global Performance of the Air Navigation System* (Doc 9883).

| | |
|--------------------------------|---|
| <i>Capacity</i> | Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases. |
| <i>Efficiency</i> | The reduced separation can also be used to more frequently offer aircraft flight levels closer to the flight optimum; in certain cases, this also translates into reduced en-route holding. |
| <i>Global interoperability</i> | Seamlessness: the use of standardized interfaces reduces the cost of development, allows air traffic controllers to apply the same procedures at the boundaries of all participating centres and border crossing becomes more transparent to flights. |
| <i>Safety</i> | Better knowledge of more accurate flight plan information. |
| <i>Cost Benefit Analysis</i> | Increase of throughput at ATS unit boundary and reduced ATCO workload will outweigh the cost of FDPS software changes. The business case is dependent on the environment. |

2.3 Necessary Procedures (Air and Ground)

2.3.1 Required procedures exist. They need local analysis of the specific flows and should be spelled out in a Letter of Agreement between ATS units; the experience from other Regions can be a useful reference.

2.4 Necessary System Capability

Avionics

2.4.1 No specific airborne requirements.

Ground systems

2.4.2 Technology is available. It consists in implementing the relevant set of AIDC messages in flight data processing and could use the ground network standard AFTN-AMHS or ATN. Europe is presently implementing it in ADEXP format over IP wide area networks.

2.4.3 The technology also includes for oceanic ATSUs a function supporting transfer of communication via data link.

2.5 Human Performance

Human Factors Considerations

2.5.1 Ground interoperability reduces voice exchange between ATCOs and decreases workload. A system supporting appropriate human-machine interface (HMI) for ATCOs is required.

2.5.2 Human factors have been taken into consideration during the development of the processes and procedures associated with this module. Where automation is to be used, the HMI has been considered from both a functional and ergonomic perspective (see Section 6 for examples). The possibility of latent failures, however, continues to exist and vigilance is required during all implementation activity. In addition it is important that human factor issues, identified during implementation, be reported to the international community through ICAO as part of any safety reporting initiative.

Training and Qualification Requirements

2.5.3 To make the most of the automation support, training in the operational standards and procedures will be required and can be found in the links to the documents in Section 8 to this module. Likewise, the qualifications requirements are identified in the regulatory requirements in Section 6 which are integral to the implementation of this module.

2.6 Regulatory/Standardization Needs and Approval Plan (Air and Ground)

- Regulatory/standardization: use current published criteria that include:
 - a) ICAO Doc 4444, *Procedures for Air Navigation Services — Air Traffic Management*;
 - b) EU Regulation, EC No 552/2004.
- Approval plans: to be determined based on regional consideration of ATS interfacility data communications (AIDC).

2.7 Implementation and Demonstration Activities (As known at time of writing)

2.7.1 Although already implemented in several areas, there is a need to complete the existing SARPs to improve harmonization and interoperability. For Oceanic data link application, North Atlantic (NAT) and Asia and Pacific (APAC) (cf ISPACG PT/8- WP.02 - GOLD) have defined some common coordination procedures and messages between oceanic centres for data link application (ADS-C CPDLC).

2.7.2 Current use

- Europe:** It is mandatory for exchange between ATS units.
http://europa.eu/legislation_summaries/transport/air_transport/124070en.htm

The European Commission has issued a mandate on the interoperability of the European air traffic management network, concerning the coordination and transfer (COTR) between ATS units through REG EC 1032/2006 and the exchange of flight data between ATS units in support of air-ground data link through REG EC 30/2009. This is based on the standard OLDI-Ed 4.2 and ADEXP-Ed 3.1.
- EUROCONTROL:** Specification of interoperability and performance requirements for

the flight message transfer protocol (FMTP). The available set of messages to describe and negotiate consistent transfer conditions via electronic means across centres' boundaries have been used for trials in Europe in 2010 within the scope of EUROCONTROL's FASTI initiative.

- **India:** AIDC implementation is in progress in Indian airspace for improved coordination between ATC centres. Major Indian airports and ATC centres have integrated ATS automation systems having AIDC capability. AIDC functionality is operational between Mumbai and Chennai ACCs. AIDC will be implemented within India by 2012. AIDC trials are underway between Mumbai and Karachi (Pakistan) and are planned between India and Muscat in coordination with Oman.
- **AIDC:** is in use in the Asia-Pacific Region, Australia, New-Zealand, Indonesia and others.

2.7.3 Planned or Ongoing Activities

To be determined.

2.7.4 Currently in Operation

To be determined.

2.8 Reference Documents

2.8.1 Standards

- ICAO Doc 4444, *Procedures for Air Navigation Services - Air Traffic Management*, Appendix 6 - *ATS Interfacility Data Communications (AIDC) Messages*.
- ICAO Doc 9880, *Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols, Part II — Ground-Ground Applications — Air Traffic Services Message Handling Services (ATSMHS)*.

2.8.2 Procedures

To be determined.

2.8.3 Guidance material □ ICAO Doc 9694, *Manual of Air Traffic Services Data Link Applications*; Part 6; □ GOLD Global Operational Data Link Document (APANPIRG, NAT SPG), June 2010; □ Pan Regional Interface Control Document for Oceanic ATS Interfacility Data.

Communications (PAN ICD) Coordination Draft Version 0.3. 31 August 2010; □ Asia/Pacific Regional Interface Control Document (ICD) for ATS Interfacility Data Communications (AIDC) available at http://www.bangkok.icao.int/edocs/icd_aide_ver3.pdf, ICAO Asia/Pacific Regional Office. □ EUROCONTROL Standard for On-Line Data Interchange (OLDI); and EUROCONTROL Standard for ATS Data Exchange Presentation (ADEXP).

- ASSEMBLY — 38TH SESSION A38-WP/266.

3. ICAO GENERAL ASSEMBLY 38 WP-266



International Civil Aviation Organization

WORKING PAPER

A38-WP/266
TE/120
12/09/13

ASSEMBLY — 38TH SESSION

TECHNICAL COMMISSION

Agenda Item 33: Air Navigation — Standardization

OLDI as AIDC realisation in the MID Region

(Presented by the United Arab Emirates)

EXECUTIVE SUMMARY

The Aviation System Block Upgrade (ASBU) B0-25 recommends “Increased interoperability, efficiency and capacity through ground-ground integration”. To this end ATS inter-facility data communication (AIDC) is presumed by many States. The EUROCONTROL uses a different tool called On Line Data Interchange (OLDI) satisfying all AIDC requirements.

The AIDC and the OLDI are tools to coordinate flight data between Air Traffic Service Units (ATSU) and both satisfies the basic coordination of flight notification, coordination and transfer of control. Additional options like pre-departure coordination, Civil-Military coordination and air-ground data link for forwarding log-on parameters are available in the OLDI.

The majority of States in the MID Region has either implemented or is planning to implement OLDI and have no intention of using only AIDC.

Action: The Assembly is invited to:

- a) Recommend that OLDI implementation be accepted as MID regional variation of AIDC implementation.
- b) Urge States to capitalise opportunities provided by OLDI and wherever both AIDC and OLDI are implemented, choose the suitable option satisfying the requirements of the partnering States.

| | |
|--------------------------------|--|
| <i>Strategic Objectives:</i> | This working paper relates to Strategic Objective B |
| <i>Financial implications:</i> | Not applicable |
| <i>References:</i> | 1. Manual of Air Traffic Services Data Link Applications (Doc 9694) 2. MID Region ATN-IPS WG5 meeting report, 3. MID Region ATN-IPS WG5 WP4 Appendix A |

1. INTRODUCTION

1.1 Seeking to ensure continuous Safety improvement and Air Navigation modernization, the International Civil Aviation Organization (ICAO) has developed the strategic systems approach termed Aviation System Block Upgrade (ASBU). The latter, which defines programmatic and flexible global systems, allows all States to advance their Air Navigation capacities based on their specific operational requirements.

1.2 The ASBU approach has four Blocks, namely Block 0, Block 1, Block 2 and Block 3. Each block is further divided into Modules. Block 0 is composed of Modules containing technologies and capabilities that are implemented to date.

1.3 Module 25 in Block 0 is introduced to improve coordination between air traffic service units (ATSUs) by using ATS inter-facility data communication (AIDC). The transfer of communication in a data link environment improves the efficiency of this process. The data link environment enhances capacity, efficiency, interoperability, safety and reduces cost.

2. DISCUSSION

2.1 EUROCONTROL uses a different tool called On Line Data Interchange (OLDI) satisfying all AIDC requirements. The AIDC and the OLDI are tools to coordinate flight data between Air Traffic Service Units (ATSU) and both satisfies the basic coordination of flight notification, coordination and transfer of control. Additional options like pre-departure coordination, Civil-Military coordination and air-ground data link for forwarding log-on parameters are available in the OLDI.

2.2 The OLDI is a proven technology and is in operational use for more than twenty years in the European Region and for more than four years in the United Arab Emirates. This technology meets all the AIDC requirements and is kept up to date to cope with the new developments in the industry. An example is the release of OLDI version 4.2 to accommodate INFPL requirements.

2.3 Based on the analysis carried out during the MID Region ATN-IPS WG5 meeting it was noted that the majority of States in the MID Region have either implemented OLDI or are planning to implement OLDI and have no intention of using only AIDC. Therefore, the meeting agreed that OLDI implementation should be considered and accepted as Regional variation of AIDC implementation as was the case in the European Region.

2.4 The MID Region ATN-IPS WG5 meeting further agreed that if both AIDC and OLDI are implemented, then it will be a bilateral issue and some States that are interfacing with adjacent Regions may require to support and implement dual capabilities (AIDC and OLDI).

2.5 The MID Region is monitoring the work of the joint taskforce harmonization of AIDC and OLDI in NAT and ASIA PAC as it is important to harmonize AIDC and OLDI in order that States in the interface areas have smooth operations.

3. CONCLUSION

3.1 The implementation of OLDI in the MID Region should be accepted as variation AIDC implementation. Wherever both AIDC and OLDI are implemented then States should choose the suitable one satisfying the requirements of the partnering State.

4. DETAILS OF THE ATM SYSTEMS TO SUPPORT IMPLEMENTATION

| State | ATM System | Protocol and Version used | Number of adjacent ATSU's | Number of adjacent ATSU's connected by AIDC/ OLDI and type of connection | ATM System Capability | | Current use | | Planned Use | | Intention of using AIDC only | Reasons and Remarks |
|---------|---|---------------------------------|---------------------------|--|--------------------------|--------------------------|-------------|--------------------------|--------------------------|--------------------------|------------------------------|---|
| | | | | | AIDC | OLDI | AIDC | OLDI | AIDC | OLDI | | |
| Bahrain | Thales TopSky-C | OLDI 2.3 FMTP 2.0 | 7 | None 1 OLDI | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | No | OLDI to connect to implemented with UAE OLDI with Doha is in progress neighbouring ATSU's |
| Egypt | TOPSKY (THALES) Support X25 Protocol only | OLDI V 4.2 V2.3 AIDC V2.0 | 7 | 1 OLDI | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No | - OLDI is implemented with EUR (Athens) - OLDI with Nicosia is in progress AIDC over AFTN is planned with Jeddah and Khartoum OLDI in use to connect to EUR (Athens) |
| Iran | Thales | OLDI | 11 | None | | <input type="checkbox"/> | | | | | | OLDI messages are sent to Ankara |
| Iraq | Raytheon Thales TopSky | OLDI 4.0 | 5 | none | <input type="checkbox"/> | <input type="checkbox"/> | | | | <input type="checkbox"/> | No | OLDI planned with Kuwait and Ankara |

| | | | | | | | | | | | | |
|----------------|-------------------------|--|---|------------------------|--------------------------|--------------------------|--|--------------------------|-------------------------------------|--------------------------|----|--|
| Jordan | Aircon 2100 Indra | OLDI 4.1 AIDC 2.0 | 5 | none | <input type="checkbox"/> | <input type="checkbox"/> | | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | No | Planned with Jeddah and Egypt Q2-2015 |
| Kuwait | Aircon 2100 INDRA | OLDI v4.2 AIDC v3.0 | 3 | none | <input type="checkbox"/> | <input type="checkbox"/> | | | | <input type="checkbox"/> | No | OLDI to connect to Bahrain and Riyadh |
| Lebanon | | | 3 | -1 OLDI with Cyprus | | <input type="checkbox"/> | | | | <input type="checkbox"/> | No | OLDI with Cyprus is in progress Planned OLDI with Syria use to connect to-EUR |
| Libya | Aircon 2000 Indra | OLDI 2.3 AIDC 2.0 | 7 | None | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | No | AIDC planned with Egypt, OLDI planned with Tunis and Malta (2020) Can connect with Sudan Chad and Egypt AIDC. OLDI Tunis Malta and Egypt |
| Oman | Indra Itec | OLDI 4.1 AIDC 2.3 | 5 | none 1 OLDI | <input type="checkbox"/> | <input type="checkbox"/> | | | <input type="checkbox"/> | <input type="checkbox"/> | No | UAE Q1-2015 OLDI connection to UAE OLDI planned with Jeddah-Q2-2015 AIDC with Mumbai in progress-Q1-2015 AIDC planned with Karachi |
| Qatar | Selex | OLDI V4.2 FMTP 2.0 AIDC 2.0 | 3 | 1 | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | | OLDI in use with UAE and planned for use with Bahrain |

| | | | | | | | | | | | | |
|---------------------|------------------------------|--|----|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----|--|
| Saudi Arabia | PRISMA from COMSOFT INDRA | OLDI V4.2 AIDC V3.0 FMTP V4 & V6 OLDI V4.2 FMTP 2.0 AIDC xx | 11 | - None - - (Eurocat-X) AIDC Connected between Riyadh and Jeddah | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No | AIDC for internal and OLDI for neighbouring units requests OLDI planned for 2020/2021 |
| Sudan | TopSky | OLDI 4.3 AIDC 2.0 | 5 | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No | Both AIDC and OLDI to cater to neighbouring units requests |
| Syria | | | 5 | none | | | | | | | | |
| UAE | PRISMA from COMSOFT T | OLDI V4.2 FMTP 2.0 | 10 | -3-6 two-way integrated OLDI connections -2-1 two-way | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | No | OLDI already in use with 6-7 partners and all neighbouring ATSU's are OLDI capable |

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| | | | | standalone OLDI one-way Standalone OLDI connection | | | | | | | | |
|-------|--|--|---|--|--|--|--|--|--|--|--|--|
| Yemen | | | 3 | Total 6 OLDI connections none | | | | | | | | |

5. MESSAGE TYPES – PHASE 1

These are the ~~initial~~ messages that were agreed ~~during the MID AIDC/OLDI Seminar Mar 2014~~ to be used in ICAO MID Region:

I. Basic Procedure Messages

- | | |
|-------------------------------------|----------------|
| 1. Advance Boundary Information | ABI |
| 2. Activate | ACT |
| 3. Revision | REV |
| 4. Preliminary Activation | PAC |
| 5. Abrogation of Co-ordination | MAC |
| 6. SSR Code Assignment | COD |
| 7. Arrival Management | AMA |
| 8. Logical Acknowledgement Message | LAM |
| 8-9. Information Message | INF |

II. Advance Boundary Information ABI

1. Purpose of the ABI Message

The ABI message satisfies the following operational requirements:

- Provide for acquisition of missing flight plan data;
- Provide advance boundary information and revisions thereto for the next ATC unit;
- Update the basic flight plan data;
- Facilitate early correlation of radar tracks;
- Facilitate accurate short-term sector load assessment;
- Request the assignment of an SSR code from the unit to which the above notification is sent, if required.

The ABI is a notification message.

2. Message Contents

The ABI message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code (if available);
- Departure Aerodrome;
- Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft;
- Type of Flight;
- Equipment Capability and Status.

If bilaterally agreed, the ABI message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data.

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3. Example

- (ABIOMAE/OMSJ578-ABY464/A5476-VIDP-MAXMO/0032F100-OMSJ-9/A320/M-15/N0457F360 OBDAG LUN G333 TIGER/N0454F380 G452 RK G214 PG G665 ASVIB M561 MOBET/N0409F260 A419 DARAX -80/S-81/W/EQ Y/EQ U/NO R/EQ/A1B1C1D1L1O1S1)

III. Activate ACT

1. Purpose of the ABI Message

The ACT message satisfies the following operational requirements:

- Replace the verbal boundary estimate by transmitting automatically details of a flight from one ATC unit to the next prior to the transfer of control;
- Update the basic flight plan data in the receiving ATC unit with the most recent information;
- Facilitate distribution and display of flight plan data within the receiving ATC unit to the working positions involved;
- Enable display of correlation in the receiving ATC unit;
- Provide transfer conditions to the receiving ATC unit.

2. Message Contents

The ACT message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft;
- Type of Flight;
- Equipment Capability and Status.

If bilaterally agreed, the ACT message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data;
- Actual Take-Off Time.

Note: The Actual Take-Off Time is normally used in the cases where the ACT follows a PAC message that included the Estimated Take-Off Time.

3. Example

- (ACTOMAE/OMSJ727-ABY604/A7306-HEBA-ALRAR/0130F110-OMSJ-9/A320/M-15/N0428F250 DCT NOZ A727 CVO/N0461F350 UL677 MENLI UN697 NWB W733 METSA UB411 ASH G669 TOKLU UP559 ASPAK/N0438F290 UP559 NALPO P559 ITGIB/N0409F230 P559 -80/S-81/W/EQ Y/EQ U/NO R/EQ/A1B1C1D1L1O1S1)

IV. Revision Message REV

1. Purpose of the REV Message

The REV message is used to transmit revisions to co-ordination data previously sent in an ACT message provided that the accepting unit does not change as a result of the modification.

2. Message Contents

The REV message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Estimate Data and/or Co-ordination point;
- Destination Aerodrome;

Note: The Estimate Data contained in the REV has to include complete data in the Estimate Data field in order to eliminate any ambiguity regarding the transfer elements. If the ACT message included the supplementary flight level, the following REV message will include the supplementary flight level if still applicable.

The REV message shall contain the following items of data if they have changed:

- SSR Mode and Code;
- Equipment Capability and Status.

If bilaterally agreed, the REV message shall contain any of the following items of data, if they have changed:

- Route.

If bilaterally agreed, the REV message shall contain any of the following items of data:

- Message Reference.

3. Example

- (REVBC/P873-UAE4486-OMDB-TUMAK/2201F360-LERT-81/Y/NO U/EQ)

V. Preliminary Activation PAC

1. Purpose of the PAC Message

The PAC message satisfies the following operational requirements:

- Notification and pre-departure co-ordination of a flight where the time of flight from departure to the COP is less than that which would be required to comply with the agreed time parameters for ACT message transmission;
- Notification and pre-departure co-ordination of a flight by a local (aerodrome /approach control) unit to the next unit that will take control of the flight;
- Provide for acquisition of missing flight plan data in case of discrepancies in the initial distribution of flight plan data;
- Request the assignment of an SSR code from the unit to which the above notification/coordination is sent.

2. Message Contents

The PAC message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Estimated Take-Off Time or Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft;

A PAC message sent from a TMA control unit or an ACC shall contain the following items of data:

- Type of Flight;
- Equipment Capability and Status.

If bilaterally agreed, the PAC message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data;
- Message Reference.

3. Example

- (PACOMSJ/OMAE292-SQC7365/A9999-OMSJ0020-WSSS-9/B744/H-15/N0505F310 DCT RIKET B525 LALDO B505 NADSO A777 VAXIM P307 PARAR N571 VIRAM/N0505F330 N571 LAGOG/M084F330 N571 IGOGU/M084F350 N571 GUNIP/N0500F350 R467 -80/S-81/W/EQ Y/EQ U/NO R/EQ/)

VI. Message for the Abrogation of Co-ordination MAC

1. Purpose of the MAC Message

A MAC message is used to indicate to the receiving unit that the co-ordination or notification previously effected for a flight is being abrogated. The MAC is not a replacement for a Cancellation (CNL) message, as defined by ICAO, and therefore, shall not be used to erase the basic flight plan data.

2. Message Contents

The MAC message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Co-ordination point;
- Destination Aerodrome;

If bilaterally agreed, the MAC message shall contain any of the following items of data:

- Message Reference;
- Co-ordination Status and Reason

3. Example

- (MACAM/BC112 AM/BC105-HOZ3188-EHAM-NIK-LFPG-18/STA/INITFL)

VII. SSR Code Assignment Message COD

1. Purpose of the COD Message

The Originating Region Code Allocation Method (ORCAM) is provided to permit a flight to respond on the same code to successive units within a participating area. Unless code allocation is performed centrally, e.g. by an ACC, airports may need to be individually allocated a set of discrete SSR codes. Such allocations are very wasteful of codes.

The COD message satisfies the operational requirement for the issue of a Mode A SSR code by one Air Traffic Service Unit to another for a specified flight when requested.

The COD message also satisfies the operational requirement to inform the transferring Air Traffic Service Unit of the next Mode A SSR code when the code assigned cannot be retained by the accepting Air Traffic Service Unit.

2. Message Contents

The COD message shall contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Destination Aerodrome;

If bilaterally agreed, the COD message shall contain any of the following items of data:

- Message Reference.

3. Example
 - (CODOMAE/OMSJ720-ABY567/A3450-OMSJ-OAKB)

VIII. Arrival Management Message AMA

1. Purpose of the AMA Message

Arrival management requires the capability for an accepting unit to pass to the transferring unit information on the time that a flight is required to delay (lose) or gain in order to optimise the approach sequence.

The AMA message satisfies the following operational requirements in order to alleviate ATC workload in co-ordinating arriving flights:

- Provide the transferring ATC unit with the time that the flight is to delay/gain at the arrival management metering fix;
- Where procedures have been bilaterally agreed between the units concerned, provide the transferring ATC unit with a target time for the flight to be at the COP;
- When bilaterally agreed, provide the transferring unit with a speed advisory. The speed advisory needs to be communicated to the flight, prior to transfer.

2. Message Contents

The AMA message shall contain the following items of data:

- Message Type;
 - Message Number;
 - Aircraft Identification;
 - Departure Aerodrome;
 - Destination Aerodrome;
- and based on bilateral agreement, contain one or more of the following items of data:
- Metering Fix and Time over Metering Fix;
 - Total Time to Lose or Gain;
 - Time at COP;
 - Assigned speed;
 - Application point;
 - Route;
 - Arrival sequence number

Note: The item Route contains the requested routing

3. Example

- (AMAM/BN112-AZA354-LIRF-CLS/0956-LEMD-18/MFX/PRADO TOM/1022 TTL/12)

IX. Logical Acknowledgement Message LAM

4.1 Purpose of the LAM Message

The LAM is the means by which the receipt and safeguarding of a transmitted message is indicated to the sending unit by the receiving unit.

