International Civil Aviation Organization

Tenth Meeting of the Surveillance Implementation Coordination Group (SURICG/10)

Bangkok, Thailand, 21 - 23 April 2025

Agenda Item 4:   Review Progress of SURSG

**OUTCOME OF THE FOURTH MEETING
OF THE SURVEILLANCE STUDY GROUP SURSG/4**

(Presented by the Secretariat)

SUMMARY

This paper presents the discussions and relevant outcomes on the Fourth Meeting of the Surveillance Study Group (SURSG/4).

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1.   INTRODUCTION

1.1   The Fourth meeting of the Surveillance Study Group (SURSG/4) was held in Hong Kong, China, from *30-31 May 2024*. The Meeting was attended by **63** participants from **12** Member States, **1** International Organizations and **4** industry partners. The Meeting report and other documents of the meeting can be accessed at the ICAO APAC Meeting webpage at:
https://www.icao.int/APAC/Meetings/Pages/2024-SURSG-4.aspx

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

2.   DISCUSSION

2.1   The summary of the discussion in the Meeting is given in the following paragraphs.

A Summary of the Journey of SURSG - Sec (WP/02)

2.2   The paper recalled the background and motivation for establishing the Surveillance Study Group (SURSG) and the key outcomes of the last three meetings of SURSG. The meeting appreciated SURSG for completing the study on surveillance data sharing within two years of timelines, demonstrating members' strong dedication and commitment. The meeting thanked Hong Kong China for leading the SURSG and sharing surveillance data during the SWIM demonstration. The meeting noted that the Joint event of SWIM over CRV Demonstration (the demo) and Surveillance data over SWIM Trial (the trial) was a collaborative and intricate work of S3TIG. The Joint event was successfully conducted from 28 May to 29 May 2024.

2.3   The meeting was informed that as per the current plan, as most deliverables except one Guidance material for the sharing and access of surveillance data allocated to SURSG have been completed and most objectives achieved, the future SURSG Meeting may propose the dissolution of the SURSG after the completion of the remaining deliverable.

Review of Work Plan for Surveillance Study Group - Hong Kong China (WP/06)

2.4   The paper shared the Surveillance Study Group Work Plan modified by the SURSG/3 meeting for review and modifications, given the progress and development following SURSG/3 held in March 2023.

2.5   The meeting deliberated the proposed plan and updated the timelines and deliverables of the remaining tasks. The approved and modified SURSG work plan by the meeting is as follows.

3	Report on the possible implementation of surveillance data sharing in SWIM	-	SURSG/2	SURICG/7	TBD	Completed Outcomes of Joint event were presented in SURSG/4 meeting.
3-1	Consolidation of all the outcomes of Task 2 into a report according to the contents defined in ToR for submission to SURICG	-	SURSG/2	SURICG/7	Hong Kong China, IATA, Singapore, Thailand, Viet Nam	
~~3-2~~	~~Preparation of draft multi-lateral agreement on surveillance data sharing and data consumption~~ **[absorbed into Task 4]**	~~SURSG/2~~	~~SURICG/7~~ ~~(to be reviewed at SURSG/3)~~	~~TBD~~	~~3-2~~	
4	Guidance materials for the sharing and access of surveillance data	~~SURICG/7~~ ~~(after demo)~~ **SURICG/11 (2026)**	~~SURICG/9~~ **SURICG/11**	TBD	4	**Guidance Material**
4-1	Preparation of the framework and 1ˢᵗ draft of guidance material	~~SURICG/7~~ ~~SURICG/8~~	~~SURSG/3~~ ~~SURSG/4~~	TBD	4-1	

		(after demo) SURICG/ 11 (2026)	or SURSG/5 [1] SURICG /11 (2026)			
4-2	Further development of the working draft of guidance material for endorsement by SURICG and CNS SG	SURSG/3 (after demo) SURICG/ 11 (2026)	SURICG/ 9 SURICG /11	TBD	4-2	

2.6   The meeting discussed the proposed framework of guidance material. It was agreed that the study report published by SURSG in 2022 could serve as an initial draft to initiate work on the guidance material. It was decided that the guidance material would restrict the scope of sharing ADS-B surveillance only. Additionally, key aspects that would be considered in the draft of the documents are (1) surveillance information service security, (2) infrastructure and bandwidth consideration, (3) surveillance data performance requirements and (4) data formats – ASTERIX, JSON or new data formats.

