INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

REPORT OF

FIRST MEETING OF THE SURVEILLANCE STUDY GROUP

(SURSG/1)

Video Tele-Conference (VTC)
(20 to 22 April 2021)

The views expressed in this Report should be taken as those of the Meeting and not the Organization.

Approved by the Meeting
And published by the ICAO Asia and Pacific Office, Bangkok

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1. Introduction

1.1 The First Meeting of the Surveillance Study Group (SURSG/1) was held via video tele-conference from *20 to 22 April 2021*.

2. Attendance

2.1 The meeting was attended by **118** participants from **15** States/Administration and 4 International Organizations and 2 industry partners including Australia, China, Hong Kong - China, India, Indonesia, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, CANSO, IATA, ICCAIA, IFATCA, Frequentis and PCCW Global, via video conference. List of participants is at **Attachment 1**.

3. Opening of the Meeting

3.1 The meeting was opened by Mr. Luo Yi, Regional Officer CNS. Mr. Luo highlighted the motivation for the creation of SURSG, extended warm welcome to all participants and expressed deep appreciation and gratitude to participants in supporting the setting up of this SURSG/1 on-line meeting.

4. Officers and Secretariat

4.1 Mr. Luo Yi, Regional Officer CNS and Ms. Soniya Nibhani, Regional Officer ANS (CNS) Implementation, ICAO Asia and Pacific Regional Office, acted as secretary for the meeting with the support of Ms. Bhabhinan Sirapongkosit, the Programme Assistant of the same office.

5. Organization, Working Arrangements and Language

5.1. The meeting met as a single body and working language was English only, inclusive of all documentation and this Report. A total of **Seven** (07) Working Papers and **Six** (06) Information Papers were considered by the meeting. A List of Working Papers and Information Papers is provided at **Attachment 2.**

5.2. The meeting was interrupted for 30 minutes on the second day, i.e. 21 April 2021, due to unknown technical issue with the meeting platform. The meeting was suitably extended to make up for the lost time and all scheduled business of the meeting for the second day was conducted smoothly.

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Agenda Item 1: Election of Chair and Adoption of Agenda

Provisional Agenda- Sec (WP/01)

1.1 Mr. Vincent Wong, Acting Chief Electronics Engineer of the Air Traffic Engineering Services Division of the Hong Kong Civil Aviation Department (HKCAD), was nominated by Thailand, seconded by China, India, and Singapore and elected as the chair of the surveillance study group (SURSG).

1.2 Mr. Vincent Wong expressed his appreciation to the meeting for his nomination and selection as the chair of SURSG. He reiterated that there are many challenges and many works needed to be done for the completion of various tasks defined in Terms of Reference of SURSG. He also highlighted regional efforts in surveillance data sharing and SWIM related projects including SWIM Demonstration, which will surely benefit the study group and repeated that only with the States' collaboration and support would this Study Group be able to fulfill its objectives.

1.3 The tentative agenda items presented in **WP/01** were adopted by the meeting.

Agenda Item 2: Review SURSG Terms of Reference (ToR)

Review of Terms of Reference (ToR) - Sec (WP/02)

2.1. The paper presented the Terms of Reference of the Study Group under SURICG on Sharing of Surveillance Data in SWIM ("Study Group", "SURSG" as acronym) for review and further actions.

2.2. Surveillance data sharing issue has been discussed in various regional meetings in particular in the SEA/BOB ADS-B WG meetings as well as in SURICG meetings. The SEA/BOB ADS-B WG had prepared a draft data sharing agreement serving as template to promote and implement surveillance data sharing at sub-regional level to improve the efficiency and safety of air navigation service.

2.3. The CNS SG/23 meeting adopted the Conclusion CNS SG/23/10 (SURICG/4/1) - ADS-B and Flow Management. CNS SG/24 meeting adopted the Decision CNS SG/24/16 (SURICG/5/1) - Establishment of Study Group under SURICG on Sharing of Surveillance Data in SWIM.

2.4. The objectives of the Study Group are to study and provide expert views and recommendations to achieve harmonized sharing of surveillance data in SWIM in the Asia and Pacific (APAC) Regions along with the possible models of sharing of surveillance data in SWIM according to Surveillance Strategy adopted by APANPIRG and in support of ICAO's GANP and ASBU initiatives. The Study Group will also review, identify and provide expert views and recommendations to address major issues raised to the SURSG by ICAO APAC, in the technical, operational or regulatory aspects of surveillance data sharing to facilitate the implementation of surveillance from "departure to destination" in APAC.

