International Civil Aviation Organization

ELEVENTH MEETING OF THE SURVEILLANCE IMPLEMENTATION COORDINATION GROUP (SURICG/11)

Bangkok, Thailand, 25 – 27 March 2026

Agenda Item 4: Review Progress of SURSG

REVIEW OF OUTCOMES OF SURSG/5

(Presented by Secretariat)

SUMMARY

This paper presents the discussions and relevant outcomes of the Fifth Meeting of the Surveillance Study Group (SURSG/5) for meeting review.

1. INTRODUCTION

1.1. The Fifth Meeting of the Surveillance Study Group (SURSG/5) was held from **23 – 24 March 2026** in the ICAO APAC Regional Office, Bangkok, Thailand. The Meeting was attended by **51** participants from **16** Member States/Administrations and **1** International Organization. The Meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/meetingdocs?fid=33630

1.2. This paper summarized the outcomes of the Fifth Meeting of the Surveillance Study Group (SURSG/5) for SURICG/11 Meeting review and action.

2. DISCUSSION

2.1. The summary of the discussion in the SURSG/5 Meeting is given in the following paragraphs.

Review of Relevant ICAO Meetings – Sec (WP/02)

2.2. The paper summarized relevant information and updates, highlighting the outcomes of APANPIRG/36, CNS SG/29, SURSG/4, SURICG/10, SWIM TF/10 and relevant meetings from 2024 to 2025.

2.3. The Meeting noted that the CNS SG/29 Meeting adopted the 5 Conclusions and 6 Decisions and developed 3 Draft Conclusions and 1 draft Decision for consideration by APANPIRG/36 Meeting, which were further adopted by APANPIRG/36 and discussed the follow-up.

2.4. The Meeting noted that the SWIM TF/10 Meeting shared a need for a global surveillance information exchange format and suggested requesting the Surveillance Panel to develop a globally standardized information exchange model for surveillance data sharing over SWIM.

2.5. It was recalled by SWIM TF/10 that SURSG was working on the task of reviewing, identifying and providing expert views and recommendations to address major issues raised to the SURSG in the technical, operational or regulatory aspects of surveillance data sharing to facilitate the implementation of surveillance from "departure to destination" in APAC and surveillance information exchange format should be part of this task. SWIM TF/10 requested that the ICAO Secretariat coordinate with SURICG and SURSG to obtain the required information.

2.6. ICAO Secretariat coordinated with the SURSG chair for this matter, and it was further discussed in the SWIM TF Task Leads meeting on 17 November 2025. SURSG chair informed that ASTERIX and/or JSON are proposed as the data exchange models for surveillance data sharing in the region. However, for the data exchange model to be used globally, it was suggested that it should be handled separately by a global body.

2.7. Given that the global body for surveillance matters in aviation is the Surveillance Panel (SP), the meeting deliberated on the recommendation requesting the SP to discuss the topic and advise on the message format for global surveillance data exchange.

2.8. It was shared by participating SP members that ASTERIX is managed by Eurocontrol, not by the SP. Therefore, SP may not endorse the global surveillance data exchange format.

2.9. The SWIM TF Co-chair informed that, under the current ICAO SWIM provisions, surveillance information is mentioned at various places. However, to date, no studies have been conducted, unlike those for flight information (FIXM), metrological information (IWXXM) and aeronautical information (AIXM). She provided examples of studies conducted in the APAC region evaluating the suitability of using FIXM for the exchange of surveillance information over SWIM.

2.10. The SWIM TF Co-chair added that, while conducting studies for the APAC Regional FIXM version 4.1 and version 4.2 extensions, an attempt was made to add surveillance data into these FIXM extensions. However, it was concluded that, due to the high update rate of surveillance data and the resulting significant bandwidth requirements, FIXM may not be an appropriate information model for sharing surveillance data in the SWIM environment.

2.11. The SWIM TF Co-chair also shared an example of a governance framework for FIXM. It was noted that for FIXM, the Change Control Board (CCB) is responsible for FIXM management and is not an ICAO group. However, there is a relationship between ATM Requirements and the Performance Panel (ATMRPP) and the FIXM CCB, whereby ATMRPP provides inputs and requirements to the FIXM CCB, and the FIXM CCB develops the FIXM schema accordingly. It was suggested that SP may wish to consider adopting a similar governance framework.

2.12. SURSG recommended SURICG consideration for requesting SP to discuss the global surveillance data exchange format. **ACTION ITEM 5-1**

2.13. Singapore suggested that an information paper be presented at the upcoming SP meeting on this topic, including various considerations shared by the SWIM TF Co-chair. **ACTION ITEM 5-2**

Guidance Material to assist APANPIRG Subsidiary Groups in reviewing and updating the list of APAC Common SWIM Information Services– SWIM TF (WP/03)

2.14. The Meeting was informed that by Decision 36/11, APANPIRG/36 in November 2025, adopted the First Version of the Business Functionality for APAC Common SWIM Information

Services. It was recalled that at SWIM TF/10 in May 2025, it was noted that the level of detail differed across different information domains (e.g. aeronautical information, flight information, surveillance data, meteorological information, etc.), potentially caused by different levels of understanding as to what detail is needed by SWIM TF to facilitate the development of SWIM information services within the APAC region. In response to this, the Task 6 team of the SWIM TF was developing the guidance material.

2.15. This paper requested APANPIRG Subsidiary Groups with subject matter expertise in relevant information domains to review and update/refine the details associated with Common APAC SWIM Information Services planned for future implementation in the region.

2.16. SWIM TF Guidance Material for Business Functionality of APAC Common SWIM Information Services to clarify the level of detail requested, and a new working version (draft Second Version) of the Business Functionality for APAC Common SWIM Information Services was provided to the meeting. APANPIRG Subsidiary groups were requested to use the provided Guidance Material and use "track changes" to submit any proposed updates to SWIM TF. It was informed that the proposed updates submitted by the groups will be collated into a WP for submitting the draft Second Version to the SWIM TF/11 scheduled for 26-29 May 2026.

2.17. The Meeting noted SWIM TF welcomes suggested improvements to the usability/clarity/structure of the information in the list of APAC Common SWIM Information Services. Two potential changes have already been identified by SWIM TF for consideration for future updates:

(i) Introduction of "applicability" (e.g., "region-wide" in order to achieve the anticipated benefits, vs. "as needed" to meet local needs), and
(ii) Addition of desired implementation timeframe (e.g., immediate (before 2030), medium-term (2030-2035), and long-term (beyond 2035)).

2.18. SWIM TF also recommended APANPIRG Subsidiary Groups considering the review of the Common APAC SWIM Information Services document as a standing meeting agenda item for future meetings and subsequent update to SWIM TF, as both SWIM and the associated required Information Services continue to evolve regionally and globally.

2.19. It was added that this paper was presented to the Fourth Asia/Pacific FF-ICE Ad-Hoc Group Meeting and Workshop, held from 16 to 18 March 2026. The Ad-hoc Group reviewed the Business Functionality of APAC Common SWIM Information Services, Version 1.0, and agreed on the following recommendations for consideration by the ICAO APAC SWIM Task Force (SWIM TF).

1. Recognizing the limited technical expertise within domain-specific groups such as the FF-ICE Ad-Hoc Group, it was agreed that the group should **focus on defining business rules and business process completion criteria** for information services. The determination of appropriate Message Exchange Patterns (MEPs) for each business process should be undertaken by SWIM TF, which possesses the relevant technical expertise.

2. To support the determination of MEPs, it was agreed that **comprehensive operational scenarios**, including operational requirements and business process completion criteria, are essential. Accordingly, such scenarios, where required, should be provided as an appendix to the Business Functionality of APAC Common SWIM Information Services document. A reference to the appendix should also be included in the 'Brief description of the service' column. Figure 1 illustrates an example of how these comprehensive scenarios may be incorporated:

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	~~Priority of Recommended Service in Initial APAC Common SWIM IS~~ (1) / (2) / (3)
FF-ICE filing service	Provides a means to submit, update or cancel flight plans through a SWIM-based interface using FIXM. Appendix A: Filing Scenario	Flight plan for registration, update or cancellation	FIXM	Appendix A	1

SWIM TF to fill in

Appendix A: Filing Scenario

	Message	Details	Timeout	Comments	Message Exchange Pattern
1	eAU send eFPL (FFP) to eASP	Mandatory	N/A	-	
2	eASP returns Submission Response (SR) #1 to eAU	Mandatory (after eFPL received)	1 minute	eASPs validate message format and basic rules. SR ACK: Validation passed SR REJ: Validation failed SR MAN: Manual Processing needed	
3	eASP returns Submission Response (SR) #2 to eAU	Conditional (only if SR#1 = MAN)	Variable (manual processing time)	Any subsequent SR is provided after manual intervention of eFPL (after SR MAN)	
4	eASP returns Filing Status (FS) #1 to eAU	Mandatory (If final SR = ACK)	1 minute after SR "ACK"	eASPs evaluate flight plan against operational constraints and ATM configuration	
5	eASP returns Filing Status (FS) #2 to eAU	Conditional (If FS #1 = PENDING, or due to **re-evaluation**)	Variable (2nd evaluation)	eASP sends updated FS when flight is ready to be evaluated (for PENDING) or when operational changes affect flight status	

Figure 1: An example of how the comprehensive scenarios may be incorporated in the Business Functionality of APAC Common SWIM Information Services

2.20. The feedback submitted by FF-ICE/4 will be reviewed by the SWIM TF/11 Meeting in May 2026.

2.21. The Meeting reviewed the guidance material, and no changes were proposed. The draft Guidance Material for Business Functionality of APAC Common SWIM Information Services is provided in **Appendix A**.

2.22. For the request to consider the review of the APAC Common SWIM Information Services document as a standing meeting agenda item for future meetings and subsequent update to SWIM TF, as both SWIM and the associated required Information Services continue to evolve regionally and globally, the Meeting agreed that if SURSG is dissolved by the SURICG/11 Meeting, the list of APAC Common SWIM Surveillance Information Services document will be part of the agenda items of SURICG and the list will be updated by the SURICG meeting in the future. **ACTION ITEM 5-3**

Review and update of APAC Common SWIM Information Services (Surveillance) – Sec (WP/04)

2.23. According to the outcome of the SWIM survey conducted in 2022, it was recommended that a list of the common set of SWIM information services for APAC be developed. SWIM TF Task Leads on Information Services undertook the work, in coordination with relevant subject matter experts, to identify the types of information to be exchanged via APAC SWIM and propose the necessary business functionality to be supported by APAC Common SWIM Information Services for addressing the operational needs in APAC.

2.24. This paper presented the updates on the work of the ICAO APAC SWIM Task Force (SWIM TF) on Information Services to finalize APAC Common SWIM Information Services for addressing the operational needs in APAC and requests inputs from SURSG to modify APAC Common SWIM Surveillance Information Services.

2.25. The Meeting deliberated in length on the initial set of APAC Common SWIM Surveillance Information Services and provided inputs and comments. The revised APAC Common SWIM Surveillance Information Services agreed by the meeting is provided in **Appendix B** using "Track Changes" and will be proposed to the SURICG/11 and SWIM TF/11 for further discussion. **ACTION ITEM 5-4**

2.26. The Meeting recommended that Guidance Material for the sharing of surveillance data in SWIM should be added as a reference document for APAC Common SWIM Surveillance Information Services to support service implementers. As Task 6 of SWIM TF is working on adding relevant references to all services listed in APAC Common SWIM Information Services, it was suggested that this information be shared with Task 6 of SWIM TF. ICAO Secretariat will share this information with the Task 6 Task Leads. **ACTION ITEM 5-5**

Updates on the Guidance Materials for the sharing of surveillance data in SWIM - Hong Kong China (WP/07)

2.27. Hong Kong China presented the development of the Guidance Materials for the sharing of surveillance data in SWIM and the latest status.

2.28. It was recalled that after the successful conduct of the Joint Event of SWIM Demonstration over CRV and surveillance data in SWIM trial held in Hong Kong China, from 28 – 29 May 2024, SURSG has started to prepare the last deliverable of the Study Group (i.e. Guidance Materials, GMs) based on the proposed framework to include (1) surveillance information service security; (2) infrastructure and bandwidth consideration; (3) surveillance data performance requirement; and (4) data formats.

2.29. With the joint effort from the volunteers, the first draft of the GMs was completed in August 2025 and circulated for SURSG members' review. The ICAO Secretariat also helped to distribute the first draft of the GMs for SWIM TF members' review in November 2025. Comments received were then addressed and a second draft of the GMs was completed in January 2026. No further comments were received on the second draft of the GMs.

2.30. The Meeting reviewed and finalized the Guidance Material; the finalized Guidance Material is provided in **Appendix C** to this paper. The following draft Conclusion was endorsed by the SURSG/5 Meeting for adoption by SURICG/11 and CNS SG/30.

<table>
<tr><td colspan="3">Draft Conclusion SURSG/5/01 – Guidance Materials for the sharing of surveillance data in SWIM</td></tr>
<tr><td colspan="2">What: The Guidance Materials for the sharing of surveillance data in SWIM be adopted</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To assist APAC States/Administrations in their SWIM development and implementation on the sharing of</td><td>Follow-up:</td><td>☐Required from States</td></tr>
</table>

surveillance data, the finalized version of the Guidance Materials for the sharing of surveillance data in SWIM is ready for adoption.	
When: 24-Mar-26	Status: Draft to be adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SURICG	

2.31. The Meeting was informed that, as SWIM development in the region is ongoing, it was anticipated that future updates on the Guidance Material would be necessary, especially on any further required details of the surveillance information services. SURSG proposed that SURICG assume this responsibility and respond appropriately when the relevant standard(s) mature. The Meeting agreed to the proposal and requested that the ICAO Secretariat share this recommendation from SURSG for SURICG consideration. **ACTION ITEM 5-6**

Review of Work Plan for Surveillance Study Group - Hong Kong China (WP/08)

2.32. The Meeting reviewed the Work Plan of SURSG in view of the progress and development following SURSG/1 to SURSG/4. The Meeting noted that the work plan was updated by the SURSG meeting each year. As per the work plan shared at the SURSG/4 meeting, the only remaining deliverable was guidance material, which SURSG completed. The final work plan was updated and provided in **Appendix D** of this paper.