The LAM processing provides the ATC staff at the transferring unit with the following:

- A warning when no acknowledgement has been received;
- An indication that the message being acknowledged has been received, processed successfully, found free of errors, stored and, where relevant, is available for presentation to the appropriate working position(s).

5.2 Message Contents

The LAM message shall contain the following items of data:

- Message Type;
- Message Number;
- Message Reference.

6.3 Example

- (LAMOMSJ/OMAE939OMAE/OMSJ718)

X. Logical Acknowledgement Message LAM

1. The INF message is used to provide information on specific flights to agencies not directly involved in the coordination process between two successive ATC units on the route of flight.

The INF message may be used to provide copies of messages and to communicate agreed co-ordination conditions to such agencies following a dialogue between controllers. For this purpose INF messages may be generated by the systems at the transferring or accepting unit. The message may also be used to provide information in relation to any point on the route of flight to an agency. The format allows the communication of initial data, revisions and cancellations.

2. The INF message shall contain the following items of data:

- Message type;
- Message number;
- All items of operational data as contained in the original message or resultant co-ordination being copied;
- Reference Message Type.

6.3. Example

(INFL/IT112-BAW011/A5437-EGLL-KOK/1905F290-OMDB-9/B747/H-15/N0490F410 DVR

- KOK UG1 NTM UB6 KRH-18/MSG/ACT)

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The Pan Regional (NAT and APAC) Interface Control Document for ATS Interfacility Data Communications (PAN AIDC ICD) Version1.0 has defined the specific AIDC messages to be used between ATSUs should be included in bilateral agreements as in the below table which is number as table 4-3

AIDC Messages

| Core | Non-core | Message Class | Message |
|-------------|-----------------|----------------------|---------------------------------------|
| X | | Notification | ABI (Advance Boundary Information) |
| X | | Coordination | CPL (Current Flight Plan) |
| X | | Coordination | EST (Coordination Estimate) |
| | X | Coordination | PAC (Preliminary Activate) |
| X | | Coordination | MAC (Coordination Cancellation) |
| X | | Coordination | CDN (Coordination Negotiation) |
| X | | Coordination | ACP (Acceptance) |
| X | | Coordination | REJ (Rejection) |
| | X | Coordination | PCM (Profile Confirmation Message) |
| | X | Coordination | PCA (Profile Confirmation Acceptance) |

| Core | Non-core | Message Class | Message |
|-------------|-----------------|----------------------------|---------------------------------------|
| | X | Coordination | TRU (Track Update) |
| X | | Transfer of Control | TOC (Transfer of Control) |
| X | | Transfer of Control | AOC (Acceptance of Control) |
| X | | General Information | EMG (Emergency) |
| X | | General Information | MIS (Miscellaneous) |
| X | | Application Management | LAM (Logical Acknowledgement Message) |
| X | | Application Management | LRM (Logical Rejection Message) |
| | X | Application Management | ASM (Application Status Monitor) |
| | X | Application Management | FAN (FANS Application Message) |
| | X | Application Management | FCN (FANS Completion Notification) |
| | X | Surveillance Data Transfer | ADS (Surveillance ADS-C) |

6. D – MESSAGE TYPES – PHASE 2

The messages during this phase will be the advance messages covering all phases of flight

Intentionally left blank

7. TEST OBJECTIVES

| Test Objectives | | |
|--|---|---|
| No | Test step | Test Description |
| 01 | Connectivity between FDPSs | Check connectivity between FDPSs. |
| 02 | FPL Processing | Check FPLs are correctly received and processed. |
| <i>Preliminary Activation Message (PAC)</i> | | |
| 03 | PAC Message association | Check PAC messages are correctly sent, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention. |
| 04 | Coordination of Changes to previous PAC message | Check changes to previous PAC messages such as Change in SSR code, Aircraft type, Coordination point, Flight level and Destination aerodrome are correctly sent, received and associated with the correct FPL. |
| <i>Advance Boundary Information (ABI)</i> | | |
| 05 | ABI Message association | Check ABI messages are correctly sent, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention. |
| 06 | Coordination of Changes to previous ABI message | Check changes to previous ABI messages such as Change in SSR code, Aircraft type, Coordination point, Flight level and Destination aerodrome are correctly sent, received and associated with the correct FPL. |
| <i>Activate (ACT)</i> | | |
| 07 | ACT Message association | Check ACT messages are correctly sent, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention. |
| <i>Logical Acknowledgement Messages (LAM)</i> | | |
| 08 | LAM Message generation | Check LAM messages are generated for messages that are syntactically and semantically correct. |
| <i>SSR Code Request Messages (COD)</i> | | |
| 09 | COD Message association | Check COD messages are sent with correct SSR Code, received, processed and associated with the correct FPL. If the system is unable to process a message that is syntactically and semantically correct, it should be referred for Manual intervention. |

8. SAMPLE TEST SCRIPTS

NOTE: All the samples are provided by UAE

1. Test 001 Connectivity:

| Test 001 – Connectivity | | | | |
|--------------------------------|------------------------------|---|--|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Ping Doha FDPS from RDS FDPS | OK / Not OK | OK / Not OK | |
| 02 | Ping RDS FDPS from Doha FDPS | OK / Not OK | OK / Not OK | |
| 03 | Check the link | Log in as root in rds fdps Type in netstat -tnap, should show the link “established” OK / Not OK | Check the link “established” OK / Not OK | |

2. Test 002 Flight plan:

| Test 002 – Flight Plan – sent from UAE ACC | | | | |
|---|----------------------------|---------------------|------------------|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Send TST001 (OMAA-OTBD) | OK / Not OK | OK / Not OK | |
| 02 | Send TST002 (OMAM-OTBH) | OK / Not OK | OK / Not OK | |

| | | | | |
|----|------------------------------|-------------|-------------|--|
| 03 | Send TST003 (OMAA-OEJN) | OK / Not OK | OK / Not OK | |
| 04 | Send TST004 (OOMS – OTBD) | OK / Not OK | OK / Not OK | |
| 05 | Send TST005 (OTBD – OMDB) | OK / Not OK | OK / Not OK | |
| 06 | Send TST006 (OTBH – OMDM) | OK / Not OK | OK / Not OK | |
| 07 | Send TST007 (OEJN-OMAD) | OK / Not OK | OK / Not OK | |
| 08 | Send TST008 (OTBD – OOMS) | OK / Not OK | OK / Not OK | |

3. Test 003 Preliminary Activation Message (PAC):

| Test 003 – Preliminary Activation Message (PAC) <i>Doha FDPS to UAE ACC FDPS</i> | | | | |
|--|---|--|------------------|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Activate start up TST005 (OTBD – OMDB) SSR code:0001 RFL : FPL level | SFPL moves from Pending to Workqueue with SSR code, check CFL field OK / Not OK | OK / Not OK | |
| 02 | Change SSR of TST005 New SSR Code:0002 | SFPL colour changes to Green in Workqueue OK / Not OK | OK / Not OK | |
| 03 | Change ATYP of TST005 New ATYP: A332 | SFPL colour changes to Green in Workqueue OK / Not OK | OK / Not OK | |
| 04 | Change ADES of TST005 New ADES: VOMM | New FPL is created by OLDI with new ADES | OK / Not OK | |

| | | | | |
|----|---|---|-------------|--|
| | | OK / Not OK | | |
| 05 | Change RFL of TST005 New RFL: 370 | Manual coordination requires OK / Not OK | OK / Not OK | |
| 06 | Change COP of TST005 New COP : NADAM | SFPL colour changes to Green in Workqueue OK / Not OK | OK / Not OK | |
| 07 | Check LAM messages | OK / Not OK | OK / Not OK | |

4. Test 004 ABI & ACT messages:

| Test 004 – Advance Boundary Information Message (ABI), Activate Message (ACT) Doha FDPS to UAE ACC FDPS | | | | |
|--|---|---|------------------|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Enter estimate for TST007 (OEJN – OMAD) SSR code:0003 Exit level : 190 ETX : Current time | SFPL moves from Pending to Work queue with SSR code, check ETN and CFL field OK / Not OK | OK / Not OK | |
| 02 | Change SSR of TST007 New SSR code: 0004 | SFPL colour changes to Green if in Workqueue OK / Not OK | OK / Not OK | |
| 03 | Change ATYP of TST007 New ATYP: C130 | SFPL colour changes to Green if in Workqueue OK / Not OK | OK / Not OK | |

| | | | | |
|----|--|---|---|--|
| 04 | Change ADES of TST007 New ADES: OMAL | New FPL is created by OLDI with new ADES OK / Not OK | OK / Not OK | |
| 05 | Change XFL of TST007 New XFL: 170 | SFPL colour changes to Green if in Workqueue OK / Not OK | OK / Not OK | |
| 06 | Change COP of TST007 New COP: NAMLA | SFPL colour changes to Green if in Workqueue OK / Not OK | OK / Not OK | |
| 07 | when ETX is Current time + 5 minutes the ACT should be automatically generated | No change, SFPL already in active. OK / Not OK | OK / Not OK | |
| 08 | Change ATYP of TST007 New ATYP:C30J | No change, SFPL already in active Expect manual coordination. OK / Not OK | Flag to notify ATCA that ATYP change is not communicated OK / Not OK | |
| 09 | Check LAM messages | OK / Not OK | OK / Not OK | |

5. Test 005 ABI & ACT messages:

| Test 005 – Advance Boundary Information Message (ABI), Activate Message (ACT) UAE ACC FDPS to Doha FDPS | | | | |
|--|---|---|---|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Enter estimate for TST004 (OOMS – OTBD) SSR code:0005 Exit level : 180 ETN : Current time COPX: MEKMA | SFPL moves from Pending to Active with SSR code A new ABI will be generated OK / Not OK | SSR, ETN and Entry level and entry point should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK | |

| | | | | |
|----|--|---|--|--|
| 02 | Change SSR of TST004 New SSR code: 0006 | A new ABI will be generated OK / Not OK | SSR should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK | |
| 03 | Change ATYP of TST004 New ATYP: AT45 | A new ABI will be generated OK / Not OK | ATYP should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK | |
| 04 | Change ADES of TST004 New ADES: OTBH | A new ABI will be generated OK / Not OK | ADES should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK | |
| 05 | Change XFL of TST004 New XFL: 160 | A new ABI will be generated OK / Not OK | Entry level should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK | |
| 06 | Change COP of TST004 New COP: BUNDU | A new ABI will be generated OK / Not OK | COP should be automatically updated for the concerned flight and flagged for ATCA OK / Not OK | |
| 07 | when ETX is Current time + 5 minutes the ACT should be automatically generated | ACT will be generated OK / Not OK | OK / Not OK | |
| 08 | Change ATYP of TST004 New ATYP: B738 | An indication to ATCO to show that this change needs to be manually coordinated | Expect manual coordination OK / Not OK | |
| 09 | Check LAM messages | OK / Not OK | OK / Not OK | |

6. Test 006 PAC, ABI, ACT without FPL for UAE:

| Test 006 – PAC, ABI, ACT – No FPL for UAE | | | | |
|--|---|---|--|-----------------------|
| <i>Doha FDPS to UAE ACC FDPS</i> | | | | |
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Activate start up TST009 (OTBD – OMAA) SSR code:0007 ATYP:A320 XFL: 210 COP: NAMLA | SFPL is created by PAC. OLDI window pops up. OK / Not OK | Automatically generates PAC message OK / Not OK | |
| 02 | Enter estimate for TST010, (OEJN – OOMS) SSR Code: 0010 ATYP: B738 XFL: 230 COP: BUNDU ETX: Current time | SFPL is created by ABI. OLDI window pops up. OK / Not OK | Automatically generates ABI message OK / Not OK | |
| 03 | Enter estimate for TST011, (OEJN – OOMS) SSR Code: 0011 ATYP: B738 XFL: 230 COP: BUNDU ETX: Current time + 3 mins | SFPL is created by ACT. OLDI window pops up. OK / Not OK | Automatically generates ACT message OK / Not OK | |
| 04 | Check LAM messages | OK / Not OK | OK / Not OK | |

7. Test 007 ABI, ACT without FPL for Doha:

| Test 007 – ABI, ACT – No FPL for Doha FDPS | | | | |
|---|--|--|---|-----------------------|
| <i>UAE ACC FDPS to Doha FDPS</i> | | | | |
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Enter estimate for TST012, (TACT – OTBH) SSR Code: 0012 ATYP: K35R XFL: 220 COP: TOSNA ETN: Current time | Automatically generates ABI message OK / Not OK | FPL created by ABI and flags for ATCA attention. OK / Not OK | |
| 02 | Enter estimate for TST013, (OOMS – OTBD) SSR Code: 0013 ATYP: A321 XFL: 180 COP: MEKMA ETN: Current time -20 mins | Automatically generates ACT message OK / Not OK | FPL created by ACT and flags for ATCA attention. OK / Not OK | |
| 03 | Check LAM messages | OK / Not OK | OK / Not OK | |

8. Test 008 Duplicate SSR:

| Test 008 – Duplicate SSR | | | | |
|---------------------------------|--|---|---|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Create a FPL TST020 at Doha with SSR 0014 to block SSR code Enter estimate data for TST002 at UAE RDS (OMAM – OTBH) SSR Code : 0014 ETN: Current time XFL: 180 | OLDI message window pops up with a question mark on TST002 OK / Not OK | Duplicate SSR should be duly flagged to operator OK / Not OK | |
| 02 | Create a FPL TST030 at UAE RDS with SSR 0015 to block SSR code Enter estimate data for TST008 at Doha (OTBD – OOMS) SSR Code : 0015 ETN: Current time XFL: 230 | OLDI message window pops up with a question mark on TST008 OK / Not OK | Duplicate SSR should be duly flagged to operator OK / Not OK | |

9. Test 009 Communication failure:

| Test 009 – Communication failure | | | | |
|---|-------------------------|--|--|----------------|
| <i>No</i> | <i>Test description</i> | <i>UAE ACC FDPS</i> | <i>Doha FDPS</i> | <i>Remarks</i> |
| 01 | Simulated link failure | OLDI messages that are not coordinated will move from Active to Workqueue OK / Not OK | Failures should be duly flagged to operator OK / Not OK | |

10. Test Flight plans:

a. TST001 (OMAA – OTBD)

(FPL-TST001-IS
-A320/M-SDFHIJLOPRVWY/SD
-OMAA0655
-N0415F220 TOXIG Z994 VEBAT P899 MEKMA DCT NAJMA DCT DOH
-OTBD0030 OEDF
-PBN/A1B1C1D1L1O1S1 NAV/GPSRNAV DOF/13???? REG/A6TST
EET/OMAE0008 OBBD0020 SEL/ARKQ OPR/TST RMK/TEST FPL)

b. TST002 (OMAM – OTBH)

(FPL-TST002-IM
-C17/H-SGHJPRWXYZ/SD
-OMAM0820
-N0454F280 DCT MA270020 DCT MA285032 DCT DASLA Z994 BUNDU B415
DOH
DCT
-OTBH0032 OMAM
-PBN/A1B1C1D1L1O1S1 NAV/GPSRNAV DOF/13???? REG/A6TST
EET/OBBD0019 SEL/CFPR NAV/RNP10 RNAV1 RNAV5 RNVD1E2A1
RMK/TEST FPL)

c. TST003 (OMAA – OEJN)

(FPL-TST003-IS
-A320/M-SDGHIJLPRWXY/S
-OMAA0800
-N0467F220 TOXIG Z994 BUNDU B415 DOH A415 KIA G782 RGB/N0461F360
UM309 RABTO G782 ASLAT DCT
-OEJN0201 OEMA
-PBN/A1B1C1D1L1O1S1 NAV/GPSRNAV DAT/SV DOF/13???? REG/A6TST
EET/OMAE0009 OBBD0021 OEJD0044 SEL/BMAR RMK/TCAS
EQUIPPED RMK/TEST FPL)

d. TST004 (OOMS – OTBD)

(FPL-TST004-IS
-A320/M-SDFHIJLOPRVWY/SD
-OOMS0655
-N0458F320 MCT L764 PAXIM P899 ITRAX ALN P899 DASLA/N0440F260
Z994
VEBAT/N0424F220 P899 MEKMA DCT NAJMA DCT DOH
-OTBD0057 OMAA
-PBN/A1B1C1D1L1O1S1 DAT/V NAV/TCAS DOF/13???? REG/A6TST
EET/OMAE0023 OBBD0047 SEL/GLEH RMK/TEST FPL)

e. TST005 (OTBD – OMDB)

(FPL-TST005-IS

-B738/M-SHPRWXYIGZ/S
-OTBD1230
-N0390F210 DOH L305 ITITA L308 DESDI DESDI4T
-OMDB0049 OMRK OMAL
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST
EET/OMAE0015 SEL/HQER RMK/TEST FPL)

f. TST006 (OTBH – OMDM)

(FPL-TST006-IM
-C130/M-SHITUY/S
-OTBH1000
-N0311F150 UL305 ALSEM L305 ITITA L308 SHJ DCT
-OMDM0059 OBBI
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST
EET/OMAE0020 RMK/TEST FPL)

g. TST007 (OEJN – OMAD)

(FPL-TST007-IN
-GLF4/M-SDGHIRVWXY/S
-OEJN0600
-N0458F210 JDW T532 KIA B418 ASPAN N318 XAKUM Q666 BOXAK DCT
-OMAD0212 OMAL
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST EET/OBBB0113 OMAE0151
RMK/TEST FPL)

h. TST008 (OTBD – OOMS)

(FPL-TST008-IS
-A320/M-SDFHIJLOPRVWY/SD
-OTBD0630
-N0466F310 B415 AFNAN B415 ADV N685 LAKLU G216 MCT DCT
-OOMS0103 OMAL
-PBN/A1B1C1D1L1O1S1 NAV/RNAV1 RNAV5 RNP4 RNP10 RNP5
RNVD1E2A1 DOF/13???? REG/A6TST EET/OBBB0007 OMAE0012
OOMM0038 SEL/GLEH RMK/TEST FPL)

9. BILATERAL AGREEMENT TEMPLATE

Bilateral Agreement Template to be appended to the main Letter of Agreement (LoA) Template
Please choose the appropriate OLDI or AIDC.

NOTE:

This part of the LOA only to be used as guidance it is related to the Automatic data exchange either OLDI or AIDC which are attachments 1 and 2 respectively to Appendix C of the complete letter of agreement.

Appendix C (1)

Exchange of Flight Data

(With automatic data exchange)

Unit 1

Revision: xxxx

Effective: xx xxxx xxxx

Revised: xxx

Unit 2

C.1 General

C.1.1 Basic Flight Plans

Basic flight plan data should normally be available at both ATS Units.

C.1.2 Current Flight Plan Data

Messages, including current flight plan data, shall be forwarded by the transferring ATS unit to the accepting ATS unit either by automatic data exchange or by telephone to the appropriate sector/position.

C.1.2.1 Automatic Data Exchange.

The messages (List agreed message for OLD e.g. ABI/ACT/LAM/PAC/REV/MAC messages are exchanged between the two ATS units in accordance with Attachment 1 or Attachment 2 to Appendix C.

C.1.2.2 Verbal Estimates.

For conditions that are not supported by the automatic data exchange, verbal estimates will be exchanged.

A verbal estimate shall be passed to the appropriate sector at the accepting ATS unit at least value minutes prior, but not earlier than 30 minutes before the aircraft is estimated to pass the transfer of control point.

A verbal estimate shall contain:

- a) Callsign.

Note: To indicate that the flight plan is available, the accepting ATS unit should state aircraft type and destination after having received the callsign.

b) SSR code:

Note: Normally, the notification of a SSR code indicates that the selection of that code by the aircraft was verified.

c) ETO for the appropriate COP as laid down in Appendix D to this LoA.

d) Cleared level, specifying climb or descent conditions if applicable, at the transfer of control point.

Requested level if different from cleared level.

e) Other information, if applicable.

Normally, verbal estimates will not be passed in parallel with ACT messages.

In all cases, verbally passed data shall take precedence over data exchanged automatically.

C.1.2.3 **Failure of Automatic Data Exchange.**

In the event of a failure which prevents the automatic transfer of data, the Supervisors shall immediately decide to revert to the verbal exchange of estimates.

After recovery from a system failure, the Supervisors shall agree as to when they will revert to automatic data exchange.

C.1.3 **Non-availability of Basic Flight Plan Data**

If the accepting ATS unit does not have basic flight plan data available, additional information may be requested from the transferring ATS unit to supplement the ACT message or a verbal estimate.

Within the context of RVSM, such additional information should include:

a. the RVSM approval status of the aircraft; and

b. whether or not a non-RVSM approved aircraft is a State aircraft.

C.1.4 **Revisions**

Any significant revisions to the flight data are to be transmitted to the accepting ATS unit. Time differences of value minutes or more are to be exchanged.

Any levels which different than describe in Appendix D of this LOA are subject to an Approval Request.

C.1.5 **Expedite Clearance and Approval Requests**

Whenever the minimum time of value minutes for a verbal estimate, or those prescribed in Attachment 1 to Appendix C for ACT messages, cannot be met, either an expedite clearance request, an approval request (*or a PAC*), as appropriate, shall be initiated.

C.2 **Means of Communications and their Use**

C.2.1 **Equipment**

The following lines are available between Unit 1 and Unit 2:

| Line Type | Amount | Additional Information |
|-----------------|--------|------------------------|
| Data Line | | |
| Telephone Lines | | |

“Additional Information” column should indicate if telephone lines meet the requirements for Direct Controller-Controller Voice Communication (DCCVC) or Instantaneous Direct Controller-Controller Voice Communication (ICCVV)

C.2.2 Verbal Co-ordination

All verbal communications between non-physically adjacent controllers should be terminated with the initials of both parties concerned.

