



ICAO

International Civil Aviation Organization

Fourth Meeting of the Asia/Pacific Air Traffic Management Automation System Task Force (APAC ATMAS TF/4)

Bangkok, Thailand, 28 - 30 June 2023

Agenda Item 2: Review of outcomes of relevant meetings on Surveillance

OUTCOMES OF THE EIGHTH MEETING OF THE SURVEILLANCE IMPLEMENTATION COORDINATION GROUP (SURICG/8)

(Presented by the Secretariat)

SUMMARY

This paper presents the relevant outcomes of the Eighth Meeting of the Surveillance Implementation Coordination Group (SURICG/8) for information and action, which will be interested to ATMAS TF.

1. INTRODUCTION

1.1 The Workshop on ICAO Aircraft Address and Target Identification in Surveillance Data and Flight Plan and the Eighth Meeting of the Surveillance Implementation Coordination Group (SURICG/8) were held at ICAO APAC Regional Office, Bangkok, Thailand, from 6 – 9 June 2023. The Meeting was attended by 79 participants from 18 Member States/Administrations, 2 International Organizations, and 5 service providers. The Workshop received 6 comprehensive presentations, while the meeting considered 8 Working Papers, 21 Information Papers, 5 Presentations, and 1 Flimsy, and endorsed two (2) Draft Conclusions and one (1) Draft Decision for consideration and endorsement in CNS SG/26, and adopted one (1) Decision. The workshop materials, meeting report, working papers, information papers and other resources can be accessed at

<https://www.icao.int/APAC/Meetings/Pages/2023-SURICG8.aspx>

1.2 SURICG/8 reviewed the report of the Sixth Meeting of Mode S Downlinked Aircraft Parameters Working Group (Mode S and DAPs WG/6) which was held from 28 to 30 March 2023 in Bangkok, Thailand. Mode S and DAPs WG/6 was attended by 76 participants from 14 States/Administrations and 2 International Organizations. The Mode S and DAPs WG/6 meeting report, working papers, information papers, and other resources can be accessed at

<https://www.icao.int/APAC/Meetings/Pages/2023-Mode-S-and-DAPs-WG6.aspx>

1.3 SURICG/8 also reviewed the report of the Third Meeting of the Surveillance Study Group (SURSG/3) which was held in Hong Kong, China, as a hybrid Meeting from 22 to 24 March 2023. The Meeting was attended by 102 participants (25 In-Person and 77 Virtual) from 14 States/Administrations, 2 International Organizations, and 3 industry partners. The SURSG/3 meeting report, working papers, information papers, and other resources can be accessed at <https://www.icao.int/APAC/Meetings/Pages/2023-SURSG-3.aspx>.

1.4 This paper summarized relevant information and updates from the meeting.

2. DISCUSSION

2.1. The summary of discussions in the meeting is given in the following paragraphs.

Workshop on ICAO Aircraft Address and Target Identification in Surveillance Data and Flight Plan

2.2. The objective of Workshop is to promote to stakeholders (ANSPs, airline operators, ground handling agents etc.) and the aviation community on ensuring proper ICAO Aircraft Address and Target Identification in Surveillance Data and Flight Plan, as well as the exploration of follow-up actions with proper points of contact to rectify incorrect data used in the operational environment. The Workshop received 6 comprehensive presentations from contributors as shown in the Workshop Program in **Attachment 3**. All presentations are uploaded to the SURICG/8 website

<https://www.icao.int/APAC/Meetings/Pages/2023-SURICG8.aspx>

2.3. The Workshop identified the importance and necessity to develop a regional guidance material to mitigate the discrepancies observed in ICAO Aircraft Address and Target Identification between surveillance data and flight plan by consolidating the outcomes of the workshop, which will be recorded as an **ACTION ITEM** of SURICG/8 taken by an Ad-hoc group led by Hong Kong China, supported by China, New Zealand, Singapore, USA and IATA. The proposed guidance material is planned to be presented to SURICG/9 for review.

Election of new Co-Chair

2.4. Nominated by USA and seconded by Hong Kong China, Mr. Ho Wee Sin, Deputy Director (Info Air Traffic Management) of the Civil Aviation Authority of Singapore was unanimously elected as the new co-Chair of the SURICG.

Review Report of Mode S and DAPs WG/6 (WP/03)

Sharing of State's implementation on Mode S and related issues in APAC region

A Case Analysis of Manoeuvring Aircraft Track Missing

2.5. China discussed a case of Mode S secondary radar (MSSR) missing a manoeuvring aircraft for a long time due to the error of DAPs data resulting in false extrapolated tracks. Limited by antenna pattern and Mode S scheduling management, short-range aircraft flying along the radial direction of MSSRs might be out of the correlation window when the aircraft making a high-manoeuve flight turn to a tangential direction. This paper suggested that MSSR manufacturers should verify and reject false DAPs data, with methods described in IP/19 of SURICG/6 and implementation in IP/11 of DAPs WG/5. Besides, MSSR stations should be built far enough from the route turning point and avoid along the route, especially in the terminal area.