2.33. With the aforementioned work plan, as all the tasks under the ToR allocated to SURSG were successfully completed, SURSG was proposed to be dissolved after seeking endorsement in SURICG/11 and CNS SG/30, by the following draft decision.

Draft Decision SURSG/5/02 – Proposing dissolution of SURSG	
What: SURSG completed all the allocated tasks under the ToR and is proposed to be dissolved.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: SURSG completed all the allocated tasks under the ToR.	Follow-up: ☐Required from States
When: 24-Mar-26	Status: Draft to be adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SURICG	

2.34. The Meeting reviewed and updated the action item list. The final action item list is provided in **Appendix E** of this paper.

3. ACTION BY THE MEETING

3.1. The meeting is invited to:

a) note the information given in this paper;

b) consider requesting SP to discuss the global surveillance data exchange format;

c) review the list of APAC Common SWIM Surveillance Information Services document (Appendix B);

d) consider adding the list of APAC Common SWIM Surveillance Information Services as part of the agenda items of SURICG to maintain and update the list;

e) endorse the draft Conclusion to adopt Guidance Materials for the sharing of surveillance data in SWIM specified in section 2.30;

f) endorse the draft Decision for proposing dissolution of SURSG specified in section 2.33; and

g) discuss any matters as appropriate.

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Guidance Material for Business Functionality of APAC Common SWIM Information Services

Developed by: SWIM Task Force (Task 6)

Purpose

- This Guidance Material has been developed to assist relevant APANPIRG Subsidiary Groups (e.g. MET/IE, SURICG, AAITF, FF-ICE Ad Hoc Group, ATFM SG) in specifying the relevant information associated with the high-level definition of planned APAC Common SWIM Information Services
  - Version 1 of the APAC Common SWIM Information Services has recently been published on the ICAO APAC eDocs site as per Decision APANPIRG/36/11:

    https://www.icao.int/sites/default/files/APAC/Documents/edocs/CNS/APAC-Common-SWIM-Information-Services.pdf
  - The purpose of list of APAC Common SWIM Information Services (including associated priorities) is to provide States/Administrations with **guidance on anticipated services** to **support their planning and implementation** of SWIM
    - Listed Information Services are expected to be at different levels of maturity, i.e. are not expected to be fully matured prior to being added to the list as an indicative roadmap for the Information Service
    - It is not intended to be overly prescriptive
      - This information will be captured in the Information Service Definitions (ISD)

Version Maintenance

- The latest published version of the Common APAC SWIM Information Services is available on the ICAO APAC eDocs site (CNS section)
- Between published versions, SWIM TF maintains an updated working version of Information Services to capture inputs from the APANPIRG Subsidiary Groups as they occur
  - APANPIRG Subsidiary Groups are recommended to regularly review/update the APAC Common SWIM Information Services document each time they meet, and to provide updates to SWIM TF as necessary to maintain the currency of the list relevant to their information domain (e.g. Aeronautical Information, Flight information, Meteorological information)
  - Between published versions, SWIM TF will update the working list at SWIM TF meetings based on inputs from Subsidiary Groups
    - The latest working version will be available following finalisation of each SWIM TF Report

Categories

- The Categories associated with the Business Functionality of APAC Common SWIM Information Services are:
  - Business Functionality of the information service
  - Brief description of the service
  - Type of information to be exchanged
  - Information exchange model / Message type
  - Message exchange pattern
  - Priority
- Guidance on each Category is provided in the following slides

Business functionality of the information service

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **What the Information Service is called**
  - **Wherever possible**, this should **align with Information Services that are being implemented globally,** defining APAC regional variations only where needed
    - e.g. FF-ICE filing service
  - It may be prudent (even advisable) to define **different information services** where the **same information** is provided in the payload, but which may serve a **different business need** (i.e. be utilised by different consumers of the information services at a different rate or have a different Quality of Service)
    - E.g. An information service providing surveillance data to support the provision of aircraft separation could be expected to be defined separately to an information service providing surveillance data to support ATFM purposes, as the business usage differs between the two information services

Brief description of the service (1)

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **Plain text description of the information service**
  - Includes **Intended usage** of the information service
    - Includes indication (where relevant) of the intended service consumers and/or associated business need
  - Includes **Identification of** (and link to) the **latest reference document** (where one exists)
    - Provides insight/clarity on how the intended information service is aligning with global or regional concepts/implementations
      - E.g. For FF-ICE filing service, **ICAO Doc 9965 (Manual on FF-ICE)**
      - E.g. for Surveillance data only sharing service, **Guidance Materials for the sharing of surveillance data in SWIM** developed by SURSG
    - As maturity increases over time, the document reference will change
      - **Goal** is to reference the relevant Information Service Description (ISD) once developed

Brief description of the service (2)

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **Plain text description of the information service**
  - The description of the information service should include proposed timeframe for implementation
    - Note: proposed implementation timing may be moved to a separate column in a future update of the table
  - The description of the information service should ***not*** include:
    - Proposed timeframe for implementation (this is proposed to be captured in a future update to the table)
    - Reference to the Information Exchange Model (e.g. FIXM)
    - Information to be exchanged (captured in the “information to be exchanged” column)

Type of information to be exchanged

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **The information that will be exchanged as part of the information service**
  - Describes the information in general terms only (rather than individual data elements)
    - E.g. Surveillance data with DAPs, Basic flight plan information (without trajectory), etc.
  - The ISD (once developed) will specify all mandatory and optional fields
    - Subsidiary groups may need to separately develop this additional granularity if the information service has not already been defined elsewhere
  - Timeframes for transitioning information types should not be included

Information exchange model / message type

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **The information exchange model (or message type) employed by the payload of the information service**
  - Identifies standard Exchange Models (FIXM, IWXXM, AIXM)
    - E.g. (FIXM, IWXXM, AIXM)
  - Where the content within the payload comes from another message type or data format, this can be identified
    - E.g. Surveillance data: JSON or RAW (derived from ASTERIX Cat 21)
  - Version / associated extensions of the Exchange Model is not required
  - If not yet known or confirmed, “TBD” is acceptable

Message exchange pattern (1)

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **The type of information that will be exchanged as part of the information service**
  - **At least one of**:
    - Request/Reply (**Req/Rep**), **including type if known** (see additional information on following slides)
      - Synchronous Request/Reply (**Sync R/R**)
      - Asynchronous Request/Reply (**Async R/R**)
    - Fire and Forget (**One-way**)
    - Publish/Subscribe (**Pub/Sub**)
  - If multiple MEPs are possible, identify which are mandatory or optional
    - E.g. Pub/Sub and Sync R/R
    - E.g. Req/Rep (mand), Req/Rep (opt), etc.
  - **"TBD" to be used where MEP is not yet known**

Fire and Forget vs. Publish / Subscribe

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

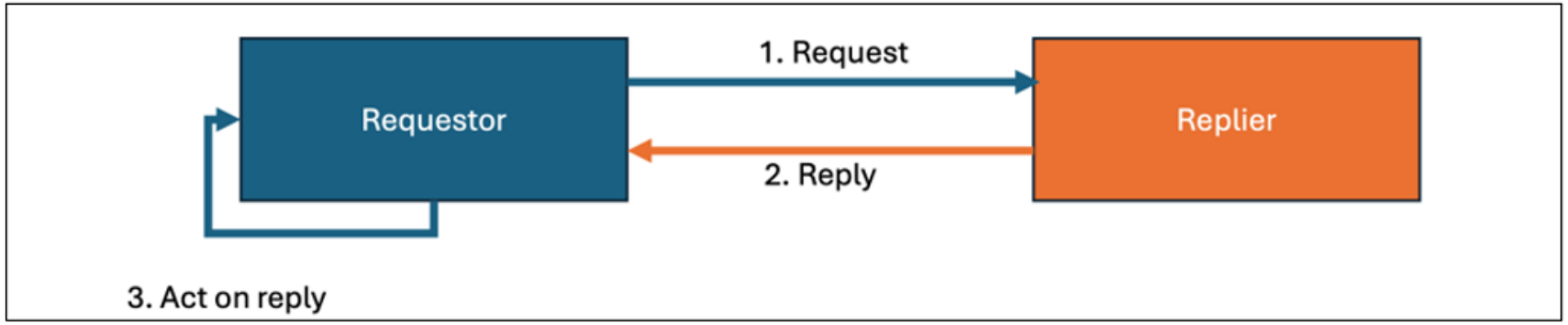
From the ICAO Manual on the SWIM Implementation (Doc 10203):

- For the **One-way ("Fire and Forget") MEP**, *the consumer initiates a message to an information service without expecting any response from the information service. This MEP is particularly useful at the lower application layer, where immediate message responses are not required*;
- For the **Publish/Subscribe MEP**, *the consumer initiates a subscription request to an information service. The subscription may be capable of providing details (such as through a filtering parameter) on the information being subscribed*
- The P/S MEP can be either a 'push' or a 'pull' mechanism:
  - For the 'push' mechanism, this requires that the consumer can receive messages at any time, and is not restricted from completing other operations while waiting for the Information Service to respond
  - For the 'pull' mechanism, this requires the Information Service to keep necessary updates available to the consumer, and that the consumer sends requests to the information service to receive the updates

Synchronous Request-Reply

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

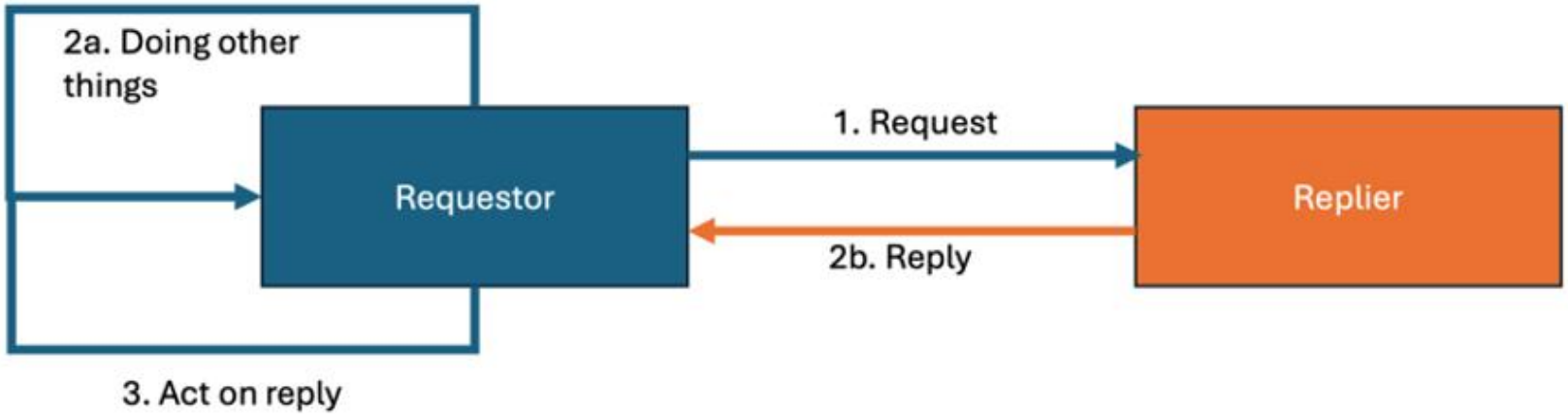
In Doc. 10203, **synchronous** R/R MEP is defined as – *The consumer initiates a request to an information service; the service processes the request and generates a reply to the consumer. The consumer waits for the information service to provide a response. During this waiting period, the consumer cannot send or receive any other requests or responses. This pattern is specifically applicable to information services that can quickly execute and respond to consumer requests*



Asynchronous Request-Reply

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

In Doc. 10203, **asynchronous** R/R MEP is defined as – *The consumer initiates a request to an information service; the service processes the request and generates a reply to the consumer. However, the consumer is not restricted from performing other operations while waiting for the information service's response. This MEP requires that the consumer be able to receive messages at any time and correlate them with prior requests*



Synchronous vs. Asynchronous Request-Reply

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

Index	Synchronous	Asynchronous
Time Coupling	Both requester and replier are available at the same time.	Requester sends a request and continues its process; replier can send the response later when available.
Space Coupling	Requester needs to know the exact service endpoint (protocol, address, API).	Requester sends to a known endpoint, but response may arrive via callback, polling, or correlation ID; looser coupling in response handling.
Reliability Handling	Retries and error handling happen at requestor side.	Retries and correlation of delayed responses must be managed at the requester side (e.g., matching reply with original request).
Use Cases	• Low latency expected • Both parties are available • Immediate response interaction	• Replier may not be immediate • Deferred or background processing acceptable
Typical Scenarios	• User Authentication • User Interface Interactions • Database Read and Immediate Write	• Order processing with delayed confirmation • Flight plan filing with later validation • Weather data request with queued response • Batch data processing

- Additional guidance can be found in "**Draft Guidance Material REQ REP MEP in Asia**" provided as **Appendix C** to the Working Paper

- If in doubt:
  - Specify Req/Rep only
  - Leave as TBD

Priority (1) / (2) / (3)

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)

- **Either 1, 2 or 3 as determined by:**
  - Priority (1): Recommended for region-wide implementation for region-wide benefits
  - Priority (2): Recommended for implementation as much as practicable
  - Priority (3): Additional information services without common regional requirements and not included as a part of common regional information services

- *Note: It has been proposed to separate applicability (region-wide vs. as needed by a subset of States) and desired timeframe into separate columns, however any change to table columns will be formally communicated to Subsidiary Groups separately*

Example update

Note: this is not an actual update, it has been provided to indicate *potential* updates to FF-ICE Common APAC SWIM Information Services content that would align with this Guidance Material