Exchange of flight plan data, estimates and control messages by voice shall be carried out in accordance with the following tables:

C.2.2.1 Messages from Unit 1 to Unit 2.

| Receiving Sector/COPs | Message | Position |
|-------------------------|--|----------|
| Sector Name COPs | Flight Plan Data and Estimates | |
| | Control Messages, Expedite Clearances, Approval Requests and Revisions | |
| | Surveillance Co-ordination | |

C.2.2.2 Messages from Unit 2 to Unit 1.

| Receiving Sector/COPs | Message | Position |
|-------------------------|---|----------|
| Sector Name COPs | Flight Plan Data and Estimates | |
| | Control Messages, Expedite Clearances, Approval Requests and Revisions | |
| | Surveillance Co-ordination | |

C.3 Failure of Ground/Ground Voice Communications

C.3.1 Fall-Back Procedures for Co-ordination

To mitigate the effects of failures of direct speech circuits, both parties will establish and maintain dial-up facilities via PABX and ATC Voice Communications Systems (VCS) as follows:

Sector Name Tel Number (For Both Units)

Stand-alone telephones with auto-dial facilities will be maintained as a second level of fall-back to cover the event of failure of PABX or VCS:

Sector Name Tel Number (For Both Units)

C.3.2 Alternate Fall-Back Procedures for Co-ordination

In case of communications failure where the alternatives described in paragraph C.3.1 above are not available or practicable, pilots shall be instructed, at least 5 minutes prior to the transfer of control point, to pass flight data on the appropriate frequency of the accepting ATS unit for the purpose of obtaining an ATC entry clearance from the accepting ATS unit.

If the accepting ATS unit cannot issue an entry clearance to the pilot upon his initial contact, the pilot shall be instructed to inform the transferring ATS unit accordingly via RTF.

The transferring ATS unit shall hold the aircraft within its AoR and after a minimum of 10 minutes instruct the pilot to re-establish RTF contact with the accepting ATS unit.

This procedure shall be repeated until an onward clearance has been obtained from the accepting ATS unit.

C.4 Validity

This Appendix to the LoA takes effect on xxx xxxx xxxx and supersedes previous Appendix to Letter of arrangements between the Unit 1 and Unit 2.

Date:

Date:

Name

Name

Title

Title

Authority 1

Authority 2

Attachment 1 to Appendix C

Automatic Data Exchange related to OLDI

ABI/ACT/LAM messages are exchanged between the two ATS units in accordance with the table below:

| Messages | COPs | Time and/or Distance Parameters | |
|----------|------|-----------------------------------|-----------------------------------|
| | | Messages from Unit 1 To Unit 2 | Messages from Unit 1 To Unit 2 |
| ABI | | | |
| ACT | | | |
| LAM | | | |
| REV | | | |
| PAC | | | |
| MAC | | | |
| LOF | | | |
| NAN | | | |

Attachment 2 to Appendix C

Automatic Data Exchange related to AIDC

This is the Generic Template available in the PAN which also contain real sample agreement Auckland Oceanic – Brisbane ATS Centre and Auckland Oceanic – Nadi ATM Operations Centre

AIDC Procedures

1. The format of AIDC messages (*List messages used e.g. ABI, PAC, CDN, CPL, ACP, REJ, MAC, LAM and LRM*) are as defined by the Pan Regional (NAT and APAC) AIDC Interface Control Document (ICD) as amended from time to time, unless described otherwise in this LOA.
2. List messages not supported (*e.g. "EST, TOC, AOC messages are not supported"*).
3. Acceptance of CPL or CDN message is approval of the flight's profile and requires no further voice communication (i.e. Non-Standard Altitudes, Block Altitudes, and Deviations).
4. (*Describe other procedures applicable to the use of AIDC for this LOA. Some examples are listed below*)
 - a. *Example only. If there is any doubt with regard to the final coordination data, voice coordination should be used for confirmation.*
 - b. *Example only. Receipt of a MAC message must not be interpreted as meaning that the flight plan has been cancelled. Voice coordination must be conducted by the transferring controller to confirm the status of the flight.*
 - c. *Example only. Each facility should advise the other facility of any known equipment outage that affects AIDC. In the event of AIDC outage, voice communication procedures will apply.*
 - d. *Example only. Truncation. Where route amendment outside the FIR is unavoidable.*
 - i. *Terminate the route details at the farthest possible flight plan significant point of the flight and enter "T" immediately following this.*
 - ii. *Without amending the originally received details, every effort is to be made to truncate the route at a minimum of one significant point beyond the adjacent FIR to provide an entry track in that FIR.*

AIDC Messages

(For each message used describe when it will be sent by each ATSU under the parameter column and use the Notes column to describe other applicable information for the message use by each ATSU. The data below provides an example of the type of information that could be incorporated.)

| Messages | Parameter | Notes |
|----------|--|--|
| ABI | <p>ATSUI: Sends ABI approx. 80 minutes prior to boundary (73 minutes prior to the 50 nm expanded sector boundary).</p> <p>ATSU2: Sends ABI approx. 87 minutes prior to boundary (80 minutes prior to the 50 nm expanded sector boundary). (Note: An updated ABI will not be sent once a CPL has been sent.)</p> | <p>ATSUI : ATSU2 Updated ABI's will be sent automatically if there is any change to profile. ABI is sent automatically and is transparent to the controller. ABI automatically updates the receiving unit's flight data record.</p> |
| CPL | <p>ATSUI : ATSU2 Send CPL messages approx. 37 minutes prior to the boundary (30 minutes prior to the 50 nm expanded sector boundary).</p> | <p>ATSUI : ATSU2 CPL messages should be sent by the transferring controller in sufficient time to allow the completion of coordination at least 30 minutes prior to the boundary or 30 minutes prior to the aircraft passing within 50nm of the FIR boundary for information transfers.</p> |
| CDN | <p>ATSUI : ATSU2 CDN messages are sent by either the transferring or receiving facility to propose a change once the coordination process has been completed, i.e., CPL sent and ACP received. CDN's must contain all applicable profile restrictions (e.g. weather deviations, speed assignment, block altitude). If the use of a CDN does not support this requirement, then verbal coordination is required.</p> | <p>ATSUI : ATSU2 The APS will display a flashing "DIA" until receipt of ACP. If ACPJ not received within ten (10) minutes, controller is alerted with a message to the queue. CDN messages are not normally used for coordination of reroutes; however, with the receiving facilities approval a CDN may be used to coordinate a reroute on a critical status aircraft such as in an emergency.</p> |
| PAC | <p>ATSUI : ATSU2 PAC messages will normally be sent when the time criteria from the departure point to the boundary is less than that stipulated in the CPL.</p> | <p>ATSUI : ATSU2 Will respond to a PAC message with an ACP. PAC messages should be verbally verified with receiving facility.</p> |
| ACP | <p>ATSUI : ATSU2</p> | <p>ATSUI : ATSU2 The APS will display a flashing "DIA" until receipt of ACP. If ACP not received within ten (10) minutes, controller is alerted with a message to the queue.</p> |
| TOC | <p>ATSUI : ATSU2 Not supported. Implicit hand in/off.</p> | |
| AOC | <p>ATSUI : ATSU2 Not supported. Implicit hand in/off.</p> | |
| MAC | <p>ATSUI : ATSU2 MAC messages are sent when a change to the route makes the other facility no longer the "next" responsible unit.</p> | <p>ATSUI : ATSU2 Receipt of a MAC message must not be interpreted as meaning that the flight plan has been cancelled. Voice coordination must be conducted by the transferring</p> |

| | | |
|------------|--|---|
| | | <i>controller to confirm the status of the flight.</i> |
| <i>REJ</i> | <i>ATSU1 : ATSU2 REJ messages are sent in reply to a CDN message when the request change is unacceptable</i> | <i>ATSU1 : ATSU2 REJ messages are sent only as a response to a CDN message.</i> |

AIDC Messages

(For each message used describe when it will be sent by each ATSU under the parameter column and use the Notes column to describe other applicable information for the message use by each ATSU. The data below provides an example of the type of information that could be incorporated.)

| Messages | Parameter | Notes |
|-----------------|--|--|
| <i>ABI</i> | <p>ATSU1: Sends ABI approx. 80 minutes prior to boundary (73 min prior to the 50 nm expanded sector boundary).</p> <p>ATSU2: Sends ABI approx. 87 minutes prior to boundary (80 min prior to the 50 nm expanded sector boundary).</p> <p><i>(Note: An updated ABI will not be sent once a CPL has been sent.)</i></p> | <p>ATSU1 : ATSU2</p> <p><i>Updated ABI's will be sent automatically if there is any change to profile. ABI is sent automatically and is transparent to the controller. ABI automatically updates the receiving unit's flight data record.</i></p> |
| <i>CPL</i> | <p>ATSU1 : ATSU2</p> <p><i>Send CPL messages approx 37 minutes prior to the boundary (30 minutes prior to the 50 nm expanded sector boundary).</i></p> | <p>ATSU1 : ATSU2</p> <p><i>CPL messages should be sent by the transferring controller in sufficient time to allow the completion of coordination at least 30 minutes prior to the boundary or 30 minutes prior to the aircraft passing within 50nm of the FIR boundary for information transfers.</i></p> |
| <i>CDN</i> | <p>ATSU1 : ATSU2</p> <p><i>CDN messages are sent by either the transferring or receiving facility to propose a change once the coordination process has been completed, i.e., CPL sent and ACP received. CDN's must contain all applicable profile restrictions (e.g. weather deviations, speed assignment, block altitude). If the use of a CDN does not support this requirement, then verbal coordination is required.</i></p> | <p>ATSU1 : ATSU2</p> <p><i>The APS will display a flashing "DIA" until receipt of ACP. If ACPJ not received within ten (10) minutes, controller is alerted with a message to the queue.</i></p> <p><i>CDN messages are not normally used for coordination of reroutes; however, with the receiving facilities approval a CDN may be used to coordinate a reroute on a critical status aircraft such as in an emergency.</i></p> |

| | | |
|------------|---|---|
| <i>PAC</i> | <i>ATSUI : ATSU2</i> <i>PAC messages will normally be sent when the time criteria from the departure point to the boundary is less than that stipulated in the CPL.</i> | <i>ATSUI : ATSU2</i> <i>Will respond to a PAC message with an ACP. PAC messages should be verbally verified with receiving facility.</i> |
| <i>ACP</i> | <i>ATSUI : ATSU2</i> | <i>ATSUI : ATSU2</i> <i>The APS will display a flashing “DIA” until receipt of ACP. If ACP not received within ten (10) minutes, controller is alerted with a message to the queue.</i> |
| <i>TOC</i> | <i>ATSUI : ATSU2</i> <i>Not supported. Implicit hand in/off.</i> | <i>ATSUI : ATSU2</i> |
| <i>AOC</i> | <i>ATSUI : ATSU2</i> <i>Not supported. Implicit hand in/off.</i> | |
| <i>MAC</i> | <i>ATSUI : ATSU2</i> <i>MAC messages are sent when a change to the route makes the other facility no longer the “next” responsible unit.</i> | <i>ATSUI : ATSU2</i> <i>Receipt of a MAC message must not be interpreted as meaning that the flight plan has been cancelled. Voice coordination must be conducted by the transferring controller to confirm the status of the flight.</i> |
| <i>REJ</i> | <i>ATSUI : ATSU2</i> <i>REJ messages are sent in reply to a CDN message when the request change is unacceptable</i> | <i>ATSUI : ATSU2</i> <i>REJ messages are sent only as a response to a CDN message.</i> |

10. IMPLEMENTATION PHASES

In line with ASBU Block 0 time lines, the AIDC/OLDI implementation shall be completed as per the MID Air Navigation Plan. In order to support and assist, the implementation could be accomplished in phases listed below. The actual targets set for the MID Region are in the MID Air Navigation Strategy.

| | |
|---------|---|
| Phase 1 | <ul style="list-style-type: none"> • OLDI/AIDC capable ATSUs should start implementation activities. The activity should cover the following: <ul style="list-style-type: none"> ➤ test activities ➤ operator training ➤ Revision of LoA ➤ transition activities ➤ implementation ➤ post-implementation reviews • The ATSUs not capable of OLDI/AIDC should avail the facility of Standalone terminals with a planned implementation asap, and budget for full Integration with a planned implementation date of the MID Air Navigation Strategy. |
| Phase 2 | <ul style="list-style-type: none"> • The ATSUs using OLDI/AIDC in an Operational environment should assist other ATSUs to implement OLDI/AIDC • The OLDI/AIDC software is readily available therefore the ATSUs waiting for software upgrade should expect a software package asap. On receipt of it they should start implementation activities. The activity should cover the following: <ul style="list-style-type: none"> ➤ test activities ➤ operator training ➤ Revision of LoA ➤ transition activities ➤ implementation ➤ post-implementation reviews |
| Phase 3 | <ul style="list-style-type: none"> • All ATSUs are connected by Integrated OLDI/AIDC or Standalone terminals |

APPENDIX 4G

SURVEILLANCE/MICA WORKSHOP

Summary of Discussions

(Cairo, Egypt, 26-28 February 2019)

PARTICIPATION

25 participants from 6 States (Egypt, Iran, Iraq, Qatar and Sudan) and 2 Organizations.
The workshop supported by EUROCONTROL.
Aireon participated via Webex

WORKSHOP OBJECTIVES

The objectives of the Workshop were to:

- 1) provide an overview of the Mode S principle and operation, the SSR Radio frequency, Avionic Monitoring, and the new Surveillance Standards;
- 2) provide the MICA Operators in the MID Region with necessary information to implement MICA processes efficiently; and
- 3) review and update the Draft MID Region Surveillance Plan.

DISCUSSIONS

The Workshop:

- was apprised of the Mode S principles; lockout, Radar coverage, clusters, IC codes, Elementary and enhanced Surveillance;
- noted MICA process and cycle, EUROCONTROL MICA website was presented;
- reviewed and updated MICA focal points in the MID Region;
- was apprised of the II and SI codes use, operation and allocation;
- noted IC Conflict causes and Management process;
- was apprised of Mode S Radar programming to reduce their contribution to 1030/1090MHz RF band usage;
- was apprised of the radar systems use the shared RF band 1030/1090, examples in Europe and simulation of future use;
- highlighted the impact of the Small Unmanned Aircraft System (sUAS) equipped ADS-B operation on Aircraft detection;
- was apprised of the space based ADS-B technology; constellation, coverage and validation algorithm; and
- noted that EU mandates ADS-B carriage version 2 for IFR flight and aircraft more than 5700kg from 2020.

CONCLUSIONS

- No IC allocation needed for mobile Mode S radars and WAM/MLAT (II Code 0).
- In the ICAO MID Region, II codes and matching SI codes are still not allocated to Mode S radar with overlapping coverage.
- EMS Coverage maps allocated by the MICA Cell when supported by Mode S radar and reported in the IC application. Otherwise, range per sector is provided.
- When IC conflict is detected, the Focal Point has to provide the necessary assistance and advice to achieve an early resolution of the IC conflict.

- Radar detection of outbound traffic and not inbound, would be a symptom of IC Code conflict (delayed acquisition of incoming aircraft by Mode S radar).
- Target disappearance could be resulted from transponder over interrogations, so it will be unable to reply to other interrogations. As too many interrogations may prevent the transponder to reply to some of them, and has an impact on surveillance systems.
- The output power and density of sUAS equipped ADS-B could impact the detection range of Aircraft.
- The detection range of aircraft decreases when the ADS-B squitter rate and/or number of aircrafts in sky increase.
- The importance to verify that transponders are not subject to excessive rate of interrogations (below ICAO minimum reply rate capability (50 reply/s)) was highlighted.
- ADS-B version 2 provides good position indicators.
- Space-based ADS-B provides more than a single source ADS-B (ground based ADS-B). With the redundancy of the satellite coverage the same message is received by more than 1 satellite, that means that space based ADS-B is not only providing to the ANSP the ADS-B message, but it is able also to validate the position of that message, independently from GPS or transponder quality. To do the same with ground stations, a complete WAM system will be required, with at least 3 sensors looking at the same target.
- Single source ADS-B means that an ADS-B coverage coming from a single ground sensor. In this case, if a transponder has a bad quality, the ANSP has no way to validate the position.
- Space based ADS-B does not require any modification on board of an ADS-B equipped aircraft. it is capable to receive ADS-B messages from all ADS-B transponder, so v.0, v.1, v.2.
- The Hardware needed by ANSP is the Service Delivery Point, a simple redundant router and server. As for data distribution, dual MPLS line can be used to connect SDP to the Space based ADS-B domain. If MPLS will not be available, a dedicated solution has to be investigated.

RECOMMENDATIONS

- States shall request coordinated IC code(s) and coverage map(s) (Surveillance and lockout) before start of operation, preferably one year in advance.
- States to plan carefully using active MLAT in order not to generate excess 1030/1090MHz FRUIT; and not to over occupy the Transponder (due to selective interrogations).
- States to monitor, if possible, the transmission on 1030/1090MHz to make sure that Aircraft are not over-interrogated (ICAO annex 10, Vol VI, section 3.1.2.10.3.7.3 & section 3.1.1.7.9.1).
- States to program radar to extract needed BDS register Data and not to extract unused ones.
- For the safety of the air traffic surveillance system, the coverage of two Mode S radars using the same IC shall not overlap.
- Target disappearance is a safety related issue, fall-back procedure should be in place including lockout override.
- ICAO MID to coordinate with IATA to get statistics on the percentage of SI equipped aircraft in the MID Region.
- Regulators and Radar Operators are encouraged to register to MICA website.
- ICAO MID to consider addressing the impact of vehicles equipped ADS-B (ex. sUAS, gladder, airports vehicles, etc.) on 1090MHz RF environment in future relevant Workshops.
- CNS SG/9 to consider requiring that Mode S Radars support the use of II/SI code operation.
- MID Region to consider allocating II code and matching SI for Military.

APPENDIX 4H



MID Region Surveillance Plan

Version 0.3

24/4/2018

DRAFT

Developed by

COMMUNICATION, NAVIGATION AND SURVEILLANCE SUB-GROUP
(CNS SG)

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1- BACKGROUND

Aeronautical surveillance systems are major elements of modern air navigation infrastructure required to safely manage increasing levels and complexity of air traffic. The sixteenth meeting of Air Navigation Planning and Implementation Regional Group in the Middle East (MIDANPIRG/16) tasked the CNS SG through Decision 16/24 to develop the MID Region Surveillance Plan based on the Regional operational requirements, Users' capabilities and specificities of the Region:

DECISION 16/23: MID REGION SURVEILLANCE PLAN

That, the MID Region Surveillance Plan be developed by the CNS SG, based on the operational needs identified by the ATM SG.

The global Air Navigation Plan (GANP) through B0-ASUR, defined the possibility of using lower cost ground surveillance supported by new technologies such as ADS-B OUT and Wide Area Multilateration (MLAT) systems.

This document reviews the available surveillance technologies and highlight their strengths and weaknesses. The plan timelines are divided into three stages; short-term until 2020, mid-term from 2021 to 2025, and long-term beyond 2025.

2- INTRODUCTION

The surveillance service delivered to users may be based on a mix of three main types of surveillance:

- a) independent non-cooperative surveillance: the aircraft position is derived from measurement not using the cooperation of the remote aircraft; like Primary Surveillance Radar (PSR);
- b) independent cooperative surveillance: the position is derived from measurements performed by a local surveillance subsystem using aircraft transmissions. Aircraft derived information (e.g., pressure altitude, aircraft identity) can be provided from those transmissions, like Secondary Surveillance Radar (SSR) and Multilateration; and
- c) dependent cooperative surveillance: the position is derived on board the aircraft and is provided to the local surveillance subsystem along with possible additional data (e.g., aircraft identity, pressure altitude). Like Automatic Dependent Surveillance-Broadcast (ADS-B) and Automatic Dependent Surveillance-Contract (ADS-C).

The main applications of ATC Surveillance in civil aviation are:

- 1- Aerodrome Control Service;
- 2- Approach Control Service; and

- 3- Area Control Service.
- 4- Surface/ Ground Management

3- SURVEILLANCE IN GANP

The GANP addressed the emerging Surveillance technologies through the thread Alternative Surveillance in block 0 (B0-ASUR), the technologies laid down in that module are ADS-B Out and MLAT.

The lower costs of dependent surveillance infrastructure (ADS-B and MLAT) in comparison to conventional radars support business decisions to expand radar-equivalent service volumes and the use of radar-like separation procedures into remote or non-radar areas.

The eleventh Air Navigation Conference recommended ADS-B on 1090MHz for international use and this is happening. Equipage rate is growing together with Mode S, airborne collision avoidance system (ACAS) and ADS-B OUT mandates. ADS-B OUT, Version 2 also provides ACAS RA DOWNLINK information.

The GANP Surveillance roadmap is depicted in figure (1).

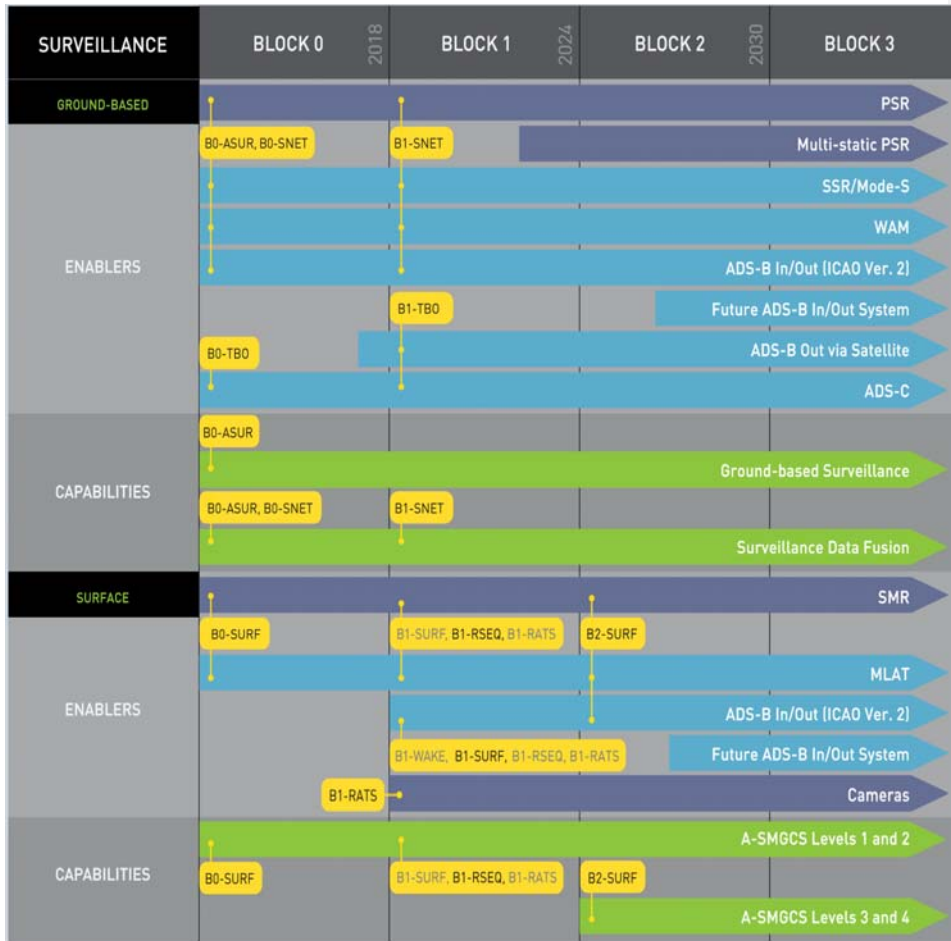


Figure (1)

4- SURVEILLANCE TECHNOLOGIES

4-1 PRIMARY RADAR

Primary Surveillance Radar (PSR) derives aircraft position based on radar echo returns, PSR transmits a high-power signal, some of which is reflected by the aircraft back to the radar. The radar determines the aircraft's position in range from the elapsed time between transmission and reception of the reflection.