2.5. The meeting recognized the need to revise ToR by adding chair role and function, frequency of the meeting of SURSG and the mode of the various task lead meetings for effective progress update, decision making, work assignments as they arise and the need to update the list of contributing States as necessary.

2.6. The meeting discussed and agreed that the States who will not use SWIM or CRV may be considered in the study.

2.7. The meeting discussed the need to understand the problem, which is to be solved by the use of CRV and SWIM before progressing with detailed development. It was noted that there is a long history within the region of States sharing surveillance data by direct connection between the sharing States following APAC Regional guidance. It was noted that this guidance specifies protocols for the exchange of information such as the ASTERIX format. It was also observed that PNG and Aireon have adopted the CRV for the distribution of space based ADS-B.

2.8. The revised ToR is provided in **Appendix A** to this Report and will be presented to SURICG/6 for adoption**.**

Agenda Item 3: Review outcomes of relevant meetings

Outcome of Relevant Meetings on Surveillance- Sec (WP/03)

3.1. The paper summarized relevant information and updates with the highlight on the reviewed outcomes of SURICG/5 and SWIM TF/4.

3.2. The CNS SG/24 meeting adopted **eight** (8) Conclusions and **five** (5) Decisions. In addition, based on the outcome of discussions on various agenda items, the CNS SG/24 meeting developed four (4) Draft Conclusions for consideration by APANPIRG/31 Meeting, which were adopted by APANPIRG/31. The meeting noted Conclusion/Decision adopted by CNS SG/24 and reviewed the different Conclusions and Decisions adopted by APNPIRG/31 in December 2020, which were of interest to the group and discussed the follow-up.

Outcomes of Mode S DAPs WG/4 Meeting- Sec (IP/02)

3.3. This paper presented the relevant outcomes of the Fourth Meeting of the Mode S Downlink Aircraft Parameters working group (Mode S DAPs WG/4) held via video Tele-conference from 29 to 31 March 2021.

3.4. Mode S DAPs WG/4 meeting agreed for **seven** (7) draft Conclusions and **one** (1) draft Decisions to be presented to SURICG/6 for adoption.

Update on SWIM Regional Coordination- IATA (IP/03)

3.5. IATA provided a summary on key SWIM activities being undertaken in Asia & Pacific Region. IATA informed about updated Information Management Panel (IMP) definition of SWIM Region. IATA also noted discussions on the potential benefits for States that need to connect to both the CRV and to other inter-regional connections, and also a proposal for a SWIM Demonstration on CRV hosted by Hong Kong China in March 2020, which has been postponed until further notice due to the COVID-19 situation. The paper also covered the results of the discussion by SWIM TF/4 on how to overcome the limitations of CRV and avoid the unsupportable point-to-point connections between all stakeholders as the cooperation between CRV and SWIM service providers is required.

3.6. IATA discussed about APAC FIXM 4.1 Extension, concept of SWIM discovery services, and a SWIM Service Category Taxonomy. It also summarized important updates from the Ninth Meeting of the Meteorological Requirements Working Group held on 07 May 2020 and 11 – 14 May 2020, Sixth Meeting of the Asia/Pacific Airport-Collaborative Decision-Making Task Force (APA-CDM TF/5) held from 15-17 June 2020, Seventh Meeting of Aeronautical Communications Services (ACS) Implementation Co-ordination Group of APANPIRG (ACSICG/7) that had taken place 21-23 July 2020, Fifth Meeting of the Surveillance Implementation Coordination Group (SURICG/5) held 22 - 24 September 2020, and a virtual seminar on SWIM in January 2021 by Electronic Navigation Research Institute (ENRI) in Japan.

3.7. The ICAO APAC Regional Office is progressively uploading SWIM reference and education material to the SWIM-APAC site of the ICAO Secure Portal. The meeting was briefed on steps to gain access. The meeting was further informed that IATA offers a two-day IATA SWIM Training classroom course and has developed a two-hour online SWIM introductory course. The registration link was shared with the meeting.