Example – FF-ICE Information Services - Current

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
APAC Common SWIM Flight Information Services					
GUFI service	GUFI (Globally Unique Flight Identifier) generation and provision	GUFI	FIXM	Req/Reply	1
FF-ICE filing service	Provides a means to submit, update or cancel flight plans through a SWIM-based interface using FIXM.	Flight plan for registration, update or cancellation	FIXM	Req/Reply Pub/Sub	1
FF-ICE publication service	Provides harmonised sharing of flight plan information in a global standard supporting common situation awareness.	Flight information for publication	FIXM	Pub/Sub	2
FF-ICE trial service	Allows operators to test the effect of a potential change in a flight plan prior to committing to the change.	Proposed changes in a flight plan	FIXM	Req/Reply	2
FF-ICE flight data request service	Allows an operator to request the current status of a flight plan, or an ANSP can request an operator to submit the latest version of their flight plan.	Current status of a flight plan, a copy of flight plan or supplementary plan	FIXM	Req/Reply	1
FF-ICE notification service	Provides notification of a change in flight state, such as Departure (DEP) and Arrival (ARR) Air Traffic Service (ATS) messages.	ARR, DEP messages	FIXM	Req/Reply Pub/Sub	1
FF-ICE planning service	Allows operators to submit preliminary flight plans for early Air Traffic Flow Management (ATFM) planning and to obtain feedback regarding restrictions/constraints affecting the flight.	Preliminary flight plan for early ATFM planning	FIXM	Req/Reply Pub/Sub	2

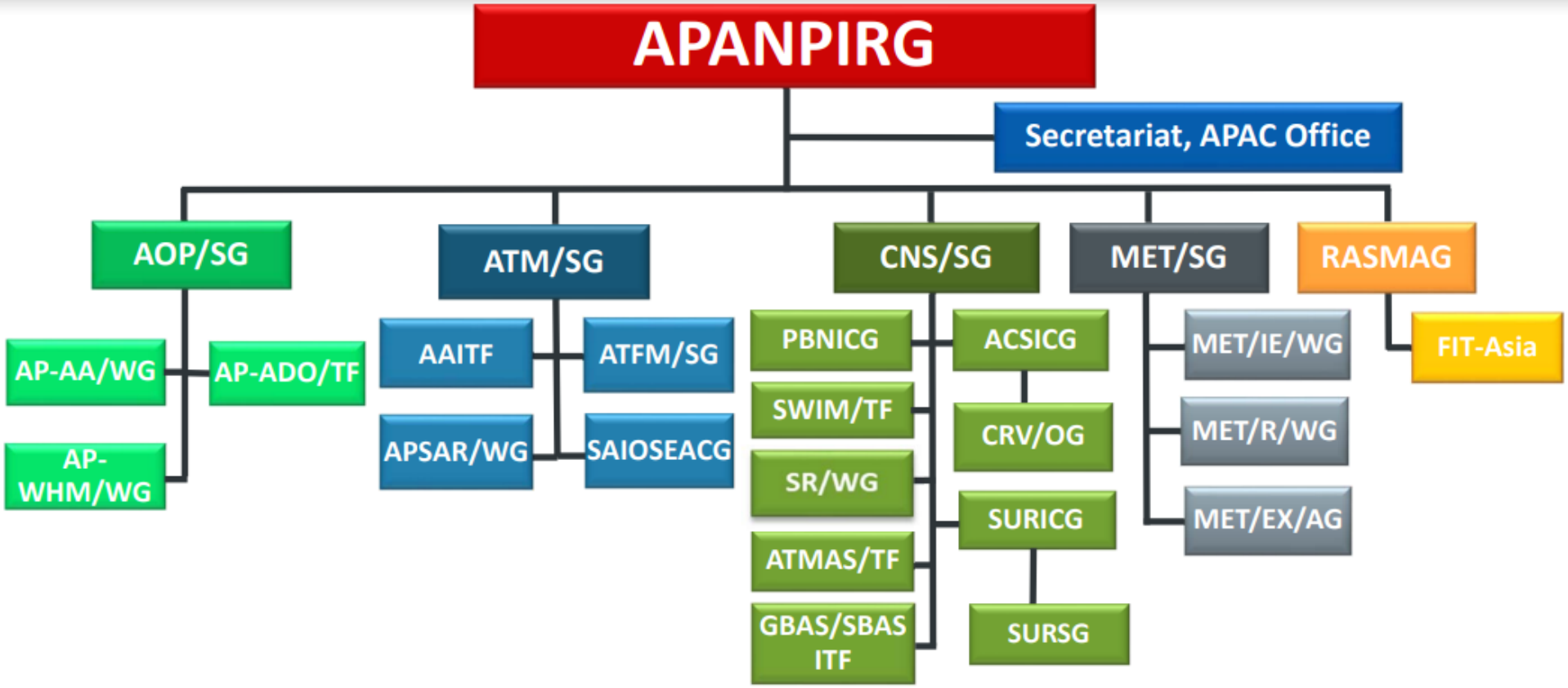
Example – FF-ICE Information Services – *Potential* updates

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
FF-ICE filing service	Provides a means for Airspace Users to submit, update or cancel flight plans ~~through a SWIM based interface using FIXM.~~ Reference: ICAO Doc 9965 (Manual on FF-ICE) Target Implementation timeframe 2034	Full ~~F~~flight plan with trajectory~~for registration, update or cancellation~~	FIXM	~~Req/Reply~~ Async R/R and Pub/Sub	1
FF-ICE publication service	Provides ~~harmonised sharing of~~ flight plan information in a ~~global~~ standard format supporting common situation awareness. Reference: ICAO Doc 9965 (Manual on FF-ICE)	~~Flight information for publication~~Full Flight Plan with trajectory (latest agreed)	FIXM	Pub/Sub	2
FF-ICE trial service	Allows operators to test the effect of a potential change in a flight plan prior to committing to the change. Reference: ICAO Doc 9965 (Manual on FF-ICE)	Proposed changes in a flight plan	FIXM	~~Req/Reply~~ Sync R/R and Async R/R	2
FF-ICE flight data request service	Allows an operator to request the current status of a flight plan, or an ANSP can request an operator to submit the latest version of their flight plan. Reference: ICAO Doc 9965 (Manual on FF-ICE) Target Implementation timeframe 2034	Current status of a flight plan, ~~or~~a copy of full flight plan, or supplementary plan	FIXM	~~Req/Reply~~ Sync R/R and Async R/R	1
FF-ICE notification service	Provides notification of a change in flight state, such as Departure (DEP) and Arrival (ARR) Air Traffic Service (ATS) messages. Reference: ICAO Doc 9965 (Manual on FF-ICE)	~~ARR, DEP messages~~Movement information (e.g. ARR, DEP)	FIXM	~~Req/Reply~~ Pub/Sub and Sync R/R and Async R/R	1
FF-ICE planning service	Allows operators to submit preliminary flight plans for early Air Traffic Flow Management (ATFM) planning and to obtain feedback regarding restrictions/constraints affecting the flight. Reference: ICAO Doc 9965 (Manual on FF-ICE)	Preliminary full flight plan with trajectory ~~for early ATFM planning~~	FIXM	~~Req/Reply~~ Async R/R and Pub/Sub	2

Further Improvements?

- **SWIM TF is open to improving usability/clarity of information within the table of APAC Common SWIM Information Services prior to publishing the next version**
  - E.g. it is proposed to replace “Priority” column with:
    - Applicability: region-wide (to achieve anticipated benefits) vs. as needed (to meet local needs), and
    - Desired implementation timeframe (e.g. immediate (before 2030), medium (2030-2035), longer term)
  - Subsidiary Groups are invited to provide any other suggestions to improve the table prior to SWIM TF/11 to enable any changes to be effected at the same time
    - Thank you in advance for any recommendations!

Reference



AOP/SG	-	Aerodrome Operations and Planning Sub Group
AP-AA/WG	-	APAC Aerodrome Assistance Working Group
AP-ADO/TF	-	APAC Aerodrome Design and Operations Task Force
AP-WHM/WG	-	APAC Wildlife Hazard Management Working Group

ATM/SG	-	ATM Sub Group
AAITF	-	AIS - AIM Implementation Task Force
APSAR/WG	-	APAC Search and Rescue Working Group
ATFM/SG	-	ATFM Steering Group
SAIOSEACG	-	South Asia Indian Ocean and South East Asia ATM Coordination Group

CNS/SG	-	CNS Sub Group
PBNICG	-	PBN Implementation Coordination Group
SWIM/TF	-	System-Wide Information Management Task Force
SR/WG	-	Spectrum Review Working Group
ATMAS/TF	-	ATM Automation System Task Force
GBAS/SBAS ITF	-	GBAS/SBAS Implementation Task Force
ACSICG	-	Aeronautical Communication Services Implementation Coordination Group
• CRV/OG	-	Common Regional Virtual Private Network (VPN) Operations Group
SURICG	-	Surveillance Implementation Coordination Group
• SURSG	-	Surveillance Study Group

MET/SG	-	Meteorology Sub Group
MET/IE/WG	-	Meteorological Information Exchange Working Group
MET/R/WG	-	Meteorological Requirements Working Group
MET/EX/AG	-	Meteorological Exercises Advisory Group

RASMAG	-	Regional Airspace Safety Monitoring Advisory Group
• FIT-ASIA	-	FANS Interoperability Team-Asia

Business Functionality of APAC Common SWIM Information Services
(Updated by SURSG/5)

Draft Second Version (xx 2026)

Purpose.– This list of APAC Common SWIM Information Services, including associated priorities, provides States/Administrations with guidance on anticipated services to support their planning and implementation of SWIM.

Notes.– Priority of Recommended Services in Initial APAC Common SWIM Information Service (IS) ((1)/(2)/(3)):

- Priority (1): Recommended for region-wide implementation for region-wide benefits
- Priority (2): Recommended for implementation as much as practicable
- Priority (3): Additional information services without common regional requirements and not included as a part of common regional information services

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
APAC Common SWIM Aeronautical Information Services					
Airspace management service	Exchanges of airspace status information between ASM Support System and Air Traffic Control (ATC) System. The sharing of airspace availability and airspace structure in real-time will contribute to a more efficient execution of the flight as information impacting the trajectory will be exchanged.	Availability or activation/deactivation or temporarily change of airspace, restricted area, danger area, search and rescue regions	AIXM	Pub/Sub or Req Reply	2
Airspace feature service	Provides the characteristics of the three-dimensional airspace, described as horizontal projection with vertical limits, and their relevance to air traffic.	FIR/UIR boundaries, waypoints, enroute ATS routes, SIDs and STARs, navaids, procedures, and other airspace not limited to restricted area, prohibited area, danger area, search and rescue regions	AIXM	Pub/Sub or Req Reply	2

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
		(Remarks – Other data published in the AIP may be included)			
Aerodrome feature service	Provides current and/or planned airport layout features, such as aerodrome mapping data, runway, taxiway, passenger facilities.	Runways, movement areas, aerodrome services, navaids, instrument landing systems, Aerodrome location, communication facilities (frequencies)	AIXM	Pub/Sub or Req Reply	2
Runway Condition Report service	Provides runway surface conditions and contaminants (least to most slippery) that are directly correlated to aircraft take-off and landing performance.	Global Reporting Format (GRF) for runway surface conditions	AIXM	Pub/Sub or Req/Reply	2
Digital NOTAM distribution service	Provides aeronautical information in accordance with the Digital NOTAM Specification, such as runway closure.	Digital NOTAM (e.g. Special activity airspace (SAA) NOTAMs, or other types of NOTAMs)	AIXM	Pub/Sub or Req Reply	2
ATIS distribution service	Provides continuous and automated broadcast of recorded aeronautical information in airport and terminal areas.	Current weather conditions, runway in use, available approaches, and other data relevant to arriving and departing aircraft, specific ATC procedures, and any airport construction activity that could affect taxi planning	TBD	Pub/Sub	3
Search and rescue service	Allows Rescue Coordination Centres (RCCs) to exchange information with neighbouring RCCs and ATS units for coordination during SAR operations.	Search and rescue regions, Registered aircraft operator details and contacts, ICAO Autonomous Distress Tracking (ADT) data, Location of Aircraft in Distress Repository (LADR) data, ICAO OPS CTRL database contact information, SAR Unit (SRU) location and capability data	TBD	Pub/Sub	3

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
APAC Common SWIM Flight Information Services					
GUFI service	GUFI (Globally Unique Flight Identifier) generation and provision	GUFI	FIXM	Req/Reply	1
FF-ICE filing service	Provides a means to submit, update or cancel flight plans through a SWIM-based interface using FIXM.	Flight plan for registration, update or cancellation	FIXM	Req/Reply Pub/Sub	1
FF-ICE publication service	Provides harmonised sharing of flight plan information in a global standard supporting common situation awareness.	Flight information for publication	FIXM	Pub/Sub	2
FF-ICE trial service	Allows operators to test the effect of a potential change in a flight plan prior to committing to the change.	Proposed changes in a flight plan	FIXM	Req/Reply	2
FF-ICE flight data request service	Allows an operator to request the current status of a flight plan, or an ANSP can request an operator to submit the latest version of their flight plan.	Current status of a flight plan, a copy of flight plan or supplementary plan	FIXM	Req/Reply	1
FF-ICE notification service	Provides notification of a change in flight state, such as Departure (DEP) and Arrival (ARR) Air Traffic Service (ATS) messages.	ARR, DEP messages	FIXM	Req/Reply Pub/Sub	1
FF-ICE planning service	Allows operators to submit preliminary flight plans for early Air Traffic Flow Management (ATFM) planning and to obtain feedback regarding restrictions/constraints affecting the flight.	Preliminary flight plan for early ATFM planning	FIXM	Req/Reply Pub/Sub	2

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
ADP Distribution Service	Supports publication and distribution of ATFM Daily Plan (ADP), based on information included in the APAC ADP Exchange Procedure[1]. The published ADP is designed to inform for stakeholders on upcoming demand/capacity constraints and possible ATFM measures.	Refer to ADP template	FLXM[2]?	Pub/Sub	1
Flight-Specific ATFM Measure Service	Supports notification of information related to "flight-specific" ATFM measures, i.e. measures whose control mechanisms apply to a single flight. An example is the Ground Delay Program (GDP), whose control mechanism is a Calculated Take-Off Time (CTOT), or an ATFM measure for airborne flight, whose control mechanism is a Calculated Time Over (CTO). Recipients of this information should take actions to comply with the ATFM measure contained herein.	CTOT, CTO, CLDT, and fields currently included in APAC AFTN/AMHS-Based ICD for ATFM[3]	FIXM	Req/Reply Pub/Sub	1
Flow-Specific ATFM Measure Service	Supports notification of information related to "flow-specific" ATFM measures, i.e. measures whose control mechanisms apply to a "group of flights" on a particular traffic flow. An example is the Minutes-in-Trail (MINIT) requirement applied on an eastbound traffic using A1 from VT*, VV* to RK*.	Spacing parameters for MINIT, MIT; Departure intervals for MDI; Alternate routes for Re-Routing; Flight level allocation for Level Capping	TBD	Pub/Sub	2 or 3

[1] The ADP template included herein is not updated. The new ADP template had been agreed by the AMNAC group and included into the AMNAC COP v6.1, Appendix D, and was proposed to the ATFM/SG/15 (Apr-May 2025). The meeting agreed that the Secretariat will update the ADP Exchange Procedure to include the new template, which has already been supplied by AMNAC core team post-meeting.