Surface Movement Radar (SMR) is the most widely used non-cooperative surveillance system for aerodrome surveillance. SMR is a primary radar that provides surveillance cover for the manoeuvring area, which is defined as that used for the

take-off, landing and taxiing of aircraft. In A-SMGCS, the non-cooperative surveillance service is typically provided by one or several SMRs.

Millimetre radar is an emerging technology used for aerodrome surveillance which provides higher resolution than traditional SMR. Millimetre Radar and SMR can be used for FOD Detection.

The strengths and weaknesses below are related to the PSR.

4-1-1 Strengths

- ✚ independent Radar, does not require any specific equipment of the aircraft (Transponder).

4-1-2 Weaknesses

- ✚ does not provide the identity or the altitude of the Aircraft
- ✚ cannot be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ PSR has a heavy reliance on mechanical components with large maintenance requirements
- ✚ high CAPEX
- ✚ can report false target
- ✚ depends on the cross section of the target
- ✚ Silence Cone
- ✚ [Requires high transmission power.](#)

4-2 SECONDARY SURVEILLANCE RADAR (SSR/MSSR)

A surveillance radar system which uses transmitters/receivers (interrogators) and transponders.

4-2-1 Strengths

- ✚ receive aircraft data for barometric altitude, identification code
- ✚ depends on Reply pulses, which are stronger than echo signals used in Primary Radar.
- ✚ Separate frequency spectrum for transmission and reception, Clutter reduction

4-2-2 Weaknesses

- ✚ high CAPEX
- ✚ cannot be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ has a heavy reliance on mechanical components with large maintenance requirements
- ✚ Silence Cone

4-3 MODE S RADAR

An enhanced mode of SSR that permits selective interrogation and reply capability.

4-3-1 Strengths

- ✚ improve shortage and constraints in Mode Δ codes (Aircraft ID)
- ✚ backward compatible with transponder mode A/C
- ✚ ability to download enhance surveillance information
- ✚ increase in data integrity by the use of a parity check mechanism.
- ✚ high parametric altitude accuracy (Coding of altitude data in 25-foot increments).

4-3-2 Weaknesses

- ✚ has a heavy reliance on mechanical components with large maintenance requirements
- ✚ cannot be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ high CAPEX
- ✚ Silence Cone

4-4 ADS-B

Dependent surveillance is an advanced surveillance technology that allows avionics to broadcast an aircraft's identification, position, altitude, velocity, and other information.

4-4-1 Strengths

- ✚ improve shortage and constraints in Mode Δ codes (Aircraft ID)
- ✚ Low cost
- ✚ Easy to maintain
- ✚ The non-mechanical nature of the ADS-B ground infrastructure make it easy to relocate and maintain.
- ✚ it to be sited in locations that are difficult for radar installations, like hilly areas, filling the surveillance gap between radar coverage
- ✚ provide radar-like separation procedures into remote or non-radar areas
- ✚ Use of dependent surveillance also improves the search and rescue support provided by the surveillance network, ADS-B's positional accuracy and update rate allows for improved flown trajectory tracking allowing for early determination of loss of contact and enhances the ability for search and rescue teams to pinpoint the related location
- ✚ no Silence Cone

4-4-2 Weaknesses

- ✚ aircraft must be equipped with ADS-B OUT
- ✚ dependent on GNSS, outage of GNSS affect ADS-B

4-5 ADS-C

The aircraft uses on-board navigation systems to determine its position, velocity and other data. A ground ATM system establishes a “contract” with the aircraft to report this information at regular intervals or when defined events occur. This information is transmitted on point-to-point data links.

4-5-1 Strengths

- ✚ can be easily sited in oceanic locations, or rough terrain such as in mountainous regions
- ✚ does not need ground infrastructure
- ✚ minimal cost at ANSP
- ✚ use of dependent surveillance also improves the search and rescue support provided by the surveillance network

4-5-2 Weaknesses

- ✚ high cost per report, as the airline use third party network.
- ✚ long latency when satellite used.

The ADS-C used in Oceanic and remote areas (non-Radar area), therefore, it will be excluded in the next section as it's not applicable in the MID Region.

4-6 MLAT

MLAT is a system that uses currently existing aircraft transponder signals to calculate, usually as a minimum, a three-dimensional position. it requires a minimum of four receiving stations to calculate an aircraft's position. If the aircraft's pressure altitude is known then the position may be resolved using three receiving stations.

MLAT can act in two modes; Passive mode where it uses the existing transmissions made by the aircraft, or active mode, [one interrogator \(at least\)](#) to trigger replies in the manner of Mode S SSR interrogations.

The technique is used to provide surveillance over wide area (wide area MLAT system - WAM).

4-6-1 Strengths

- ✚ can make use of currently existing aircraft transmissions, does not requires specific avionic.
- ✚ improve shortage and constraints in Mode A codes (Aircraft ID)

✚ provides a transition to an environment where the majority of aircraft will be equipped with ADS-B.

✚ no Silence Cone.

✚

4-6-2 Weaknesses

✚ requires multiple sensors to calculate aircraft's positions

✚ high running cost; including maintenance; telecommunication; multiple secured sites

✚ needs a common time reference to determine the relative TOA of the signal at the receiving stations (time-stamped by a common clock or synchronism by a common reference such as GNSS)

4-7 SURVEILLANCE CAMERAS

Surveillance Camera can be used to send High-resolution images at the airport to a workstation in the control tower. Surveillance Camera is an enabler to run remotely aerodrome control as in ASBU module B1-RATS. The air traffic controller can monitor air traffic via screens which provide an image that corresponds to the view through the window in a traditional control tower.

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5- COMPARISON BETWEEN SURVEILLANCE TECHNOLOGIES

| | PSR | MSSR | Mode S | ADS-B | MLAT |
|--------------------------|--|---|--|--|--|
| 1)Required Avionics | No avionics required | Transponder is required Mode A/C | Transponder is required Mode S transponder | Transponder is required ADS-B or 1090 ES (Mode S + ADS-B) | Transponder is required Can process data from all ADS-B/ES, Mode S, Mode A/C |
| 2)Information Provided | Range and Azimuth | mode A codes, Pressure altitude | mode A codes; Pressure altitude; 24-bit address of the aircraft; aircraft "on-the-ground" status; aircraft ID; aircraft pressure-altitude with 25-ft resolution; and other information | Position, flight level (barometric), position integrity, geometric altitude (GPS altitude), 24 bit unique code, Flight ID, velocity vector, vertical rate, emergency flags, aircraft type category | Position, flight level (barometric), calculated altitude, 4 digit octal identity, calculated velocity vector +mode s data |
| 3)Accuracy & update rate | <u>Moderately high update rate</u> Accuracy depends on target cross-section and range | <u>moderately high update rate and high accuracy dependent on range</u> | <u>dependent on range</u> <u>Moderately high update rate and high accuracy</u> | High accuracy ,inherent accuracy of the GPS determined position, and very high update rate | High accuracy at Local Area (LAM), less accurate for Wide Area (WAM) Some MLAT has its own of source of synchronization GNSS is critical for MLAT based on |

| | | | | | |
|---|---|---|---|---|--|
| | | | | | GNSS for time provision. |
| 4)Coverage | Up to 250 NM | 250 NM | 250 NM | 250 NM Traffic density can affect the coverage | **Depending on the geometry,number of sensors, hilly areas requires more sensors |
| 5)Failure effect | | Total loss of coverage | Total loss of coverage | Total loss of coverage | Partial or negligible, (N-1) principle |
| 6) Cost* | | | | | |
| 6.1 CAPEX | | | | | |
| Sensor Purchase | Very high | High | high | very low | Depending on geometry, for 15 sensors average cost is 5M\$ |
| Site requirement (Civil work, renting/buying land(s), fence,...., etc.) | One site required High cost of the tower | One site required High cost of the tower | One site required High cost of the tower | One site required Cost less | Multiple sites required |
| 6.2 OPEX | | | | | |
| Maintenance cost (periodic, preventive, emergency) | Heavy maintenance (mechanical parts) | Heavy maintenance (mechanical parts) | Heavy maintenance (mechanical parts) | Low maintenance cost | High maintenance costs to multiple sites |
| Telecommunication | Dual Telecom. connections | Dual Telecom. connections | Dual Telecom. connections | Dual Telecom. connections | Multiple Dual Telecom. |

| media | Required from the sensor site. to the ATM centre | Required from the sensor site to the ATM centre | Required from the sensor site to the ATM centre | Required from the sensor site to the ATM centre | connections Required From the sensors sites to the ATM centre |
|------------------------|--|---|---|---|---|
| Site physical Security | One secured site | One secured site | One secured site | One secured site | Multiple secured Sites |

**The cost does not take into consideration fleet equipage cost*

*** Number of MLAT sensor depends on geometry area and number of clusters, 15 sensors is an estimated number to cover flat 250 NM.*

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6. OPERATIONAL REQUIREMENTS

The need to increase the availability of Surveillance services and to cover the gap areas in the MID Region.

7. BASELINE IN THE MID REGION (2013-2018)

- All MID State uses SSR/MSSR, some States Uses PSR for Security and Safety purposes.
- Bahrain, Egypt, Oman and UAE implemented MLAT at International Aerodromes and Lebanon plan to do same.
- ADS-B has been implemented at some States as backup and complementary means to the MSSR in Egypt, Iraq, Jordan, Sudan and UAE.
- Bahrain has implemented ADS-B for Vehicle Tracking purpose.
- Bahrain, Egypt, Iraq, Jordan, Oman, Qatar, Sudan and UAE have installed SSR Mode S
- UAE issued ADS-B/Out carriage Mandate as of 01 January 2020, ADS-B IN capability shall not be carried unless approved by the GCAA.
- Saudi Arabia issued ADS-B/Out carriage Mandate as of 01 January 2020 for Class A and B.
- Other ICAO Regions/States mandated carriage of ADS-B; Australia, Europe and United States (FAA) in 2020.
- Several ADS-B mandates worldwide will accelerate the ADS-B equipage. However, Regional Airline, General flights and Military aircraft impeding the ADS-B implementation in the MID Region.

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8- SURVEILLANCE PLAN

8.1 Short Term (2018 – 2020)

- Make full use of SSR Mode 'S' capabilities, reduce reliance on 4-digit octal code.
- States to consider emerging dependent Surveillance technologies (ADS-B and MLAT) in their National Surveillance Plans.
- Non-cooperative Surveillance radars maybe retained for Airports and approach services based on States operational needs (detection drones, non-equipped vehicle,....,etc)?????
- ADS-B/Out Implementation:
 - 1- Prioritize ADS-B/Out implementation in areas where there is no radar coverage surveillance.

- 2- State ~~should~~shall conduct safety assessment for ADS-B/ MLAT implementation as per *Reference [5]*.
- 3- The proportions of equipped aircraft are critical for the ADS-B deployment, therefore, States should early involve Users, communicate the change, the rationale and the impact.
- 4- States are encouraged to use INCENTIVE strategy with stakeholders to accelerate ADS-B equipage; incentive approach might be financial or operational incentive or combined (e.g. Most Capable Best Served principle, waive fees).

- MLAT/SMR to be implemented at Aerodrome to enable A-SGMCS

8.2 Mid Term (2021-2024)

- ADS-B/Out Implementation (*High proportion of ADS-B equipage is anticipated*):
 - 1- ADS-B to be implemented for Area and approach Control Services, where implementation would bring capacity and operational efficiencies;
 - 2- Relocate, as appropriate, WAM Sensors to work as ADS-B receivers.
- States to share Radar/ADS-B data to improve boundary coverage and enhance the surveillance availability.
- Retain SSR Mode S Radar as backup to ADS-B
- MLAT/SMR/Camera to be implemented at Aerodrome for Ground/ Surface Management service.
- Surveillance Camera can be used to operate Remote Control Tower (B1-RTAS).

8.3 Long Term (2025 Onward)

- ADS-B is foreseen to be main Surveillance technology. The existence of Multi-constellation GNSS (GPS, Galileo, GLONASS, ..., etc.) reduces the likelihood of ADS-B outage.
- Implementation of Airborne Collision Avoidance System (ACAS) adapted to trajectory-based operations with improved surveillance

function supported by ADS-B aimed at reducing nuisance alerts and deviations.

- Airlines to upgrade ADS-B/Out Avionic to ADS-B in/out.

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- [5] ICAO circular 326, Assessment of ADS-B and Multilateration Surveillance to Support Air Traffic Services and Guidelines for Implementation
- [6] EUROCONTROL Standard Document for RADAR Surveillance in EN-Route Airspace and Major Terminal Areas.
- [7] Guidance Material on Comparison of Surveillance Technologies (GMST), APAC Region.

**EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION**



**Requirements process for
the coordinated allocation
and use of Mode S
Interrogator Codes in the
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EXECUTIVE SUMMARY

The introduction of SSR Mode S interrogators requires a coordinated approach to the allocation and implementation of the Interrogator Codes.

Provisions regarding the implementation and monitoring of Mode S IC allocations have been defined by ICAO.

In the ICAO European region, the management of the plan is exercised by EUROCONTROL on behalf of the European regional office of ICAO. EUROCONTROL has put in place a cell (the MICA Cell) to provide the centralised service of Interrogator Code (IC) allocation to Mode S Operators through their competent Focal Point. To support the coordinated allocation and implementation of the IC to Mode S interrogators in the ICAO European region, the Mode S IC allocation process has been formalized in the "EUROCONTROL Specification for the Mode S IC Allocation Coordination and IC Conflict Management" document.

Mode S interrogators are also installed in the ICAO Middle East region. The operational coverage of some of these interrogators is overlapping coverage of Mode S interrogators installed in the ICAO European region. In order to avoid any Mode S IC conflict with operational Mode S interrogator, it is therefore critical to coordinate the Mode S IC allocation in the ICAO Middle East region in close cooperation with the ICAO Middle East regional office. The Mode S IC allocation process applied in the ICAO European region will also be applied for IC allocation to Mode S interrogators in the ICAO Middle East region. This process is based on 168 days (approximately 6 months) cycles, aligned on AIRAC effective dates. The IC allocation to Mode S interrogators in the ICAO Middle East region and the ICAO European region will be processed together during the same MICA cycles.

This document defines processes applicable to the use of the centralised Mode S interrogator code allocation service in charge of coordinating interrogator code allocations within the ICAO Middle-East region. It specifies the detailed procedures for Mode S Operators to obtain a coordinated Mode S interrogator code and particularly the interfaces between the Mode S Operators, the ICAO Middle-East Regional Officer CNS acting as Focal Point for all competent States of ICAO Middle-East region, and the EUROCONTROL centralised Mode S interrogator code allocation service. State Focal Points can also be nominated in competent States of ICAO Middle-East region in order to support the ICAO Middle-East Regional Officer CNS in the coordination of all matters concerning the allocation of ICs with the Mode S Operators in the State.

This document also specifies the procedures in place to manage interrogator code conflicts and the resolution of issues with respect to the interrogator code allocation plan.

In addition, the IC allocation in the ICAO European region relies on required Mode S interrogator performances and airborne carriage. The last part of this document introduces recommended functionalities for Mode S interrogators and transponders which could compromise future IC allocations if not implemented in that region.

1. Introduction

1.1 Purpose of the document

The purpose of this document is to lay down recommendations and requirements for an efficient support of the EUROCONTROL MICA Cell to the allocation of Mode S Interrogator Code by the ICAO Middle East regional office.

It describes the process and procedures in order to coordinate the Mode S Interrogator Code (IC) allocation for Mode S interrogators, civil and military with a fixed position, within the International Civil Aviation Organisation (ICAO) Middle East (MID) region.

This document defines the procedures and the role of the following parties involved in the process:

- Mode S Operators
- ICAO MID regional office
- International Organisations
- MID Focal Point(s)
- State Focal Points
- EUROCONTROL Mode S IC Allocation Cell (hereinafter MICA Cell)

The document also describes the management and resolution of IC allocation and IC conflict issues.

1.2 Context

Whilst traditional Mode A/C Secondary Surveillance Radar (SSR) stations continuously interrogate all aircraft within their range, Mode S interrogators perform selective interrogations.

In order to avoid ambiguity in the operation of the system it is essential that each eligible Mode S interrogator is allocated an eligible Interrogator Code (IC) and is protected from interference by other Mode S interrogators operating in overlapping or contiguous airspace. The coverage areas of two Mode S interrogators using the same IC must not overlap, except if they are grouped in a cluster or if other appropriate operational mitigations are in place.

The introduction of Mode S interrogators has identified the need for a coordinated approach to the allocation and implementation of the ICs used by ground-based, airborne and shipborne platforms.

Note: systems such as ACAS or current Multilateration systems do not require the co-ordinated allocation of an IC. Even if they use Mode S interrogations and replies, they do not rely on "All Call" for acquisition or perform lockout.

Note: Civil and military Mode S interrogators with a fixed position are subject to the co-ordinated allocation of an IC. Mobile Mode S interrogators are NOT subject to the co-ordinated allocation of an IC and operate on II code 0 (uncoordinated IC).

Interrogator Codes can be either Interrogator Identifiers (II) or Surveillance Identifiers (SI). The design of the Mode S system limits the number of Interrogator Codes available (excluding II zero) to 15 II codes and 63 SI codes. For more information, please refer to [ANNEX A](#).

Due to the limited number of ICs, it is necessary to have a centralised IC allocation system to ensure an optimised allocation and a safe operation. In the ICAO EUR region, the centralised IC allocation system is exercised by EUROCONTROL on behalf of the European regional office of ICAO. The MICA Cell has been created to provide the centralised service of IC allocation to Mode S Operators through their competent State Focal Point.

In 2011, the ICAO MID regional office requested EUROCONTROL to formally provide support for Mode S interrogator code allocation in ICAO MID region. It has been agreed that the MICA Cell will also support the ICAO MID regional office, with the same standard bi-annual MICA cycle (see [Section 5](#)) as that for Mode S interrogators within EUR region. This includes a coordinated listing of IC and coverage for Mode S interrogators in MID region. It has also been agreed that a single ICAO MID Regional Officer CNS will coordinate directly with the MICA Cell for all countries in MID region.

1.3 Abbreviations

| | |
|--------------|---|
| ANSP | Air Navigation Service Provider |
| EANPG | European Air Navigation Planning Group |
| EMS | European Mode S Station |
| EU | European Union |
| EUR | Europe (ICAO region) |
| IC | Interrogator Code |
| ICAO | International Civil Aviation Organisation |
| ICD | Interface Control Document |
| II | Interrogator Identifier |
| MICA | Mode S Interrogator Code Allocation |
| MICoG | Mode S Interrogator Code Coordination Group |
| MID | Middle East (ICAO region) |
| SGEG | Surveillance Ground Environment Group |
| SI | Surveillance Identifier |
| SSR | Secondary Surveillance Radar |
| TRD | Test, Research and Development |

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1.4 Definitions

For the purpose of this EUROCONTROL Specification, the following definitions are applicable.

Cluster: a set of Mode S interrogators connected with each other in the same network and using the same IC to share track information in order to allow aircraft acquisition already acquired by other stations in the same cluster.

Competent State:

- (a) in the case of an ANSP from an EU Member State or States having chosen to transpose the EU regulation, the State that has certified the provider in accordance with Commission Regulation (EC) No 1035/2011 repealing Regulation 2096/2005;
- (b) in other cases for an EU Member State or States having chosen to transpose the EU regulation, the State within the area of responsibility in which the Mode S Operator operates, or intends to operate, an eligible Mode S interrogator.

(c) for States not subject to EU regulation, the State within the area of responsibility in which the Mode S Operator operates, or intends to operate, an eligible Mode S interrogator in accordance with the ICAO EUR FASID and Doc024 (European Principles And Procedures for the Allocation of Secondary Surveillance Radar Mode S Interrogator Codes (IC)).

(d) States from ICAO MID region

Eligible Interrogator Code: any code among the II codes and the SI codes, except:

1. II code 0;
2. the interrogator code(s) reserved for military entities, including intergovernmental organisations in particular North Atlantic Treaty Organisation (NATO) management and allocation;

Eligible Mode S Interrogator: Mode S interrogator for which at least one of the following conditions is satisfied:

1. the interrogator relies, at least partly, on Mode S all call interrogations and replies for Mode S targets acquisition; or
2. the interrogator locks out acquired Mode S targets in reply to Mode S all call interrogations, permanently or intermittently, in part or totality of its coverage; or
3. the interrogator uses multi-site communications protocols for data link applications;

Focal Point (in ICAO EUR region): a person representing one or several competent States or an international organisation applying for interrogator codes, who is responsible for the coordination of all matters concerning the IC allocations between the MICA Cell and the Mode S Operators in his area of oversight.

MID Focal Point: an ICAO Middle East Regional Officer CNS representing the competent States or an international organisation within the ICAO Middle East region applying for interrogator codes, who is responsible for the coordination of all matters concerning the IC allocations between the MICA Cell and the Mode S Operators in the ICAO Middle East region.

State Focal Point: a person representing one or several competent States or an international organisation applying for interrogator codes, who is responsible to support the MID Focal Point(s) in the coordination of all matters concerning the allocation of ICs with the Mode S Operators in his area of responsibility.

