International Civil Aviation Organization

Twelfth Meeting of the Air Traffic Management Sub-Group (ATM/SG/12) of APANPIRG

Bangkok, Thailand, 23 – 27 September 2024

Agenda Item 6: ATM Coordination (Meetings, Route Development, Contingency Planning)

PROGRESS UPDATE OF THE SPACE VEHICLE LAUNCH AND RE-ENTRY COORDINATION SMALL WORKING GROUP (SVLRC SWG)

(Presented by the SVLRC SWG)

SUMMARY

This paper provides the updated Asia-Pacific regional guidance material created by the APANPIRG ATM Sub-Group Asia Pacific Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG), which was formed through a decision of APANPIRG ATM/SG/10 in October 2022. The goal of the regional guidance material is to outline consistent and repeatable coordination procedures to achieve timely and efficient collection and dissemination of space object launch and re-entry information that will assist with avoiding hazards to civil aircraft and minimize interference with the normal operation of such aircraft.

The working paper request replacement of the existing regional guidance provided in the Asia/Pacific Seamless ANS Plan Version 3.0, and in the Asia/Pacific Planning Checklist for Space Launch and Space Re-Entry Operations, approved by APANPIRG/29 with the new regional guidance document, and is in keeping with the provisions of UN Resolution 2222(XXI) as amended.

1. INTRODUCTION

1.1 Recognizing that space object launch and re-entry activities pose a risk to aircraft operating in close proximity to designated hazard areas, the importance of timely and accurate collection, coordination and dissemination of activity information between all stakeholders cannot be understated, and is imperative to limit risk exposure to airspace users. Consistent and repeatable coordination procedures for space object launch and re-entry activities provides necessary information and allows sufficient time for airspace managers to assess and mitigate operational impacts, and for airspace users to plan around hazardous activity.

1.2 To mitigate the potential risk of space launch activities to regional airspace users, the Tenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/10) of the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) took decision ATM/SG/10-8 requiring the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG), reporting to the ATM/SG, be formed to:

a) Study global practices and procedures for the coordination of space vehicle launch and re-entry activities, with a view to making recommendations for best practices to be adopted in the Asia/Pacific Region;

b) Consolidate and update Asia/Pacific regional guidance material on space vehicle launch and re-entry coordination and response;

c) Recommend consolidated guidance and performance expectations for inclusion in the 2023 update of the Asia/Pacific Seamless ANS Plan.

1.3 This paper provides an update to the ATM SG regarding the completion of the SVLRC SWG deliverables to date and requests replacing the existing regional guidance provided in the Asia/Pacific Seamless ANS Plan Version 3.0 and the Asia/Pacific Planning Checklist for Space Launch and Space Re-Entry Operations, approved by APANPIRG/29, with the new regional guidance document.

2. DISCUSSION

2.1 Currently there exists APAC guidance published specifically for space/ballistic vehicle launch and re-entry procedures (Asia/Pacific Planning Checklist for Ballistic Launch and Space Re-Entry) and sections 5.31-33 and 7.45 of the Asia/Pacific Seamless ANS Plan Version 3.0. Both documents can both be found on the ICAO APAC ePages library. However, ATM SG/10 understood that gaps existed in the current guidance and realized it does not go far enough to allow affected States to adequately plan for and effectively facilitate space object launch and re-entry activities in a safe and efficient manner. To remedy this, the SVLRC SWG was formed to update the Asia/Pacific regional guidance material.

2.2 During the last quarter of calendar year 2022, relevant experts were contacted from the various member states to be part of the effort. The first meeting of the SVLRC SWG was held virtually on 18 January 2023, and consisted of representatives from Australia, India, Japan, New Zealand, republic of Korea, Singapore, Sri Lanka, Thailand, United States, IATA and ICAO. China joined the virtual meetings beginning 29 March 2023. Subsequent virtual meetings were held with the representatives, to include launch service providers, over the course of the 2023 calendar year.

2.3 ATM/SG/11 was held in Singapore 2-6 October 2023 and WP36 provided an update on the progress to date. Following discussions regarding the barriers to successfully completing the identified outcomes of the SVLRC SWG, the decision was taken to hold a face-to-face meeting at the ICAO APAC offices 27 November to 1 December 2023 to finalize the efforts of the SWG. The face-to-face meeting was scheduled via ICAO State Letter and provided all States the opportunity to participate. Representatives from Australia, China, Hong Kong China, Japan, Republic of Korea, Papua New Guinea, Singapore, Sri Lanka, Thailand, United States, Viet Nam, IATA and ICAO attended the face-to-face meeting at the ICAO Regional Office on the dates included in the State Letter.