[2] FLXM: Flow Information Exchange Model

[3] Based on the conclusion from ATFM/SG/15, an amendment to this ICD will be proposed in which a more structured use of REGUL and REGCAUSE fields will be introduced. This proposal is expected to be tabled at the upcoming CNS/SG meeting.

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
	Recipients of this information should take actions to comply with the ATFM measure contained herein.[4]				
ATFM/A-CDM Integration Service	Supports exchanges of flight-specific ATFM measure information and A-CDM milestone parameters among stakeholders, including arrival/departure ATFM units, airspace users, and airport operators, to integrate A-CDM process with ATFM operations.	ATFM measure information: CTOT A-CDM departure planning information: TOBT, TTOT, TSAT	FIXM	Req/Reply Pub/Sub	1
APAC Common SWIM Meteorological Information Services					
FOR AERODROME					
METAR/SPECI service	Provides of IWXXM-formatted METAR/SPECI product specified in ICAO Annex 3.	Provision of the existing Annex 3 product via an information service	IWXXM	Pub/Sub Req/Reply	1
TAF service	Provides of IWXXM-formatted TAF product specified in ICAO Annex 3.		IWXXM	Pub/Sub Req/Reply	1
Aerodrome Meteorological Observation Information Service	Provides continuous observations of weather parameters at an aerodrome. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel.	To be introduced as recommended practice in Annex 3 (Amd 84) in Nov 2030 tentatively (Note: Level of standardisation needs to be considered, as different aerodrome information services may be required for different use cases.)	IWXXM	Pub/Sub or Req/Reply	2*
Aerodrome Meteorological Forecast Information Service	Provides information of the expected meteorological conditions, including probability, at an airport during a specified period. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel.		IWXXM	Pub/Sub or Req/Reply	2*
FOR ENROUTE					
SIGMET service	Provides IWXXM-formatted SIGMET product specified in ICAO Annex 3.	SIGMETs for thunderstorm, tropical cyclone, turbulence, icing, mountain wave, duststorm,	IWXXM	Pub/Sub Req/Reply	1

[4] Common operating procedure for this group of ATFM measures (e.g., MINIT, MIT, MDI, Re-Route, Level Capping) has not been developed for the APAC region yet, and should be developed before finalizing the information service to support the operations.

* Will become Priority (1) when it is introduced as recommended practice in Annex 3 tentatively in Nov 2030

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
		sandstorm, volcanic ash and radioactive cloud			
AIRMET service	Provides IWXXM-formatted AIRMET product specified in ICAO Annex 3.	Provision of the existing Annex 3 product via an information service	IWXXM	Pub/Sub Req/Reply	2
Tropical Cyclone Advisory service	Provides IWXXM-formatted Tropical Cyclone Advisory product specified in ICAO Annex 3. (Designated provider: States with Tropical Cyclone Advisory Centre)		IWXXM	Pub/Sub Req/Reply	1
Volcanic Ash Advisory service	Provides IWXXM-formatted Volcanic Ash Advisory product specified in ICAO Annex 3. (Designated provider: States with Volcanic Ash Advisory Centre)		IWXXM	Pub/Sub Req/Reply	1
Space Weather Advisory service	Provides IWXXM-formatted Space Weather Advisory product specified in ICAO Annex 3. (Designated provider: States with Space Weather Advisory Centre)		IWXXM	Pub/Sub Req/Reply	1
Volcano Observatory Notice for Aviation (VONA) service	Provides of IWXXM-formatted VONA specified in ICAO Annex 3. Provision of VONA is a recommended practice in Annex 3 (Amd 82). (Designated provider: States with a designated State Volcano Observatory)		IWXXM	Pub/Sub Req/Reply	2
Quantitative volcanic ash concentration information (QVA) service	Provides detailed information of significant volcanic ash in the atmosphere, including probabilities of ash concentration thresholds over space and time. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel. (Designated provider: States with Volcanic Ash Advisory Centre (VAAC))	QVA gridded forecasts including probabilities, and IWXXM QVA objects. A recommended practice for significant ash clouds in Annex 3 (Amd 82) for VAACs in a position to do so from Nov 2025, and for all VAACs from Nov 2026.	Gridded data (e.g. NetCDF), IWXXM	Pub/Sub Req/Reply	2[#]

[#] Will become Priority (1) from Nov 2026

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
WAFC (World Area Forecast Centres) gridded forecast service	Provides global gridded weather forecasts. (Designated provider: WAFCs (UK and US))	Global gridded forecasts of CB, icing, turbulence, upper winds, upper-air temperatures and humidity, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind	Gridded data in GRIB2	Pub/Sub Req/Reply	1
WAFC significant weather (SIGWX) forecast service	Provides global WAFC SIGWX data sets with coverage expressed in polygons. (Designated provider: WAFCs (UK and US))	Significant weather forecast such as tropical cyclone, turbulence, icing, etc.	IWXXM	Pub/Sub ~~or~~ Req/Reply	1
Special Air Report (ARS) service	Provides reports of special observations made by aircraft when they encounter special weather phenomena, such as moderate/severe turbulence or icing. (Note: Currently there is no plan to implement this information service at MET Panel)	Special aircraft observations of weather phenomena as specified in Annex 3, including turbulence, icing, mountain wave, thunderstorms, duststorm, sandstorm, volcanic cloud, volcanic activity / eruption	TBD	Pub/Sub or Req/Reply	2
MET derived from Mode S DAPs service	Provides upper air winds and temperatures derived from Mode S Downlinked Aircraft Parameters (DAPs) (e.g. true airspeed, ground speed, magnetic heading, true track angle) and facilitates exchange of derived winds and temperatures among MET service providers.	Upper air winds and temperatures derived from Mode S DAPS	TBD	Pub/Sub or Req/Reply	3
Satellite image service	Provides satellite observational information.	Satellite derived MET information (e.g. significant convection)	Gridded format (e.g. NetCDF) and image format	Req/Reply	2
Weather radar image service	Provides two- or three-dimensional radar observational information.	Weather radar reflectivity to visualise the intensity of convection	Gridded format (e.g. NetCDF) and image format	Req/Reply	2

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority (1) / (2) / (3)
APAC Common SWIM Surveillance Information Services					
Surveillance data only sharing service	Provides surveillance data of aircraft.	latitude, longitude, flight level, ground speed (optional), magnetic heading (optional), target identification, target address, mode 3/A code (optional), date, time of message reception for position, quality indicators, SAC, SIC	ASTERIX Cat 21 (payload in JSON or RAW format)	Pub/Sub	1
Surveillance data with flight plan information sharing service	Provides surveillance data of aircraft with flight plan information.	globally unique flight identifier, aircraft identification, departure aerodrome, destination aerodrome, aircraft type (optional), wake turbulence category (optional), latitude, longitude, flight level, ground speed (optional), magnetic heading (optional), target identification, target address, mode 3/A code (optional), date, time of message reception for position, quality indicators, SAC, SIC	ASTERIX Cat 21+FPL (payload in JSON format) Or ASTERIX Cat 21+FPL (FPL contained in message header and Cat 21 payload in RAW format)	Pub/Sub	2

Guidance Materials for the sharing of surveillance data in SWIM

Jan 2026

Study Group Under SURICG On Sharing of Surveillance Data In SWIM (SURSG)

Table of Contents

1. Introduction

1.1. Background

1.1.1. Surveillance Study Group (SURSG)

The establishment of the SURSG and its Terms of Reference (TOR) was endorsed by the CNS SG/24 on 4 December 2020 under the ***"Decision CNS SG/24/16 (SURICG/5/1) - Establishment of Study Group under SURICG on Sharing of Surveillance Data in SWIM"***. Based on the TOR, the objectives of the 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 the 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, Common aeRonautical Virtual Private Network (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.

1.1.2. SURSG Study Report

With members' support, inputs, and efforts from task leads, all tasks in the feasibility study stage were completed in Feb 2022 with a Concept of Operations (CONOPS) and a Study Report been published in ICAO portal (SURICG/6-IP17 and Appendix E in CNS SG/26-WP13) which formed the basis for shaping the performance requirements and service categorization of surveillance data sharing in the region. One of the recommendations and moving forward from the Study Report was the proposal for the establishment of a Surveillance Sharing in SWIM Trial Implementation Group (S3TIG) to oversee a trial with the following main responsibility and objectives:

1) Coordinating with the SWIM Task Force, CRV OG to reflect SWIM development in the trial
2) Leading and coordinating with interested states/administrations, and stakeholders (commercial and non-commercial) to conduct the trial:
   a) to demonstrate as far as practicable the general, technical and administrative aspects of surveillance sharing in SWIM in the Study Report; and
   b) to serve as a reference model for future surveillance sharing implementation in SWIM.

1.1.3. S3TIG and Joint Event

S3TIG was then established in December 2022 to support and promote the trial implementation of surveillance data sharing based on SWIM. With the endorsement of SURSG/3, SWIM TF/7, and SURICG/8, the SWIM Demonstration over CRV and surveillance data sharing in the SWIM trial were

successfully conducted as a Joint Event by S3TIG in Hong Kong, China, from 28 to 29 May 2024. The report of the joint event can be found in the ICAO portal (SWIM TF/10-WP/05).

1.1.4. Guidance Materials

Guidance materials (i.e. this document) for the sharing and access of surveillance data is one of the deliverables under SURSG. Upon successful completion of the Joint Event, States/Administrations including Hong Kong China, Singapore, and the USA have volunteered and contributed to producing this document.

1.2. Purpose of the Document

This document provides guidance for system planning, design, and implementation of SWIM platforms in the APAC region for surveillance data sharing, with the purpose of ensuring continuous and coherent development of the SWIM platforms for surveillance data sharing that is harmonized and interoperable within the region.

2. Summary of Major Considerations from the Study Report and their Outcomes from the Joint Event

2.1. Implementation Model

2.1.1. Starting small and simple

To align with the philosophy and roadmap for the implementation of SWIM in APAC, the same incremental approach (i.e. starting small and simple) has been leveraged for surveillance data sharing in the Joint Event. With a focus on operations selected (i.e. ATFM, FF-ICE, and MET) to benefit from surveillance data sharing, the infrastructure and associated information service have been identified and implemented. Where the first implementation of surveillance data sharing of ADS-B data proved feasible and beneficial.

2.1.2. SWIM over CRV

CRV has been endorsed as the carrier of SWIM data at CRV OG/5 and SWIM TF/3 meetings. S3TIG considered that the option to use the operational CRV for the Joint Event was not preferred considering the potential bandwidth impact and cyber security risks, even if remote, on the operational CRV, which is the network carrying safety critical operation data.

Instead, PCCWG established a pseudo-CRV network for the Joint Event. The pseudo-CRV operated exactly like the operational CRV, utilizing a dedicated and segregated CRV network with the same hardware setup. Similar to the operational CRV, dedicated network interface devices were installed at the site for each participant participating with an EMS.

For participants without an EMS, PCCWG provided SIM cards for mobile connection through its Console Connect platform. This platform allows users to access the simulated SWIM environment in the Joint Event to publish/subscribe data services and interact with the HMI of the SWIM services provided by PCCWG. The network infrastructure used in the Joint Event is illustrated in Figure 1 below.

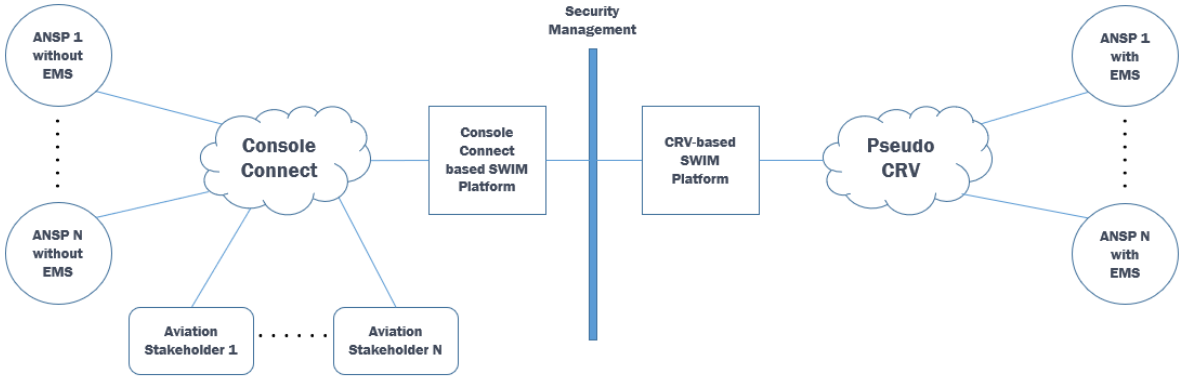


Figure 1 – Network Infrastructure for the Joint Event

The outcome of the Joint Event confirmed that the proposed implementation of surveillance data sharing using a SWIM platform, as depicted in Figure 1 above, with a combination of CRV-based SWIM platform and third-party/commercial interest providing the internet-based SWIM platform (i.e. Console Connect in the case of the Joint Event) for different kinds of stakeholders is feasible.