[Interrogator Code Allocation: an IC allocation grants an eligible Mode S interrogator to operate on an eligible Interrogator Code within a given region \(defined by the allocated coverage: surveillance and lockout coverage\).](#)

Interrogator Code Allocation Plan: the most recently approved complete set of interrogator code allocations.

Interrogator Code Allocation Plan Proposal: a proposal for a complete set of IC allocations, submitted by the interrogator code allocation service for approval by competent States.

Interrogator Code Allocation System: means a system within the European Air Traffic Management Network, and the associated procedures, through which a centralised service of interrogator code allocation (hereinafter interrogator code allocation service), for dealing with the processing of interrogator code applications and the distribution of an interrogator code allocation plan proposal, is provided for Mode S Operators through competent States.

Interrogator Code Application (hereinafter IC application): an application from a Mode S Operator for the allocation of an eligible interrogator code.

Interrogator Code Conflict: uncoordinated coverage overlap of two or more Mode S interrogators operating on the same interrogator code, potentially resulting in aircraft remaining undetected by at least one of the Mode S interrogators.

Lockout: protocol that allows the suppression of Mode S all call replies from already acquired Mode S targets.

Lockout Coverage: Mode S interrogator configuration defining where and how to apply lockout to Mode S targets. The Lockout Coverage can be provided in different formats depending on Mode S interrogator capabilities: European Mode S Coverage Map ICD, lockout range per sector, unique lockout range.

Lockout Coverage in European Mode S Coverage Map ICD format Map (hereinafter Lockout Map): Mode S interrogator configuration file defining where and how to apply lockout to Mode S targets.

MICA Cell: the EUROCONTROL Team operating the interrogator code allocation system in accordance with its associated procedures in order to provide a centralised interrogator code allocation service.

MICA Cycle: a recurrent 6 monthly procedure for Mode S IC allocation.

MICA Cycle Effective Date: the last date of a given MICA cycle.

MICA website: the Mode S IC Allocation web-based application (hereinafter MICA website) is used to coordinate and manage the allocation of eligible IC to eligible Mode S interrogators in ICAO EUR region and ICAO MID region. The access to the web application is managed through the Eurocontrol OneSkyOnline portal. The MICA website is part of the interrogator code allocation system.

Mode S: cooperative surveillance technique for air traffic control which enables the selective interrogation of aircraft and the extraction of air derived data through which new air traffic management functionalities can be developed.

Mode S All Call interrogations: messages that are normally used by Mode S interrogators to acquire Mode S targets entering their area of coverage.

Mode S interrogator: a system composed of antenna and electronics, supporting addressing of individual aircraft through the Mode Select, known as Mode S.

Mode S Operator: a person, organisation or enterprise operating or offering to operate a Mode S interrogator, including:

- (a) Air navigation service providers;
- (b) Mode S interrogators manufacturers;
- (c) Airport operators;
- (d) Military authorities;
- (e) Research establishments;
- (f) Any other entity entitled to operate a Mode S interrogator;

Mode S target: a platform equipped with a Mode S transponder.

Third Country: a country where the Mode S IC allocation is not coordinated by the EUROCONTROL MICA Cell.

1.5 References

[RD 1] ICAO Annex 10 to the Convention on International Civil Aviation
Aeronautical Telecommunications

Volume IV Surveillance and Collision Avoidance Systems

Amendment 85 or latest

[RD 2] EUROCONTROL Specification for the Mode S IC Allocation Coordination and IC Conflict Management
EUROCONTROLSPEC153
14th June 2013

1.6 Document structure

[Section 2](#) describes how the IC Allocation coordination is organized in ICAO European region.

[Section 3](#) provides details about the actors and their role in the IC allocation process.

[Section 4](#) details the procedure to submit an IC application in order to request an IC allocation.

[Section 5](#) details the Mode S IC allocation cycle (MICA cycle) which is the default procedure for processing IC applications.

[Section 6](#) details the Ad-Hoc allocation process which is an alternative but more constraining procedure to process IC applications.

[Section 7](#) provides details about the IC conflict reporting procedure.

[Section 8](#) provides details on how to resolve IC allocation and conflict issues.

[Section 9](#) provides some guidance for IC allocation in ICAO Middle East Region. In particular the Mode S interrogator performances are discussed.

2. IC Allocation Coordination in Europe

2.1 Organization

Provisions regarding the implementation and monitoring of Mode S IC allocations have been defined by ICAO.

In the ICAO EUR region, the management of the plan is exercised by EUROCONTROL on behalf of the European regional office of ICAO.

EUROCONTROL has put in place the MICA Cell to perform the allocation of the Interrogator Codes. In addition, the Mode S Interrogator Codes Co-ordination Group (MICoG) had been created to oversee the allocation process and provide guidance to the MICA Cell. Presently, the Surveillance Ground Environment Group - Mode S Interrogator Codes Co-ordination Group (hereinafter SGEG-MICoG) performs this task. The SGEG-MICoG members are the Focal Points representing the National Regulatory Authorities of European States and those international organisations applying for IC.

The Focal Points are also responsible for the coordination of all matters concerning the IC allocations between the MICA Cell and the Mode S Operators in their area of oversight.

The Figure 1 here below depicts the co-ordination for IC allocation to Mode S interrogators in ICAO EUR region.

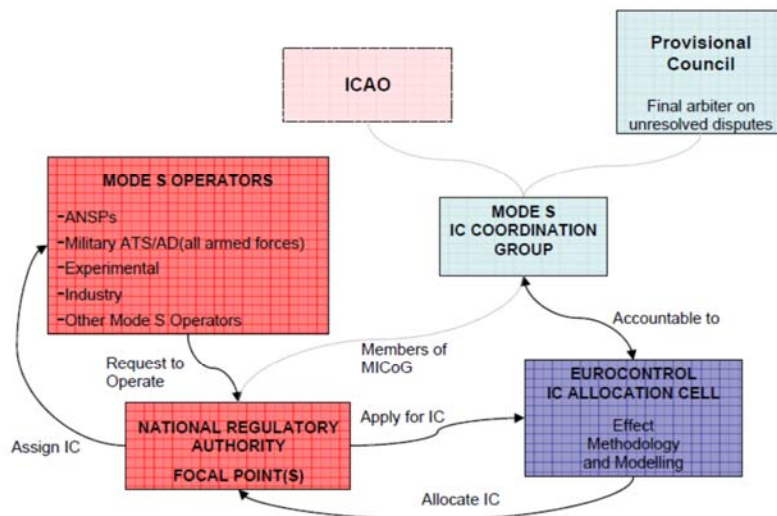


Figure 1: Mode S IC Allocation Coordination in Europe

2.2 IC Allocations Framework

IC allocation started with deployment of the first Mode S interrogators in Europe. The deployment of more Mode S interrogators required a coordinated process which was formalized in 2005:

Mode S Interrogator Codes Allocation Process 1.0

29 September 2005

From that date, the Mode S IC allocation is managed in cycle of 6 months.

To enforce the requirements and responsibilities on each participant, the following European Regulation was issued in 2009:

COMMISSION REGULATION (EC) No 262/2009 of 30 March 2009

laying down requirements for the coordinated allocation and use of Mode S interrogator codes for the single European sky

In 2013, the “EUROCONTROL Specification for the Mode S IC Allocation Coordination and IC Conflict Management” document ([\[RD 2\]](#)) has been issued. This EUROCONTROL specification defines processes applicable to the use of the centralised Mode S interrogator code allocation service (managed by the EUROCONTROL MICA Cell) in charge of coordinating IC allocations within the ICAO EUR region. It superseded the “Mode S Interrogator Codes Allocation Process 1.0” document identified above.

This document specifies the detailed procedures for Mode S Operators to obtain a coordinated Mode S IC and particularly the interfaces between the Mode S Operators, the Focal Points representing competent States in the ICAO EUR region and the EUROCONTROL centralised Mode S interrogator code allocation service.

This document also specifies the procedures in place to manage interrogator code conflicts and the resolution of issues with respect to the interrogator code allocation plan.

EU Member States that comply with this specification comply with a number of regulatory provisions of the European Regulation identified above.

In addition, a web application, called MICA website, has been developed to improve the processing and coordination of IC Allocation to Mode S interrogators in the European region.

3. General Requirements and Responsibilities

3.1 Focal Point Nomination

The ICAO MID regional office **shall** nominate an ICAO Middle East Regional Officer CNS to act as MID Focal Point for all Mode S Operators, civil and military, within the ICAO Middle East region. The MID Focal Point is responsible for the coordination of all matters concerning the allocation of ICs between the MICA Cell and Mode S Operators that operate in a State of the ICAO MID region.

The ICAO MID regional office **should** nominate a backup MID Focal Point to support and to replace the MID Focal Point in order to ensure continuity of service.

Competent States from ICAO MID region **should** nominate a State Focal Point to support the MID Focal Point(s) in the coordination of all matters concerning the allocation of ICs with the Mode S Operators in their area of responsibility.

Competent States from ICAO MID region **should** nominate a backup State Focal Point to support and to replace the State Focal Point in order to ensure continuity of service.

Note: It is expected that the Focal Point availability is ensured during standard business hours. There is no requirement for 24 hours a day, 7 days per week (24/7) availability.

The ICAO MID regional office **should** provide known points of contact for third countries to the MICA Cell through their MID Focal Point(s).

3.2 MID Focal Point Responsibilities

MID Focal Point(s) **shall** be registered on the MICA website. Prior to MICA website registration, MID Focal Point(s) **shall** self-register on the EUROCONTROL OneSkyOnline portal¹. MID Focal Point(s) **shall** inform their State Focal Points, and civil and military Mode S Operators of their responsibilities described in this document.

MID Focal Point(s) **shall** transmit to the MICA Cell the MICA website registration requests they have received and accepted from State Focal Points and Mode S Operators representing either civil or military organisations under their responsibility.

MID Focal Point(s) **shall** inform the MICA Cell within 6 months when a Mode S interrogator ceases operation in order to permit the withdrawal of the corresponding IC allocation.

MID Focal Point(s) **shall** revalidate the IC allocations under their responsibility every 5 years and confirm to the MICA Cell via e-mail whether the issued IC allocations are still in use. This revalidation is to occur every 5 years following the effective date of the issued IC allocation. The IC allocation system automatically identifies which IC allocations need to be revalidated and notifies the MID Focal Point(s) and the States Focal Points if any, for action. An IC allocation that has not been revalidated may be withdrawn from the allocation plan if it is no longer in use (see [Section 3.5](#)).

Note: The effective date of an IC allocation is either the end date of the MICA cycle (see [Section 5](#)) or the end date of the Ad-Hoc allocation process (see [Section 6](#)). The effective date of an IC allocation is indicated on the MICA website and on any exported IC allocation file from the website.

¹ <https://extranet.eurocontrol.int/http://was.eurocontrol.int/elsh/registerNewUserForApplication.do?eurocontrolresourceid=circa>

3.3 State Focal Point Responsibilities

State Focal Point(s) **should** be registered on the MICA website. Prior to this registration, they **shall** self-register on the EUROCONTROL OneSkyOnline portal² and send a request to the responsible MID Focal Point(s) to enable access to the MICA website.

3.4 Mode S Operator Responsibilities

Mode S Operators **should** be registered on the MICA website. Prior to this registration, they **shall** self-register on the EUROCONTROL OneSkyOnline portal² and send a request to their responsible MID Focal Point(s) and State Focal Point(s) if any, to enable access to the MICA website.

Mode S Operators **shall** only operate an eligible Mode S interrogator, using an eligible IC and coverage map if they have received an issued IC allocation, for this purpose, from their responsible MID Focal Point(s).

Mode S Operators **shall** ensure that all Mode S interrogators under their responsibility of operation are programmed with the latest issued IC allocation.

Mode S Operators **shall** report to their responsible MID Focal Point(s) and State Focal Point(s) if any, at least every six months, any update on the installation and operation of eligible Mode S interrogators:

- Any change in the installation planning **shall** be reported.
- Any change in the operational status of the eligible Mode S interrogators **shall** be reported.

Mode S Operators **shall** develop their IC and associated lockout coverage programming procedures, to take into account their own specific arrangements. If Mode S Operators rely on the Mode S interrogator manufacturer to program the Mode S interrogator, they **shall** ensure that the manufacturer has developed programming procedures.

As a minimum, procedures **shall** include the following verification steps, to be completed for each IC allocation programming:

1. Verification of the compliance of programming parameters with the IC allocation data, including:
 - Position of the radar;
 - IC;
 - Lockout range and coverage map.
2. Verification of the validity status of the IC allocation used for programming.
3. Verification of following parameters:
 - Parameters related to II/SI Code Operation;
 - Default parameters to apply when the coverage map is not correctly loaded, if any.
4. When operating in a cluster, verification that the relevant parameters of cluster states are compliant with the IC allocation data.
5. Verification that the programmed data, including following radar chain switch-over and switch-off/switch-on cycles are applied correctly.

² <https://extranet.eurocontrol.int/http://was.eurocontrol.int/elsh/registerNewUserForApplication.do?eurocontrolresourceid=circa>

The procedure results **shall** be recorded, dated, signed and archived for future reference.

3.5 International Organisation Responsibilities

International Organisations **shall** only operate an eligible Mode S interrogator, using an eligible IC and coverage map if they have received an issued IC allocation, for this purpose, from their responsible MID Focal Point(s).

International Organisations intending to operate, or operating, an eligible Mode S interrogator, using an eligible IC and coverage map, **shall** comply with all Mode S Operator responsibilities described in the current document.

3.6 MICA Cell Responsibilities

The MICA Cell **shall** maintain the interrogator code allocation plan.

The MICA Cell **shall** maintain the MICA website.

The MICA Cell **shall** inform the MID Focal Point(s) about IC allocations that need to be revalidated (after the 5-year period).

The MICA Cell **shall** coordinate with the MID Focal Point(s) when an IC allocation has not been revalidated. If it is determined that the IC allocation is no longer in use, it may be withdrawn from the allocation plan.

The MICA Cell **shall** develop and maintain complementary guidance material on the operation of the centralised Mode S interrogator code allocation service.

3.7 IC Allocation Coordinated Area

For the EUR region, the MICA Cell manages the Mode S IC Allocation coordination on behalf of the European regional office of ICAO.

The MICA Cell is also supporting the ICAO Middle East regional office in the coordination and allocation of Mode S ICs in the ICAO Middle East Region.

The list of countries where the Mode S IC Allocation coordination is managed or supported by the MICA Cell can be downloaded from the MICA website (MICA – List of Coordinated Countries.doc). This list provides the status at a given date and may be subject to modification.

Where a potential overlap exists between the coverage of an eligible Mode S interrogator located within the area of responsibility of a competent State whose IC allocation is carried out through the MICA Cell and the coverage of a Mode S interrogator located within the area of responsibility of a third country which is not in the list of coordinated countries, provided that the MID Focal Point(s) has communicated a point of contact for the third country to the MICA Cell, the MICA Cell **shall**:

- a. inform the third country of the safety requirements related to the allocation and use of interrogator codes;
- b. coordinate the use of ICs with that third country

4. IC Application Procedures

4.1 Mode S Operator Responsibilities

Civil and military Mode S interrogators with a fixed position can receive an IC allocation on an eligible Interrogator Code through the normal MICA process.

Mobile Mode S interrogators are NOT subject to the co-ordinated allocation of IC and operate on II code 0. However, mobile Mode S interrogators can receive an IC allocation on an eligible Interrogator Code through the normal MICA process if they remain fixed during the lifetime of the IC allocation.

Civil or military Mode S Operators intending to operate, or operating, an eligible Mode S interrogator for which no IC has been allocated, **shall** submit an IC application to the MID Focal Point(s) and the responsible State Focal Point(s) if any, including the following key items, as a minimum:

- A unique application reference from the competent State;
- Full details of the Mode S Operator point of contact for Mode S IC allocation matters;
- Mode S interrogator name;
- Mode S interrogator use (operational or test);
- Mode S interrogator position using the World Geodetic System 1984 (WGS 84) reference (Latitude and Longitude in degree, minute, seconds format);
 - If the Mode S interrogator position is sensitive information (e.g. military interrogators), that position may be accurate to the minute.
- Antenna centre height above ground and ground altitude above mean sea level;
- Rotation period;
- Mode S interrogator manufacturer and model;
- Planned date of first Mode S transmission;
- Planned date of end of transmission in case of temporary allocation;
- Ad-Hoc allocation process requested;
 - The Operator **shall** justify why the IC application is to follow the Ad-Hoc allocation process. No justification is required if the IC application is for a TRD Mode S interrogator.
- Requested Mode S coverage;
 - expressed as a range (in NM) per sector
- Specific operational requirements;
- SI code capability;
- “II/SI code operation” capability;
- EMS Map ICD coverage map capability.
- Mode S interrogator operating in cluster or not.
 - second IC requested or not in case of cluster

Note: Fixed operational interrogators are normally allocated a single IC, unless they are operated in a cluster. In that case, a second IC may be allocated to the cluster for fallback modes of operation, and to test and integrate new clustered interrogators.

Mode S Operators **shall** submit an IC application either by using the MICA website or through the responsible MID Focal Point(s).

Note: An IC application form has been developed for this purpose and can be downloaded from the MICA website or from the EUROCONTROL MICA webpage.

When an IC application is submitted using the MICA website, an automatic notification e-mail is sent to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

Mode S Operators **shall** inform their MID Focal Point(s) and responsible State Focal Point(s) if any, of any changes in the installation or planning of eligible Mode S interrogators as soon as possible and at least every six months. IC applications which have not yet been processed **shall** also be updated to reflect those changes.

Note: The planned date of first Mode S transmission provided in an IC application determines when the IC application will be processed by the MICA Cell. Therefore, once the planned date of first Mode S transmission changes and the IC application has not been processed, it is important to update this date information in the IC application.

4.2 MID Focal Point Responsibilities

MID Focal Point(s) **shall** check the validity of IC applications received from Mode S Operators, before they are submitted to the Mode S IC allocation system. The validity check shall include the key items listed in [Section 4.1](#). That validity check depends on the way the IC application has been submitted by the Mode S Operator:

- If the IC application has been directly submitted on the MICA website, the MID Focal Point is informed by a notification e-mail sent by the MICA website. The MID Focal Point **shall** then use the MICA website to review and acknowledge this IC application.

Upon acknowledgement, an automatic notification e-mail is sent by the MICA website to inform the IC application creator, the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

- If the MID Focal Point has received from a Mode S Operator an IC application which has not been submitted on the MICA website, the MID Focal Point **shall** review and submit this IC application on the MICA website.

Upon submission, an automatic notification e-mail is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

- In the event of MICA website service unavailability for MID Focal Point IC Allocation submission:
 1. The MID Focal Point **may** submit the IC application by e-mail to the MICA Cell accompanied by the appropriate form which has been developed for that purpose (the IC application form can be downloaded from the MICA website or from the EUROCONTROL MICA webpage). In this case the MID Focal Point **shall** add full details about the MID Focal Point who is responsible for the coordination of the Mode S IC Allocation.
 2. Once the MICA Cell has submitted the IC application on the MICA website, the MID Focal Point **shall** review and acknowledge this IC application using the MICA website when service availability is resumed.

Upon acknowledgement, an automatic notification e-mail is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

MID Focal Point(s) **shall** submit and acknowledge IC applications on the MICA website before the requirement freeze date of the MICA cycle preceding the Mode S interrogator planned date of first Mode S transmission.

Note: Key MICA cycle dates are available on the MICA website.

IC applications requesting the Ad-Hoc allocation process (see [Section 6](#)) **shall** be submitted and acknowledged on the MICA website by the responsible MID Focal Point before being processed. IC applications may be processed in Ad-Hoc once issued IC allocations of the current cycle are published.

MID Focal Point(s) **shall** report to the MICA Cell any change in the installation planning of eligible Mode S interrogators received from Mode S Operators. IC applications which have not yet been processed **shall** be updated to reflect those changes.

4.3 State Focal Point Responsibilities

The State Focal Point(s), if any, **shall** support the MID Focal Point(s) in reviewing the IC applications provided by Mode S operators in their area of responsibility.

4.4 MICA Cell Responsibilities

The MICA Cell **shall** validate IC applications on the MICA website in terms of their compliance with the format and data conventions, and for completeness, accuracy and timeliness.

- If the IC application cannot be validated (e.g. errors), the MICA Cell shall contact the MID Focal Point(s) for corrective actions.
- Validated IC applications **shall** be integrated into the system by the MICA Cell.

Upon integration, an automatic notification e-mail is sent by the MICA website to inform the IC application creator, the Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

If an IC application is provided by the MID Focal Point to the MICA Cell by e-mail:

1. The MICA Cell **shall** submit this IC application on the MICA website.

Upon submission, an automatic notification e-mail is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell that a new IC application has been created.

2. Once the MID Focal Point has acknowledged the IC application on the MICA website, the MICA Cell **shall** integrate this IC application. The IC application is then ready to be processed.

Upon integration, an automatic notification e-mail is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

The MICA Cell **shall** process submitted IC applications within the adequate MICA cycle on the basis of their planned date of first Mode S transmission (except for IC applications that follow the Ad-Hoc process).

5. Mode S IC Allocation Cycle

The Mode S IC allocation (MICA) cycle is the standard procedure for processing IC applications and to issue corresponding IC allocations. An IC application is submitted to request an allocation for a new eligible Mode S interrogator or to request an update of an existing IC allocation.

There are only two Mode S IC allocation process cycles per year (at 168 days intervals). Each cycle is composed of 4 periods and foresees a contingency of 14 days.

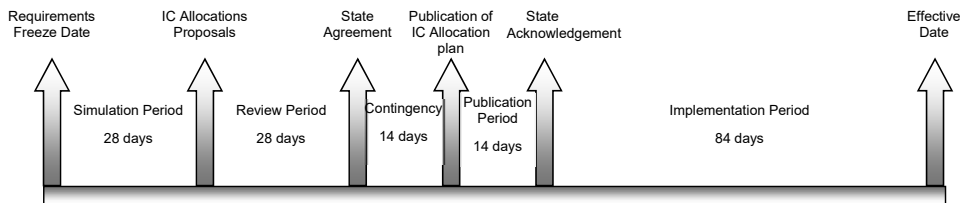


Figure 24: Mode S IC Allocation cycle (MICA cycle)

A flowchart describing the MICA cycle is provided in [ANNEX C](#).

5.1 Simulation Period

The simulation period of the MICA cycle lasts 28 days. During this period, the MICA Cell performs interrogator code allocation plan update simulations and prepares a proposed update of the interrogator code allocation plan. This proposed update is to be approved during the subsequent review period.

