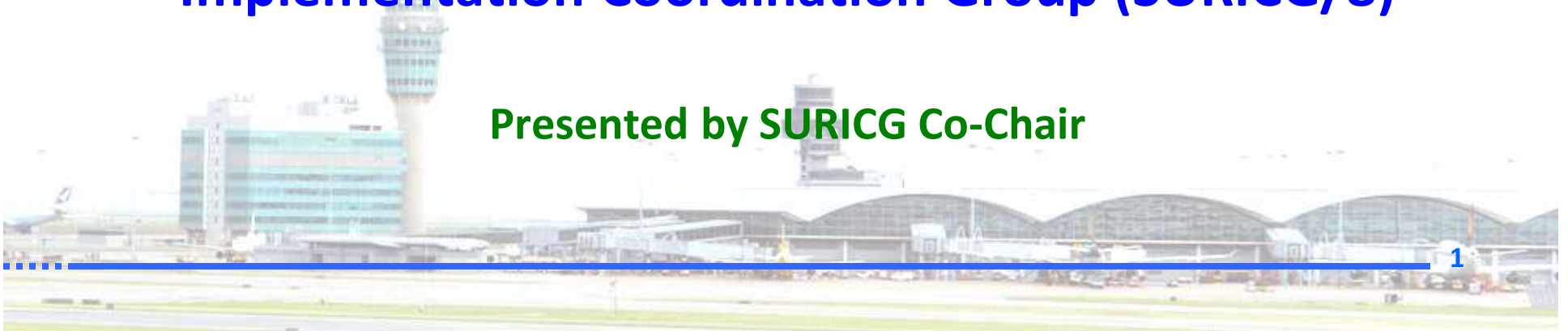27th MEETING OF COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SUB-GROUP OF APANPIRG (CNS SG/27)

BANGKOK, THAILAND, 28 AUGUST TO 1 SEPTEMBER 2023

Outcomes of the Eighth Meeting of the Surveillance Implementation Coordination Group (SURICG/8)

Presented by SURICG Co-Chair

1

High-level Overview on SURICG/8

- 6 - 9 June 2023 in ICAO APAC Regional Office

- Face-to-face manner (1st time since SURICG/4 in April 2019) with 79 participants from 18 States/Administrations

- 2 International Organizations - IATA, ICAO

- 5 Industry Partners - Airbus, Thales, Indra, Huawei and Chinney

- 8 WPs, 21 IPs, 5 Presentations and 1 Flimsy

- Major outcomes :

  i.   1 Decision adopted by SURICG/8

  ii.   1 Draft Decision & 1 Draft Conclusion – for adoption by CNS SG/27

  iii. 1 Draft Conclusion – for consideration by CNS SG/27 and adoption by APANPIRG/34
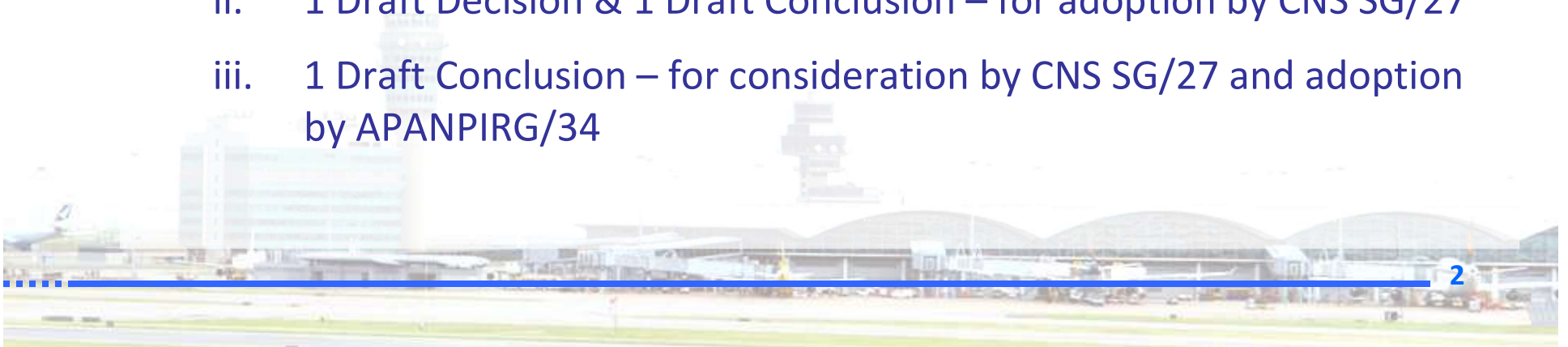
Review of Mode S and DAPs Working Group