Moreover, stakeholders who are currently outside the CRV network's coverage can subscribe to the surveillance data sharing service (whether it is within the CRV network or not) through Console Connect (left side of the diagram), using various connection means. With proper security management, the Console Connect-based SWIM platform will be able to communicate with the CRV network and allow surveillance data exchange between the two platforms.

It should be noted that the 2Mbps bandwidth tentatively offered for each State/administration in the pseudo-CRV was not sufficient to carry surveillance data sharing with a 1s data rate. Section 4 of this document provides more detailed bandwidth considerations for surveillance data sharing.

2.2. Infrastructure Model

2.2.1. SWIM Technical Infrastructure

The hybrid infrastructure model as proposed by the Study Report, comprising private EMSes owned by States/Administrations and public/commercial EMSes was adopted in the Joint Event. While setting up the EMS architecture for the Joint Event, the SWIM Implementation Pioneer Group (SIPG) noted that a GRE tunnel would have to be established between each communication pair under the CRV provision. This approach would put restrictions on the future SWIM implementation as lots of GRE tunnels have to be constructed for any-to-any connections. To mitigate the impact of such restriction, a 2-tier hierarchical architecture was proposed by SWIM TF and was adopted for the Joint Event. In the hierarchical architecture, participants were divided into sub-communities and one representative from each sub-community would act as the gateway for message exchange among all sub-communities (“the Gateway EMS”). Participants under each sub-community with EMS provision would act as the EMS provider (“the Edge EMS”) for their local downstream users. This approach could effectively reduce the number of GRE tunnels required. For participants without EMS, PCCWG would act as the 3rd party EMS provider to provide network-based EMS services for them. Figure 2 below shows a schematic diagram of such EMS architecture.

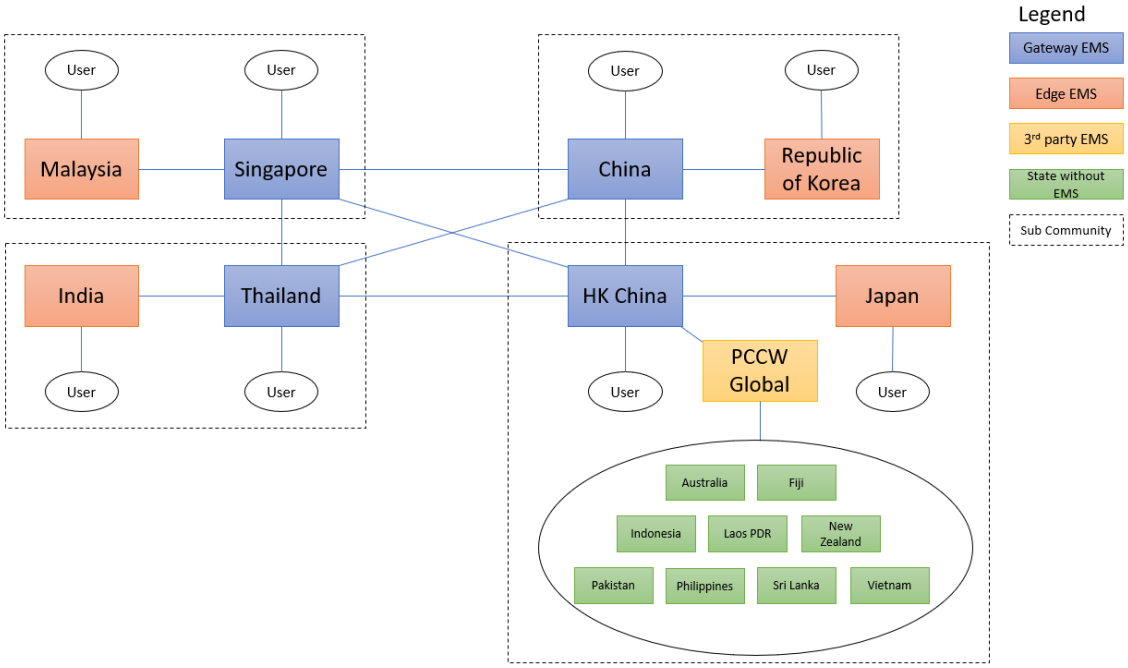


Figure 2 – EMS Infrastructure for the Joint Event

Some participants had expressed doubts about whether the hierarchical architecture is the appropriate architecture for the APAC region. There were several observations with this architecture identified during the preparation of the Joint Event, such as specific configuration required for different brands of EMS, potential message loop back if source and recipient checking was not implemented properly, combining byte message and text message into a single queue, single point of failure of the current architecture, etc.

It should be highlighted that the development of the SWIM technical infrastructure for APAC region is still ongoing. States/Administrations should refer to the latest development status as published by SIPG from time to time.

2.2.2. Surveillance Central Data Processor (SCDP)

Surveillance data sharing can be supported by direct interfacing between data contributor and data consumer. If any 3rd party wishing to provide a centralized surveillance data-sharing service may do so by way of an SCDP, which filters and collates surveillance data feeds from data contributors and outputs user-selectable data streams as a SWIM service. Figure 3 below shows a conceptual model of SCDP. While the SCDP functions were not tested in the Joint Event as such functions cannot be delivered by the SCDP service provider on time, it should be noted that the SCDP concept could bring benefit on bandwidth saving, especially for non-contributing EMS that only interested data will be transmitted from the SCDP, rather than receiving all surveillance data from all the contributing EMSes.

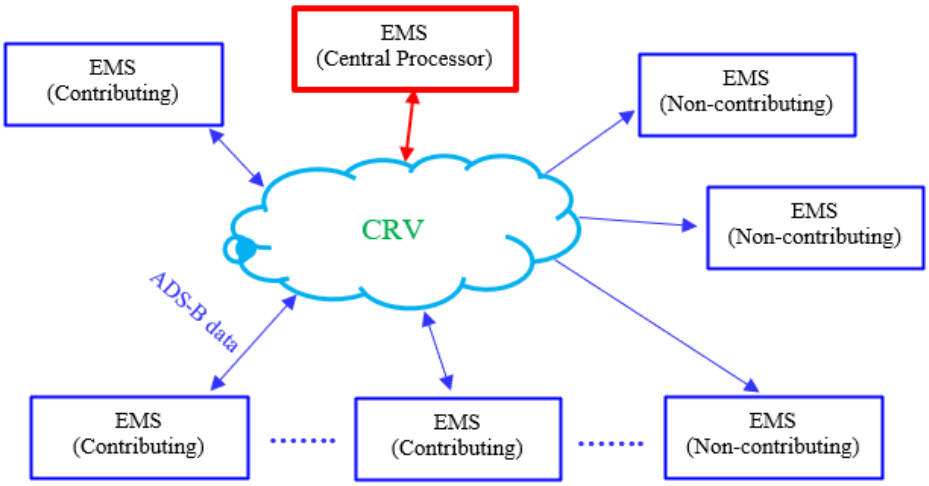


Figure 3 – Conceptual Model of SCDP

2.3. Business Model

The following are the major recommendations from the Study Report on the business model. For details, please refer to the Study Report as referred to in Section 1.1.2.

2.3.1. CONOPS

It is envisaged that States/Administrations will have varying needs for the shared surveillance data. Based on the nature of ATS applications, the service levels of shared surveillance data may be roughly classified into two types as below:

1) Level 1 Data Services for supporting ATS applications which make use of the shared surveillance data for aircraft separation.
2) Level 2 Data Services for supporting ATS applications which do not use shared surveillance data for aircraft separation (e.g. Air Traffic Flow Management (ATFM), situation awareness at FIR boundaries, etc.)

It should be highlighted that the APAC Common SWIM Information Services for surveillance data sharing in the region is not specified to support the provision of aircraft separation (i.e. Level 1 Data Services).

The Level 2 Data Services is suitable for:

a. FIR coordination.
b. Air situation awareness at FIR boundaries.
c. Flight tracking.
d. Strategic planning and analysis.

and is **not suitable** for:

a. Separation assurance.
b. Controller tactical operations.
c. Surveillance-based conflict resolution.

2.3.2. Format of Data

ASTERIX CAT 21 Edition 2.1 is recommended for the initial implementation, as most of the States/Administrations can support without additional data conversion efforts. The SCDP would be able to provide data conversion services between different ASTERIX CAT 21 editions, to support legacy systems if required. Accordingly, S3TIG proposed the data structure for surveillance data sharing. Such data structure could serve as a reference model for future surveillance-sharing implementation in SWIM. Two message payloads (i.e. ASTERIX and JSON) were tested in the Joint Event. The finalized data structure can be found in Section 6.2 - Annex 2.

2.3.3. Integrity of ADS-B Data

The data contributors should not modify the content of the surveillance data except for the following purposes:

1) ASTERIX Edition upgrading or downgrading;
2) Format conversion to meet the agreed data format for sharing;
3) SAC/SIC amendment; and
4) Fusion of data from multiple sensors, such as removal of duplicated ADS-B position reports. Position report extrapolation shall not be shared.

The time stamp of the surveillance data report shall be based on a reliable time source with timeliness performance as mentioned in Section 5.4, without any modification by the data contributors.

2.3.4. Report Filtering

Screening out special or non-civilian flights (e.g. State aircraft) is allowed with the filters being agreed upon prior to implementation. The filtering mechanism shall be detailed in the data services provided. For ADS-B data, the data contributors shall not perform any data filtering based on ADS-B quality indicators or blacklist. All the ADS-B data shall be shared with users as far as possible. Considering that States/Administrations will be making the assessment of data usability, and that lower NUC/NIC can still support lower-level operations, all data should be sent without filtering based on NUC/NIC.

2.3.5. Serviceability

Two data services, namely Level 1 (use for aircraft separation) and Level 2 (not use for aircraft separation) Data Services, were recommended to support the operation needs on surveillance data sharing in the region. These two data services are equivalent to Category 1 (support aircraft separation) and Category 3 (support enhanced flight operation) under "*Baseline ADS-B Service Performance Parameters*" of ICAO'S *ADS-B Implementation and Operations Guidance Document Edition 15.0 – September 2022"* with details as below.

Service Parameters	Level 1[1]	Level 2[2]
System Availability	Total Service Availability > 99.9%	Total Service Availability > 90%
System Reliability	Total Service MTBF > 50,000 hours	Total Service MTBF> 200 hours
Aircraft Updates	0.5 second < Interval < 10 seconds	0.5 second < Interval < 60 seconds
Data Latency	95%: < 2 seconds	95%: < 60 seconds

2.3.6. Data Coverage

Data contributor to share ADS-B data from stations that are near the FIR boundaries (useful to cover surveillance gaps) to support Level 1 data service and/or ADS-B stations that are near airports for international flights (useful for ATFM) to support Level 2 data service is recommended to be the minimum for a data contributor. Other choices to share ADS-B data from (i) all its ADS-B stations; (ii) one of its ADS-B stations; and (iii) all its international flights could be considered if such a use case is available.

2.4. Participation Model

2.4.1. Data Contributors

Due to the varying degrees of SWIM implementation status of States/Administrations, data contributors should offer flexibility to allow surveillance data sharing to the data consumers either by direct interfacing or by centralized SCDP services provided by a 3rd party.

Direct interfacing between data contributor and data consumer can be established regardless of whether an SCDP exists. However, an SCDP is expected to greatly accelerate the implementation of surveillance data sharing and popularize its utilization in accordance with the "starting small and simple" philosophy. SWIM-enabled States/Administrations can choose this collaboration model for an initial trial with a "local SCDP" and then populate the SCDP services through further collaboration in a later stage by expanding their capabilities or by way of 3rd-party SCDP centralized services.

Surveillance data sharing services (Level 1 and Level 2), if offered via SCDP, require the collaboration between States/Administrations (as data contributors) and the SCDP service provider for the data provision mechanism, including data format, data update rate, etc., to ensure the SCDP can deliver the ultimate surveillance data sharing services, meeting the service parameters mentioned in Section 2.3.5.

Data charging schemes or incentives provided to States/Administrations who are data contributors to the SCDP should be explored to encourage data contribution to the SCDP.

[1] Level 1 standards are for supporting ATS applications which make use of the shared surveillance data for aircraft separation. It should be highlighted that the service parameters mentioned in the table have been referenced from AIGD for 5NM separation, and may differ from any specific performance requirements specified in EUROCONTROL-SPEC-147 (EUROCONTROL Specification for ATM Surveillance System Performance (Volume 2 Appendices))

[2] Level 2 standards are for supporting ATS applications which do not use shared surveillance data for aircraft separation (e.g. Air Traffic Flow Management (ATFM), situation awareness at FIR boundaries, etc.)

With the presence of SCDP, States/Administrations without SWIM infrastructure can also contribute their data by legacy means and in legacy data formats (if this is the case) to the SCDP, which will then take care of data conversion and onward data surveillance sharing service for dissemination.

2.4.2. Data Consumers

States/Administrations, based on their own SWIM implementation status, can choose between direct interfacing with the data contributor or using the surveillance data sharing service provided by SCDP. States with SWIM infrastructure may participate in the initial trial by directly interfacing with data contributors. Data consumers without SWIM infrastructure can subscribe to the surveillance data sharing services from the SCDP to benefit from shared surveillance data.

Data will be shared among all the participating users in the spirit of sharing and benefiting the aviation community.

2.4.3. Data Governance

It should be highlighted that the development of the SWIM data governance for APAC region is still ongoing. States/Administrations should refer to the latest development status as published by SIPG from time to time.

2.5. Implementation Roadmap and Timeframe

2.5.1. Development of CONOPS

Singapore, Hong Kong, China, Thailand, and Vietnam have developed a proposed concept of operations (CONOPS) for surveillance data sharing in SWIM (SURICG/6-IP/17). A comprehensive discussion has been included, ranging from practical models for collaboration and operation to business models, considering available platform(s) and other technical considerations.