2.7   The meeting requested volunteers to lead the work on the draft of guidance material. Hong Kong China volunteers to lead surveillance information service security and Infrastructure and bandwidth consideration draft. **ACTION ITEM 4-1** The USA shared their willingness to lead the surveillance data performance requirements draft **ACTION ITEM 4-2** and Singapore for the Data formats draft. **ACTION ITEM 4-3** The meeting requested a volunteer to compile the draft documents received from four leads on four initial topics being considered in the guidance material. As no volunteers shared an interest in leading this task, Hong Kong China and the USA agreed to lead the task. **ACTION ITEM 4-4** The respective topic leads will solicit inputs and expert advice from SURSG nominated Member States/Administrations.

Updates from the Surveillance Sharing in SWIM S3TIG- Hong Kong China – Hong Kong China (WP/04)

2.8   The paper summarised the works achieved by S3TIG for the Joint event of SWIM Demonstration over CRV and Surveillance Data Sharing in the SWIM Trial. The meeting noted that three scenario-based demonstrations were demonstrated with real-time data exchange among involved parties in the Joint event and the operational benefits brought by SWIM were showcased. Hong Kong China presented a data exchange model for sharing surveillance data over SWIM and the corresponding message headers.

2.9   The meeting was informed that a Pseudo CRV network was established among States/Administrations acting as Gateway EMS and Edge EMS according to the SWIM technical infrastructure proposed by SWIM Implementation Pioneer Group (SIPG) under SWIM TF, and a console connect environment was established among States/Administrations acting as Observers. This architecture included both a CRV-based SLA-guaranteed network and an internet-based network. In

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[1] Subject to timing of Demo.

addition, each participating State/Administration developed SWIM services to support the scenario-based demonstrations and surveillance data sharing. The meeting noted a series of tests conducted in different stages, including network connectivity test, EMS server connectivity test, message exchange test and scenario dry run, to ensure a smooth and successful demonstration.

2.10   The meeting recorded that with the support of scenario participants and PCCWG and after completing the Joint Event, the current setup will be accessible for one month until the end of June 2024 for participants to appreciate the SWIM environment and system HMI. S3TIG will further communicate via email with members for any adjustment of the data structure for surveillance data sharing on SWIM and the relevant documentation (lesson learnt, outcomes, etc.) to support SURSG and hold ad-hoc web meetings on a need basis. It was added that Members would further review the adopted message structure in the Joint Event, make necessary adjustments for improvement, consolidate lessons learnt, and provide input to SURSG in drafting the report to be submitted to SURICG. Lastly, it was proposed that The S3TIG (as a supporting role) could be dissolved after completing the remaining deliverables under SURSG.

2.11   The meeting discussed that S3TIG was created to support the Joint event. With the successful completion of the Joint event, it was proposed that S3TIG be dissolved and that SURSG be able to complete the remaining tasks of S3TIG.

2.12   The meeting reviewed the ToR of S3TIG. After careful reflection, it was agreed that S3TIG's responsibilities for providing a safety assessment for surveillance data sharing in the SWIM environment and economic assessment for establishing and operating surveillance data sharing through SWIM could be drafted and added to the guidance material being prepared by SURSG. **ACTION ITEM 4-5** Some economic considerations may include bandwidth requirements, subscription payment, and maintenance cost of surveillance information services. The meeting suggested that a checklist of crucial parameters for states that wish to share surveillance data can also be added to the guidance material. However, it was agreed that preparing a comprehensive list of requirements is impossible because of the diversity of legal and technical requirements in various states.

2.13   After reviewing the S3TIG ToR, the meeting agreed that most tasks allocated to S3TIG were successfully completed and that the current ToR of SURSG already included the remaining tasks from S3TIG. Therefore, there was no need to modify SURSG ToR. With the aforementioned, the S3TIG was dissolved by the meeting.