The Progression of Optimization and Improvement of ADS-B Application in China

2.6. China introduced its Nationwide ADS-B Optimization and Adjustment Implementation Scheme. 332 ground stations, 36 level-3 data processing stations, 8 level-2 data processing centres, and 38 sets of ATM automation systems in 22 operation sites were involved in this project. This project allows China to unify ADS-B data output rules and data age maintenance period, filter unqualified ADS-B data in data processing centres, and stable and smoothen fused system tracks.

Mode S monitoring and analysis

The Real Time Mode-S Signal Monitoring with Asterix Cat. 48 data

2.7. ROK presented their example of Mode-S monitoring at Incheon International Airport. The paper discussed different monitoring methods and introduced their implementation of monitoring by in-house software checking the values of Data Item I048/130, Radar Plot Characteristics, to monitor surveillance quality. Republic of Korea was willing to share the research results and relevant software tool with other states to protect the 1030/1090 MHz frequency resource.

Two Cases of False Alarm in A-SMGCS System Caused by the Incorrect Air/Ground Status of Aircraft

2.8. China shared two instances of erroneous warnings in the A-SMGCS system brought on by the wrong Air/Ground status received from avionics which caused A-SMGCS to generate false alarms and affected the accuracy of system output. Since Mode S IGD suggested and DO-260 described that air/ground status to be generated automatically, users should inform the airlines concerned in time for rectification to avoid further safety impact, and controllers should pay close attention and make final judgments referring to the flight's actual situation and the alarm status in the ATM automation system or relevant systems.

The Problem of Low Efficiency of Vertical Intent Flag in DAPs

2.9. China described the low efficiency of flags related to vertical intent of MCP/FCU mode and target altitude source in BDS 4,0 which caused difficulties to determine the target altitude indicating the aircraft's real vertical intent. In the application of pilot-selected altitude and clear flight level mismatch alert, it should be aware that the selected altitude might not represent the real vertical intent of the aircraft, and carefully consider the difference between track prediction based on selected altitude and target altitude, especially for the safety net.

Interrogator Code (IC) planning and coordination

Future requirement by ICAO to use II/SI Code Operations

2.10. The paper shared the ongoing proposals within the Surveillance Panel to include a requirement for radars using SI codes to support the II/SI code operations, in which the radar will interrogate the aircraft using SI code and acquire aircraft that reply using the same SI code, as well as those replying with the matching II code. Subsequently, it will only lock out the SI capable transponder and not the non-SI capable transponder to allow the non-SI capable transponder to be acquired by nearby radars using matching SI codes. This paper introduced the text being deliberated for consideration of a provision on the use of II/SI code operations ICAO Annex 10 Vol 4 that would improve the visibility of this requirement and will facilitate its traceability during the procurement, testing of systems and the allocation of SI codes by regional offices that will need to ask whether this mode of operation is supported before allocating an SI code.

Capacity for SSR Mode S II or SI Code Assignments in APAC

2.11. This paper presented a preliminary assessment of the future capacity for SSR MODE S II or SI code assignments in the APAC region with the current data in the Frequency Finder Surveillance Module (FFSurvM). The number of possible Mode S II Code assignable was denoted with different colours – white, red, orange, yellow, green and black for 0, 1, 2, 3, 4+ and all 15 assignable II codes respectively. An overview of this raster was given in Fig.1 below, which showed that three main areas in APAC identified to be difficult or impossible to implement new SSR Mode S radar facilities, either operating with Mode S II codes or Mode S SI codes: (a) Afghanistan/Pakistan (b) Malaysia/Singapore/Indonesia, and (c) Republic of Korea/Japan.