2.5.2. Preparation of guidance material and multilateral agreement

With reference to the models and recommendations advised in the Study Report, guidance material, specified system requirements, performance requirements, operation and maintenance practice, and so forth, should be developed to facilitate and harmonize the implementation of surveillance data sharing. The guidance material should also provide guidance for the design, testing, and commissioning of the system for surveillance data sharing to ensure coherent system development.

A multilateral agreement may involve a lengthy negotiation process, depending on the size of the participant group and agendas. Despite the considerable time it may take, a multilateral agreement is considered a more suitable option over a bilateral agreement to attain non-discrimination data sharing with transparent, fair, and equitable treatment.

2.5.3. Implementation of infrastructure – SWIM, CRV and EMS

SWIM over CRV is the default means to share surveillance data. The hybrid infrastructure model is considered the most suitable one with maximum efficiency and minimal geopolitical concerns. The States/Administrations are suggested to evaluate and determine which options to be adopted, based on their own context. The infrastructure should be implemented according to the

requirements set out with considerations of latency, throughput, network security, system reliability, and cost effectiveness.

2.5.4. Implementation of information service

It is envisaged that information services developed based on the functional and performance requirements, such as message format and data filtering, will be properly tested and validated locally or with the adjacent regions to ensure a reliable system for surveillance data sharing.

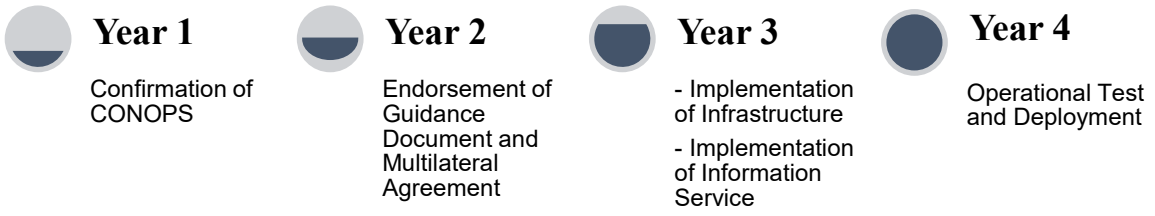
2.5.5. Operational test, validation user acceptance, and operation deployment

Upon the completion of the implementation of infrastructure and information service, the overall functions of sharing surveillance data could be verified through operational tests and user acceptance tests. State/Administration's involvement in this stage is important to identify system deficiencies or interface issues, if any, for further investigation and improvement before putting into operation.

After comprehensive testing and review, the system would be ready to deploy for operation. Regular meetings across the States/Administrations should be held with an operations group to review performance and examine any issues found. A collaborative review process and cooperative system fine-tuning will be crucial for the continuous improvement and further development of surveillance data sharing.

2.5.6. Timeframe

The implementation timeline chronologically arranges the tasks identified in the implementation roadmap proposed in Sections 2.5.1 to 2.5.5. The timeline may differ to some extent depending on the actual deployment model and approach, and also for the level of services to be delivered (e.g. quicker deployment for Level 2 Data Services than Level 1 Data Services). The implementation of the SWIM platform is a key contributing factor to the timeline of surveillance data sharing.



3. Surveillance Information Service Security

The security of the Surveillance Information Service in the SWIM platform is critical to ensuring the integrity, confidentiality, and availability of surveillance data. While the overall SWIM-related information security would be based on the guidance documents developed by the Trust Framework Panel (TFP), this document will focus on industrial best practices for securing surveillance information services and their interfaces.

3.1. General Security Principles

1) **Authentication and Authorization**: Verify the identity of all entities accessing the SWIM services and enforce strict role-based access control (RBAC).
2) **Confidentiality**: All surveillance data exchanged between systems must be encrypted to prevent unauthorized access.
3) **Integrity**: Mechanisms must be in place to detect and prevent any unauthorized alterations to surveillance data.
4) **Availability**: Ensure that the SWIM platform and its services remain operational and resistant to denial-of-service (DoS) attacks.

3.2. Security for External Interfaces

The external interface of the SWIM platform would be over CRV or the internet. This interface is vulnerable to external cyber threats and requires robust protection mechanisms, such as:

1) Data Encryption
   a) Use TLS for encrypting data exchanged over the external interface.
   b) Ensure that all endpoints support secure transport protocols.

2) Authentication
   a) Implement mutual TLS (mTLS) to authenticate both the SWIM platform and external entities.
   b) Use digital certificates issued by a trusted Certificate Authority (CA) for secure communications.

3) Access Control
   a) Apply firewall rules to restrict access to the SWIM platform to only authorized IP addresses or ranges.
   b) Use Application Layer Gateways (ALG) or dedicated API gateways to filter and validate incoming and outgoing messages.

4) Monitoring and Intrusion Detection
   a) Deploy an Intrusion Detection System (IDS) or Intrusion Prevention System (IPS) to monitor traffic between the SWIM platform and external entities.
   b) Log all access attempts and regularly audit logs for suspicious activity.

5) Message Validation
   a) Validate incoming messages for conformance to the expected format (e.g. ASTERIX CAT 21 or SWIM-based messages).
   b) Reject malformed or unexpected messages to prevent injection attacks or malformed data propagation.

6) Rate Limiting and DoS Protection
   a) Apply rate limiting to prevent excessive requests from external entities.

b) Use traffic filtering and scrubbing solutions to mitigate DoS or Distributed Denial of Service (DDoS) attacks.

3.3.Security for Internal Interfaces

The SWIM platform's internal interface would be connected to the data conversion engine and the internal ADS-B system. While the internal network is more protected, it still requires robust security to prevent insider threats or breaches.

1) **Network Segmentation**
   a) Separate the SWIM platform, data conversion engine, and internal ADS-B system into distinct network zones.
   b) Use firewalls to enforce strict segmentation and limit communication to only necessary connections.
2) **Encryption**
   a) Secure internal communications using IPSec or TLS to prevent interception or tampering of data.
3) **Data Validation and Filtering**
   a) Validate and sanitize all messages exchanged between the data conversion engine and the SWIM platform.
   b) Ensure that no unauthorized or malformed data is passed through the internal interface.
4) **Authentication**
   a) Use secure tokens or certificate-based authentication for all communications between internal systems.
   b) Implement two-factor authentication (2FA) for administrative access to internal components.
5) **Access Control**
   a) Enforce strict access control policies for internal systems. Only authorized personnel and systems should have access to the SWIM platform and the data conversion engine.
6) **Audit and Logging**
   a) Maintain detailed logs of all interactions between the SWIM platform, data conversion engine, and internal ADS-B system.
   b) Implement real-time monitoring to identify unauthorized access or unusual activity.

3.4.Security for Data Conversion Process

The data conversion engine, which converts legacy ASTERIX format data to SWIM-based messages, must be secured to ensure reliable and accurate data transformation.

1) **Input Validation:**
   a) Validate and sanitize all data received from the internal ADS-B system before processing.
   b) Ensure that only ASTERIX CAT 21 messages are accepted for conversion.
2) **Controlled Data Transformation:**
   a) Perform data conversion within a sandboxed environment to mitigate the risk of malicious payloads affecting the SWIM platform.
3) **Error Handling and Exceptions:**

a) Implement robust error handling to prevent corrupted or incomplete data from being transmitted to the SWIM platform.

4) **Data Integrity Checks:**
   a) Use hashing algorithms (e.g. SHA-256) to verify the integrity of data before and after conversion.

3.5.Security Governance and Compliance

1) **Compliance with Standards:**
   a) Ensure compliance with ICAO guidelines, such as the Global Air Navigation Plan (GANP) and Aviation System Block Upgrade (ASBU) framework.
   b) Follow guidance documents developed by the TFP.
2) **Regular Security Assessments:**
   a) Conduct periodic vulnerability assessments and penetration testing for both internal and external interfaces.
   b) Review and update security policies regularly to address emerging threats.
3) **Incident Response Plan:**
   a) Develop and maintain an incident response plan to quickly detect, respond to, and recover from security incidents.
   b) Conduct regular drills and simulations to ensure readiness.
4) **Training and Awareness:**
   a) Provide cybersecurity training to all personnel involved in the operation and management of the SWIM platform.
   b) Promote awareness of phishing, social engineering, and other common threats.

4. Infrastructure and Bandwidth Considerations

4.1. Infrastructure Considerations

The ANSP's infrastructure to support surveillance data sharing over SWIM should include at least the following components and interconnections among them.

1) Internal ADS-B system;
2) An interfacing module with flight plan system (for supporting surveillance data with flight plan information)
3) A data conversion engine/services to convert legacy ASTERIX format data to SWIM-based surveillance messages, which would most likely be a new system to be implemented, as existing automation systems typically incorporate surveillance data processing which create surveillance tracks no longer representative of the original data source (i.e. existing automation system outputs will not meet the requirement to supply the unprocessed ADS-B data).
4) An EMS to publish the SWIM based surveillance messages

Schematic diagrams showing the possible infrastructures are depicted below, with option 1 to be owned by ANSP and option 2 be cooperated with 3rd party service provider.

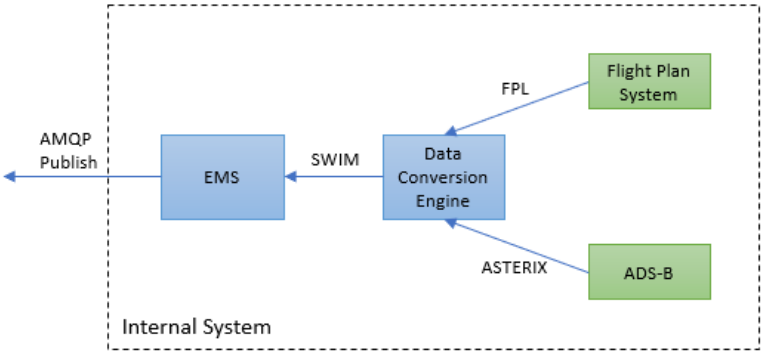


Figure 4 – Possible infrastructure (option 1)

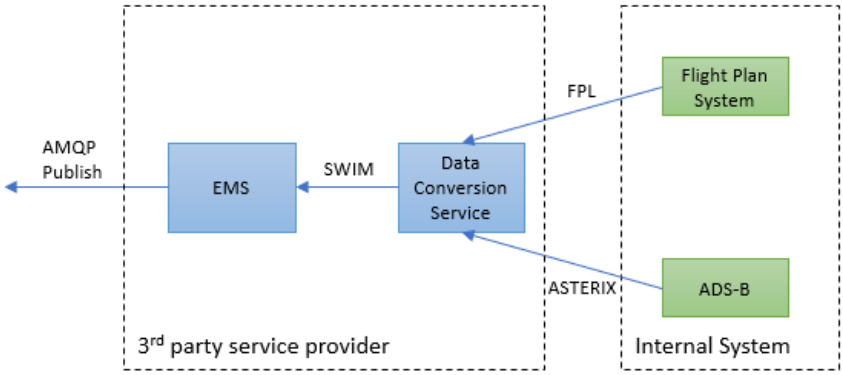


Figure 5 – Possible infrastructure (option 2)

The comparison between the two options are similar to other provision of SWIM services and could be considered by ANSP according to its situation. Some consideration factors are listed below.

1) On-premise vs Cloud-based SWIM infrastructure;
2) Self-development vs service-subscribed services;
3) Self-maintenance vs service-subscribed maintenance;
4) One-time cost vs recurrent cost; and
5) Level of data ownership and data sensitivity.

4.2. Bandwidth Considerations

In planning for the transmission of surveillance data over SWIM, it is essential to consider the bandwidth implications associated with the selected data format, message frequency, and operational requirements. Ensuing paragraphs provides considerations into the bandwidth calculation based on the Joint Event for surveillance data sharing over SWIM as presented in the WP05 in SURSG/4, 28 – 31 May 2024.

a) Transmission Overhead
Analysis of packet captures has revealed that Advanced Message Queuing Protocol (AMQP) messages incur an approximate 8% overhead relative to the size of the original message content (header and body).

b) Message Size
Statistical data from the Joint Event highlights that AMQP messages containing both ADS-B surveillance data and Flight Plan information can vary in size depending on the number of data fields and format used. Notably:
- Messages in JSON format that carry 32 data fields have an average size of **1.1K bytes** per message.
- Including the **8%** transmission overhead, the effective size per message increases to approximately **1.2K bytes**.

This represents the upper bound of message size observed and is suggested to be used as a reference for capacity planning.

c) Peak Bandwidth Estimation Example
In the case of Hong Kong, China, during peak traffic periods, the ADS-B system detects and processes data for approximately 300 aircraft targets per second within its area of responsibility. Assuming each target is associated with a message of 1.2 KB, the estimated bandwidth consumption is as follows:
- 300 messages per second × 1.2K bytes = 360K bytes per second
- This equates to approximately **2.88 Mbps**

This estimation provides a useful reference point for States/Administrations when planning their bandwidth provision in similar operational environments.

d) Suggested Calculation for Required Bandwidth

[maximum number of targets per second] x 1.2K bytes x 8 bps

5. Performance Requirements

5.1. Overview

This section defines the minimum performance requirements for sharing surveillance data in a SWIM-compliant environment. The framework assumes a fixed surveillance data refresh rate of between every 4 to 30 seconds and aims to support **Level 2 Data Services only** (align with the APAC Common SWIM Information Services) including strategic ATM operations such as situational awareness at FIR boundaries, planning, and safety monitoring—not tactical control. Emphasis is placed on the integrity, timeliness, and efficient distribution of surveillance data between contributing systems and consumers.

5.2. Surveillance Refresh Cycle and Data Management

5.2.1 Surveillance Refresh Rate

1. All surveillance data (track-level or processed target reports) shall be refreshed between every 4 and 30 seconds (0.25 and 0.03 Hz).
2. This interval defines the **data validity window** for each update; messages older than this window must be **discarded** and **replaced with the most current message**.
3. EMS and EMS Central Processing units must synchronize their output to this cycle and align time stamps using a standard (e.g., UTC-based ISO 8601).