3.8. The meeting thanked IATA for sharing and supplementing useful information on behalf of SWIM TF. The ICAO secretariat informed the meeting about a two-day SWIM workshop scheduled for ***6-7 July 2021***, which is planned as one event of the ICAO APAC Webinars in 2021. The relevant information and online registration are available at the following link: https://www.icao.int/APAC/Meetings/Pages/Webinars-.aspx.

Agenda Item 4: Issues in surveillance data sharing

Surveillance Exchange Model Framework- Hong Kong, China (WP/04)

4.1. Hong Kong, China presented some key considerations leading to a proposal of ANSP's collaboration scheme in sharing and enriching surveillance coverage for the region to benefit the aviation community. The sharing of surveillance data is expected to benefit the aviation industry in the APAC region given a more comprehensive and much wider map of surveillance coverage in the region. The paper explored ANSP's surveillance data sharing collaborative approach to expand surveillance coverage.

4.2. Three Infrastructure models for Data Contribution and Dissemination namely Distributed model, Centralised model and Hybrid model were proposed. The paper also proposed adoption of Unified Data Format, All Purpose Structured Eurocontrol Surveillance Information Exchange (ASTERIX), as common data format and described Infrastructure - Surveillance Central Data Processor (SCDP).

4.3. A deployment for sharing surveillance data was described and illustrated using EMS A and B as contributing ANSPs, EMS C and D as typical SWIM service providers, and EMS E, F and G as sole subscribers of surveillance data. The paper further discussed the SWIM surveillance data sharing services over CRV. It was informed that at the service level, SWIM in its full implementation would entail service registry, governance, technical and service agreements among States/Administrations/stakeholders. Therefore, SWIM deployment could be a timely and possibly evolving process.

4.4. For SWIM in the context of surveillance data sharing applications, there could be interim or express solutions to speed up the exchange of surveillance data as suggested in the paper. For instance, instead of starting off with a rather "complete" solution with elaborate technical infrastructure featuring the above-mentioned in the APAC region, it is worth considering a bottom-up, agile approach to exchange surveillance data by leveraging on the readily accessible CRV and adopting the common ASTERIX surveillance data format. The meeting discussed technical issues of realising the sharing of surveillance data in the region. The chair encouraged members to consider examples and potential implementation approaches provided in the paper such as in section 4.4 for consideration by the Study Group.

4.5. Pakistan asked as SCDP could process and share different types in SWIM instead of just surveillance data or just ADS-B data. Dr. Amornrat Jirattigalachote, Co-chair of SWIM TF informed that currently only some types of data in specific formats such as AIXM, FIXM, IWXXM, etc. were being considered while technically any types of data could be shared. Furthermore, the ICAO secretariat added that from technical perspective, all surveillance data could be shared among States but sharing of radar data may not be practical as radar data quality depends upon various local factors while ADS-B data are not generated locally.

4.6. Singapore commented the validity of section 4.5 of the working paper "surveillance data should be prioritized strictly over all other traffic in the data-sharing infrastructure" as it varies based on the usage. The meeting recognized the need to revise section 4.5 and proposed one task group of SURSG to look into performance requirements of surveillance data in the context of surveillance data sharing in SWIM.

4.7. India informed that they are using ASTERIX data format of surveillance data and asked if after SWIM implementation, same data format will be used or any other format will be adopted. The meeting understood that ASTERIX is a global and widely recognized surveillance data exchange format. As per SWIM ToR, this group will consider all data formats and then propose a best data format on this purpose. Currently, the FIXM extension format is a viable solution to exchange surveillance data in SWIM environment as mentioned by Dr. Amornrat Jirattigalachote.

Proposed Solutions for Sharing of Surveillance Data- Singapore (WP/06)

4.8. Singapore proposed solutions for States to share surveillance data and listed the pros and cons of the solutions. This paper was presented at SURICG/5 following the Conclusion CNS SG/23/10 (SURICG/4/1) - ADS-B and Flow Management, there is a need to share surveillance data to provide surveillance from "departure to destination".

4.9. It was discussed that there are three models, namely distributed solution, central database, and hybrid model, which can potentially be used for the implementation of the data sharing. Detailed description, advantages, and disadvantages of each model were described.

4.10. It was further informed that there might be some interested parties, who are not subscribers to CRV or without SWIM capabilities, but are keen to share their surveillance data with other States. Adjustment to the models will be required to accommodate these parties. One possible solution could be for these parties to connect directly to one or more of the centralized service data providers, if available.