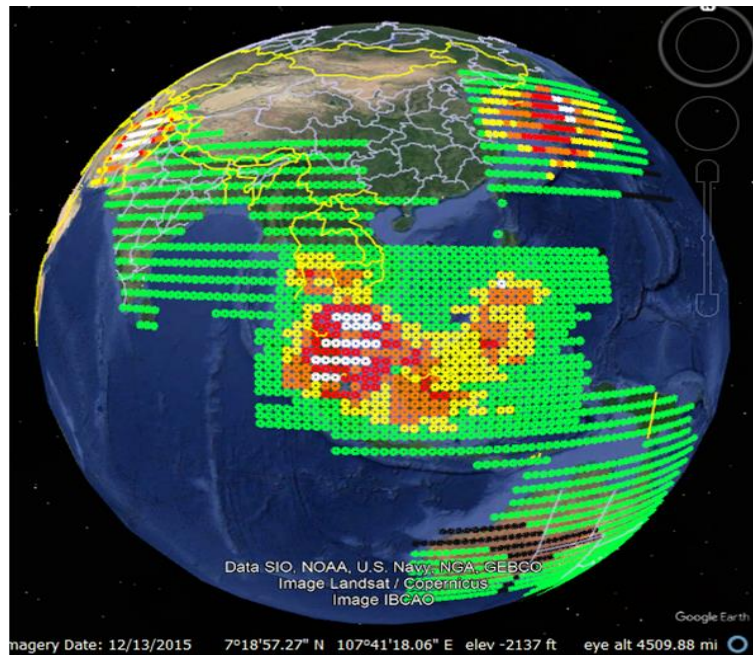


Fig 1. Graphic assessment result of assignable II codes in APAC

Review Roadmap on Mode S Implementation for APAC Region

General Strategy on Migration to SI code

2.12. The paper discussed the general strategy for the assignment of and migration to SI codes. After the Mode S and DAPs WG/6 meeting deliberated on the proposal, the detailed general strategy for the assignment of and migration to SI codes was summarized, which is provided in **Appendix A** to this paper. Subsequently, the **Draft Conclusion SURICG/8/1 (Mode S and DAPs WG/6/1): General Strategy on Assignment of and Migration to SI Code in the APAC Region** endorsed in Mode S and DAPs WG/6 was reviewed and endorsed by SURICG/8. As the strategy will involve coordination with neighbouring regions and require high-level support from CAAs/ANSPs in the region, the SURICG/8 meeting considered it appropriate to seek further endorsement from CNS Sub-Group and/or APANPIRG.

Updates to the Mode S DAPs Implementation and Operations Guidance Document

2.13. China proposed the revised draft of Edition 5.0 of the Mode S DAPs Implementation and Operations Guidance Document, developed based on the adopted Edition 4.0. Subsequently, the **Draft Conclusion SURICG/8/2 (Mode S and DAPs WG/6/2): Mode S DAPs IGD Edition 5.0** endorsed in Mode S and DAPs WG/6 was discussed and endorsed by SURICG/8.

Establish Point of Contact List for Mode S and DAPs Matters

2.14. The need for coordination on Mode S and DAPs-related matters between the ICAO APAC Regional Office and APAC States/Administrations was identified in SURICG/7. Secretariat thus proposed the establishment of such point of contact (POC) list for the efficiency and effectiveness of the coordination. The updated POC List by SURICG/8 is provided in Appendix C of the Report.

Achievement and future of Mode S and DAPs WG

2.15. The paper reviewed the background of setting up this Working Group, including the

renaming to Mode S *and* DAPs Working Group to better reflect the work done. Besides, this paper summarized the major achievements of this Working Group. The working group has achieved the objective that it was set up for. To conserve resources, the paper suggested the Mode S and DAPs WG/6 meeting might consider closing this working group, with the outstanding action items be transferred to the SURICG. China supported of continuing the discussion of Mode S and DAPs topics via incorporating ToRs to SURICG. The Secretariat mentioned that the additional scope on for Mode S and DAPs issue might add another day to the SURICG meeting.

Review of Terms of Reference

2.16. With the discussion of achievement of Mode S and DAPs WG provided in WP/06 that to conserve resources, and considering most of the ToR had been completed or already in the process of completion by this Working Group and/or by Surveillance Panel, Co-Chairs of the Mode S and DAPs WG/6 meeting proposed that the remaining tasks of this WG could be transferred under SURICG and thus of the view that this WG was able to dissolve. In such connection, the **Decision SURICG/8/3 (Mode S and DAPs WG/6/3)**: Dissolution of Mode S and DAPs Working Group was discussed and endorsed by SURICG/8.

Review of Action List

2.17. The Secretariat invited the Mode S and DAPs WG/6 meeting to review the action items. The updated Action Items List is provided in Appendix D of the Report, which will be incorporated into the Action Items of SURICG in its 9th meeting in 2023.

Review of Mode S Implementation Status in the APAC Region

2.18. The Secretariat invited the Mode S and DAPs WG/6 meeting to review the Mode S implementation status in APAC. The updated status from SURICG/8 is provided in Appendix E of the Report.

Simplified Explanation of II/SI Code Operations - Chair of DAPs WG (Presentation/01)

2.19. The presentation illustrated a simplified explanation of II-SI code operations, with an introduction of radar and Mode S working principles, radar identifiers, mechanism of all-call and roll-call in consideration of different II/SI capabilities of transponders, and the general strategy of migrating from using II to SI. For details, the SURICG/8 meeting was invited to refer to Doc9924 Appendices H and J.

Review Report of the Third Meeting of the Surveillance Study Group (SURSG/3) (WP/04)

A Joint Event for Surveillance Data Sharing in SWIM Trial and SWIM over CRV Demonstration

2.20. Hong Kong China proposed combining the surveillance data sharing in the SWIM Trial under S3TIG (“the Trial”) and the SWIM Demonstration over CRV under SWIM TF as a joint event for States’ consideration, which was agreed by SURSG/3 and the Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7) held from 9 to 12 May 2023.

Data Format for Surveillance Data Sharing

2.21. Hong Kong China presented the proposal on the data format to be exchanged in the Trial of the surveillance data sharing using SWIM under S3TIG for States’ consideration. As a

recommendation from the Study Report delivered under SURSG, the Trial to be conducted under S3TIG would adopt the ADS-B CAT 21 Version 2.1 data format to support ATFM operation.