2.4 The updated guidance material contained in Appendix 1 of this WP builds upon and provides a valuable replacement to the existing regional guidance provided in the Asia/Pacific Seamless ANS Plan Version 3.0, and in the Asia/Pacific Planning Checklist for Space Launch and Space Re-Entry Operations, approved by the 29th APANPIRG. The updated guidance material complements the well-established and proven processes compliant with ICAO Annex 11 (Air Traffic Services), Doc 10088 (Manual on Civil-Military Cooperation in Air Traffic Management), Doc 9554 (Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations).

2.5 As part of the update to APANPIRG/34, it was advised that at least one regional tabletop exercise be undertaken to validate the contents of the guidance material. The exercise was requested to be accomplished in early 2024 to allow enough time to develop a report back to ATM/SG/12 that the outcomes assigned to the SVLRC SWG have been delivered. While the tabletop exercise was not achieved due to competing regional priorities, we do know that the draft guidance material was put into practice by ANSPs in real-world space vehicle launch and re-entry activities, thereby validating

the value of the deliverable.

2.6 In January 2024, the ICAO ATM Operations Panel received an update on the SVLRC SWG activities and requested that the draft regional guidance material become a baseline for work in support of Assembly resolution A40-26 Commercial Space Transport (CST). It was also recommended that the draft regional guidance material be used as a foundation for the ATM Operations Panel Job Card proposed in ATMOPSP-WG/13 WP on the Commercial Space agenda.

2.7 Although it has taken time to create and validate with real-world experiences a comprehensive document that meets the needs of the various stakeholders and protects the safety and efficiency of the airspace system, the SWG members believe the extra time required has produced a quality document that is comprehensive, easy for readers to grasp and provides consistent and repeatable coordination procedures for space object launch and re-entry activities. The draft regional guidance document identifies the pertinent information and timelines needed to allow airspace managers to properly assess and mitigate operational impacts, and for airspace users to plan accordingly around space object launch and re-entry hazardous activities.

2.8 The SVLRC SWG would like to encourage States/Administrations to accept for publication the draft regional guidance document (**Attachment A**).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) agree to the publication of the Asia/Pacific Regional Guidance for Space Object Launch and Re-entry Activities Coordination.

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APPENDIX A

INTERNATIONAL CIVIL AVIATION ORGANIZATION

DRAFT

ASIA/PACIFIC REGIONAL GUIDANCE

FOR

SPACE OBJECT LAUNCH AND RE-ENTRY ACTIVITIES COORDINATION

Final Draft Version 1.0, August 2024

Approved by ATM/SG/12 and published by the
ICAO Asia and Pacific Office, Bangkok

CONTENTS

1: SCOPE OF THE PLAN

1.1 This guidance document was created by the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG) formed through a decision of the 10th Meeting of the Air Traffic Management Sub-Group of APANPIRG in October 2022. The document builds upon and replaces the regional guidance provided in the Asia/Pacific Seamless ANS Plan Version 3.0, and in the Asia/Pacific Planning Checklist for Ballistic Launch and Space Re-Entry, approved by the 29th APANPIRG and is in keeping with the provisions of UN Resolution 2222 (XXI) as amended.

1.2 Participants of the SWG consisted of representatives from Australia, China, Hong Kong China, India, Japan, New Zealand, Papua New Guinea, Republic of Korea, Singapore, Sri Lanka, Thailand, the United States, Viet Nam, and IATA.

1.3 This guidance applies to all forms of space object launch and re-entry activities (hereinafter referred to as activities), and includes commercial, State, ballistic launch, or any other space object activities that can pose a hazard to civil aviation.

1.4 The goal of this guidance is to achieve timely and efficient collection, coordination and dissemination of space object launch and re-entry information that will assist with avoiding hazards to civil aircraft and minimize interference with the normal operation of such aircraft.

1.5 This guidance should be harmonized with other ICAO regions who are working on similar efforts so that there is consistency across the globe on how space object launch and re-entry activities are coordinated and disseminated.