   Study on bandwidth used for ADS-B data being transmitted on SWIM CRV – Hong Kong China (WP/05)

2.14   Hong Kong China shared that during the CRV OG meetings, there was a recognised need to review and analyse the bandwidth usage of CRV in each State/Administration. Such analysis is crucial to proactive planning of upgrades and accommodating future applications, ensuring necessary actions will be taken in a timely manner. Since bandwidth in CRV is considered a crucial resource, especially for States/Administrations with higher bandwidth demand due to a higher number of applications and States which are geographically remote, understandably with higher bandwidth cost, Hong Kong China conducted a study to provide insights into the bandwidth requirements of surveillance data on SWIM from 17-20 May 2024, so that CRV experts could consider incorporating them into the tendering process for improved support of new applications for the new CRV contract upon expiry of the current one in 2028. In addition, the SURSG has already undertaken the responsibility of conducting a study on the sharing of surveillance data over SWIM and a demonstration of surveillance data sharing, which took place on 28-29 May 2024. One crucial aspect of this study was calculating bandwidth

requirements for sharing surveillance data. Through this study, Hong Kong China collected and analysed the bandwidth usage associated with such sharing.

2.15   The Configuration for the Study of Bandwidth on Surveillance Data exchanged over CRV was presented to the meeting. The meeting noted that for the demo, a 20Mbps connection to Pseudo CRV had been established in Hong Kong China and the analysis was based on the average size of an AMQP message received from different EMSes.

2.16   The meeting was informed that concerning ROK's AMQP messages carrying both ADS-B data and Flight Plan information, most of the messages contain 32 data fields, the highest number among the messages received. It was observed that such messages in JSON format occupy approximately 1.1K bytes, the most significant size among all messages exchanged in this study. If the 8% transmission overhead is included, the size increases to around 1.2K bytes.

2.17   Hong Kong China informed that during peak hours in Hong Kong China's operational environment, the Hong Kong ADS-B system detects approximately 300 targets within Hong Kong FIR and partial Mainland China FIR. Assuming that ADS-B data associated with Flight Plan information for all these 300 targets are sent in 1 second in the SWIM environment with each target of size of 1.2K bytes (refer to ROK track), a total of 360K bytes per second is necessary (i.e. 2.88Mbps). As Hong Kong is one of the busiest FIRs in the region, this figure should offer additional insights into the bandwidth demand that may be capped at this level in the worst scenario. Lastly, it was concluded that the bandwidth requirement still highly depends on different use cases. Several aspects, mainly the frequency of data sent, should be considered by different States/Administrations. The meeting agreed that the analysis result of this paper should be shared with CRV OG for further consideration.

2.18   Indonesia shared their wish to share surveillance data over CRV and requested an estimate of bandwidth requirements to asses their current subscribed package and bandwidth for CRV. Hong Kong China informed that the analysis conducted by Hong Kong China was for AMQP messages, which have a bigger size than raw CAT 21 data. Therefore, the required bandwidth should be less than the calculated peak bandwidth consumption. Hong Kong China agreed that they would produce a paper containing quantitative details of bandwidth consumption based on various categories of data recorded in the Joint event and present them in future SWIM TF and CRV OG meetings. It was suggested that theoretical bandwidth calculation for voice, surveillance data, and space-based ADS-B data could be added to the paper along with analysis of captured data during the Joint event. **ACTION ITEM 4-6**

2.19   Thailand and Singapore requested Hong Kong China to capture and analyse ADS-B data supplied by their surveillance system as the current setup for the Joint event will be accessible for one month until the end of June 2024 for participants. Hong Kong China accepted the request. **ACTION ITEM 4-7**

Use case of MET information services in SWIM demonstration for ATFM with surveillance data sharing- Hong Kong China (IP/02)

2.20   The paper presented the potential operational benefits for ATFM that could be brought by sharing MET information and surveillance data in a SWIM demonstration. The meeting was informed about the use case and the potential operational benefits of MET information sharing through SWIM for enhancing air traffic flow management (ATFM) in a demonstration scenario in the "Joint event of SWIM over CRV Demonstration (the Demo) and Surveillance data over SWIM Trial" held on 29 May 2024.

2.21   The meeting noted that in the demonstration scenario, based on the latest assessment of the aeronautical meteorological forecaster on the deteriorating weather at the Hong Kong International Airport (VHHH), a timely update of the Aerodrome Forecast (TAF) was issued by the Hong Kong Observatory (HKO) to the Hong Kong Civil Aviation Department (HKCAD) in IWXXM format through SWIM. With the digital TAF in IWXXM format, the impact of the anticipated weather on VHHH Airport Acceptance Rate (AAR) could be calculated automatically via the Surveillance Data Processor (SDP) and Flight Data Processor (FDP) trajectory capability in future advanced ATFM systems.