Considerations for Sharing of Surveillance Data- Singapore (WP/07)

4.11. Singapore presented the factors for States to take into considerations and elicit views from members towards a consensus on the approach for the sharing of surveillance data in the region.

4.12. In accordance with Conclusion CNS SG/23/10 (SURICG/4/1): ADS-B and Flow Management, States are encouraged to share surveillance data from departure to destination. While such global data sharing will benefit Air Traffic Services (ATS), there are multiple issues to be addressed before implementation. The paper aimed to list down the factors to be taken into considerations and be resolved by this Study Group (SG) in order to determine the optimum approach to be taken to establish the sharing of the surveillance data in the region.

4.13. States would need to consider and decide on the use of the additional surveillance data obtained through this sharing. Some important factors such as sharing models, Performance Requirements for the Shared Surveillance Data, message format, data filtering, Commitment from Participating States, implementation approach, and other considerations were described.

4.14. The meeting noted that in order to be consistent with SWIM architecture, performance requirements for surveillance data should be implemented in information service layer, while there is less control on transport layer. Therefore, for different service level there should be different information service requirements.

Distribution of Surveillance Data to PNG via CRV- ICCAIA&PNG (IP/04)

4.15. ICCAIA (Aireon) and Papua New Guinea jointly presented the status of Space based ADS-B data distribution using CRV. It was informed that NiuSky Pacific Limited has designed and is in the final stages of implementing a countrywide CNS/ATM modernisation program in PNG. The

previous operational surveillance was one radar, one ADS-B ground station as well as Aireon Space based ADS-B data. Space based ADS-B service was provided to NiuSky Pacific Ltd. via dual MPLS links.

4.16. In 2020, the CRV Operations Group authorised Aireon to connect and contract with the CRV provider. The contract has been signed by Aireon and NiuSky Pacific Limited. Aireon has established the first of two connections to CRV while NuiSky Pacific Limited implemented and tested the initial CRV connections. Space based ADS-B data can now be delivered to other Aireon customers in Asia Pacific via CRV, potentially without need for any additional communication link or telecommunications costs.

4.17. The meeting noted the implementation of Space-Based ADS-B system in PNG and in particular, that Space based ADS-B is now operational and one path is already using CRV.

4.18. The meeting was informed that in section 4.2 of this information paper indicating, "PNG plan to use CRV to allow *data sharing* between FIRs", the *data* means ADS-B data while the system has potential to share voice data as well as flight data.

4.19. India shared the concern for high latency of ADS-B data sharing using VSAT link. The meeting was informed by Aireon that currently the latency for spaced based ADS-B system distribution using CRV is less than 1 second while there is no issue if it total latency is shorter than 2 seconds.

Surveillance Data Sharing Platform- PCCW Global (IP/05)

4.20. PCCW Global described the system architecture of PCCW SWIM service and its progresses to build its Surveillance data-sharing platform with EMS and Service Registry.

4.21. It was informed that PCCW Global aimed at expanding the network by offering value-added services on top of the advanced aeronautical network. These services cover the provision of critical information through the globally interoperable System Wide Information Management (SWIM) infrastructure, interfaces and exchange models. By combining PCCW Global network infrastructure and hosting facilities with Frequentis, State ANSPs will be able to benefit from SWIM initiatives without the high investment costs and development expenses of traditional systems.

4.22. The meeting was informed that PCCW Global is working with Frequentis Comsoft to host their SDDS-NG (Surveillance Data Distribution System – Next Generation) in PCCW SWIM for qualified States/Administrations/Stakeholders to publish or subscribe surveillance data by following the guidelines of the CRV OG & SWIM TF.

4.23. As per system architecture of PCCW SWIM service, PCCWG EMS can be part of the GEMS and will be inter-connected with other ANSPs and providers EMS. PCCW Global Surveillance data sharing platform has the ADS-B ASTERIX data processing functions. PCCW described Validation, Filtering and Conversion of surveillance data by SDDS-NG. SDDS-NG offers individual configuration of distribution criteria on single data stream level. Furthermore, SDDS-NG Network node Resilience in different locations were discussed.