1.6 While space object launch and re-entry activities have existed for decades within the region, not all States and/or stakeholders are equally affected. The collection, coordination and dissemination of space object launch and re-entry activity information mainly include the following stakeholders:

- Launching State
- Launching State Appropriate ATS Authority
- Affected Appropriate ATS Authority
- Launch and Re-entry Operator
- Airspace user

1.7 To facilitate timely and orderly information dissemination, all APAC States are encouraged to identify and provide contact information for space object launch and re-entry activity coordination. These will be added to the regional Asia/Pacific Space Object Launch and Re-Entry Points of Contact list, maintained by the ATM/SG Secretariat.

1.8 Launching State Appropriate ATS Authorities should make efforts to collaborate with affected appropriate ATS authorities, operators, and other affected stakeholders to minimise potential impacts to the airspace system.

1.9 Generally, space object launch and re-entry activities take place from pre-defined locations, including States facilities or private spaceports. Launch locations should be positioned with consideration for minimal disruption to the safety and efficiency of airspace system.

1.10 The procedures below are intended to improve regional coordination efforts by complementing well-established and proven processes compliant with ICAO Annex 11 (Air Traffic Services), Doc 10088 (Manual on Civil-Military Cooperation in Air Traffic Management), Doc 9554 (Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations), and replacing existing ICAO APAC regional guidance. States conducting space object launch and re-entry activities, or managing airspace affected by said activities are encouraged to create, test, and refine practices and procedures that fit their needs. The ***State*** is responsible for coordination of activities potentially hazardous to civil aircraft, regardless of whether they're conducted by its space launch agencies, its military, or any other organization.

1.11 States defining consistent coordination procedures allows sufficient time for airspace managers to assess the operational impact and airspace users to plan around hazardous activity. States routinely conducting space object launch and re-entry activities and States managing affected airspace, are encouraged to dedicate adequate resources to this planning and coordination effort to assure the continued safe operation of all airspace users.

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2: DEFINITIONS, ABBREVIATIONS AND ACRONYMS

2.1 DEFINITIONS

Affected Appropriate ATS Authority – the relevant authority responsible for providing air traffic services in the airspace affected by space object launch and re-entry activities conducted by the Launching State.

Airspace user – Organisations or individuals operating flights using aircraft and/or vehicles in the airspace.

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

Appropriate ATS authority – the relevant authority designated by the State who is responsible for providing air traffic services in the airspace concerned. This is commonly referred to as the Air Navigation Service Provider or Air Traffic Services Provider.

Launch State – a State which launches or procures the launching of a space object or a State from whose territory or facility a space object is launched. This includes any space object launch and re-entry activities.

Launch Window – the span of time during which a launch or re-entry may take place while satisfying the constraints imposed by safety and mission objectives.

NOTAM *– A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.*

Launch and Re-entry Operator – an entity who conducts or will conduct the launch and/or re-entry of a space object and any payload.

Space object – includes component parts of a space object as well as its launch vehicle and parts thereof.

NOTE: The definitions listed above are to aid readers in understanding and applying the principles outlined in this document. They may not be universally agreed upon outside of the APANPIRG.

2.2 ACRONYMS AND ABBREVIATIONS

AFTN	Aeronautical Fixed Telecommunication Network
AIS	Aeronautical Information Service
AMHS	ATS Message Handling System
ATC	Air Traffic Control
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
FIR	Flight Information Region
NOF	International NOTAM Office
POC	Point of Contact

3: PROCEDURES FOR COORDINATING SPACE OBJECT LAUNCH AND RE-ENTRY ACTIVITIES

3.1 This section provides an overview of the general responsibilities of the Launching State, Launching State Appropriate ATS authority, Affected Appropriate ATS authority, Operator and Airspace User. All entities must coordinate to ensure the safe and efficient integration of activities into airspace systems. It is important to consider the responsibilities of each organization within their States.

3.1.1 *Launching State*

- Regulates space object launch and re-entry activities.
- Develops and enacts regulations ensuring that the space object launch and re-entry operator and the Launching State appropriate ATS Authority comply with the requirements in ICAO Annexe 11 for the coordination of activities potentially hazardous to civil aircraft.
- Identifies the appropriate ATS authority responsible for coordination of space activities, including designating the proper entity to initiate NOTAM request for space object launch and re-entry activities within the FIR/s assigned to the launching State.
- Validates the launch window and the coordinates of the extent of the airspace affected by the space object launch and re-entry activities.