Date and Venue for the Next Meeting

2.22. The SURSG/3 Meeting decided that further Meetings of S3TIG would be conducted in Virtual mode until the need for In- Person Meetings arises. The SURSG/3 Meeting agreed that the next Study Group Meeting would be In-Person after the successful completion of the Joint Trial/Demo Event.

Review Regional Surveillance Requirements (WP/06)

2.23. The paper reviewed regional requirements specified in Table CNS II-APAC-3 in APAC e-ANP Volume II. The SURICG/8 meeting noted that e-ANP Volume II contains the General Regional Requirements and Specific Regional Requirements related to CNS from Member States. As such, Member States are encouraged to review all facilities listed in Table CNS II-APAC-3 SURVEILLANCE under the Specific Regional Requirements in e-ANP Volume II, and provide update to ICAO APAC Regional Office as necessary through the PfA Process. The proposed changes to e-ANP Volume II Table CNS II-APAC-3 SURVEILLANCE have been incorporated in Appendix F to the Report, the Secretariat and the concerned Member States are requested to formally update the e-ANP Volume II Table CNS II-APAC-3 SURVEILLANCE in due course at earliest convenience.

Review/update Surveillance Implementation Status

2.24. The SURICG/8 meeting reviewed the ADS-B implementation information consolidated the input from States/Administrations in the Table of ADS-B Implementation Status in the APAC Region, and further updated this table which is provided in Appendix G of the Report.

Progress on ADS-B planning and implementation – Bay of Bengal (BOB) & South East Asia (SEA)

2.25. The SURICG/8 meeting reviewed the reports on the Sub-regional ADS-B implementation plan/projects presented by BOB and SEA Ad Hoc working groups which were led by Indonesia and Singapore respectively. The reports updated by BOB and SEA Ad Hoc groups are provided in Appendix H and I to the Report which could serve as a basis for further development of the sub-regional implementation plans and follow-up actions for coordination by States/Administrations.

Discuss progress on data sharing projects among States

2.26. The SURICG/8 meeting reviewed the updated table on ADS-B Data Sharing Implementation Status which States and Administrations provided their updates during the ad-hoc working group sessions. The updated table is provided in Appendix J of the Report.

ADS-B Equipage and Quality Performance Observed in the U.S. (IP/04)

2.27. USA provided an updated summary of observed NIC/NACp performance for air carrier aircraft compared to the requirements of the U.S. ADS-B mandate, as well as ADS-B equipage trends in the U.S based on the data derived from the ADS-B Performance Monitor (APM) tool which has various capabilities to support the analysis. During the most recent two-month analysis window ending on 9 April 2023 for the full airspace shown in Attachment 1 of the paper, just over 30% (2,895 out of 9,493) of the observed air carrier aircraft were registered outside the U.S.

Preliminary Analysis of ADS-B Positional Performance in Japan (IP/10)

2.28. The Japan Civil Aviation Bureau (JCAB) plans to use ADS-B for ATC operations and is evaluating ADS-B performance. ADS-B (version 2) positional performances (NIC and NACp) were analyzed for the data collected every January from 2017 through 2022 in the vicinity of Sendai airport. The percentages of aircraft equipped with ADS-B version 2 increased from 22% in January 2017 to 72% in January 2022. The NIC values of 99.95% of positional data exceeded 6. The NACp values exceeded 7 for 99.90%. JCAB analyzed the positional performance of the surface positional data alone to assess the effect of the airport surface and buildings. Further analyses will be performed to investigate the causes of positional performance degradation.

A Radar Data Quality Monitoring Tool (IP/17)

2.29. China introduced a tool aiming to monitor and analyze radar data quality accessed by ATMAS to ensure that the radar data meets the ATMAS requirement by using quality indicator extracted from radar data, and discussed the difficulty of identifying false information. The SURICG/8 meeting noted that metrics used in the tool refer to the minimal set of performance parameters proposed by SURICG/7 WP12 from China, and combine the metrics that must be paid attention to in the equipment operation and maintenance work. The data quality metrics monitored by the system and the difficulty of false information identification were further explained. It was suggested that the RSUR working group will provide the judgment method of the false information and provide the specific calculation method of the relevant metrics.

The Implementation of Optimization and Improvement of ADS-B Application in China (IP/18)

2.30. China presented the follow-up implementation progress of ‘the Study on Optimization and Improvement of ADS-B Application’ submitted by China on SURICG/7, and mainly introduced the nationwide optimization and improvement scheme, effects after adjustment, and the plans for the next stage.

Aircraft Parameters Availability in Mode S DAPs and ADS-B ADD (IP/20)

2.31. China presented aircraft downlink parameters in Mode S DAPs and ADS-B Aircraft Derived Data (ADD), and introduced the study which has been conducted in China to confirm which parameters are available at present. In the study, based on the data collected from 1763 aircraft’s in 2018 and 2289 aircraft in 2023, the capable percentage regarding the different parameters in Mode S DAPs and ADS-B ADD were summarized respectively. It was also noted that as the ADS-B V2 installation proportion grows, the available percentage of some ADS-B ADD will grow substantially.