a) SURICG/8 reviewed the objectives of setting up Mode S and DAPs Working Group set up since 2018, and summarized the major achievements of this Working Group.

b) Considering most of the objectives stated in ToR had been completed or already in the process of completion by this Working Group and/or by the Surveillance Panel, SURICG/8 endorsed the proposal of transferring the residual tasks of this Working Group to SURICG, and dissolve the Working Group.

c) As such, the following Decision was endorsed by SURICG/8:

Dissolution of Mode S and DAPs Working Group (Adopted by SURICG/8)

Decision SURICG/8/3 *(Mode S and DAPs WG/6/3)*: **Dissolution of Mode S and DAPs Working Group**	
What: Noting that most of the tasks outlined in the ToR have been completed/are in process of completion, the remaining action items will be performed by SURICG. That, the Mode S and DAPs Working Group be dissolved.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: From discussion outcome in Mode S and DAPs WG/6 meeting.	Follow-up: ☐Required from States
When: 9-Jun-2023	Status: adopted by SURICG
Who: ☐ Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other -	

Revised ToR of Surveillance Implementation Coordination Group (SURICG)

a) Noting that Mode S and DAPs Working Group would be dissolved and its residual tasks would be transferred to SURICG to follow up, the SURICG/8 reviewed and updated the ToR and the actions items of SURICG to incorporate those residual tasks and identify ways for SURICG to follow up.

b) SURICG/8 formulated a Draft Decision on the revised ToR of SURICG provided in **Appendix C** of this paper for endorsement by CNS SG/27 meeting.

Revised ToR of Surveillance Implementation Coordination Group (SURICG)

Draft Decision CNS SG/27/XX *(SURICG/8/4)* - Revised ToR of Surveillance Implementation Coordination Group (SURICG)	
What: That, the Revised Terms of Reference of the Surveillance Implementation Coordination Group (SURICG) provided in **Appendix C** to this paper be adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The ToR from dissolved Mode S and DAPs WG was reviewed and necessary updates were identified.	Follow-up: ☐ Required from States
When: 1-Sep-2023	Status: To be adopted by Sub Group
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐APANPIRG ☐ICAO HQ ☒Other: SURICG	

Amendments to Mode S DAPs IGD

a) Mode S DAPs WG/6 reviewed and proposed improvements to Mode S DAPs Implementation and Guidance (IGD). The main amendments include:

- New Section 4.1 to illustrate the Mode S downlink format;
- New Section 7.3.7 to introduce the error protection;
- Supplement the description of the implementation of Selected Altitude in section 7.5.1;
- New section 9.6 to give the application of ADS-B DAPs for GPS interference identification; and
- Add a newly identified issue in Appendix 2.

b) SURICG/8 reviewed and supported the proposed amendments. A Draft Conclusion was formulated to adopt the updated Mode S DAPs IGD Edition 5.0 provided in **Appendix B** to this paper for endorsement by CNS SG/27:

Amendments to Mode S DAPs IGD

Draft Conclusion CNS SG/27/XX *(SURICG/8/2 (Mode S and DAPs WG/6/2))* - Mode S DAPs IGD Edition 5.0	
What: That, the Mode S DAPs Implementation and Operation Guidance Document Edition 5.0 provided in **Appendix B** to this Paper be adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: Inclusion of new/supplementary content discussed in Mode S and DAPs WG/6.	Follow-up: ☐Required from States
When: 1-Sep-2023	Status: To be adopted by Sub Group
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: -	

General Strategy on Assignment of and Migration to SI Code in the APAC Region

a)   With increasing number of Mode S radars with overlapping coverage, the assignment of Interrogator Identifier (II) codes (with only 15 combinations) to Mode S radars with overlapping coverage has become increasingly difficult.

b)   It is required to formulate a general strategy for assignment of and migration from II to Surveillance Identifier (SI) codes (with 63 combinations), such that the migration could be done in a safe manner without compromising surveillance to ATC.

c)   A general strategy for the assignment of and migration from II to SI codes was deliberated and proposed by the Mode S and DAPs Working Group.

d)   The proposed general strategy was discussed and endorsed in the SURICG/8.

e)   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 further adoption by APANPIRG/34:

General Strategy on Assignment of and Migration to SI Code in the APAC Region

Draft Conclusion CNS SG/27/XX *(SURICG/8/1 (Mode S and DAPs WG/6/1)))* – General Strategy on Assignment of and Migration to SI Code in the APAC Region	
What: The General Strategy on Assignment of and Migration to SI Code in the APAC Region provided in **Appendix A** of this paper be adopted.	Expected impact: ☐ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To synchronize the APAC region on the general principles applied for assignment of and migration to SI codes.	Follow-up: ☒Required from States
When: 13-Dec-2023	Status: Draft to be adopted by PIRG
Who: ☒Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other : SURICG	

Other Reviews and Discussions

SURICG/8 reviewed and discussed other topics as summarized below:

a) Election of new Co-Chair

- SURICG extended sincere gratitude to Mr. Yeo Cheng Nam for his dedication and contributions in the past four years (since 2019) as co-chair

- Mr. Ho Wee Sin, Deputy Director (Info Air Traffic Management) of the Civil Aviation Authority of Singapore was unanimously elected

b) Conducted the Workshop on ICAO Aircraft Address and Target Identification in Surveillance Data and Flight Plan

- to promote to stakeholders and the aviation community the importance in ensuring consistency of the ICAO Aircraft Address and the Target Identification in Surveillance Data and Flight Plan, the possible adverse impacts to ATC in case of inconsistencies, as well as follow-up actions required to mitigate the inconsistencies.

- An ad-hoc group led by Hong Kong China, supported by China, New Zealand, Singapore, USA and IATA would consolidate the information presented in the Workshop into a regional guidance document, which is planned to be presented to SURICG/9 for review.

Other Reviews and Discussions

c) Explained II/SI Code Operations in simplified manner

- introduction to 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.

d) Reviewed outcomes of relevant and previous meetings on Surveillance, including 6th Meeting of Mode S and DAPS Working Group , 3rd Meeting of Surveillance Study Group, and action Items for SURICG.

e) Update the plan to conduct a trial demonstration in Hong Kong in Q1 2024 on surveillance data sharing via SWIM under S3TIG of Surveillance Study Group.

f) Reviewed progress/status of ADS-B data-sharing projects in two ad-hoc groups, namely Southeast Asia and Bay of Bengal, and encouraged concerned States to continue working on ADS-B data-sharing projects.

g) Worked on update for regional surveillance coverage map (presented as WP/05 in SURICG/8 meeting) for incorporation into next update of the APAC Seamless ANS Plan.

Thank You

Supplementary Slides

TERMS OF REFERENCE OF
SURVEILLANCE IMPLEMNTATION COORDINTION 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.

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

MODE S DOWNLINK AIRCRAFT PARAMETERS IMPLEMENTATION AND OPERATIONS GUIDANCE DOCUMENT

Edition 5.0 - March 2023

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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.