  Note: There are various responsible authorities within individual Launching States as far as space object coordination activities.

3.1.2 Launching State Appropriate ATS Authority

- Serve as the focal point for collecting, coordinating, and disseminating all available information relevant to space object launch or re-entry activities to affected appropriate ATS authorities and/or other affected stakeholders.
- Identify and assess potential impacts or constraints to airspace where the State is responsible for the provision of air traffic services, to ensure the compliance of the requirements in ICAO Annex 11, Section 2.19.

  Note: This includes the determination for the need to establish any special use airspace (SUA), airspace restrictions or temporary withdrawal of established ATS routes to avoid hazards to civil aircraft and inform affected ATSU accordingly.
- Plot area using validated coordinates and provide a graphical representation of the polygon to affected appropriate ATS authorities for reference.
- Ensure the safe and efficient integration of space object launch and re-entry activities into the airspace system.

3.1.3 **Affected Appropriate ATS Authority**

- Receive and coordinate information relevant to space object launch or re-entry activities from launching state appropriate ATS authorities with other affected stakeholders.
- Identify and assess potential impacts or constraints to airspace where the State is responsible for the provision of air traffic services, to ensure the compliance of the requirements in ICAO Annex 11, Section 2.19.

  Note: This includes the determination for the need to establish any special use airspace (SUA), airspace restrictions or temporary withdrawal of established ATS routes to avoid hazards to civil aircraft and inform affected ATSU accordingly.
- Plot Hazard/Danger Area

- Ensure the issuance and update of any NOTAM promulgating information on the activity.
- Ensure the safe and efficient integration of space object launch and re-entry activities into the airspace system.

3.1.4 **Operator**

- Provide tentative launch window commencement time and duration (primary and, if any, backup timing and dates), and extent of airspace affected (latitude/longitude coordinates), and any other necessary supporting information to the Launching State Appropriate ATS Authority.

  Note: Once the Launching State approves an operation, the operator works with the Appropriate ATS Authority to determine the necessary steps for coordination of airspace and operations.

3.1.5 **Airspace User**

- Undertake safety risk assessments in accordance with standard operating procedures;
- Comply with promulgated airspace and ATS restrictions.

3.2 PRE-LAUNCH PLANNING AND COORDINATION

3.2.1 Operational coordination to the Appropriate ATS Authority of affected airspace should be accomplished using Aeronautical Fixed Telecommunication Network (AFTN) or ATS Message Handling System (AMHS), while supplemental material should be provided via email. Ideally a conference call or some other form of positive coordination should also be accomplished by the Appropriate ATS Authority responsible for the airspace over the State where the activity planning organization is located. States should provide group mailboxes for operational coordination.

Note: This may include a list for advanced planning, including additional POCs for situational awareness, and one for tactical event updates, such as removal once an activity is complete to reopen the airspace. Ideally, each State has a single group email box forwarding information internally to appropriate parties.

3.2.2 The Launching State Appropriate ATS Authority responsible for coordinating space object launch and re-entry activity should begin coordinating with affected appropriate ATS authorities at **least 10 days (ideally 14 days)** prior to the proposed activity. The following information should be included in the coordination:

- Tentative launch window commencement time and duration (primary and, if any, backup timing and dates).
- Activity time of day and extent of airspace affected (latitude/longitude coordinates).

Note: In cases where extent of airspace affected crosses multiple FIRs, individual requests should be developed and sent to each impacted FIR. The appropriate ATS authority developing requests should ensure there are shared points for airspace affected spanning across multiple FIRs to ensure safety.

- Identification of POC in the Affected Appropriate ATS Authority.
- Any other necessary supporting information.

3.2.3 The Appropriate ATS authority for affected airspace should ensure planning and notification are in place for all stages of the activity to include any re-entry/debris possibility, and in accordance with ICAO Doc 10066. Publication of the NOTAM for all affected FIRs will be completed at least seven days in advance and include the following items of information:

- Activity window duration
- Activity time of day and extent of proposed danger or restricted area (latitude/longitude coordinates)

  Note: For ease of implementation, each danger area should be plotted with the minimum number of coordinates to present a polygon (please refer to PANS AIM for exacts on how the danger area is formulated). Publication of the danger area coordinates is crucial to ensure the safety of air traffic, especially in the event of an emergency. It is therefore vital for ATC and flight crew to have precise awareness of danger areas while managing any inflight contingencies.
- Any other necessary supporting information, such as affected airways, alternate routings, direct routings, etc. (please see attachment A)

3.3 TACTICAL LAUNCH COORDINATION

3.3.1 Launching State Appropriate ATS authority should provide notice of **three days** prior to the requested launch window via AMHS/AFTN to all affected appropriate ATS authorities.