4.24. Thailand queried about the availability and reliability of filtered data, which are provided to the consumer. PCCW Global informed that each subscriber could define its own filter such as geographical area filter. The system is following aviation standards hence availability and security are taken care by the standards. The meeting was further informed that SDDS-NG could support all three proposed models.

4.25. Singapore queried about the meaning of data processing functions and single data stream. The meeting was informed that data processing functions includes data suppression such as data filtering, data conversion, etc. Single data stream means that one may distribute customized data to different subscribers. For instance, one ANSP can create single data stream for multiple users.

Message queue system Supporting Low-Latency Surveillance Data Distribution- Hong Kong, China (IP/06)

4.26. Hong Kong, China presented an earlier test conducted by the Hong Kong Observatory (HKO) with positive results in the distribution of real-time ADS-B data to support prototyping of future meteorological applications for operation in the System Wide Information Management (SWIM) environment.

4.27. Surveillance data collected over an airspace could involve a large amount of data with high update rate. Availability of such surveillance data in low latency would be essential for operational use. In 2016, HKO had acquired and installed an ADS-B Ground Station to collect real-time ADS-B data. HKO has developed situational displays which overlay real-time ADS-B aircraft positions, planned flight routes and meteorological data giving aviation weather forecasters a visual indication of possible impact of significant convective weather to air traffic to better support their services to air traffic control, airlines and other stakeholders of the aviation community.

4.28. ASTERIX CAT21 data collected from the ADS-B Ground Station was inserted into a database before being retrieved by downstream consumers through regular polling. A figure illustrated the path of distributing real-time ASTERIX CAT21 ADS-B messages in the test system developed by HKO. Initial tests indicated that the performance of sharing live ADS-B data with the test system is very promising, while there was a continuous data stream of about 2-3 megabits per second passing to each consumer, the average latency of individual message was only about 30 milliseconds under normal system load and network activities.

4.29. Although the intention of distributing real-time ADS-B data is for prototyping future meteorological applications, which fuses different kinds of information for provision in the future SWIM environment, the HKO has successfully demonstrated the feasibility of distributing data streams with low latency with existing technologies.

4.30. The meeting appreciated the excellent sharing by Hong Kong Observatory, and noted the difference between this prototype platform and a real SWIM infrastructure based service while recognizing that the test setup and the messaging queuing configuration bore reasonable resemblance to the SWIM infrastructure and could serve as some reference or consideration by the Study Group.

Agenda Item 5: Discuss SURSG work plan/programme

Work plan of Surveillance Study Group- Hong Kong, China (WP/05)

5.1. Hong Kong, China presented a draft work plan for consideration by the SURSG, to achieve its objectives defined by Terms of Reference (ToR) for a harmonized sharing of surveillance data in SWIM in the APAC. According to the ToR, SURSG shall complete the four deliverables within its term of office. For each of the deliverables, a list of sub-tasks were identified for elaborating its required work content and facilitate the work sharing by Member States. With the division of big deliverable into smaller sub-tasks, it would mean that the completion of all sub-tasks under a deliverable would lead to the completion of the corresponding deliverable. A draft work plan was given in Attachment for consideration by the meeting.

5.2. It was recommended that Member States, which possess knowledge or experience of a task, would take up the role as Task Owner or Co-owners and contribute to the preparation works of the deliverables. Between SURSG meetings, it was suggested that Group Lead(s) would conduct teleconference(s) or web-meeting(s) with Task Owners to keep track of the tasks' progress for the report of relevant outcomes during the SURSG or SURICG meetings according to the work plan. For the coordination between Task Co-owners, it could be via any means of communications as appropriate. During the preparation process by owners, copying of relevant information/materials to Group Lead(s) was preferred.

5.3. The meeting was informed that Hong Kong China and Singapore had preliminarily studied some key considerations, in the context of SWIM TF, related to Task 2 of the draft work plan and presented working papers at SWIM TF/4 (WP/13) and CNS SG/24 (WP/22). Further recommendations were given related to implementation model, infrastructure model, business model, participation model, and a SWIM demonstration on CRV.

5.4. Singapore shared a concern for the need to include *performance requirement of surveillance data* in the work plan for SURSG. The ICAO secretariat reminded about the SURICG/3 Working Paper 05: *Baseline ADS-B service performance parameters* presented by Australia and Singapore in 2018, the proposal of the working paper was adopted and incorporated as appendix 6 of AIGD, which may be a good reference for this topic, and the AIGD (Edition 13) is available under CNS section at: https://www.icao.int/APAC/Pages/eDocs.aspx.