5.2.2 Surveillance Central Data Processing (SCDP) Interface

1. The SCDP must act as the **authoritative node** aggregating surveillance feeds from contributing **EMS or EMS Central Processing nodes**.
2. All contributing EMS nodes must:
    a. Push updates to the SCDP in harmony with the surveillance update rate, between every 4 to 30 seconds.
    b. Include metadata indicating the source system, timestamp, and message sequence.
    c. Implement logic to **replace stale messages** and ensure that only the most current data is available for downstream dissemination.
    d. SCDP shall enforce **version control** and prevent duplication or delivery of outdated data.

5.3. Message Distribution Architecture

5.3.1 Push Message Model

1. **Definition**: Data is delivered continuously from the publisher (e.g., SCDP) to subscribed consumers without solicitation.
2. **Performance Characteristics**:
    a. Suitable for systems needing continuous streams (e.g., ground situation displays, traffic flow tools).
    b. Requires **high bandwidth**, especially during peak operational hours.
    c. Messages must be prioritized and queued efficiently to avoid congestion.
    d. Tolerable one-way distribution time: **≤ 1 second end-to-end**, including **200–400 ms over CRV**, depending on available bandwidth.

5.3.2 Pull Message Model

1. **Definition**: Consumers request specific data sets from the SCDP or an intermediary data service.
2. **Performance Characteristics**:
    a. Pull requests must be **governed and filtered**: consumers may only access messages that are:
    b. Related to their airspace of responsibility.
    c. Within their operational context or authorization.
    d. Response times to pull queries should not exceed **2 seconds**, including message retrieval and filtering.
    e. Pull services must implement **access control**, **query scope limits**, and **load-balancing mechanisms** to preserve the system.

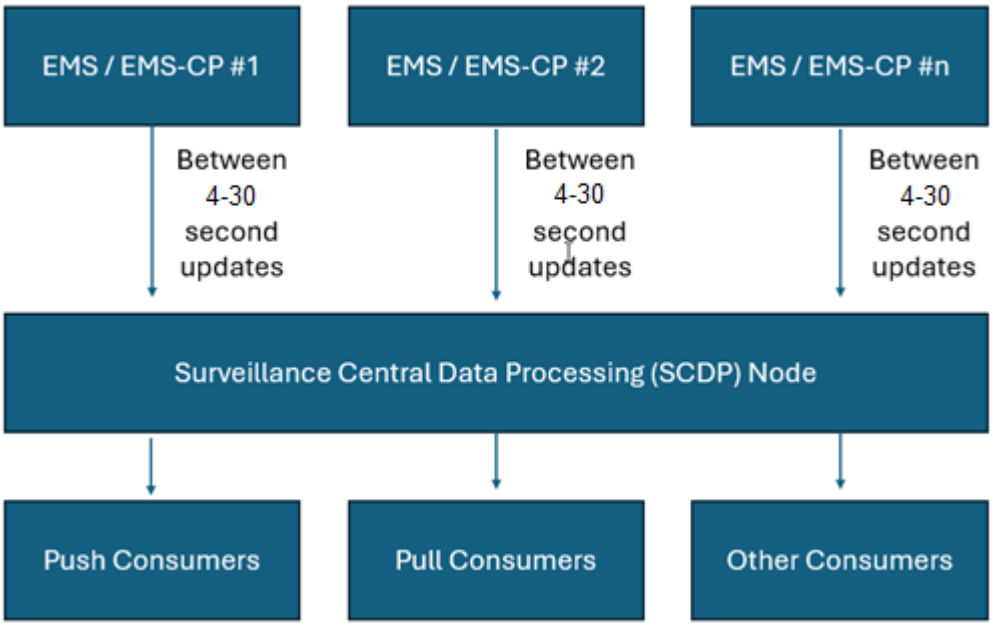
5.4. Key Performance Parameters

Parameter	Requirement
Update Rate	Between every **4 and 30 seconds** from all contributing EMSs to SCDP.
Latency	End-to-end delivery from EMS to consumer: **≤ 1 second** (nominal).
CRV Distribution Time	**200–400 ms**, subject to bandwidth; tolerance for up to 600 ms in constrained conditions.
Data Integrity	All messages must include verification (e.g., checksum, digital signature). Invalid or corrupted data shall be rejected.
Availability	99.9% availability (max 8.76 hours downtime per year).
Continuity	Surveillance data source shared via SWIM to maintain message delivery such that, for each individual source, no more than one consecutive expected message is missed within any rolling 24-hour period.
Timeliness	All surveillance data must be time-stamped to UTC with an accuracy of ±1 second.
Bandwidth Efficiency	Push models must implement flow control. Pull models must restrict volume by request scope and role-based access.
Scalability	Systems must scale to support a growing number of consumers (e.g., FIRs, ATFM units, adjacent ANSPs) without degradation in latency.

5.5. Quality Assurance and Monitoring

1. SWIM surveillance data services must implement continuous **performance monitoring** at key nodes (EMS, SCDP, CRV interface, consumer).
2. **Alerts** must be generated for:
    a. Missed updates.
    b. Latency exceeding defined thresholds.
    c. CRV congestion or message drops.
3. Logs must retain metadata for **audit and post-event analysis** for at least 30 days.

5.6.SWIM Surveillance Data Sharing Architecture



5.7. Key Components and Data Flow

1. **EMS / EMS-CP Nodes**:
    a. **Function**: Collect raw surveillance data (e.g., radar, ADS-B).
    b. **Data Transmission**: Send processed surveillance messages to the SCDP every 4 to 30 seconds.
    c. **Time Synchronization**: Ensure all messages are time-stamped using UTC (e.g., ISO 8601 format).
2. **Surveillance Central Data Processing (SCDP)**:
    a. **Function**: Aggregate, validate, and manage surveillance data from multiple EMS/EMS-CP sources.
    b. **Data Management**:
        i. Discard outdated messages beyond the 4-to-30-second refresh cycle.
        ii. Replace old messages with new ones to maintain data currency.
    c. **Data Distribution**:
        i. **Push Model**: Broadcast data to subscribed consumers.
        ii. **Pull Model**: Respond to specific data requests from consumers.
3. **Push Consumers**:
    a. **Examples**: Air Traffic Flow Management systems, situational awareness displays.
    b. **Data Reception**: Receive continuous data streams.

   c. **Bandwidth Consideration**: High bandwidth usage, especially during peak operational hours.
4. **Pull Consumers**:
   a. **Examples**: Analytical tools, post-event analysis systems.
   b. **Data Access**: Request specific data subsets based on criteria (e.g., geographic area, time frame).
   c. **Access Control**: Governed to ensure consumers receive only relevant and authorized data.
5. **CRV (Common Regional Virtual) Network**:
   a. **Function**: Facilitate data transmission between EMS/EMS-CP nodes and the SCDP.
   b. **Performance**:
      i. Typical distribution time: 200–400 milliseconds.
      ii. Potential for increased latency if bandwidth is constrained.
6. **Performance Parameters Summary**
   a. **Surveillance Refresh Rate**: Between every 4 and 30 seconds.
   b. **Message Validity**: Messages older than 4-to-30 seconds are discarded and replaced.
7. **Push Model**:
   a. **Bandwidth**: High during peak hours.
   b. **Latency**: Target end-to-end delivery within 1 second.
8. **Pull Model**:
   a. **Access Control**: Consumers receive only data pertinent to their role and authorization.
   b. **Latency**: Response time should not exceed 2 seconds.
9. **CRV Network**:
   a. **Distribution Time**: 200–400 milliseconds under optimal conditions; may increase with bandwidth limitations.

6. Annexes

6.1. Annex 1 – Message Headers for the Joint Event

Header Name	Values	Descriptions	Mandatory / Optional	Data Type
APAC_SOURCE	VH_HKCAD	Hongkong ASP (Contibutor & Consumer)	Mandatory	String
	RJ_JCAB	Japan ASP (Contibutor & Consumer)		
	WM_CAAM	Malaysia ASP (Contibutor & Consumer)		
	RK_KAC	ROK ASP (Contibutor & Consumer)		
	WS_CAAS	Singapore ASP (Contibutor & Consumer)		
	VT_AEROTHAI	Thailand ASP (Contibutor & Consumer)		
	VA_AAI	India (Contributor & Consumer)		
	RJ_JAL	Japan Airlines		
	VH_PCCW	PCCW		
APAC_RECIPIENT_LIST	ZB_ATMB	China ASP (Observer)	Mandatory	String
	VH_HKCAD	Hongkong ASP (Contibutor & Consumer)		
	RJ_JCAB	Japan ASP (Contibutor & Consumer)		
	WM_CAAM	Malaysia ASP (Contibutor & Consumer)		
	RK_KAC	ROK ASP (Contibutor & Consumer)		
	WS_CAAS	Singapore ASP (Contibutor & Consumer)		
	VT_AEROTHAI	Thailand ASP (Contibutor & Consumer)		
	VA_AAI	India (Contributor & Consumer)		
	WI_CAI	Indonesia ASP (Observer)		

Header Name	Values	Descriptions	Mandatory / Optional	Data Type
	VL_LPDR	Laos ASP (Observer)		
	NZ_AIRWAYS	NZ ASP (Observer)		
	OP_CAAPK	Pakistan ASP (Observer)		
	RP_CAAP	Philippines ASP (Observer)		
	YM_ASA	Australia (Consumer)		
	NF_FIJI	Fiji (Consumer)		
	RJ_JAL	Japan Airlines		
	VH_PCCW	PCCW		
APAC_CATEGORY	FIXM	All FIXM Messages	Mandatory	String
	AIXM	All AIXM Messages		
	IWXXM	All IWXXM Messages		
	ASTERIX	Surveillance Messages		
	GEOJSON	Meteorological Report Messages		
	JSON	Surveillance Messages in JSON Format		
APAC_CATEGORY_VERSION	FIXM_4_1	FIXM v4.1.0	Mandatory	String
	FIXM_4_1_APAC	FIXM v4.1.0 APAC Extension		
	FIXM_4_2	FIXM v4.2.0		
	FIXM_4_2_FF_ICE	FIXM v4.2.0 (for FF-ICE R1 and R2)		
	FIXM_4_2_APAC	FIXM v4.2.0 APAC Extension		
	AIXM_5_1	AIXM v5.1		
	IWXXM_2_0	IWXXM v2.0		

Header Name	Values	Descriptions		Mandatory / Optional	Data Type
	IWXXM_3_0	IWXXM v3.0			
	ASTERIX _CAT021	ASTERIX ADS-B Data Category			
	GEOJSON_4	GEOJSON v4.0			
	JSON_1	JSON v1.0			
APAC_MESSAGE_TYPE	**Values**	**Descriptions**	**Format**		
	PRELIMINARY_FLIGHT_PLAN	Preliminary Flight Plan	FIXM_FF-ICE R1	Mandatory	String
	FILED_FLIGHT_PLAN	Filed Flight Plan	FIXM_FF-ICE R1		
	SUBMISSION_RESPONSE	Submission Response	FIXM_FF-ICE R1		
	FILING_STATUS	Filing Status	FIXM_FF-ICE R1		
	PLANNING_STATUS	Planning Status	FIXM_FF-ICE R1		
	FLIGHT_PLAN_UPDATE	Flight Plan Update	FIXM_FF-ICE R1		
	FLIGHT_ARRIVAL	Arrival	FIXM_FF-ICE R1		
	FLIGHT_DEPARTURE	Departure	FIXM_FF-ICE R1		
	FLIGHT_CANCELLATION	Flight Plan Cancel	FIXM_FF-ICE R1		
	TRIAL_REQUEST	Trial Request	FIXM_FF-ICE R1		
	TRIAL_RESPONSE	Trial Response	FIXM_FF-ICE R1		
	FLIGHT_DATA_REQUEST	Flight Data Request	FIXM_FF-ICE R1		
	FLIGHT_DATA_RESPONSE	Flight Data Response	FIXM_FF-ICE R1		
	TRACK_RAW	Track Raw Data	ASTERIX Binary Data		
	TRACK_JSON	Track JSON Message	ASTERIX JSON Data		
	TRACK	Track Message	FIXM APAC Extension		
	CTOT	Calculated Take Of Time	FIXM APAC Extension		
	NOTAM	Notices to Airmen	AIXM		
	SAA	Special Activity Airspace	AIXM		

Header Name	Values	Descriptions		Mandatory / Optional	Data Type
	METAR	Aviation Routine Weather Report	IWXXM		
	SPECI	Special weather report	IWXXM		
	TAF	Terminal Area Forecast	IWXXM		
	SIGMET	Significant Meteorological information	IWXXM		
	AIRMET	Meteorological Information	IWXXM		
	VAA	Volcanic Ash Advisory	IWXXM		
DEP_AIRPORT	4 Letter ICAO Code	Departure Airport (used for flight identification)		Optional	String
ARR_AIRPORT	4 Letter ICAO Code	Arrival Airport (used for flight identification)		Optional	String
AIRLINE	Use ICAO Airline	Name of Airline		Optional	String
ACID	FIXM-defined format for ACID	Aircraft Identification (Mandatory for Tracks and Flight Plans)		Conditional Mandatory	String
GUFI	GUFI from message	Globally Unique Flight Identifier		Optional	String
EOBT	EOBT from message	Estimated off-block time (used for flight identification)		Optional	String
FFICE_PHASE	PRELIM	Preliminary phase of FF-ICE		Optional	String
	FILED	Filed phase of FF-ICE (Filed Flight Plan has been sent)		Optional	String
APAC_TIMESTAMP	epoch time	Timestamp of the message out or in the system. The time is to be appended to this field whenever the message is posted into a message queue. This field is delimited with commas E.g. JAL_OUT:1675213637251, JCAB_IN: 1675213638200 Comma delimited string of 64-bit signed integer representing the number milliseconds since Jan 1, 1970 00:00:00.000 UTC		Mandatory	String

6.2.Annex 2 – Data Structure of Surveillance Data for the Joint Event

6.2.1. JSON Structures for Surveillance Data with Flight Plan Information

Data fields below are based on ASTERIX CAT 21 version 2.1 specifications.