5.1.1 Mode S Operator Responsibilities

This period does not apply to Mode S Operators.

5.1.2 MID and State Focal Point Responsibilities

This period does not apply to MID and State Focal Points if any.

5.1.3 MICA Cell Responsibilities

During the simulation period of a Mode S IC Allocation Cycle, the MICA Cell **shall**:

- perform interrogator code allocation plan update simulations on the basis of the pending IC applications
- prepare a proposed update of the interrogator code allocation plan for approval by the Focal Points representing the competent States that are affected by it

At the end of the 28-day simulation period, the MICA Cell **shall** create IC allocation proposals covering:

- pending IC applications for new Mode S interrogators,
- pending IC applications to modify the IC allocation of existing Mode S interrogators,

- changes to existing IC allocations impacted by the proposed interrogator code allocation plan update³.

Upon creation of the IC allocation proposals, an automatic e-mail notification is sent by the MICA website to inform all Focal Points and the MICA Cell. This notification contains the list of all IC allocation proposals that constitute the proposed interrogator code allocation plan update.

The proposed update of the interrogator code allocation plan **shall** be free of IC conflict.

The IC allocations proposed by MICA Cell **shall** to the greatest extent meet the following operational requirements of the IC applications:

- Mode S interrogator planned date of first Mode S transmission
- Requested Mode S coverage
- Any specific operational requirements

IC allocation proposals **shall** be available online on the MICA website where they can be accessed by the MID Focal Point(s) and the responsible State Focal Point(s) if any, for review.

5.2 Review Period

The review period of the MICA cycle lasts 28 days. During this period, the MID Focal Point(s) and the responsible State Focal Point(s) if any, review the IC allocation proposals that constitute the proposed interrogator code allocation plan update. An acceptance (or refusal) is required from the MID Focal Points representing ICAO MID Member States that are affected by the proposed interrogator code allocation plan.

5.2.1 Mode S Operator Responsibilities

Mode S operator may access the MICA website to consult the status of the IC allocations proposed for the Mode S interrogators that they operate or plan to operate.

Mode S operators shall not program IC allocation proposals in Mode S interrogators.

5.2.2 MID Focal Point Responsibilities

The proposed updated interrogator code allocation plan **shall** be subject to the approval, through their MID Focal Point(s), by all competent States that are affected by the update of the plan.

MID Focal Point(s) **should** check the suitability of the proposed IC allocations with the responsible Mode S Operators and the responsible State Focal Point(s) if any, for the Mode S interrogators installed or planned to be installed in a member State of the ICAO MID region.

MID Focal Point(s) **shall** use the MICA website to accept or reject IC allocation proposals for planned or existing Mode S interrogators in a member State of the ICAO MID region before the end of the review period. Once an IC allocation proposal is accepted or rejected, its status is updated on the MICA website and an automatic e-mail notification is sent by the MICA website to inform the responsible MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

In the event of MICA website service unavailability, the MID Focal Point **shall** contact the MICA Cell by e-mail to indicate acceptance or rejection of the proposed IC allocations.

If an IC allocation proposal is rejected by a MID Focal Point, this **shall** be duly justified.

³ It may be necessary to change existing IC allocations in order to accommodate the IC applications.

5.2.3 State Focal Point Responsibilities

The State Focal Point(s) if any, **shall** support the MID Focal Point(s) in reviewing the IC allocation proposals for Mode S interrogators installed or planned to be in their area of responsibility during the MICA cycle review period.

5.2.4 MICA Cell Responsibilities

If any of the proposed IC allocations are rejected within the first 14 days of the review period, the MICA Cell **shall** prepare a new proposed IC allocation plan update.

Note: If any IC allocation proposal is rejected after the initial 14 days of the review period, the MICA Cell will attempt to provide a new IC allocation proposal which is acceptable. As a measure of last resort, the MICA Cell will cancel an unacceptable IC allocation proposal and the corresponding IC application will be re-processed in the next MICA cycle.

If the MID Focal Point contacts the MICA Cell by e-mail to accept or reject the IC allocation proposals, the MICA Cell **shall** use the MICA website on behalf of the MID Focal Point to submit the acceptance or rejection of these IC allocation proposals. Once an IC allocation proposal is accepted or rejected, its status is updated on the MICA website and an automatic e-mail notification is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

5.3 Publication Period

The publication period of the MICA cycle lasts 14 days. On the first day of the publication period, the MICA Cell updates the interrogator code allocation plan and communicates it to the MID Focal Points. All IC allocation proposals which have not been rejected are issued on the MICA website.

An automatic e-mail notification containing the list of all issued IC allocations is sent by the MICA website to inform the MID Focal Point(s), the State Focal Point(s) if any, and the MICA Cell. An automatic e-mail notification is also sent by the MICA website to the Mode S Operators if IC allocations are issued for the Mode S interrogators they operate.

5.3.1 Mode S Operator Responsibilities

Mode S operator may access the MICA website to consult or export the IC allocations issued for the Mode S interrogators that they operate or plan to operate.

Mode S operators shall not program issued IC allocations in Mode S interrogators during the publication period.

5.3.2 MID Focal Point Responsibilities

Within the 14 days of reception of the updated interrogator code allocation plan, MID Focal Point(s) **shall**:

- Communicate issued IC allocations covering pending IC applications as well as changes to existing IC allocations impacted by the update of the interrogator code allocation plan to the relevant Mode S Operators and State Focal Point(s) if any, under their responsibility;
- Provide the implementation sequence to all impacted Mode S Operators and State Focal Point(s) if any;

Note: IC allocation programming may need to be carefully sequenced in order to avoid temporary IC conflicts.

- Acknowledge issued IC allocations under their responsibility by using the MICA website;

Upon acknowledgement, an automatic e-mail notification is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

In the event of MICA website service unavailability, the MID Focal Point **shall** contact the MICA Cell by e-mail to submit the acknowledgement.

5.3.3 State Focal Point Responsibilities

The State Focal Point(s) if any, **shall** support the MID Focal Point(s) during the publication period.

5.3.4 MICA Cell Responsibilities

On the first day of the publication period, the MICA Cell **shall**:

- Update and communicate to the MID Focal Point(s) the interrogator code allocation plan which has been approved, without prejudice to national procedures for the communication of information on Mode S interrogators operated by military
- Provide the implementation sequence to the MID Focal Point(s)

If the MID Focal Point contacts the MICA Cell by e-mail to acknowledge issued IC allocations, the MICA Cell **shall** acknowledge these issued IC allocations on behalf on the MICA website. Upon acknowledgement, an automatic notification e-mail is sent by the MICA website to inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

5.4 Implementation Period

The implementation period of the MICA cycle lasts 84 days. The end date of this period is also the end date of the MICA cycle and the MICA cycle effective date.

All changes to existing IC allocations issued during the Mode S IC allocation cycle must be programmed in Mode S interrogators before the end of the implementation period.

IC allocations issued for new Mode S interrogators should be programmed conforming as much as possible to the planned date of first Mode S transmission provided in the IC application.

The programming of IC allocations which are covered by the implementation sequence must be coordinated as described in the implementation sequence. An example of the implementation sequence diagram is provided in [ANNEX D](#).

5.4.1 Mode S Operator Responsibilities

When programming a Mode S interrogator, Mode S Operators **shall** comply with:

- The allocated IC provided in the issued IC allocation;
- The surveillance and lockout coverage provided in the issued IC allocation;
- The implementation sequence document and coordinate IC Allocation programming with other Mode S Operators if necessary;

Prior to programming an issued IC allocation in a Mode S interrogator, the Mode S Operator **shall** perform the following verification steps:

1. verify if the issued IC allocation is identified in the implementation sequence document

- a. If the IC allocation is not identified in the implementation sequence, then no coordination with other Mode S Operators is required.

The Mode S Operator may proceed to program the IC allocation in the Mode S interrogator and skip the below steps 2 and 3.

- b. If the IC allocation is identified in the implementation sequence, then coordination with other Mode S Operators may be required.

Step 2 **shall** be performed.

2. verify the position of the issued IC allocation in the implementation sequence

- a. If the IC allocation is at the beginning of the implementation sequence, the programming of this IC allocation does not depend on any other IC allocation programming.

The Mode S Operator **should** proceed to program the IC allocation in the Mode S interrogator as soon as possible.

- b. If the IC allocation is not at the beginning of the implementation sequence, there is a dependency on the programming of other Mode S interrogators which precede it in the implementation sequence.

Step 3 **shall** be performed.

3. verify on the MICA website if all preceding IC allocations in the implementation sequence for other Modes S interrogators have been programmed

- a. If all preceding IC allocations in the implementation sequence are confirmed on the MICA website as being implemented, the Mode S Operator **should** program the IC allocation in the Mode S interrogator as soon as possible in case of changes to existing IC allocations.

- b. If any of the preceding IC allocations in the implementation sequence are not confirmed on the MICA website as being implemented, the Mode S Operator **shall** wait before programming the IC allocation.

Mode S Operators **shall** implement all changes to existing IC allocations before the end of the implementation period.

Once an issued IC allocation has been programmed, the responsible Mode S Operator **shall** inform the MID Focal Point(s), the responsible State Focal Point(s) if any, and, if he is registered on the MICA website, **shall** confirm its implementation on the MICA website.

When the implementation of an IC allocation is confirmed on the MICA website, the status of the issued IC allocation is updated on the MICA website and an automatic notification e-mail is sent by the MICA website to inform the responsible Mode S Operator(s), the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell that issued IC allocation has been programmed into the respective Mode S interrogator.

This IC allocation implementation confirmation mechanism enables the IC allocation system to provide to all registered users on the MICA website the up-to-date status of the implementation of the interrogator code allocation plan in Mode S interrogators.

Mode S Operators **shall** contact the MID Focal Point(s) and the responsible State Focal Point(s) if any, if they encounter problems or difficulties when implementing IC allocations.

5.4.2 MID Focal Point Responsibilities

MID Focal Point(s) **shall** ensure that all changes to existing IC allocations are programmed before the end of the implementation period.

When a MID Focal Point is informed that an IC allocation is programmed, he **shall** verify that the implementation status of that IC allocation is confirmed on the MICA website. If not, the MID Focal Point **shall** confirm the implementation. Upon confirmation of implementation, the status of the issued IC allocation is updated on the MICA website and an automatic e-mail notification is sent by the MICA website to inform the responsible Mode S Operator(s), the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

In the event of MICA website service unavailability to confirm the implementation of an issued IC allocation, the MID Focal Point **shall** contact the MICA Cell by e-mail to confirm the implementation of the issued IC allocation.

5.4.3 State Focal Point Responsibilities

The State Focal Point(s) if any, **shall** support the MID Focal Point(s) during the implementation period.

5.4.4 MICA Cell Responsibilities

If the MID Focal Point contacts the MICA Cell by e-mail to confirm the implementation of an issued IC allocation, the MICA Cell **shall** confirm the implementation of the issued IC allocation on behalf of him on the MICA website.

Upon confirmation of implementation, the status of the issued IC allocation is updated on the MICA website and an automatic e-mail notification is sent by the MICA website to inform the responsible Mode S Operator(s), the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell.

6. Ad-hoc Allocation Process

IC applications may be processed on an Ad-Hoc basis, but this process must not impact any existing Mode S IC allocations issued to other Mode S interrogators.

The Ad-Hoc process is suited for IC applications for TRD Mode S interrogators as there is no need to allocate a de-conflicted interrogator code. It is not recommended to apply this process for operational Mode S interrogator IC applications. Indeed, as no change will be made to existing issued IC allocations, the provided allocation may be far more constraining than one provided within a standard MICA cycle (see [Section 5](#)).

To avoid any impact on the proposed IC allocation plan update, Ad-Hoc IC applications are only processed after the publication of the issued IC allocations of the current MICA cycle.

The time frame of the Ad-Hoc allocation process in the MICA cycle is provided in the figure below.

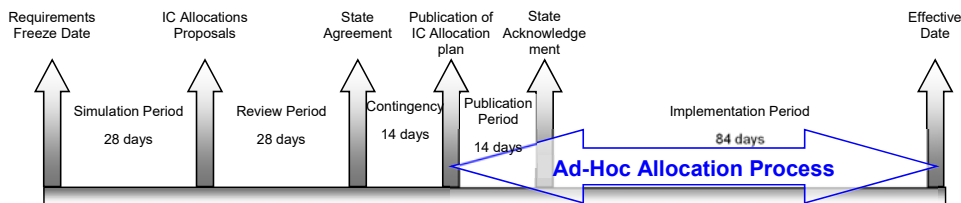


Figure 35: Ad-Hoc Allocation Process Time Frame in MICA Cycle

In general, the Ad-Hoc process is a short process lasting 15 days.

6.1 Simulation Period

During the simulation period of the Ad-Hoc allocation process, the MICA Cell performs interrogator code allocation plan update simulations on the basis of the pending IC applications and prepares a proposed update of the interrogator code allocation plan for approval by the competent States that are affected by it.

As the number of Ad-Hoc IC applications to be processed is usually low and no change to the existing IC allocations is made, the IC allocation proposals are created within a few days.

6.1.1 Mode S Operator Responsibilities

This period does not apply to Mode S Operators.

6.1.2 MID and States Focal Point Responsibilities

This period does not apply to MID and State Focal Points if any.

6.1.3 MICA Cell Responsibilities

The responsibilities on the MICA Cell are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 4.1.3](#)) with the exception of:

- The MICA Cell **shall** issue IC allocation proposals which only cover Ad-Hoc IC applications. No change will be made to existing IC allocations issued for other Mode S interrogators.

- The IC allocations proposed by MICA Cell may not meet the following operational requirements of the IC applications:
 - Mode S interrogator planned date of first Mode S transmission in case the IC application is received at short notice;
 - Requested Mode S coverage;
 - Specific operational requirements;

6.2 Review Period

Contrary to the standard MICA cycle review period of 28 days, the Ad-Hoc process review period is generally limited to 14 days. An acknowledgement is required from the Focal Points representing the competent States that are affected by the proposed interrogator code allocation plan update.

If an IC allocation proposal is rejected, the MICA Cell may prepare an updated IC allocation proposal. Nevertheless, due to the limitations inherent to the Ad-Hoc process, it may not be possible to fulfil all the requirements requested by the Mode S Operator. In such case, the unsuitable IC allocation proposal is withdrawn and the IC application will be processed in the next MICA cycle (see [Section 5](#)).

6.2.1 Mode S Operator Responsibilities

Mode S operator may access the MICA website to consult the status of the IC allocations proposed for the Mode S interrogators that they operate or plan to operate.

Mode S operators shall not program IC allocation proposals in Mode S interrogators.

6.2.2 MID Focal Point Responsibilities

The responsibilities on the MID Focal Point are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.2.2](#)).

6.2.3 State Focal Point Responsibilities

The responsibilities on the State Focal Points are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.2.3](#)).

6.2.4 MICA Cell Responsibilities

The responsibilities on the MICA Cell are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.2.4](#)) with the exception of:

- If an IC allocation proposal is rejected, the MICA Cell may prepare an updated IC allocation proposal.

6.3 Publication Period

Once the review period of the Ad-Hoc process is finalised, the MICA Cell updates the interrogator code allocation plan and communicates it to the MID Focal Point(s). All IC allocation proposals which have not been rejected are issued on the MICA website. This date of issue becomes the effective date for the IC allocations processed in Ad-Hoc.

Once IC allocations are issued, an automatic e-mail notification is sent by the MICA website to inform the MID Focal Points, the State Focal Point(s) and the MICA Cell. This notification contains the list of all issued IC allocations.

No coordination with other Modes S operators is required as there is no change to the existing Mode S allocations issued for other Mode S interrogators.

6.3.1 Mode S Operator Responsibilities

Mode S operator may access the MICA website to consult or export the IC allocations issued for the Mode S interrogators that they operate or plan to operate.

Mode S operators shall not program issued IC allocations in Mode S interrogators during the publication period.

6.3.2 MID Focal Point Responsibilities

The responsibilities on the MID Focal Point are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.3.2](#)) with the exception of:

- There is no time limit to communicate issued IC allocations to the relevant Mode S Operators and State Focal Point(s) if any;
- There is no implementation sequence to provide;

6.3.3 State Focal Point Responsibilities

The responsibilities on the State Focal Points are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.3.3](#)).

6.3.4 MICA Cell Responsibilities

The responsibilities on the MICA Cell are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.3.3](#)) with the exception of:

- There is no implementation sequence to provide;

6.4 Implementation Period

IC allocations processed Ad-Hoc can be programmed by the Mode S Operators once they are issued by the MICA Cell.

6.4.1 Mode S Operator Responsibilities

When programming a Mode S interrogator, Mode S Operators **shall** comply with:

- The allocated IC provided in the issued IC allocation;
- The surveillance and lockout coverage provided in the issued IC allocation;

Once an issued IC allocation has been programmed, the responsible Mode S Operator **shall** inform the MID Focal Point(s) and the responsible State Focal Point(s) if any. If he is registered on the MICA website, he **shall** confirm its implementation on the MICA website

When the implementation of an IC allocation is confirmed on the MICA website, the status of the issued IC allocation is updated on the MICA website and an automatic e-mail notification is sent by the MICA website to inform the responsible Mode S Operator(s), the MID Focal Point(s), the responsible State Focal Point(s) if any, and the MICA Cell that the issued IC allocation has been programmed into the respective Mode S interrogator.

This IC allocation implementation confirmation mechanism enables the IC allocation system to provide to all registered users on the MICA website the up-to-date status of the implementation of the interrogator code allocation plan in Mode S interrogators.

Mode S Operators **shall** contact the MID Focal Point(s) and the responsible State Focal Point(s) if any, if they encounter problems or difficulties when implementing IC allocations.

6.4.2 MID Focal Point Responsibilities

The responsibilities on the MID Focal Point are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.4.2](#)) apart that there is no impacted IC allocation to be considered.

6.4.3 State Focal Point Responsibilities

The responsibilities on the State Focal Points are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.4.3](#)).

6.4.4 MICA Cell Responsibilities

The responsibilities on the MICA Cell are identical to those detailed within the Mode S IC Allocation Cycle (see [Section 5.4.4](#)).

7. IC Conflict Reporting

7.1 Introduction

Operating Mode S interrogators may be impacted by an IC conflict or may be the source of an IC conflict.

An IC conflict is defined as an uncoordinated overlap of lockout coverage of two or more Mode S interrogators operating on the same IC, potentially resulting in aircraft remaining undetected by at least one of the Mode S interrogators.

The Mode S IC allocation system provides a means to report an IC conflict through a reporting mechanism implemented in the MICA website.

7.2 IC Conflict Reporting Procedure

7.2.1 Mode S Operator Responsibilities

Mode S Operator **should** assess the possible impact on air traffic services of Interrogator Code conflicts, and the corresponding potential loss of Mode S target surveillance data from the impacted Mode S interrogators, taking into account their operational requirements and available redundancy.

Unless the potential loss of Mode S target surveillance data has been assessed to have no safety significance, Mode S operators **should**:

- implement monitoring means to detect interrogator code conflicts caused by other Mode S interrogators impacting eligible Mode S interrogators they operate on any operational interrogator code;
- ensure that the interrogator code conflict detection provided by the implemented monitoring means is achieved in a timely manner and within a coverage that satisfy their safety requirements;
- identify and implement as appropriate, a fallback mode of operation to mitigate the possible interrogator code conflict hazards on any operational code;
- ensure that the implemented fallback mode of operation does not create any interrogator code conflict with other Mode S interrogators referred to by the interrogator code allocation plan.

When a Mode S Operator identifies a potential IC conflict affecting a Mode S interrogator under his responsibility, he **shall**:

1. Report the potential IC conflict to the MID Focal Point(s) and the responsible State Focal Point(s) if any, and make available, through the MICA website (if he's registered), any related information for other Mode S Operators.

Once reported on the MICA website, the system will send an automatic e-mail notification to inform all registered users (MICA Cell, Focal Points and Mode S Operators) that a potential IC conflict has been identified.

2. Report the potential IC conflict accompanied with the related information to the MICA Cell if it has not been possible to report it on the MICA website.
3. Investigate the conflict and coordinate bilaterally with appropriate Mode S Operators to determine the potential cause of conflict. Mode S Operators contact details are provided on the MICA Contact List which is published by the MICA Cell on the MICA website.

4. Advise the MICA Cell, the MID Focal Point(s), the responsible State Focal Point(s) if any, and relevant Mode S Operators once the potential cause of the conflict has been identified.
5. Advise the MICA Cell, the MID Focal Point(s), the responsible State Focal Point(s) if any, and appropriate Mode S Operators once the conflict has been resolved.

7.2.2 MID Focal Point Responsibilities

When the MID Focal Point is notified by a Mode S Operator of an IC conflict within his area of responsibility, the MID Focal Point **shall** provide the necessary assistance and advice to achieve an early resolution of the IC conflict.

If the Mode S Operator has not been able to report the conflict on the MICA website, the MID Focal Point **shall** report the IC conflict on the MICA website with any related information.

The MID Focal Point **shall** ensure that all appropriate parties that might be affected by the IC conflict are informed:

- Mode S Operator(s) who might be the cause of conflict and responsible Focal Point(s)
- Mode S Operator(s) who might be impacted by the conflict and responsible Focal Point(s)
- The responsible State Focal Point(s) if any,
- MICA Cell

When a MID Focal Point is notified that a conflict might originate from within his area of responsibility, he **shall** ensure that the relevant Mode S Operator(s) cooperate to identify the cause of the conflict and take the necessary actions in a timely manner.

7.2.3 State Focal Point Responsibilities

The State Focal Point(s) if any, **shall** support the MID Focal Point(s) in case of IC conflict.

7.2.4 MICA Cell

If a potential IC conflict accompanied with the related information has been reported to the MICA Cell but has not been reported on the MICA website, the MICA Cell **shall** report it on the MICA website accompanied with any related information provided by the Mode S Operator.

The MICA Cell **should** provide whatever assistance and advice it can to facilitate the dissemination of information and early resolution of the conflict.

8. Resolution of IC Allocation and IC Conflict Issues

8.1 IC Allocation Issues

The Mode S IC allocation process is executed in a constrained environment. Notably, to avoid overlapping coverage with other Mode S interrogators using the same IC, an IC allocation proposed by the MICA Cell may not meet the requested operational requirements of the IC application. As a result, the MICA Cell allocation proposal for a Mode S interrogator may contain operational restrictions.