Surveillance Activities in Singapore (IP/02)

2.32. Singapore summarized the Surveillance activities in Singapore regarding radars, A-SMGCS, ADS-B, ADS-C/CPDLC, and highlighted the use of Mode S Downlinked Aircraft Parameters (DAPS) in the ATM automation system. Furthermore, the requirements for ADS-B out exclusive airspace and Airport Surface were elaborated, and the results of the study on the equipage status of Singapore registered operators that an increase in the number of DO-260B equipped aircraft were shared.

Update on Surveillance Activities in Thailand (IP/09)

2.33. Thailand provided a summary update on the surveillance sensors and ATM automation system implementation in Thailand. The implementation statuses and plans for SSR Mode-S, PSR, MLAT, and ADS-B within Thailand have been introduced in detail. The SURICG/8 meeting also noted that Thailand has transitioned to the new ATM automation systems nationwide since 2020, and implemented A-SMGCS Level 2 at Suvarnabhumi airport with a plan to implement A-SMGCS at other

international airports by 2025.

Update on New Zealand Surveillance Status (IP/11)

2.34. The paper provided an update previous reports, providing information on New Zealand's Air Traffic Management surveillance activities. The SURICG/8 meeting noted that as of Dec 31st, 2022, New Zealand's surveillance structure is based on ADS-B as the Primary surveillance source, with six MSSRS, and an MLAT system providing cooperative surveillance, and 3 PSRs providing non-cooperative backup where required. The MSSRs and PSR will be replaced by 3 new MSSR/PSR between 2023 and 2025 to provide a NON GNSS contingency to ADSB.

ADS-B Implementation for Low-flying Traffic (IP/13)

2.35. Hong Kong China outlined the status of ADS-B implementation for low-flying traffic within the territories of Hong Kong China after the mandate of ADS-B avionics was effective for locally registered low-flying aircraft on 31 January 2023. According to the results of the flight trials to verify the ADS-B low-level surveillance coverage, it showed that the low-level coverage of ADS-B is far better than that of SSRs with almost no target drops observed with a comparison of flight tracks between SSR and ADS-B provided in the paper.

Long-range Air Traffic Surveillance for Air Traffic Flow Management (IP/14)

2.36. Hong Kong China presented the implementation of an in-house developed long-range air traffic surveillance display system using Space-based ADS-B to facilitate Air Traffic Flow Management (ATFM) operation in Hong Kong China by providing an air traffic overview to flow managers, thus enhancing their situational awareness and assisting them to assess the overall impacts of certain flow restriction imposed by other airspaces and assist in flow control decision making.

ATC Surveillance Activities Update in Malaysia (IP/16)

2.37. The paper provided information on Air Traffic Surveillance activities in Malaysia, especially in Kuala Lumpur Flight Information Region (KL-FIR) and Kota Kinabalu Flight Information Region (KK-FIR), and also summarized the progress of the on-going and future projects related to ATC Surveillance activities.

Update the Action Plan for Surveillance in China (IP/19)

2.38. The paper presented the current status of the civil ATC surveillance business in China and the latest development, including the progress of ADS-B Application for ATC Operation, Mode S DAPs Implementation, II conflict Analysis and II/SI Mixed Operation, Radar Clustering, and A-SMGCS. The integration and application of ADS-B data in China's ATM Automation System has increased from 65% at the end of 2019 to 92% at present. Additionally, CAAC will actively follow the ICAO APAC procedure to coordinate the allocation of II/SI codes with neighboring countries and regions.

Challenges Faced by Nepal in Implementing ADS-B Based Surveillance (IP/21)

2.39. Nepal presented challenges faced by Nepal in implementing ADS-B based surveillance in the VNSM FIR. Nepal has completed the installation of four ADS-B ground stations, which is intended not only to supplement the MSSR-based surveillance but also to extend the coverage in the far western region with NRA operations in the near future. However, to ensure compliance with the PANS-ATM procedures in 8.1.10 and 8.6.1.1, and 8.6.1.2 while implementing ADS-B based surveillance services is proving difficult as the onus of specifying the quality of information has been rested on the States (or appropriate ATS authority) without any accompanying technical guidance. Therefore, despite

induction of ADS-B, Nepal has been unable to use it operationally for the provision of air traffic services- vectoring, separation- in order to realize efficient use of airspace. Nepal is willing to learn from the experience of other Member States who have successfully implemented ADS-B based surveillance in non-radar airspace (NRA).

2.40. The SURICG/8 meeting suggested Nepal to make reference to the ADS-B Implementation and Operations Guidance Document (AIGD), which provides the guidance material for the planning, implementation and operational application of ADS-B technology in the Asia and Pacific Regions. If any further guidance/assistance is needed, Nepal can email ICAO Secretariat, and the Secretariat will coordinate/link with capable States/Administrations, such as Hong Kong China, Singapore, and New Zealand to share experiences with Nepal, and help to resolve the difficulties encountered. The SURICG/8 meeting was informed that CNS SG/27 will also discuss the challenges faced by States/Administrations and provide a platform to whom have difficulties on implementing any technologies under its Agenda Item 11: Capacity Building.