3.3.2 Positive coordination between affected Appropriate ATS authority and Launching State Appropriate ATS authority should be executed to confirm and manage the requested dates of the activity **within three days, but not less than 24 hours**, of the proposed start. The definitive information should be shared externally to ensure maximum efficiency of affected airspace.

3.3.3 After confirming coordination via AMHS/AFTN, the affected Appropriate ATS authority should publish a NOTAM for the **launch "Window" with three days' notice**, **but not less than 24 hours.**

Note: NOTAM are published by the NOF serving the affected FIR in response to the request/direction of the appropriate ATS authority for that FIR.

4: RE-ESTABLISHING NORMAL AIRSPACE OPERATIONS FOLLOWING THE END OF ACTIVITIES

4.1 When confirmation from the operator of the end of activities potentially hazardous to civil aircraft occurs prior to the end of the coordinated launch window, the Launching State Appropriate ATS Authority should notify affected appropriate ATS authorities to enable timely cessation of mitigations and withdrawal of NOTAMs for all affected FIRs. Otherwise, the NOTAMs will expire as published.

4.2 Cancellations of launch activities at any point of time needs to be disseminated by the Launching State Appropriate ATS Authority as soon as possible to all affected FIRs.

5: POST-LAUNCH ASSESSMENT

5.1 It is recommended for the Launching State to designate the Appropriate ATS Authority to conduct a post-activity assessment which helps in improving the maturity of launch-related airspace management processes. It is recommended that the affected State and the affected appropriate ATS authority conduct a similar assessment. All stakeholders may provide comments to improve future activities. POCs may exchange suggestions on improving coordination and reducing impacts on civil air traffic flow.

5.2 States should share lessons learned and proposed revisions to this regional guidance with APANPIRG, through its ATM Sub-Group.

APPENDIX A: Space Object CHECKLIST

- Launch required by:
- Proposed Temporary Danger Area:
- Proposed Launch Window, including backup dates:
- Date: DD/MM/YYYY to DD/MM/YYYY Time: XX:XX to YY:YY UTC
- Proposed Definitive launch window:
- Date: DD/MM/YYYY to DD/MM/YYYY Time: XX:XX to YY:YY UTC
- Expected exact date of launch: DD/MM/YYYY

Affected FIR	*Affected AWYs*	*Affected Flights in requested Time window*	*Option 1: Suggested revised time and date*	*Option 1: Affected flights in revised time and date*	*Option 2: Suggested revised time and date*	*Option 2: Affected flights in revised time and date*

1. With this information, airspace managers and other State authorities are expected to assess the impact of the proposed launch or re-entry details and determine if the activities can be conducted safely. This assessment includes airspace and airways affected as well as expected traffic density during the event. Potential mitigations include rerouting of traffic around the danger area or delay of traffic to avoid the event window.

2. If adequate mitigations are available, the airspace manager, State, or designated competent authority should reply to the requester noting support. However, if adequate mitigations are not available, timely feedback to the requestor clarifying the issue and potential solutions is required. Note space missions require specific timing to meet orbital requirements. Options for modification may be limited. If needed, establishing a planning call to address concerns or clarify mission parameters is highly effective.

APPENDIX B: LIST OF REFERENCES

- Doc 10088 – Manual on Civil-Military Cooperation in Air Traffic Management
- Doc 9554 – Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations
- Asia/Pacific Seamless ANS Plan V3.0
- Doc 10066 Procedures for Air Navigation Services Aeronautical Information Management (PANS AIM)
- Asia/Pacific Regional Air Navigation Plan
- Doc 9750 Global Air Navigation Plan
- Doc 9854 Global Air Traffic Management Operational Concept
- Doc 10004 Global Aviation Safety Plan
- Annex 11 Air Traffic Services
- Annex 15 Aeronautical Information Services
- Doc 4444 Procedures for Air Navigation Services Air Traffic Management (PANS ATM)
- FAA Joint Order 7400.2P – Procedures for Handling Airspace Matters
- Basics of Space Flight Section III. Space Flight Operations (nasa.gov)