2.22   It was informed that in addition to TAF, HKO also provided the gridded information of hourly significant convection forecast over the South China Sea with forecast lead time of up to 8 hours in this SWIM demonstration and the associated visualisation on HKO's SWIM-enabled MET application. It was added that HKO's SWIM-enabled MET application provided the Hong Kong ATFM Unit (ATFMU) with the forecast distribution of significant convection covering the Hong Kong Flight Information Region (FIR) and its surrounding areas. Based on the calculation using IWXXM TAF and the forecast spatial distribution of severe convective weather, Hong Kong ATFMU determined a reduction in AAR during the demonstration.

2.23   The meeting noted the details of scenarios for CPA690 and CPA770 flights. It was agreed that the demonstration scenario outlined the operational benefits of efficient MET information exchange and surveillance data sharing for improving traffic demand and capacity forecasting in ATFM. In addition, machine-readable MET and surveillance information in SWIM could be used directly in future ATFM Systems for automatic calculations and updates of landing slot allocations. Lastly, real-time updates enabled by SWIM could also facilitate more efficient re-sequencing of traffic demand. The MET information and surveillance data shared in the SWIM environment would also increase situational awareness of airlines and their pilots.

Service Description for MET Scenario (#3) in Context of the SWIM Discovery Service (SDS)- ROK (WP/07)

2.24   ROK presented the implementation of a service description based on the SWIM Discovery Service (SDS). The SWIM Discovery Service (SDS) is a web service that facilitates the metadata exchange for SWIM information services among independently managed SWIM programs. It was informed that at the SWIM TF/8 meeting in November 2023, <Proposal of Regional Candidate Standard for Service Discovery> (WP/07) was presented, and the SWIM TF/8 agreed to propose to the Information Management Panel to consider adopting the SDS as the global standard candidate for globally interoperable service discovery (Draft Decision SWIM TF/08/01).

2.25   ROK shared that Member states developed many SWIM services for the SWIM over CRV demonstration and surveillance data over the SWIM trial, focusing on exchanging flight, surveillance, aeronautical, and MET information rather than metadata. Due to this, the development of service descriptions or metadata and the exchange of metadata through SDS instances were not considered for the demonstration. ROK provided additional information regarding the service description and the SDS for SWIM services provided by ROK. This included enhancing the visibility of SWIM services and how service descriptions could be written in the Service Description Model in JSON (SDM-J). It also included other implementations of service description (e.g., Public Data Portal, SWIM Registry) for SWIM services in the MET scenario (#3).

2.26   A list of SWIM services used for demonstration and Service Descriptions of SWIM services discovered using the KAC SWIM Registry were discussed. The meeting noted that Service Descriptions discovered using the KAC SDS instance Service are in JSON format and written in SDM-

J. It was added that in the case of MET Information Query Services mentioned, these services were provided through the public internet, registered in the Public Data Portal managed by the government, and provided service discovery and service description through the Public Data Portal.

Review ToR and Action Items List – Sec (WP/03)

2.27   The paper presented the current ToR of SURSG and the Action item list of SURSG Meetings for Meeting review and update. The meeting noted that there was no need to update the ToR of SURSG and the Action Items list was discussed and updated by the meeting. The reviewed action item list is provided in **Appendix A** of this paper.

Date and Venue for the Next Meeting

2.28   The SURSG/4 Meeting discussed the date and venue of the next SURSG Meeting. It was advised that the SURSG could work on the remaining deliverables offline and coordinate by email. The next SURSG meeting should be held after completing all remaining deliverables. The SURSG/4 Meeting agreed that the next Study Group Meeting can be conducted online or In-Person based on anticipation of the level of discussion. The ICAO Secretariat will inform participants about the exact dates, mode and venue when decided.