ICAO Surveillance Panel Activities (IP/07)

2.41. Chair of ICAO Surveillance Panel described recent and planned activities of the ICAO Surveillance Panel. The ongoing works by SP covered the Change Proposals (CPs) to the Manual on Airborne Surveillance Applications (Doc 9994), the PfA of Annex 10 Volume IV, the proposed Change Proposal for Doc 9871 Technical Provisions for Mode S Services and Extended Squitter, the Change Proposals for Doc 9924 Aeronautical Surveillance Manual, the PfA to Annex 10 Volume III, compatibility testing with LDACS (L-band Digital Aeronautical Communications System), surveillance material in Doc 9830 (A-SMGCS Manual). The SURICG/8 meeting was further informed that the new guidance material containing performance-based surveillance requirements with examples from States will be circulated to Member States for comments and released as ICAO documents. The SURICG/8 meeting also encouraged States who are interested in aviation surveillance to nominate members to join and contribute to the Surveillance Panel consistently.

Sharing from Aircraft Manufacturers and Avionics Suppliers

2.42. Indra provided a brief introduction on the topic of creating skies together, including the relevant technologies in Automation, Surveillance, Communications, Navigation, Drones, Information services. Thales shared the advance solutions regarding automation, traffic flow management, the deployment of UAS operations into the airspace, non radar surveillance, navigation aids, and civil radars. Huawei presented the full situational awareness and accurate data to ensure aviation safety and operational readiness. Airbus introduced the technologies equipped in the different models of Airbus aircrafts, including ADS-B OUT, ATSAW, CAVS, SURF-A, ACAS Xa.

ToR of SURICG and Action Items

2.43. The paper presented the Terms of Reference of the SURICG and its action items for review and update. Noting that Mode S and DAPs WG will be dissolved and its remaining tasks would be transferred to SURICG to follow up, Hong Kong China and Singapore analyzed the ToR of Mode S and DAPs WG, and suggested a revised version of ToR of SURICG. The SURICG/8 meeting reviewed and adopted the revised ToR of SURICG, which is provided in **Appendix B** to this paper, and formulated the **Draft Decision SURICG/8/4: Revised ToR of Surveillance Implementation Coordination Group (SURICG) for CNS SG/27 consideration**. The updated action items of SURICG which are provided in Appendix K to the Report.

Date and Venue for the Next Meeting

2.44. The SURICG/8 meeting considered that the next SURICG meeting would be held for

4 days tentatively planned for April 2024. Exact dates and venue will be coordinated with States concerned and inform Member States in due course.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matter as appropriate

GENERAL STRATEGY ON ASSIGNMENT OF AND MIGRATION TO SI CODE

Consider that when formulating the general strategy:

- a) It was previously shared that radars using SI code cannot detect II-only transponders unless a work-around known as the II/SI code operation is used;
- b) Even if a radar using SI code supports the II/SI code operation, it will not be able to detect an II-only transponder if that transponder is already locked to a matching II code by a radar using that matching II code. A way to overcome this is for II radars to also use the II/SI code operations whereby it will only lock out SI-capable transponders and not II-only transponders. However, it is difficult to ensure that all radars (including old radars) can support the II/SI code operations;
- c) Transponders that support only II codes are unlikely to disappear totally. Even with strict enforcement by ICAO, there will still be aircraft not subjected to ICAO's provision;
- d) While it is possible to configure the lock-out coverage to be smaller than the designated operating coverage, such configuration may not be intuitive and may be subjected to error;
- e) The European region is reserving II 14 and 15 (and their matching SI codes) for special use (i.e. research/test and military purposes);
- f) The Surveillance Panel is deliberating on a proposal to include a **requirement** for use of II/SI code operations for radars using SI code and a **recommendation** for the use of II/SI code operations for radars using II code; and
- g) The strategy is to be kept simple,

The following general strategy is thus proposed for the assignment of SI codes:

- a) ICAO APAC regional office will assign SSR Mode S II or Mode S SI codes in accordance with the planning criteria in *Appendix A-1*, at the same time ensuring support for Mode S II-only transponders;
- b) ICAO APAC regional office will only assign an SI code if the radar can support II/SI code operations;
- c) ICAO APAC regional office will only assign an SI code to radars having overlapping coverage with another radar using "matching" II code when the radar using "matching" II code can support II/SI code operations;
- d) The ICAO APAC Regional Office will assume that the designated operating coverage is the same as the lockout coverage. There will be a 5NM buffer between the coverages of two radars using the same II or SI code. States can, as necessary, select a lockout coverage that is smaller than the Designated Operational Coverage; and
- e) The ICAO APAC regional office will generally avoid assigning II 14 and 15 (and their matching SI codes) to new radars.