Field Name	Type	CAT21 Data Item Reference	Compulsory	Values	Descriptions
GUFI	String	N/A	No	0248982c-4384-49f4-bdb3-7956bd553383	Globally Unique Flight Identifier (obtained from FF_ICE services)
ACID	String	N/A	Yes	TLM912	Aircraft Identification
ADEP	String	N/A	Yes	VTBS	Departure Aerodrome
ADES	String	N/A	Yes	ZGGG	Destination Aerodrome
ARCTYPE	String	N/A	No	A339	Aircraft Type
WKTRC	String	N/A	No	H	Wake Turbulence Category
LAT	Number	I021/130 or I021/131	Yes	18.6701799113899	Latitude (Degree) Use I021/131. If I021/131 does not exist, use I021/130
LONG	Number	I021/130 or I021/131	Yes	103.180853652939	Longitude (Degree) Use I021/131. If I021/131 does not exist, use I021/130
FL	Number	I021/145	Yes	310	Flight Level
GS	Number	I021/160	No	498	Ground Speed (Knot) Use I021/160 x 3600 because I021/160 provides Ground Speed in NM/s
HEADING	Number, Null	I021/152 or I021/160	No	34.2773437344	Heading (Degree) Use I021/152 If I021/152 does not exist, use I021/160 null, if both not exist.

Field Name	Type	CAT21 Data Item Reference	Compulsory	Values	Descriptions
ARCADDR	String	I021/080	Yes	883031	Aircraft Address (ICAO 24-bit Mode S address)
SSRCODE	String	I021/070	No	5035	Mode 3A Code
DT	String	I021/071 or I021/073 or I021/075	Yes	2022-09-13T15:41:3	Date and Time (Date from server date and Time from packet) Use I021/073 If I021/073 does not exist, use I021/075 If I021/075 does not exist, use I021/071 I021/071, I021/073 and I021/075 are time only value. Publishers have to add date themselves.
QITYPE	String	I021/210	Yes	NUCp or NIC	NUCp = Navigational Uncertainty Category for Position NIC = Navigational Integrity Category
QI	Integer	I021/090	Yes	6	Range is 0-11 for NIC and 0-9 for NUCp
SAC	Integer	I021/010	Yes	78	Data Source Identification (SAC)
SIC	Integer	I021/010	Yes	29	Data Source Identification (SIC)

6.2.2. JSON Structures for Surveillance Data only

Data fields below are based on ASTERIX CAT 21 version 2.1 specifications.

Field Name	Type	CAT21 Data Item Reference	Compulsory	Values	Descriptions
ACID	String	I021/170	Yes	TLM912	Target Identification in 8 characters, as reported by the target.
LAT	Number	I021/130 or I021/131	Yes	18.6701799113899	Latitude (Degree) Use I021/131. If I021/131 does not exist, use I021/130

Field Name	Type	CAT21 Data Item Reference	Compulsory	Values	Descriptions
LONG	Number	I021/130 or I021/131	Yes	103.180853652939	Longitude (Degree) Use I021/131. If I021/131 does not exist, use I021/130
FL	Number	I021/145	Yes	310	Flight Level
GS	Number, Null	I021/160	No	498	Ground Speed (Knot) Use I021/160 x 3600 because I021/160 provides Ground Speed in NM/s
HEADING	Number	I021/152 or I021/160	No	34.2773437344	Heading (Degree) Use I021/152 If I021/152 does not exist, use I021/160 null, if both not exist.
ARCADDR	String	I021/080	Yes	883031	Aircraft Address (ICAO 24-bit Mode S address)
SSRCODE	String	I021/070	No	5035	Mode 3A Code
DT	String	I021/071 or I021/073 or I021/075	Yes	2022-09-13T15:41:3	Date and Time (Date from server date and Time from packet) Use I021/073 If I021/073 does not exist, use I021/075 If I021/075 does not exist, use I021/071 I021/071, I021/073 and I021/075 are time only value. Publishers have to add date themselves.
QITYPE	String	I021/210	Yes	NUCp or NIC	NUCp = Navigational Uncertainty Category for Position NIC = Navigational Integrity Category
QI	Integer	I021/090	Yes	6	Range is 0-11 for NIC and 0-9 for NUCp
SAC	Integer	I021/010	Yes	78	Data Source Identification (SAC)
SIC	Integer	I021/010	Yes	29	Data Source Identification (SIC)

6.2.3. Message Header for Surveillance Data with Flight Plan Information

Header Name	Values	Descriptions
APAC_SOURCE	RJ_JCAB	Name of message publisher
APAC_RECIPIENT_LIST	RJ_JAL,VT_AEROTHAI	Name list of recipients (comma delimited)
APAC_CATEGORY	ASTERIX	Name of information exchange model (ASTERIX)
APAC_CATEGORY_VERSION	ASTERIX _CAT021	Version of information exchange model (Data Category of ASTERIX)
APAC_MESSAGE_TYPE	TRACK_RAW or TRACK_JSON	Message type of information exchange model • TRACK_RAW for binary data • TRACK_JSON for JSON data
DEP_AIRPORT	RJAA	Departure Airport
ARR_AIRPORT	VTBS	Arrival Airport
AIRLINE	JAL	Name of Airline
ACID	JAL707X	Aircraft Identification
GUFI	0248982c-4384-49f4-bdb3-7956bd553383	Globally Unique Flight Identifier
EOBT	2023-02-01T03:00:00Z	Estimated Off-Block Time
APAC_TIMESTAMP	JCAB_OUT:1675213637251	Timestamp of the message out or in the system

6.2.4. Message Header for Surveillance Data Only

Header Name	Values	Descriptions
APAC_SOURCE	RJ_JCAB	Name of message publisher
APAC_RECIPIENT_LIST	RJ_JAL,VT_AEROTHAI	Name list of recipients (comma delimited)
APAC_CATEGORY	ASTERIX	Name of information exchange model (ASTERIX)
APAC_CATEGORY_VERSION	ASTERIX _CAT021	Version of information exchange model (Data Category of ASTERIX)
APAC_MESSAGE_TYPE	TRACK_RAW or TRACK_JSON	Message type of information exchange model • TRACK_RAW for binary data • TRACK_JSON for JSON data
ACID	JAL707X	Aircraft Identification
APAC_TIMESTAMP	JCAB_OUT:1675213637251	Timestamp of the message out or in the system

7. Acronyms and Abbreviations

2FA	Two Factor Authentication
ADS-B	Automatic Dependent Surveillance - Broadcast
ALG	Application Layer Gateways
AMQP	Advanced Message Queuing Protocol
ANSP	Air Navigation Service Provider
APAC	Asia Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
API	Application programming interface
ASBU	Aviation System Block Upgrade
ASTERIX	All Purpose Structured EUROCONTROL Surveillance Information Exchange
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
bps	Bits per second
CA	Certificate Authority
CONOPS	Concept of Operations
CNS SG	Communications, Navigation and Surveillance Sub-group
CRV	Common aeRonautical Virtual Private Network
CRV OG	Common aeRonautical Virtual Private Network Operations Group
DoS	Denial of Service
DDoS	Distributed Denial of Service
EMS	Enterprise messaging system
FF-ICE	Flight and Flow Information for a Collaborative Environment
FIR	Flight Information Region
GANP	Global Air Navigation Plan
GRE	Generic Routing Encapsulation
HMI	Human Machine Interface
ICAO	International Civil Aviation Organization
IDS	Intrusion Detection System
IPSec	Internet Protocol Security

JSON	JavaScript Object Notation
MET	Aeronautical Meteorological Services
MTBF	Mean Time Between Failure
NIC	Navigation Integrity Category
NUC	Navigation Accuracy Category
PCCWG	PCCW Global
RBAC	Role-based Access Control
S3TIG	Surveillance Sharing in SWIM Trial Implementation Group
SAC	System Area Code
SCDP	Surveillance Central Data Processor
SHA	Secure Hash Algorithm
SIC	System Identification Code
SIM	Subscriber Identity Module
SIPG	SWIM Implementation Pioneer Group
SURICG	Surveillance Implementation Coordination Group
SURSG	Surveillance Study Group
SWIM	System Wide Information Management
SWIM TF	System Wide Information Management Task Force
TFP	Trust Framework Panel
TLS	Transport Layer Security
TOR	Terms of Reference

REVISED WORK PLAN of SURSG

Table 1							
Group	**Task**	**Description**	**ToR Para.**	**Start**	**End**	**Task Owner(s)**	**Deliverables**
Feasibility Study Stage	1	Preparation of Progress Report on the SURSG deliverables	-	-	Before every SURSG Meeting	Study Group Lead(s)	**WPs (Completed)**
	2	Study, identification and recommendation of possible and practical models for surveillance data sharing in SWIM	2	SURSG/ 1	SURSG/ 2	Hong Kong China (TL)	**Study Report (Completed)**
	2-1	Preparation of Concept of Use/Operation	2(a) 3(c)	SURSG/ 1	SURSG/ 2	Singapore/TL, Hong Kong China, Thailand, Viet Nam	
	2-2	Study, identify, and recommend the implementation model, including the consideration of system design and collaboration model on the sharing of surveillance data.	2(b), (d) 3(a)	SURSG/ 1	SURSG/ 2	Hong Kong China, Republic of Korea, Singapore, Thailand, Viet Nam	
	2-3	Study, identify and recommend an Infrastructure Model based on SWIM and CRV infrastructure	2(f) 3(b)	SURSG/ 1	SURSG/ 2	China, Hong Kong China, Singapore, Thailand, Viet Nam, PCCW Global as advisor	
	2-4	Study, identify and recommend a Business Model including commitments by data sharing participants as well as incurred resource and cost	2(b), (c), (d) 3(d), (e)	SURSG/ 1	SURSG/ 2	China, Hong Kong China, Singapore, Thailand, Vietnam	

	2-5	Study, identification and recommendation of Participation Model in consideration of commitments by data consumers and multi-lateral agreement on surveillance data sharing	2(c), (d) 3(e)	SURSG/ 1	SURSG/ 2	Hong Kong China, Singapore, Thailand, China, Vietnam, IATA	
	2-6	Preparation of implementation roadmap and time frames with consideration of approach, types of surveillance data and information exchange model	2(e) 3(a)	SURSG/ 1	SURSG/ 2	China, Hong Kong China, Singapore, Thailand, Vietnam	
Recommendation Stage	3	Report on the possible implementation of surveillance data sharing in SWIM	-	SURSG/ 2	SURICG /7	~~TBD~~ **Hong Kong China**	Completed Outcomes of the Joint event were presented in the 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~~	
	4	Guidance materials for the sharing and access of surveillance data	4	SURICG /11	SURICG /11	~~TBD~~ **Hong Kong China, Singapore, USA**	**Guidance Materials (Completed)**
	4-1	Preparation of the framework and 1st draft of guidance material	-	SURICG /11	SURICG /11	~~TBD~~ **Hong Kong China,**	

						Singapore, USA	
	4-2	Further development of the working draft of guidance material for endorsement by SURICG and CNS SG	-	SURICG /11	SURICG /11	~~TBD~~ **Hong Kong China, Singapore, USA**	

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	close	
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	

Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
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
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

Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
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		close	
4-2	The USA shared will lead the surveillance data performance requirements draft	USA	SURSG/5		close	
4-3	Singapore will lead the draft of the Data formats in guidance material	Singapore	SURSG/5		close	
4-4	Compile the draft documents received from four leads on four initial topics being considered in the guidance material	USA and Hong Kong China	SURSG/5		close	

Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
4-5	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.	Hong Kong China	SURSG/5		close	
4-6	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. Theoretical bandwidth calculation for voice, surveillance data, space-based ADS-B data and space-based VHF data will be added to the paper along with analysis of captured data during the Joint event	Hong Kong China	SURSG/5		close	
4-7	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	Hong Kong China	SURSG/5		close	
5-1	SURSG recommended SURICG consideration for requesting SP to discuss the global surveillance data exchange format	SURICG, ICAO Secretariat	SURICG/11		Open	
5-2	Singapore suggested that an information paper be presented at the upcoming SP meeting on this topic, including various considerations shared by the SWIM TF Co-chair	Singapore	SURICG/12		Open	

Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
5-3	For the request to consider the review of the APAC Common SWIM Information Services document as a standing meeting agenda item for future meetings and subsequent update to SWIM TF, as both SWIM and the associated required Information Services continue to evolve regionally and globally, the Meeting agreed that if SURSG is dissolved by the SURICG/11 Meeting, the list of APAC Common SWIM Surveillance Information Services document will be part of the agenda items of SURICG and the list will be updated by the SURICG meeting in the future	SURICG, ICAO Secretariat	SURICG/12		Open	
5-4	The Meeting deliberated in length on the initial set of APAC Common SWIM Surveillance Information Services and provided inputs and comments. The revised APAC Common SWIM Surveillance Information Services agreed by the meeting is provided in Appendix B using “Track Changes” and will be proposed to the SURICG/11 and SWIM TF/11 for further discussion	ICAO Secretariat	SURICG/11		Open	
5-5	The Meeting recommended that Guidance Material for the sharing of surveillance data in SWIM should be added as a reference document for APAC Common SWIM Surveillance Information Services to support service implementers. As Task 6 of SWIM TF is working on adding relevant references to all services listed in APAC Common SWIM Information Services, it was suggested that this information be shared with Task 6 of SWIM TF. ICAO Secretariat will share this information with the Task 6 Task Leads	ICAO Secretariat	SURICG/12		Open	

Action ID	Task	Responsible Person	Due Date	Deliverables	Status	Remarks
5-6	The Meeting was informed that, as SWIM development in the region is ongoing, it was anticipated that future updates on the Guidance Material would be necessary, especially on any further required details of the surveillance information services. SURSG proposed that SURICG assume this responsibility and respond appropriately when the relevant standard(s) mature. The Meeting agreed to the proposal and requested that the ICAO Secretariat share this recommendation from SURSG for SURICG consideration	SURICG, ICAO Secretariat	SURICG/12		Open	