5.5. Draft work plan as Attachment to WP/05 proposed ***four main tasks*** based on the draft ToR of the Study Group with six sub-tasks under Task-2 and two sub-tasks under Task-3 and Task-4. The meeting advised that Hong Kong, China to provide the mapping for each task with terms of reference of SURSG for detailed technical description of each task. **ACTION-ITEM 1-1**

5.6. The meeting discussed the draft work plan and proposed some modifications. The meeting agreed to relocate sub-task 3.2 under Task-2 and renumber it as sub-task 2.7, and decided to invite volunteers for Task-1 and Task-2 only at this stage in consideration of available resources and dependability of Task-3 and Task-4 on Task-2.

5.7. The agreed work plan with focal point of voluntary Administrations/Organization is provided in **Appendix B** to this report**.**

Agenda Item 6: Next meetings and any other Business

Date and Venue for the Next Meeting

6.1. The meeting discussed to plan the next meeting as a small meeting with key contributors of different tasks and subtasks. It was decided that panels would meet quarterly, if possible, to further progress tasks listed in the Terms of Reference. The Secretariat will coordinate for different task meetings. The next Study Group meeting is tentatively scheduled for *March 2022*. The Secretariat will inform participants in due course for the exact dates and venue.

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Revised TERMS OF REFERENCE

STUDY GROUP UNDER SURICG ON SHARING OF SURVEILLANCE DATA IN SWIM

Working Arrangement of the Study Group

Membership: The Study Group under SURICG on Sharing of Surveillance Data in SWIM ("Study Group", "SURSG**"** as acronym) shall be composed of subject matter experts from Member States involved in the provision of surveillance services and SWIM development as well representatives from Member States with an interest to contribute to the works of the SURSG. The SURSG may invite representatives of International Organizations recognized by the ICAO Council, Industry Partners or interested parties representing important civil aviation interests to participate in its work in consultative capacity.

Participants of SURSG/1 *(in alphabetical order)***:**

Australia, China, Hong Kong - China, India, Indonesia, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Thailand, United States, Viet Nam, CANSO, IATA, ICCAIA.

The SURSG shall have one elected Chair.

The SURSG shall have Task Leads and Sub-Task Leads for tasks detailed in the "Deliverables to meet the Objectives", which currently features 4 main Tasks together with their sub-tasks. Members may volunteer to subscribe to the tasks and sub-tasks. Task Leads and Sub-Task Leads are to be selected through coordination and agreement among the respective task or sub-task subscribers.

Meetings: While the SURSG is established in ad hoc nature, it shall convene face-to-face/web meeting to achieve its TOR. Outcome of its meetings shall be reported to and sought endorsement from the SURICG. Progress of the SURSG shall also be shared with SWIM TF and CRV OG via their nominated representatives joining the SURSG.

Task Leads and Sub-Task Leads shall convene meetings as necessary and in formats as appropriate to discuss and work on their tasks to achieve the scheduled deliverables making reference to Deliverables Template, a temple of which is provided on the last page of this ToR.

Task Leads and Sub-Task Leads shall attend the SURSG meetings and in between SURSG meetings, ad-hoc or regular meetings to harmonize their work or resolve issues.

Schedule and delivery: Subject to the extent of prioritized applications considered by the SURSG, the schedule for delivery of the SURSG shall be decided by the SURSG, which shall update the SURICG accordingly.

The Objectives of Study Group are to:

1) Study, provide expert views and recommendations:
    a) to achieve harmonized sharing of surveillance data in SWIM in the Asia and Pacific Regions (APAC) according to Surveillance Strategy adopted by APANPIRG and in support of ICAO's GANP and ASBU initiatives; and

b) on the possible models of sharing surveillance data in SWIM in the SWIM environment, in consideration of the SWIM technical infrastructure, SWIM information service, CRV infrastructure and any applicable governance, and technical requirements.

2) Review, identify and provide expert views and recommendations to address major issues, raised to the SURSG by ICAO APAC, in the technical, operational or regulatory aspects of surveillance data sharing to facilitate the implementation of surveillance from “departure to destination” in APAC.