These operational restrictions may not be acceptable to the MID Focal Point and the IC allocation proposal for the Mode S interrogator can be rejected.

Other proposals may lead to unacceptable operational restrictions on existing IC allocations for other Mode S interrogators. If no other acceptable IC allocation can be proposed, then no IC allocation will be issued at the end of the IC Allocation process for the Mode S interrogator. As a consequence, the update of the interrogator code allocation plan will not contain an IC allocation covering the IC application submitted for the Mode S interrogator.

If no IC allocation has been issued, the MICA Cell will perform the following actions:

1. Re-process the IC application in the next Mode S IC Allocation cycle.
2. Investigate and propose an interim IC allocation to the MID Focal Point(s), i.e. a temporary IC allocation that would be valid until a satisfactory IC allocation is issued. This temporary IC allocation may be on a test IC or on an operational IC with operational restrictions. This temporary IC allocation should permit to start the Mode S interrogator installation and test.
3. Attempt to determine IC allocation options in close collaboration with the MID Focal Point(s) of competent States that could participate in the identification of an acceptable proposal for all parties.

8.2 IC Conflict Issues

Operation of Mode S interrogators may be impacted by an IC conflict. This may prevent them to reliably detect incoming traffic, potentially compromising the safety of air navigation. Mode S interrogators impacted by such conflicts may need to apply the appropriate fallback mode of operation to mitigate the IC conflict.

The IC conflict resolution depends on the collaboration between Mode S Operators (see [Section 7](#)). In the event of lack of collaboration, the MICA Cell will initiate mediation with the Focal Points of the competent States concerned.

8.3 Resolution of Issues

Dispute may happen during the Mode S IC Allocation process.

The MID Focal Point(s) shall manage disputes inside the ICAO Middle East region.

Final arbiter has to be identified to resolve disputes that could occur between countries of ICAO EUR region and ICAO MID region.

9. Guidance for IC allocation in ICAO MID Region

9.1 Mode S Interrogators Performances

9.1.1 SI code capability

It is recommended for Mode S Interrogators to support SI code capability.

Initially, for technical reasons, only Interrogator Identifier codes (II codes) 1 to 15 were defined and allocated as Interrogator Codes in the ICAO EUR region. Due to the expected number of Mode S interrogators, measures were later taken to allow the use of additional Surveillance Identifier codes (SI codes) 1 to 63.

Only SI code capable Mode S targets will be correctly detected by Mode S interrogators operating on SI code. ICAO annex 10 requires all Mode S transponders to be SI code capable however the experience shows that there are still old versions of Mode S transponders flying without the SI code capability.

9.1.2 II/SI code operation

It is requested that Mode S Interrogators support II/SI code operation.

Normally, the use of SI codes requires that all Mode S targets within the coverage of Mode S interrogators are equipped for this purpose. However, specifications were developed by EUROCONTROL for an II/SI code operation which enables the early use of SI codes by Mode S interrogators in an environment where not all Mode S targets are equipped for the use of SI codes.

A Mode S interrogator which operates on an SI code with II/SI code operation enabled will correctly detect both SI capable and II only capable Mode S targets.

For more information, please refer to [ANNEX B](#).

9.1.2.1 II/SI code operation in ICAO Middle East region

Even if the current number of Mode S interrogators installed in ICAO MID region is not as high as in the ICAO EUR region, there is no guarantee that allocating only II code to Mode S interrogators in the ICAO MID region will remain possible in the future. Therefore, its mandated that all Mode S interrogator to support SI code and II/SI code operation.

9.1.2.2 II/SI code operation in the European Union

In order to facilitate and support the use of SI code in European Union, requirements on SI code and II/SI code support capabilities have been lay down in article 3 of COMMISSION REGULATION (EC) No 262/2009:

Article 3

Interoperability and performance requirements:

Mode S operators shall ensure that the radar head electronics constituent of their Mode S interrogators using an operational interrogator code:

1. support the use of SI codes and II codes in compliance with the International Civil Aviation Organisation provisions⁴

⁴ Chapter 3 'Surveillance radar systems', Section 3.1.2.5.2.1.2 'IC: Interrogator code' of ICAO Annex 10 'Aeronautical

- | |
|---|
| 2. support the use of II/SI code operation in compliance with the requirements specified in Annex B |
|---|

9.1.3 Mode S Coverage

Several formats exist to define the Mode S coverage:

- Mode S responsibility map (in European Mode S Coverage Map ICD format⁵).
 - This map format has been developed by EUROCONTROL in the frame of the POEMS contract⁶. System Maps are geodesic maps (latitude/longitude) sub-divided into horizontal cells of approx. 5NM by 5NM (latitude of Paris) and an associated vertical extent.
 - When supported by the Mode S interrogator, the coverage allocated during the Mode S IC Allocation Cycle is provided in this format.
- Sectorized Range
 - The circular coverage is divided into sectors (by default 32 sectors). Surveillance and Lockout ranges are provided per sector.
 - When coverage map in EMS Map ICD format is not supported by the interrogator, then surveillance and lockout coverage allocated to the radar are provided in this format.
- Global Range for the circular coverage.
 - One unique surveillance range and one unique lockout range are provided for the circular coverage.
 - When none of the both formats above is supported, then this format is used.

Mode S Operators are encouraged to support the use of European Mode S coverage maps.

As these coverage maps are all aligned on the same common origin and have the same cell size, coverage maps can be joint without overlapping which is optimal in terms of allocation volume and RF band usage (as there may be no gap between coverage of neighbouring Mode S interrogators on the same Interrogator Code, aircraft lockout is optimized).

The second solution is less optimal as their will be gaps between allocated coverage. Nevertheless to use range per sector is better than to apply the same range to the circular coverage (Third solution).

Concerning the third solution, the maximum range without overlap of neighbouring Mode S interrogators on the same IC will be used as the circular range.

9.2 Requirements for airborne carriage

It is required for Mode S targets to support SI code capability.

In ICAO Annex 10 Vol. IV - §2.1.5.1.7.1: "SI code capability shall be provided in accordance with the provisions of 2.1.5.1.7 for all Mode S transponders installed on or after 1 January 2003 and by all Mode S transponders by 1 January 2005."

Telecommunications', Volume IV 'Surveillance Radar and Collision Avoidance Systems' (Third Edition, July 2002, incorporating Amendment 77).

⁵ European Mode S Station Coverage Map Interface Control Document, Edition 1.16

⁶ European Mode S Station Functional Specification, Edition 3.11

Airspace regulation should enforce the carriage of Mode S transponder capable to support SI capability as defined in ICAO Annex 10 Vol. IV.

Middle East ICAO office should verify and ensure the correct transponder capability in order to allow the use of SI codes in the ICAO MID region.

It is already possible to start using SI code without having 100% of the fleet SI capable. However in this case Mode S ground stations shall have the II/SI code operation capability in order to acquire aircraft which are not SI capable.

When using II/SI code operation aircrafts which are not SI cable must not be locked-out. Depending on the number of aircrafts which are not SI capable, the II/SI code operation may increase the RF pollution.

9.3 MICoG working arrangement

SGEG-MICoG working arrangement has been created to oversee the allocation process and provide guidance to the MICA Cell. SGEG-MICoG members are the Focal Points representing the National Regulatory Authorities of European States and those international organisations applying for Interrogator Codes.

As Focal Point for all countries in ICAO MID region, the ICAO MID regional officer is invited to be a SGEG-MICoG member and to attend SGEG-MICoG meetings (twice a year).

ICAO MID regional office should determine the necessity to meet Middle East Mode S Operators at regular interval to discuss about technical problems and other topics related to Mode S interrogators installation in ICAO MID region. The MICA cell would not participate to Middle East Mode S Operators meetings.

The ICAO MID regional officer could submit problems encountered in ICAO MID region during the SGEG-MICoG meeting.

ANNEX A – Discrete Code Allocation

A.1 II code and mobile interrogators

II code 0 has been reserved by ICAO for Mode S interrogators that have not been assigned with a unique discrete Interrogator Code and are authorized to transmit (please refer to §3.1.2.5.2.1.4.2 of [RD 1](#) for more information).

Mode S interrogators using II code 0 in accordance with the ICAO Standards and Recommended Practices do not need to be subject to the coordinated IC allocation process.

Discrete code allocations are not issued for mobile installations for which special modes of acquisition on II code 0 are used.

SI codes matching II code 0 (SI 16, SI 32, SI 48) are not allocated.

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Note: as not all Mode S aircraft are SI capable, II/SI code operation has to be programmed on stations operating both on II code and matching SI codes in order to acquire both SI capable and non-SI capable aircraft. As there is no requirement to support II/SI code operation for mobile stations interrogating on II code 0, matching SI codes (SI 16, SI 32, SI 48) are currently not allocated by MICA Cell.

A.2 Test, Research and Development Mode S interrogators on II code 14

In order to save interrogator codes for operational ATC (and Air Defence...) Mode S interrogators, SGEG-MICoG decided that, when transmitting for non-essential Test, Research or Development (TRD) activities, interrogators should operate on a reserved, shared interrogator code: II 14.

Due to the mode of operation of TRD stations on II code 14 (no constraint on II/SI Code Operation programming (see [ANNEX B](#) for more information on II/SI Code Operation)), SI codes matching II 14 (SI 14, SI 30, SI 46, SI 62) are currently not allocated to operational Mode S interrogators. As a consequence, SI codes matching II 14 may currently be allocated to TRD stations.

In order to avoid unnecessary RF pollution in the 1090 MHz band, SGEG-MICoG decided that TRD sites with allocated II code 14 would need to use permanent lockout in their entire coverage, and would not be allowed to use All Call lockout override.

SGEG-MICoG is aware that this is a very restrictive mode of operation which does not guarantee detection performances when two or more TRD stations with overlap transmit concurrently. Therefore SGEG-MICoG agreed on the following:

- Should a TRD operator require guaranteed detection performances for limited trials, he can initiate a co-ordination with overlapping TRD operators to make sure that they do not transmit at the same time (informing the MICA Cell and regulators as well). The TRD operator is responsible for initiating this co-ordination. When TRD operators do not need guaranteed detection performances, they can transmit without coordinating with other TRD operators, as long as they do not conflict with critical operations announced by others through the above mechanism.
- Should a TRD operator need to operate for extended periods with guaranteed performance (for transponder monitoring for instance), then he should apply for a distinct code allocation, using the normal IC allocation request procedure. This request will be processed by the MICA Cell, with due regard to the operational requirements, as for any other IC application.

- Should a TRD operator need to test and evaluate modes of operation that are normally not allowed on code 14 (e.g. lockout override...), then he should apply for an exemption, using the normal IC allocation request procedure. This request will be processed by the MICA Cell, with due regard to the operational requirements, as for any other IC application.

An IC application has to be submitted to get an IC allocation to test systems. However, as there is no need to prevent conflict situation on II 14, applications for TRD stations are most of the time processed in Ad-Hoc.

A.3 Specific Interrogator Codes for specific military operations

II code 15 is currently reserved in ICAO EUR region for NATO management. It is not available for allocation as part of the process run by EUROCONTROL.

SI codes matching II code 15 (SI 15, SI 31, SI 47, SI 63) are reserved for military operations in ICAO EUR region (see MCoG Report Meeting #25). They are not available for allocation as part of the process run by EUROCONTROL. The management of these codes is the responsibility of NATO.

This decision only applies to non-fixed, deployable military installations.

Fixed military interrogators are still eligible to get a discrete Interrogator Code following the normal Mode S IC allocation process. In that case, they have to coordinate with the Focal Point responsible of the country where the fixed military interrogators will be installed.

A NATO Focal Point has been nominated and is member of SGEG-MCoG.

In the ICAO MID region, II code 15 and matching SI codes (SI 15, SI 31, SI 47, SI 63) are reserved for military operations.

ICAO Middle East regional office has to decide how to use II code 15.

ICAO Middle East regional office has to decide how to use SI codes matching II code 15.

A.4 Interrogator Codes allocated to operational Mode S interrogators

All other ICs, i.e. those IC which have not been detailed previously in this Annex, are available for allocation to operational eligible Mode S interrogators:

- II code 01 and matching SI codes (SI 01, SI 17, SI 33, SI 49)
- II code 02 and matching SI codes (SI 02, SI 18, SI 34, SI 50)
- II code 03 and matching SI codes (SI 03, SI 19, SI 35, SI 51)
- II code 04 and matching SI codes (SI 04, SI 20, SI 36, SI 52)
- II code 05 and matching SI codes (SI 05, SI 21, SI 37, SI 53)
- II code 06 and matching SI codes (SI 06, SI 22, SI 38, SI 54)
- II code 07 and matching SI codes (SI 07, SI 23, SI 39, SI 55)
- II code 08 and matching SI codes (SI 08, SI 24, SI 40, SI 56)
- II code 09 and matching SI codes (SI 09, SI 25, SI 41, SI 57)

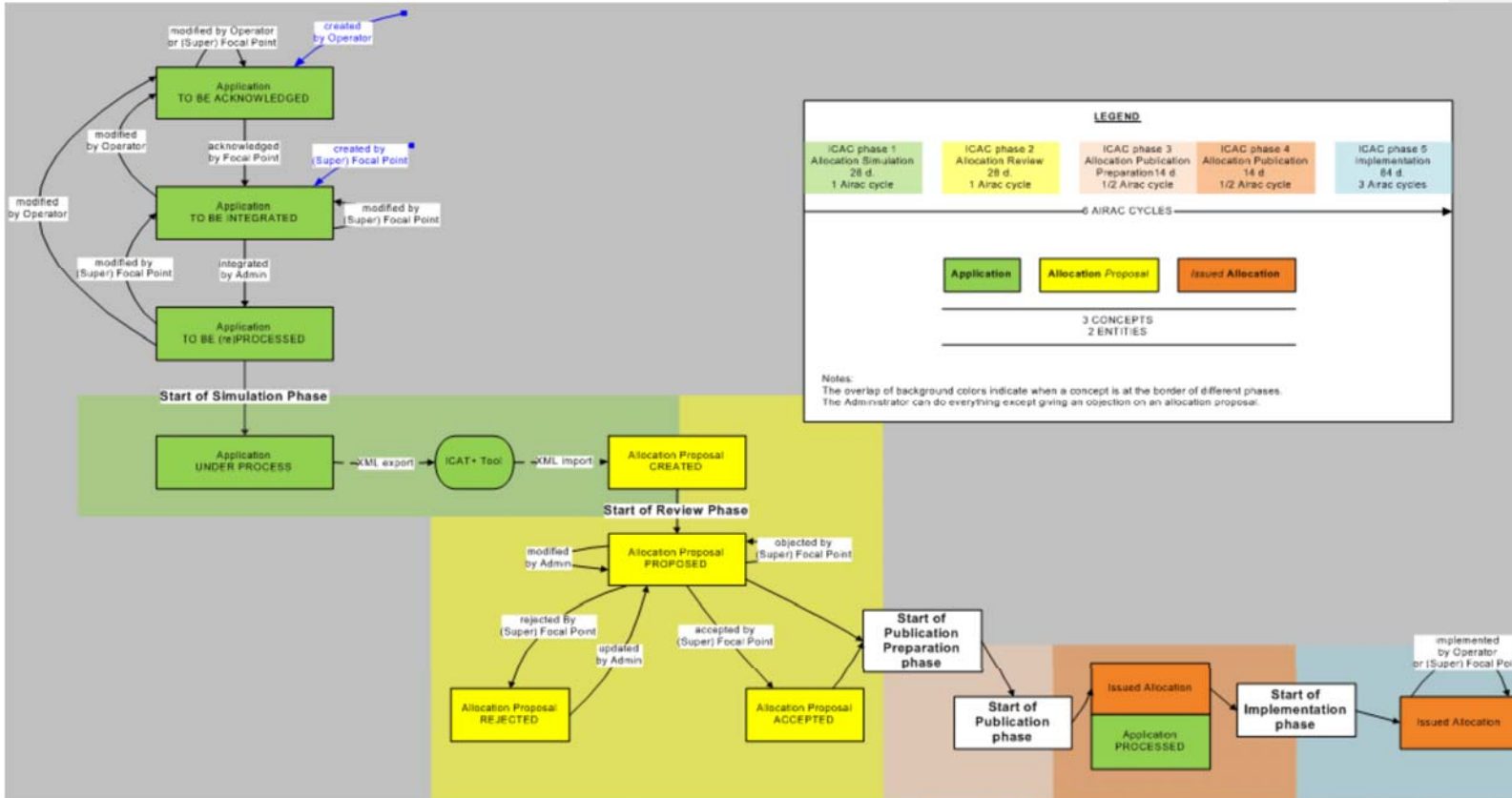
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- II code 10 and matching SI codes (SI 10, SI 26, SI 42, SI 58)
- II code 11 and matching SI codes (SI 11, SI 27, SI 43, SI 59)
- II code 12 and matching SI codes (SI 12, SI 28, SI 44, SI 60)
- II code 13 and matching SI codes (SI 13, SI 29, SI 45, SI 61)

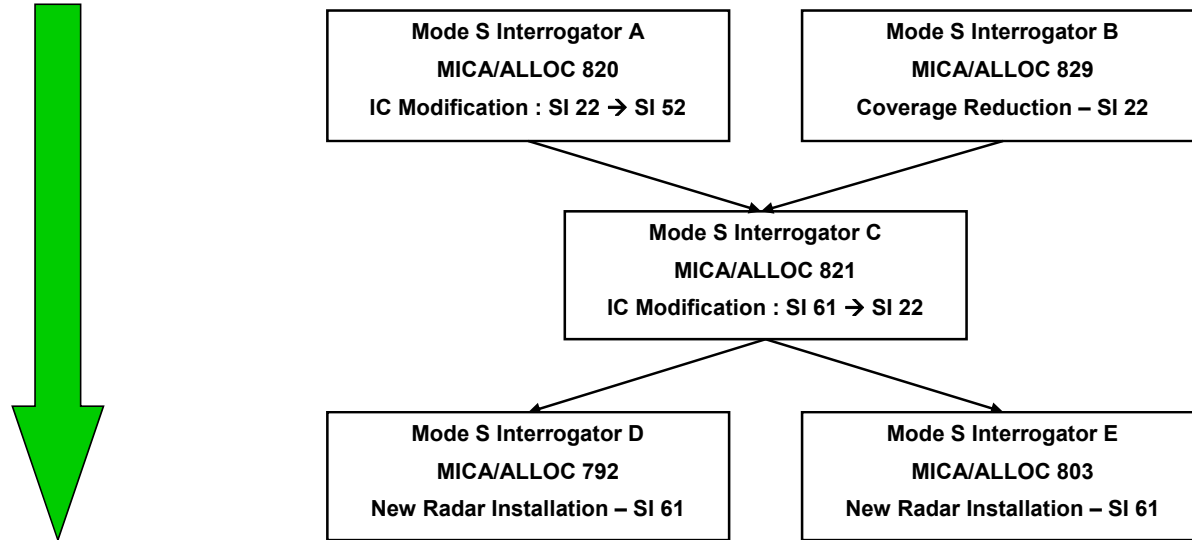
ANNEX B – II/SI code operation

1. Mode S interrogators, when operating with an SI code and if enabled by an appropriate operational parameter, shall also acquire targets through all call replies which are encoded using the matching II code.
2. Mode S interrogators, when operating with an SI code and if enabled by an appropriate operational parameter, shall consider transponders replying with all call replies encoded using the matching II code as non-SI equipped transponders, irrespectively of the SI capability reported in the data link capability report.
3. Mode S interrogators, when operating with an SI code and if enabled by an appropriate operational parameter, shall interrogate transponders lacking SI code capability using the Mode S multisite lockout protocol messages foreseen for II code operation. The II code to be used shall be the matching II code.
4. Mode S interrogators, when operating with an SI code and if enabled by an appropriate operational parameter, shall be configurable by the operator to either:
 - o not use lockout on the matching II code for transponders lacking SI code capability, or
 - o use intermittent lockout on the matching II code for transponders lacking SI code capability.
5. Mode S interrogators, when operating with an II code and if enabled by an appropriate operational parameter, shall be configurable by the operator to either:
 - o not use lockout for transponders which report no SI capability in their data link capability report or cannot report their data link capability, or
 - o use intermittent lockout for transponders which report no SI capability in their data link capability report or cannot report their data link capability.
6. When the II/SI code operation is activated, the lockout maps shall not be taken into account for transponders lacking SI code capability.

ANNEX C – Mode S IC Allocation Cycle Flow



ANNEX D – Implementation Sequence Diagram



In the Implementation Sequence Diagram provided above, the sequence of Mode S interrogators programming is the following:

1. The IC programmed in **Mode S Interrogator A** has to be changed from SI 22 to SI 52 conforming to MICA/ALLOC 820.

The coverage programmed in **Mode S Interrogator B** on SI 22 has to be modified conforming to MICA/ALLOC 829.

As these 2 IC allocations are at the beginning of the implementation sequence diagram, the programming of these IC allocations does not depend on the programming of any IC allocation.

MICA/ALLOC 820 and MICA/ALLOC 829 must be programmed before the end of the Implementation Period of MICA Cycle.

2. As MICA/ALLOC 821 is not at the beginning of the implementation sequence, the programming of this IC allocation depends on the programming of the IC allocations which precede it in the implementation sequence: MICA/ALLOC 820 and MICA/ALLOC 829.

Once step 1 above is done, the IC programmed in **Mode S Interrogator C** has to be changed from SI 61 to SI 22 conforming to MICA/ALLOC 821.

MICA/ALLOC 821 must be programmed before the end of the Implementation Period of MICA Cycle.

3. As MICA/ALLOC 792 and MICA/ALLOC 803 are not at the beginning of the implementation sequence, the programming of these IC allocations depends on the programming of the IC allocation which precedes them in the implementation sequence: MICA/ALLOC 821.

Once step 2 above is done, **Mode S Interrogator D** can be programmed on SI 61 conforming to MICA/ALLOC 792 and **Mode S Interrogator E** can be programmed on SI 61 conforming to MICA/ALLOC 803.