The following general strategy for migration is proposed:

- a) States with Mode S radars that can support II/SI code operation are encouraged to coordinate with the ICAO APAC Office to assign or re-assign SI codes to these radars.
- b) The ICAO APAC Regional Office may also approach certain States to start migrating to SI codes.

Appendix A-1

The following planning criteria for assigning SSR Mode S II or SSR Mode S SI codes have been agreed by the Surveillance Panel and will be incorporated in the ICAO Aeronautical Surveillance Manual (DOC 9924)

(Editorial Note: Some of the texts below are edited from the original material in DOC. 9924)

Table 1: Considered interrogator (interrogator for which an Interrogator Code is demanded)				
Mode S II-only interrogator				
Operating on II code				
Can operate with Mode S II-only and Mode S II/SI transponders				
Case	Capability of the overlapping interrogator	Operating code	Condition	Transponder Type
A	A Mode S II only	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
B	Mode S SI operating with II code (1)	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
C	Mode S SI operating with SI code (1)	Any SI code, including a “matching” SI code	Overlap OK	II/SI
D	Mode S II/SI+ operating with II code (2)	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
E	Mode S II/SI+ operating with SI code (2)	Non-matching SI code	Overlap OK	II-only and II/SI
		Matching SI code	No overlap	

Note 1: Mode S SI means Mode S II/SI capable interrogator which does not support the II/SI code operation

Note 2: Mode S II/SI+ means Mode S II/SI capable interrogator which does support the II/SI code operation

Table 2: Considered interrogator (interrogator for which an Interrogator Code is demanded)				
Mode S II/SI interrogator that does not support the use of II/SI code operation.				
Operating on II code				
Can operate with Mode S II-only and Mode S II/SI transponders				
Case	Capability of the overlapping interrogator	Operating code	Condition	Transponder Type
A	A Mode S II only	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
B	Mode S SI operating with II code (1)	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
C	Mode S SI operating with SI code (1)	Any SI code, including a “matching” SI code	Overlap OK	II/SI
D	Mode S II/SI+ operating with II code (2)	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
E	Mode S II/SI+ operating with SI code (2)	Non-matching SI code	Overlap OK	II-only and II/SI
		Matching SI code	No overlap	

Note 1: Mode S SI means Mode S II/SI capable interrogator which does not support the II/SI code operation

Note 2: Mode S II/SI+ means Mode S II/SI capable interrogator which does support the II/SI code operation

Table 3: Considered interrogator (interrogator for which an Interrogator Code is demanded) Mode S II/SI interrogator that does not support the use of II/SI code operation. Operating on SI code
Can only operate with Mode S II/SI transponders

Case	Capability of the overlapping interrogator	Operating code	Condition	Transponder Type
A	A Mode S II only	Any II code including the matching II code	Overlap OK	II/SI
B	Mode S SI operating with II code (1)	Any II code including the matching II code	Overlap OK	II/SI
C	Mode S SI operating with SI code (1)	Different SI code	Overlap OK	II/SI
		Same SI code	No overlap	
D	Mode S II/SI+ operating with II code (2)	Any II code including the matching II Code	Overlap OK	II/SI
E	Mode S II/SI+ operating with SI code (2)	Different SI code	Overlap OK	II/SI
		Same SI code	No overlap	

Note 1: Mode S SI means Mode S II/SI capable interrogator which does not support the II/SI code operation

Note 2: Mode S II/SI+ means Mode S II/SI capable interrogator which does support the II/SI code operation

Table 4: Considered interrogator (interrogator for which an Interrogator Code is demanded) Mode S II/SI+ interrogator that supports the use of II/SI code operation. Operating on II code
Can operate with Mode S II-only and Mode S II/SI transponders

Case	Capability of the overlapping interrogator	Operating code	Condition	Transponder Type
A	A Mode S II only	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
B	Mode S SI operating with II code (1)	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
C	Mode S SI operating with SI code (1)	Any SI code including a matching SI code	Overlap OK	II/SI
D	Mode S II/SI+ operating with II code (2)	Different II code	Overlap OK	II-only and II/SI
		Same II code	No overlap	
E	Mode S II/SI+ operating with SI code (2)	Any SI code including a matching SI code	Overlap OK	II-only and II/SI

Note 1: Mode S SI means Mode S II/SI capable interrogator which does not support the II/SI code operation

Note 2: Mode S II/SI+ means Mode S II/SI capable interrogator which does support the II/SI code operation

**Table 5: Considered interrogator (interrogator for which an Interrogator Code is demanded)
Mode S II/SI+ interrogator that supports the use of II/SI code operation.
Operating on SI code
Can operate with Mode S II-only and Mode S II/SI transponders**

Case	Capability of the overlapping interrogator	Operating code	Condition	Transponder Type
A	A Mode S II only	Non-matching II code	Overlap OK	II-only and II/SI
		Matching II code	No overlap	
B	Mode S SI operating with II code (1)	Non-matching II code	Overlap OK	II-only and II/SI
		Matching II code	No overlap	
C	Mode S SI operating with SI code (1)	Different SI code	Overlap OK	II/SI
		Same SI code	No overlap	
D	Mode S II/SI+ operating with II code (2)	Any II code including a matching II code	Overlap OK	II-only and II/SI
E	Mode S II/SI+ operating with SI code (2)	Different SI code	Overlap OK	II-only and II/SI
		Same SI code	No overlap	