Deliverables to meet the Objectives:

1) To submit not fewer than 1 Progress Report per year to SURICG and SWIM TF, with the latest report submitted at least 2 months prior to convening of the SURICG meeting on the Study Group deliverables (listed in 2 to 4 below);

2) To study, identify and make recommendations on the **possible and practical** models for surveillance data sharing in SWIM in APAC with considerations of:

a) Concept of use/operation;
b) System design considerations of individual participant that shares surveillance data such as system robustness, data security and integrity, data latency, fallback arrangements and system recovery;
c) General requirements from perspective of collaborative sharing of surveillance data such as centralized/decentralized surveillance data processing, data repository, service registry, service resilience and service recovery;
d) Required commitments of data sharing participants such as commitment of resources and costs;
e) Implementation roadmap and time frames with consideration of
    (i) An incremental approach/a comprehensive approach at the outset;
    (ii) Type(s) of surveillance data to be shared; and
    (iii) Information exchange model for surveillance data in SWIM;
f) SWIM technical infrastructure, SWIM information service, CRV infrastructure;
g) Other currently available or emerging technologies; and
h) ICAO Global Air Navigation Plan (GANP) and Aviation System Block Upgrades (ASBU) as well as APAC Seamless ANS Plan.

3) To prepare, based on its works in 2) above, a report on the possible implementation of surveillance data sharing in SWIM in APAC inclusive of the following:

a) Recommendations for:
    (i) An incremental approach/a comprehensive approach at the outset in surveillance data sharing;
    (ii) Type(s) of surveillance data to be shared; and
    (iii) Exchange model of surveillance data in SWIM.
b) Pros and cons and cost effectiveness for the possible models that have been considered and a recommendation on the best approach or parallel approaches;
c) Concept(s) of Operations of the recommended approach(es);
d) Required commitments of participating Member States who share their surveillance data;
e) Required commitments of Member States who access the shared surveillance data; and
f) Draft multi-lateral agreement on surveillance data sharing and data consumption.

4) To develop guidance materials to assist Members States participating in the sharing of surveillance data and Member States accessing the shared surveillance data.

Template of Deliverables

		Efforts thus far
1	Study, provide expert views and recommendations: a) to achieve harmonized sharing of surveillance data in SWIM in the Asia and Pacific Regions (APAC) according to Surveillance Strategy adopted by APANPIRG and in support of ICAO's GANP and ASBU initiatives; and b) on the possible models of sharing surveillance data in SWIM environment, in consideration of the SWIM technical infrastructure, SWIM information service, CRV infrastructure, and any applicable governance, and technical requirement.	
2	Review, identify and provide expert views and recommendations to address major issues, raised to the SURSG by ICAO APAC, in the technical, operational or regulatory aspects of surveillance data sharing to facilitate the Mode S DAPs implementation in APAC.	
Deliverables to meet the Objectives:		**Efforts thus far**
1	To submit not fewer than 1 Progress Report per year to SURICG and SWIM TF , with the latest report submitted at least 2 months prior to convening of the SURICG meeting on the SURSG deliverables (listed in 2 to 4 below)	
2	To study, identify and make recommendations on the possible and practical models for surveillance data in SWIM in APAC with considerations of : a) Concept of use/operation; b) System design considerations of individual participant that shares surveillance data such as system robustness, data security and integrity, fallback arrangements and system recovery; c) General requirements from perspective of collaborative sharing of surveillance data such as centralized/decentralized surveillance data processing, data repository, service registry, service resilience and service recovery; d) Required commitments of data sharing participants such as commitment of resources and costs; e) Implementation roadmap and time frames with consideration of: (i) An incremental approach/a comprehensive approach at the outset; (ii) Type(s) of surveillance data to be shared; and (iii) Information exchange model for surveillance data in SWIM. f) SWIM technical infrastructure, SWIM information service, and CRV infrastructure; g) Other currently available or emerging technologies; and	

	h) ICAO Global Air Navigation Plan (GANP) and Aviation System Block Upgrades (ASBU).	
3	To prepare, based on its works in 2) above, a report on the possible implementation of surveillance data sharing in SWIM in APAC inclusive of the following: a) Recommendations for: (i) An incremental approach/a comprehensive approach at the outset in surveillance data sharing; (ii) Type(s) of surveillance data to be shared; and (iii) Information Exchange model for surveillance data in SWIM. b) Pros and cons and cost effectiveness for the possible models that have been considered and a recommendation on the best approach or parallel approaches; c) Concept(s) of Operations of the recommended approach(es); d) Required commitments of participating Member States who share their surveillance data; e) Required commitments of Member States who access the shared surveillance data; and f) Draft multi-lateral agreement on surveillance data sharing and data consumption.	
4	To develop guidance materials to assist Members States participating in the sharing of surveillance data and Member States accessing the shared surveillance data.	