APPENDIX 4J

**Air Navigation Services Cyber Security Working Group
(ACSWG)**

1. TERMS OF REFERENCE (TOR)

- a) promotes cybersecurity awareness throughout the ANS community;
- b) develop consolidated ANS cyber security plan in the MID Region;
- c) develop a comprehensive understanding of the cyber vulnerabilities across the ANS systems, and develop policies, proactive approaches and measures to protect the ANS System.
- d) encourage collaboration and exchange between States and other stakeholders for the development of an effective and coordinated Regional framework to address the challenges of cybersecurity in civil aviation;
- e) review and update the content on the ADCS Portal and provide suggestion for improvement;
- f) review and monitor security incidents, their causes, resolutions and development of defenses for future prevention;
- g) collaborate with relevant ICAO Groups and International Organizations to address ANS Cyber Security; and
- h) provide regular progress reports to the CNS SG and MIDANPIRG concerning its work programme.

2. COMPOSITION

- a) ICAO MID Regional Office;
- b) MIDANPIRG CNS Sub Group Chairpersons;
- c) Members appointed by the MIDANPIRG member States; and
- d) other representatives, who could contribute to the activity of the Working Group, could be invited to participate as observers, when required.

APPENDIX 4K

B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

Description and Purpose

To improve coordination between air traffic service units (ATSUs) by using ATS Interfacility Data Communication (AIDC) defined by the ICAO *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.

Main Performance Impact:

| | | | | |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N | Y | Y | N | Y |

Applicability Consideration:

Applicable to at least two area control centres (ACCs) dealing with enroute and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

| Elements | Applicability | Performance Indicators/Supporting Metrics | Targets | Timelines |
|---|---|---|---------|-----------|
| AMHS capability | All States | Indicator: % of States with AMHS capability Supporting metric: Number of States with AMHS capability | 70% | Dec. 2017 |
| AMHS implementation /interconnection | All States | Indicator: % of States with AMHS implemented (interconnected with other States AMHS) Supporting metric: Number of States with AMHS implemented (interconnections with other States AMHS) | 60% | Dec. 2017 |
| Implementation of AIDC/OLDI between adjacent ACCs | As per the AIDC/OLDI Applicability Table* | Indicator: % of priority 1 AIDC/OLDI Interconnection have been implemented Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs | 70% | Dec. 2020 |

* Note – the required AIDC/OLDI connection is detailed in the MID eANP Volume II Part III

TABLE B0-FICE 3-1**EXPLANATION OF THE TABLE**

Column

- 1 Name of the State
 2,3,5 Status of AMHS Capability and Interconnection and AIDC/OLDI Capability, where:
 Y – Fully Implemented
 N – Not Implemented
 4 **File Transfer Body Part (FTBP) Capability**
 Y – Fully Implemented
 N – Not Implemented
 6 Number of required AIDC/OLDI Interconnections
 7 Number of implemented AIDC/OLDI Interconnection.
 8 Remarks

| State | AMHS Capability | AMHS Interconnection | FTBP Capability | AIDC/OLDI Capability | Required AIDC/OLDI Interconnections | AIDC/OLDI Implementation | Remarks |
|----------------------------------|--------------------|----------------------|-----------------|----------------------|-------------------------------------|--------------------------|--|
| <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5*</i> | <i>6</i> | <i>7</i> | <i>8</i> |
| Bahrain | Y | Y | | Y | 5 | 1 | connection with ABU Dhabi |
| Egypt | Y | Y | | Y | 4 | 1 | |
| Iran | N | N | | Y | 4 | 0 | Contract signed for AMHS |
| Iraq | Y | N | | Y | 2 | 0 | Thales Topsky ATM system AMHS planned in 2019 |
| Jordan | Y | Y | | Y | 2 | 0 | |
| Kuwait | Y | Y | | Y | 2 | 0 | |
| Lebanon | Y | Y | | Y | 1 | 0 | |
| Libya | Y | N | | Y | 0 | 0 | 0Contract signed for AMHS |
| Oman | Y | Y | | Y | 4 | 1 | |
| Qatar | Y | Y | | Y | 2 | 1 | local implementation for OLDI |
| Saudi Arabia | Y | Y | | Y | 8 | 2 | local implementation for AIDC |
| Sudan | Y | Y | | Y | 4 | 0 | |
| Syria | N | N | | N | 0 | 0 | |
| UAE | Y | Y | | Y | 4 | 3 | |
| Yemen | N | N | | N | 0 | 0 | Contract signed for AMHS |
| Total Percentage / Number | 73% 80% | 67% | | 80% | 42 | 9 (21%) | |

B0 – ACAS: ACAS Improvements

Description and Purpose:

To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation

Main Performance Impact:

| | | | | |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N/A | N/A | Y | N/A | Y |

Applicability Consideration:

Safety and operational benefits increase with the proportion of equipped aircraft.

B0 – ACAS: ACAS Improvements

| Elements | Applicability | Performance Indicators/Supporting Metrics | Targets | Timelines |
|----------------------|----------------------|---|----------------|------------------|
| Avionics (TCAS V7.1) | All States | Indicator: % of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons Supporting metric: Number of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons | 100% | Dec. 2017 |

Table B0-ACAS 3-1**EXPLANATION OF THE TABLE**

Column

- 1 Name of the State
 2 Status of implementation:
 Y – Fully Implemented
 N – Not Implemented
 3 National Regulation(s) Reference(s)
 4 Remarks

| State | Status | Regulation Reference | Effective Date | Remarks |
|----------------|--------|---|----------------|--|
| 1 | 2 | 3 | 4 | 5 |
| Bahrain | Y | Aeronautical Circular AC/OPS/05/2015 dated 10th of March 2015 | | Air Navigation Technical Regulations (ANTR) updated to reflect Annex 10 (Volume IV) Reference needs to be provided http://www.mtt.gov.bh/content/caa-laws-and-regulations |
| Egypt | Y | ECAR Part 121.356 & ECAR Part 91.221 | 1 January 2017 | Egyptian Civil Aviation Regulation (ECAR) Parts 121 and 91 have been updated in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Ch.4 http://www.civilaviation.gov.eg/Regulations/regulation.html |
| Iran | Y | Aeronautical Telecommunications bylaw, articles 3 and 4 | | According to articles 3 and 4 of Iran aeronautical telecommunications by law, ratified by board of ministers, Airborne collision avoidance systems are categorized as aeronautical telecommunications systems and should be manufactured, installed and maintained according to standards of Annex 10. -Since no difference to ICAO annex 10 is notified, ACAS V 7.1 is mandatory according to provisions of annex 10 amendment 85. -Airworthiness directives issued by FAA and EASA shall to be implemented by Iranian AOC holders. |
| Iraq | N | | | |

| State | Status | Regulation Reference | Effective Date | Remarks |
|--------------|--------|--|----------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Jordan | Y | JCAR-OPS.1 (1.668 airborne collision avoidance system) | 15 April 2015 | |
| Kuwait | Y | Kuwait Civil Aviation Safety Regulations – Part 6 – Operation of Aircraft, Para. 6.20.4 | | |
| Lebanon | Y | Lebanese Aviation Regulations Part V subpart 6 605.12 | | http://dgca.gov.lb/index.php/en/pd-cat-8-lar6-en/file/72-part-vi-subpart-5-general-operating-and-flight-rules-new-2015 |
| Libya | N | | | |
| Oman | Y | CAR-OPS 1, Subpart K, CAR-OPS 1.668-Airborne Collision Avoidance System | | Regulation reference needs to be provided |
| Qatar | Y | QCAR – OPS 1, Subpart K, QCAR – OPS 1.668 – Airborne collision avoidance system QCAR Part 10 - Volume4 Chapter 4 Airborne Collision Avoidance System | | References: http://www.caa.gov.qa/en/safety_regulations |
| Saudi Arabia | Y | GACAR PART 91 – Appendix C | | |
| Sudan | Y | Amended Annex 10 (V4)- ANNEX 6 (V2) | | According to adopted annexes to Sudan Regulations (SUCAR 10 V4 Par. 4.3.5.3.1 and SUCAR 6 V2 par 2.05.15) |
| Syria | N | | | |
| UAE | Y | CAR-OPS 1.668 Airborne Collision Avoidance System (See IEM OPS 1.668) and CAAP 29 and AIP 1.5.6.6 | 1 July 2011 | https://www.gcaa.gov.ae/en/ePublication/Pages/CARs.aspx?CertD=CARs |
| Yemen | Y | | | Reference need to be provided |

APPENDIX 4L

B0-ASUR: Initial capability for ground surveillance

Description and purpose

Ground-based surveillance supported by new technologies such as ADS-B OUT and/or wide area multilateration (MLAT) systems will improve safety, especially search and rescue and capacity through separation reductions. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.

Main performance impact:

| | | | | |
|----------------------------|------------------|---------------------|----------------------|-----------------|
| KPA-01 – Access and Equity | KPA-02– Capacity | KPA-04 – Efficiency | KPA-05 - Environment | KPA-10 – Safety |
| N | Y | Y | N | Y |

Applicability consideration:

| B0-ASUR: Initial capability for ground surveillance | | | | |
|---|---------------|--|--------------------|--|
| Elements | Applicability | Performance Indicators/Supporting Metrics | Targets | Remarks |
| ADS-B/MLAT Implementation Plan | All States | Indicator: % of States that have National ADS-B /MLAT Implementation Plan. Supporting Metric: Number of States that have National ADS-B/MLAT Implementation Plan. | 50 % by Dec. 2019 | States to conduct safety assessment on ADS-B |
| Cooperative Surveillance System for non-radar covered areas (GAP) | All States | Indicator: % of States that have implemented Cooperative Surveillance System for GAP Areas *Supporting Metric: Number of States that have implemented Cooperative Surveillance System for GAP | 100 % by Dec. 2020 | |
| Cooperative Surveillance System for separated radar routes | All FIRs | Indicator: % of FIRs where dual Cooperative Surveillance Sources are implemented for the provision of surveillance services in radar separated areas. *Supporting Metric: Number of FIRs that have implemented dual Cooperative Surveillance Sources for the provision of surveillance services in radar separated area. (applicability area) | 70% by Dec 2020 | |

This capability is characterized by being dependent/cooperative (ADS-B OUT) and independent/cooperative (MLAT). The overall performance of ADS-B is affected by avionics performance and compliant equipage rate.

APPENDIX 4M

B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

Description and purpose:

To improve coordination between air traffic service units (ATSUs) by using ATS Inter-facility Data Communication (AIDC) defined by the ICAO *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.

Main performance impact:

| | | | | |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N | Y | Y | N | Y |

Applicability consideration:

Applicable to at least two area control centers (ACCs) dealing with enroute and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

| <i>B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration</i> | | | | |
|--|---|---|----------------|------------------|
| Elements | Applicability | Performance Indicators/Supporting Metrics | Targets | Timelines |
| AMHS capability | All States | Indicator: % of States with AMHS capability Supporting metric: Number of States with AMHS capability | 90% | Dec. 2020 |
| AMHS implementation /interconnection | All States | Indicator: % of States with AMHS implemented (interconnected with other States AMHS) Supporting metric: Number of States with AMHS implemented (interconnections with other States AMHS) | 90% | Dec. 2020 |
| Implementation of AIDC/OLDI between adjacent ACCs | As per the AIDC/OLDI Applicability Table* | Indicator: % of priority 1 AIDC/OLDI Interconnection have been implemented Supporting metric: Number of AIDC/OLDI interconnections implemented between adjacent ACCs | 70% | Dec. 2020 |

* Note – the required AIDC/OLDI connection is detailed in the MID eANP Volume II Part III

B0 – ACAS: ACAS Improvements

Description and purpose:

To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation

Main performance impact:

| | | | | |
|-----------------------------|-------------------|---------------------|----------------------|-----------------|
| KPA- 01 – Access and Equity | KPA-02 – Capacity | KPA-04 – Efficiency | KPA-05 – Environment | KPA-10 – Safety |
| N/A | N/A | Y | N/A | Y |

Applicability consideration:

Safety and operational benefits increase with the proportion of equipped aircraft.

| <i>B0 – ACAS: ACAS Improvements</i> | | | | |
|--|----------------------|---|----------------|------------------|
| Elements | Applicability | Performance Indicators/Supporting Metrics | Targets | Timelines |
| Avionics (TCAS V7.1) | All States | Indicator: % of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons Supporting metric: Number of States requiring carriage of ACAS (TCAS v 7.1) for aircraft with a max certificated take-off mass greater than 5.7 tons | 100% | Dec. 2017 |

APPENDIX 5A

Deficiencies in the CNS Field

KUWAIT

| Item No | Identification | | Deficiencies | | | | Corrective Action | | | |
|---------|---------------------------------|--|--|---------------------|--|-----|-------------------|----------------|--------------------|---------------------|
| | Requirement | Facilities/ Services | Description | Date First Reported | Remarks/ Rationale for Non-elimination | | Description | Executing Body | Date of Completion | Priority for Action |
| 1 | MID eANP VOI II, Table CNS II-2 | Inter-regional Communication link with ICAO EUR/NAT Region | The Inter-regional Communication Link between Kuwait COM Centre and one of the entry/exit points of the ICAO EUR/NAT Region is not implemented | Mar, 2019 | - | O - | | Kuwait | Dec, 2019 | B |

(1) Rationale for non-elimination: “F”= Financial

“H”= Human Resources

“S”= State (Military/political)

“O”= Other unknown causes

Deficiencies in the CNS Field

LEBANON

| Item No | Identification | | Deficiencies | | | | Corrective Action | | | |
|---------|---------------------------------|---|--|---------------------|--|---|-------------------|--------------------|--------------------|---------------------|
| | Requirement | Facilities/ Services | Description | Date First Reported | Remarks/ Rationale for Non-elimination | | Description | Executing Body | Date of Completion | Priority for Action |
| 1 | MID eANP VOL II, Table CNS II-3 | ATS Direct Speech circuit Ankara - Beirut | ATS Direct Speech Circuit between Ankara and Beirut is not implemented | Mar, 2019 | - | O | - | Lebanon and Turkey | Dec, 2019 | B |

⁽¹⁾ Rationale for non-elimination: "F"= Financial

"H"= Human Resources

"S"= State (Military/political)

"O"= Other unknown causes

Deficiencies in the CNS Field

LIBYA

| Item No | Identification | | Deficiencies | | | | Corrective Action | | | |
|---------|---------------------------------|----------------------|--|---------------------|--|---|-------------------|----------------|--------------------|---------------------|
| | Requirement | Facilities/ Services | Description | Date First Reported | Remarks/ Rationale for Non-elimination | | Description | Executing Body | Date of Completion | Priority for Action |
| 1 | MID eANP Vol II, Table CNS II-4 | HF Service | HF Service in Tripoli is unserviceable | Mar, 2019 | - | O | - | Libya | Dec, 2019 | A |

⁽¹⁾ Rationale for non-elimination: “F”= Financial

“H”= Human Resources

“S”= State (Military/political)

“O”= Other unknown causes

Deficiencies in the CNS Field

OMAN

| Item No | Identification | | Deficiencies | | | | Corrective Action | | | |
|---------|--------------------------------|-------------------------------------|---|---------------------|---|---|---|----------------|--------------------|---------------------|
| | Requirement | Facilities/ Services | Description | Date First Reported | Remarks/ Rationale for Non-elimination | | Description | Executing Body | Date of Completion | Priority for Action |
| 1 | MID eANP VOL II Table CNS II-3 | Direct Speech Circuit Muscat-Sana`a | Direct Speech Circuit (LIM MID RAN) is required between Muscat and Sana`a | Oct, 1998 | Under implementation. Oman Ready. Oman and Yemen are working to implement the circuit | O | Corrective Action Plan has not been formally provided by the State. | Oman- Yemen | Dec, 2018 | B |

⁽¹⁾ Rationale for non-elimination: “F”= Financial

“H”= Human Resources

“S”= State (Military/political)

“O”= Other unknown causes

Deficiencies in the CNS Field

YEMEN

| Item No | Identification | | Deficiencies | | | | Corrective Action | | | |
|---------|--------------------------------|---|---|---------------------|--|---|--|-----------------------|--------------------|---------------------|
| | Requirement | Facilities/ Services | Description | Date First Reported | Remarks/ Rationale for Non-elimination | | Description | Executing Body | Date of Completion | Priority for Action |
| 1 | MID eANP VOL II Table CNS II-3 | ATS Direct speech Circuits Sana`a-Asmara, Sana`a-Djibouti, Sana`a-Mogadishu, Sana`a-Mumbai and Sana`a-Muscat. | ATS Direct speech circuits are not implemented between Sana`a-Mumbai and Sana`a-Muscat. | Oct, 1998 | - | O | Corrective Action Plan has not been formally provided by the State | Yemen, India and Oman | Dec, 2018 | A |

⁽¹⁾ Rationale for non-elimination: “F”= Financial

“H”= Human Resources

“S”= State (Military/political)

“O”= Other unknown causes

Note:* Priority for action to remedy a deficiency is based on the following safety assessments:

'U' priority = Urgent requirements having a direct impact on safety and requiring immediate corrective actions.

Urgent requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is urgently required for air navigation safety.

'A' priority = Top priority requirements necessary for air navigation safety.

Top priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation safety.

'B' priority = Intermediate requirements necessary for air navigation regularity and efficiency.

Intermediate priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation regularity and efficiency.

Definition:

A deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council, or with related ICAO Standards and Recommended Practices, and which situation has a negative impact on the safety, regularity and/or efficiency of international civil aviation.

- END -

⁽¹⁾ Rationale for non-elimination: “F”= Financial

“H”= Human Resources

“S”= State (Military/political)

“O”= Other unknown causes

APPENDIX 6A

COMMUNICATION, NAVIGATION AND SURVEILLANCE SUB-GROUP

(CNS SG)

1. TERMS OF REFERENCE

1.1 The Terms of Reference of the CNS Sub-Group are:

- a) ensure that the implementation of CNS in the MID Region is coherent and compatible with developments in adjacent Regions, and is in line with the Global Air Navigation Plan (GANP), the Aviation System Block Upgrades (ASBU) methodology and the MID Region Air Navigation Strategy;
- b) monitor the status of implementation of the MID Region CNS-related ASBU Modules included in the MID Region Air Navigation Strategy as well as other required CNS supporting infrastructure, identify the associated difficulties and deficiencies and provide progress reports, as required;
- c) keep under review the MID Region CNS performance objectives/priorities, develop action plans to achieve the agreed performance targets and propose changes to the MID Region CNS plans/priorities, modernization programmes through the ANSIG, as appropriate;
- d) seek to achieve common understanding and support from all stakeholders and involved in or affected by the CNS developments/activities in the MID Region;
- e) provide a platform for harmonization of developments and deployments of CNS facilities and procedures within Region and inter regional;
- f) monitor and review the latest developments in the area of CNS, provide expert inputs for CNS-related issues; and propose solutions for meeting ATM operational requirements;
- g) follow-up the developments of ICAO position for future ITU World Radio Communication (WRC) Conferences and provide expert advises to States;
- h) follow-up the **development operation** of the MID ATS Message Management Center (MIDAMC);
- i) provide regular progress reports to the ANSIG and MIDANPIRG concerning its work programme; and
- j) review periodically its Terms of Reference and propose amendments, as necessary.

1.2 In order to meet the Terms of Reference, the CNS Sub-Group shall:

- a) provide necessary assistance and guidance to States to ensure harmonization and interoperability in line with the GANP, the MID ANP and ASBU methodology;
- b) provide necessary inputs to the MID Air Navigation Strategy through the monitoring of the agreed Key Performance Indicators related to CNS facilities and procedures;
- c) identify and review those specific deficiencies and problems that constitute major obstacles to the provision of efficient CNS implementation, and recommend necessary remedial actions;
- d) lead the work programme of the MID-AMC including the conduct of trainings and upgrades;
- e) assist, coordinate, harmonize and support in the implementation of CNS facilities and procedures;
- f) seek States support to ICAO Position at WRCs, and encourage States for the proper utilization of the Frequency Spectrum and Interrogation Code Allocations;
- g) follow-up surveillance technologies implementation to be in line with the MID Region surveillance plan and the operational improvements in coordination with other Sub-Groups;
- h) review, identify and address major issues in technical, operational, safety and regulatory aspects to facilitate the implementation or provision of efficient Surveillance services in the MID Region;
- i) follow-up Global GNSS evolution, and provide assistance/guidance to states on available GNSS services;
- j) address Datalink communication services and support implementation where operationally required; and
- k) review and identify inter-regional and intra-regional co-ordination issues in the field of CNS, harmonize and recommend actions to address those issues.

2. COMPOSITION

2.1 The Sub-Group is composed of:

- a) MIDANPIRG Member States;
- b) Concerned International and Regional Organizations as observers; and
- c) other representatives from provider States and Industry may be invited on ad-hoc basis, as observers, when required.

ATTACHMENT A

LIST OF PARTICIPANTS

| NAME | TITLE |
|---|---|
| <u>STATES</u> | |
| BAHRAIN Mr. Yaseen Hasan Al Sayed | A\Director Air Navigation Systems Civil Aviation KINGDOM OF BAHRAIN |
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| Mr. Ibrahim Sabah Naiem Obaid | Iraq-MICA Focal Point Iraqi General Company of Air Navigation Services Baghdad International Airport Baghdad - IRAQ |
| Mr. Mostafa Z. AbdulAmeer Al-Dujaili | Information Security Manager Iraqi General Company of Air Navigation Services Baghdad International Airport Baghdad - IRAQ |
| Mr. Yasir Hamid Hanoosh Al-Zubaidi | NAV. Aids Supervisor Iraqi General Company of Air Navigation Services Baghdad International Airport Baghdad - IRAQ |

| NAME | TITLE |
|---|--|
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| <p>Mr. Mohamad Abdallah Saad</p> | <p>Head of Telecommunication Equipments Lebanese Directorate General of Civil Aviation Raffic Harriri Int'l Airport Beirut – LEBANON</p> |
| <p>LIBYA Mr. Fadel Ageli Ghubbar</p> | <p>AFTN Unit Chief Libyan Civil Aviation Authority Tripoli - LIBYA</p> |
| <p>OMAN Mr. Ahmed Saif Salim Al Amri</p> | <p>AIS Officer Public Authority for Civil Aviation Muscat International Airport Muscat, SULTANATE OF OMAN</p> |
| <p>Mr. Amer Mansoor Al Kathiri</p> | <p>Chief CNS Salalah Airport Public Authority for Civil Aviation Muscat International Airport Muscat, SULTANATE OF OMAN</p> |
| <p>Mr. Said Hussein Biri Al Balushi</p> | <p>Chief of Aeronautical Communication Public Authority for Civil Aviation Muscat International Airport Seeb, SULTANAT OF OMAN</p> |
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