Note 1: Mode S SI means Mode S II/SI capable interrogator which does not support the II/SI code operation

Note 2: Mode S II/SI+ means Mode S II/SI capable interrogator which does support the II/SI code operation

**TERMS OF REFERENCE OF
SURVEILLANCE IMPLEMENTATION COORDINATION GROUP (SURICG)**

Consists of objectives and deliverables as follows:

The Objectives of the SURICG are to:

- 1) *Ensure continuous and coherent development of the Surveillance parts of the Asia/Pacific Regional Air Navigation Plan (APAC e-ANP) in a manner that is harmonized with adjacent regions, consistent with ICAO SARPs, the Global Air Navigation Plan and the Global Aviation Safety Plan;*
- 2) *Facilitate the implementation of Surveillance systems and services identified in the Aviation System Block Upgrades (ASBU) modules, APAC ANP, and Asia/Pacific Seamless ATM Plan elements using the project management principles where appropriate; and*
- 3) *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 Asia and Pacific Regions.*

Deliverables to meet the Objectives:

- 1) *Progress report to be submitted to CNS SG addressing the SURICG deliverables (listed in 2 to 13 below);*
- 2) *Surveillance parts of the APAC ANP to be reviewed and aligned with work programme of States and, as necessary, amendment proposals prepared to update the APAC ANP to reflect changes in the operational and global requirements;*
- 3) *To review the outcome of the Surveillance Panel, SAS Panel, AN-Conf, APANPIRG and CNS SG related to surveillance, revise and update a tasks list and action items for the SURICG and formulate relevant Working Groups to work on those tasks / action items;*
- 4) *To develop regional targets/metrics for planning, implementation, measurement and monitoring of Surveillance systems and services;*
- 5) *To review and update the Surveillance Strategy by considering currently available and emerging technologies with respect to concept of operations, relative costing, technical and operational performance and maturity of alternative technology/solutions such as primary radar, secondary radar including Mode-S, ADS-B, Multilateration, ADS-C, multi-static primary radar (MPSR) and existing and emerging technology for detection of UAS including RPAS;*
- 6) *To study and identify applicable multilateration applications in the Asia and Pacific Regions considering:*
 - *Concept of use/operation*
 - *Required site and network architecture*
 - *Expected surveillance coverage*
 - *Cost Benefits Analysis*
 - *Recommended separation minimums*

- 7) To study and identify applicable Mode S ~~radar~~ and DAPs applications in the Asia and Pacific Regions considering:
- Concept of use/operation;
 - Assignment of and migration to SI code in APAC;
 - Required site and network architecture;
 - Expected surveillance coverage;
 - Cost of system;
 - Requirement of surveillance systems (focusing on radar)
 - Matching functionality required in ATC ATM automation system;
 - ~~the use of Enhanced MODE S data (DAPS)~~
 - Other currently available or emerging technologies;
 - ~~ICAO GANP and ASBU; and~~
 - Evaluation method for Mode S and DAPs performance.
- 8) To develop an implementation plan for ADS-B applications in the Asia and Pacific Regions including implementation target dates taking into account:
- available equipment standards;
 - readiness of airspace users and ATS providers;
 - identifying sub-regional areas (FIRs) where there is a positive cost/benefit for implementation of ADS-B and associated VHF voice communications;
 - developing a standardised and systematic task-list approach to ADS-B implementation; and
 - major traffic flows.
- 9) To coordinate ADS-B implementation plan and concept of operations with other ICAO regions where ADS-B implementation is going on and with relevant external bodies such as EUROCONTROL, EUROCAE, RTCA and Industry;
- 10) To encourage research and development, trials and demonstrations in the field of Surveillance and other relevant areas; ¶
- 11) Facilitate implementation of surveillance data sharing (including DCPC) and sharing surveillance information and expertise between States through organizing educational seminars and providing guidance materials to educate States and airspace users
- 12) To support the ICAO in making specific recommendations, developing guidance materials, aimed at improving the Surveillance services by the use of existing and/or new procedures, facilities and technologies; and
- 13) Draft Conclusions and Decisions to be formulated relating to matters in the field of Surveillance that come within the scope of the APANPIRG or CNS Sub-group work plan.

[Note: The Implementation Coordination Group, while undertaking the tasks, should take into account of the work being undertaken by SAS, Surveillance Panels with a view to avoid any duplication.

The Implementation Coordination Group will report to CNS Sub-group and CNS Sub-group will coordinate with ATM Sub-group.]

Membership:

All APAC member States/Administrations providing air navigation services in the Asia and Pacific Regions.

The Surveillance Implementation Coordination Group shall normally invite representatives of International Organizations recognized by the ICAO Council and Industry partners as required by the group which represent important civil aviation interests to participate in its work in a consultative capacity.