3.   ACTION BY THE MEETING

3.1   The meeting is invited to:

a) note the information contained in this paper;
b) review the further work required from SURSG and their proposed way forward; and
c) discuss any relevant matter as appropriate

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Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
1-1	To provide the mapping for each task with terms of reference of SURSG for detailed technical description of each task	Hong Kong China	SURSG/2	WP	Close	
2-1	To prepare a draft ToR of S3TIG by mid-April 2022 and send to all registered delegates of SURSG/2 for their feedback by an email	Hong Kong China, ICAO Secretariat	15-Apr-22	Draft ToR for SURICG/7 adoption	Close	
3-1	Description of Task 4 (on Guidance Material) would be elaborated to include the incorporation of a section of technical and operational considerations as reference for the preparation of multilateral agreement for states/parties intending to share surveillance data and the elaborated text is to be discussed at the next SURSG meeting	SURSG	SURSG/4	WP in SURSG/4	Open	
3-2	The Meeting shared the need to explore other options to join the Trial/demo by States/Administrations having no CRV connectivity. Further deliberations are required about the cost implication for States having CRV connectivity but no spare bandwidth to share for the Trial/demo. S3TIG will incorporate this discussion into the agenda item while preparing the Survey questionnaire	S3TIG, ICAO Secretariat	28 April 2023	Survey questionnaire with supporting documents Propose to close	Close	
3-3	The S3TIG will amend the questionnaire and prepare supporting documents containing useful information such as definitions of various terms used in the questionnaire to clear potential doubts of Member States/Administrations responding to the survey and any other necessary modifications. The questionnaire will be a composite survey with ideally 2 separate sets of questions respective for the Trial and SWIM over CRV Demonstration (Demo).	S3TIG, ICAO Secretariat	28 April 2023	Survey questionnaire with supporting documents Propose to close	Close	
3-4	The S3TIG will share the part of the questionnaire mainly related to the Demo and the endorsement of the proposal for the Joint Event by SURSG/3 in a joint working paper to SWIM TF/7 to be held from 9-12 May 2023 in Bangkok, Thailand for SWIM TF/7's agreement	S3TIG, ICAO Secretariat	SWIM TF/7 (12 May 2023)	Working Paper Propose to close	Close	Presented by WP/13 in SWIM TF/7

Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
3-5	The Survey will be shared, after SWIM TF/7 endorsement, with Member States/Administrations by ICAO Secretariat	ICAO Secretariat	19 May 2023	State Letter for responding to the Survey questionnaire

Propose to close | Close | The survey questionnaire was circulated through ICAO APAC State Letter Ref.: T 8/13.1: AP071/23 (CNS) with Subject – Survey on a Joint Event of SWIM over CRV Demonstration ("the Demo") and Surveillance Data Sharing in SWIM Trial ("the Trial") on 16 May 2023, which expected Member States/Administrations to submit the completed survey preferably not later than 12 June 2023 |
| 3-6 | The S3TIG will draft a formal package/agreement to participate in the Joint Event by Member States/Administrations to be shared with interested States/Administrations after the outcomes of the Survey are processed, analyzed, and interested Members to participate in the Demo/Trial are identified | S3TIG, ICAO Secretariat | July 2023 | Formal package/agreement

Propose to close | Close | SGP: Suggested to initiate this task in parallel ASAP

Take into consideration of formal agreement from 2019 demo. |
| 3-7 | The requirements to add a question related to the preferred data format, with ASTERIX and JSON data format as potential answers, in the Survey questionnaire will be evaluated. | S3TIG | 28 April 2023 | Survey questionnaire with supporting documents

Propose to close | Close | |
| 3-8 | S3TIG will further deliberate on potential data formats for conducting the trial and SWIM over CRV demonstration. S3TIG will propose data format(s) for the Trial and Demo | S3TIG | July 2023 | Finalized data format(s)

Propose to close | Close | |
| 3-9 | The S3TIG will consider the feasibility to incorporate the demonstrations proposed in the IP/02 in the upcoming Joint Event. | S3TIG | Q3 2023 | Final Scenarios for Demo/Trial
Propose to close | Close | |
4-1	Hong Kong China will lead the draft of surveillance information service security and Infrastructure and bandwidth consideration	Hong Kong China	SURSG/5		Open	
4-2	The USA shared will lead the surveillance data performance requirements draft	USA	SURSG/5		Open	
4-3	Singapore will lead the draft of the Data formats in guidance material	Singapore	SURSG/5		Open	