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Work Plan of Surveillance Study Group

Group	Task	Description	Start	End	Task Lead(s) (TL)/ Contributors
Feasibility Study Stage	**1**	**Preparation of Progress Report on the SURSG deliverables**	-	Before every SURSG Meeting	Hong Kong China (**TL**)
	2	**Study, identification and recommendation of possible and practical models for surveillance data sharing in SWIM**	SURSG/1	SURSG/2	Hong Kong China (**TL**)
	2-1	Preparation of Concept of Use/Operation	SURSG/1	SURSG/2	Singapore/**TL**, Hong Kong China, Thailand, Viet Nam
	2-2	Study, identify and recommend on Implementation Model including the consideration of system design and collaboration model on sharing of surveillance data.	SURSG/1	SURSG/2	Hong Kong China, Republic of Korea, Singapore, Thailand, Viet Nam.
	2-3	Study, identify and recommend on an Infrastructure Model based on SWIM and CRV infrastructure	SURSG/1	SURSG/2	China, Hong Kong China, Singapore, Thailand, Viet Nam, PCCW Global as advisor
	2-4	Study, identify and recommend on a Business Model including commitments by data sharing participants as well as incurred resource and cost	SURSG/1	SURSG/2	China, Hong Kong China, Singapore, Thailand, Viet Nam
	2-5	Study, identification and recommendation of Participation Model in consideration of commitments by data consumers and multi-lateral agreement on surveillance data sharing	SURSG/1	SURSG/2	Hong Kong China, Singapore, Thailand, China, Viet Nam, IATA
	2-6	Preparation of implementation roadmap and time frames with consideration of approach, types of surveillance data and information exchange model	SURSG/1	SURSG/2	China, Hong Kong China, Singapore, Thailand, Viet Nam.
	2-7	Preparation of draft multi-lateral agreement on surveillance data sharing and data consumption	SURSG/2	SURICG/7	Hong Kong China, IATA, Singapore, Thailand, Viet Nam

Recommendation Stage	**3**	**Report on the possible implementation of surveillance data sharing in SWIM**	SURSG/2	SURICG/7	To be decided (TBD)
	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	TBD
	4	**Guidance materials for the sharing and access of surveillance data**	SURICG/7	SURICG/9	TBD
	4-1	Preparation of the framework and 1st draft of guidance material	SURICG/7	SURSG/3	TBD
	4-2	Further development of the working draft of guidance material for endorsement by SURICG and CNS SG	SURSG/3	SURICG/9	TBD

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LIST OF WORKING/INFORMATION PAPERS

WP & IP/No.	Agenda Item No.	Subject	Presented by
		WORKING PAPERS	
WP/01	1	Provisional Agenda	Secretariat
WP/02	2	Review of Terms of Reference	Secretariat
WP/03	3	Review of Relevant Meetings/Web-conferences	Secretariat
WP/04	4	Surveillance Exchange Mode Framework	Hong Kong, China
WP/05	5	Work Plan of Surveillance Study Group	Hong Kong, China
WP/06	4	Proposed Solutions for Sharing of Surveillance Data	Singapore
WP/07	4	Considerations for Sharing of Surveillance Data	Singapore
		INFORMATION PAPERS	
IP/01	-	Meeting Bulletin	Secretariat
IP/02	2	Outcomes of Mode S DAPs WG/4 Meeting	Secretariat
IP/03	3	Update on SWIM Regional Coordination	IATA on behalf of ICAO APAC SWIM Task Force
IP/04	4	Distribution of Surveillance Data to PNG via CRV	ICCAIA (Aireon) and NuiSky Pacific (PNG)
IP/05	4	Surveillance Data Sharing Platform	PCCW Global
IP/06	4	Message Queue System Supporting Low-Latency Surveillance Data Distribution	Hong Kong, China

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