

INTERNATIONAL CIVIL AVIATION ORGANIZATION



ASIA/PACIFIC REGIONAL GUIDANCE FOR SPACE OBJECT LAUNCH AND RE-ENTRY ACTIVITIES COORDINATION

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1. SCOPE OF THE DOCUMENT

1.1 This guidance document was developed by the Space Vehicle Launch and Re-entry Coordination Small Working Group (SVLRC SWG) formed through a decision of the Tenth Meeting of the Air Traffic Management Sub-Group of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (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 Twenty Ninth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/29), and is in keeping with the provisions of United Nations Resolution 2222 (XXI) as amended.

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

1.3 This guidance applies to all forms of space object launch and re-entry, 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:

- a) Launching State;
- b) Launching State Appropriate Air Traffic Service (ATS) Authority;
- c) Affected Appropriate ATS Authority;
- d) Space Object Launch and Re-entry Operator; and
- e) Airspace user.

1.7 To facilitate timely and orderly information dissemination, all Asia and Pacific (APAC) States are urged to identify and provide contact information for space object launch and re-entry activities coordination. These will be added to the regional *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination*, maintained by the ICAO APAC Office, and posted on its eDocuments webpage.

1.8 Launching State Appropriate ATS Authority should make efforts to collaborate with Affected Appropriate ATS Authorities, Space Object Launch and Re-entry Operators, and other affected stakeholders to minimize 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*, *Manual on Civil-Military Cooperation in Air Traffic Management* (ICAO Doc 10088), *Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations* (ICAO Doc 9554), and replacing existing ICAO APAC Office regional guidance.

1.11 States conducting space object launch and re-entry activities, or managing airspace affected by said activities are encouraged to develop, 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.

1.12 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.

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. Organizations or individuals operating flights using aircraft and/or vehicles in the airspace.

Air traffic service. A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

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.

Launch or re-entry 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.

Launching 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.

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.

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

Space Object Launch and Re-entry Operator. An entity who conducts or will conduct the launch or re-entry of a space object and any payload.

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 Abbreviations and Acronyms

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

3. STAKEHOLDERS' RESPONSIBILITIES

3.1 This chapter provides an overview of the general responsibilities of the Launching State, Launching State Appropriate ATS Authority, Affected Appropriate ATS Authority, Space Object Launch and Re-entry 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.

3.2 General responsibilities of Launching State:

- a) regulate space object launch and re-entry activities;
- b) develop and enact regulations ensuring that the Space Object Launch and Re-entry Operator and the Launching State Appropriate ATS Authority comply with the requirements in ICAO Annex 11 Section 2.19, for the coordination of activities potentially hazardous to civil aircraft;
- c) identify the Appropriate ATS Authority responsible for coordination of activities, including identifying the proper entity to initiate NOTAM request for space object launch and re-entry activities within the FIR/s assigned to the Launching State, in accordance with ICAO Annex 15 Section 2.1;
- d) validates the launch or re-entry window and the coordinates (in degrees, minutes and seconds format, example: 012345N 1234567E) of the extent of the airspace affected by the space object launch and re-entry activities. An appropriate safety buffer zone should be incorporated; and
- e) ensures the Launching State Appropriate ATS Authority provide up-to-date information to Affected Appropriate ATS Authorities with minimal delay.

3.3 General responsibilities of Launching State Appropriate ATS Authority:

- a) ensure that the State's Points of Contact (POCs) in the *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination* are regularly updated and provided to the ICAO APAC Office;
- b) 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;
- c) plot area using validated coordinates (in degrees, minutes and seconds format, example: 012345N 1234567E) and provide a graphical representation of the polygon to Affected Appropriate ATS Authorities for reference. An appropriate safety buffer zone should be incorporated into the plotted area;
- d) ensure up-to-date information relevant to launch or re-entry activities is provided to the Affected Appropriate ATS Authorities with minimal delay;
- e) identify and assess potential impacts or constraints to airspace where the State is responsible for the provision of ATS, 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 ATS unit accordingly.

- f) collect feedback from Affected Appropriate ATS Authorities and conduct post-activity analysis to improve coordination process; and
- g) ensure the safe and efficient integration of space object launch and re-entry activities into the airspace system.

3.4

General responsibilities of Affected Appropriate ATS Authority:

- a) ensure that the State's POCs in the *Asia/Pacific Regional Points of Contact List for Space Object Launch and Re-entry Activities Coordination* are regularly updated and provided to the ICAO APAC Office;
- b) receive and coordinate information relevant to space object launch or re-entry activities from Launching State Appropriate ATS Authority with other affected stakeholders;
- c) identify and assess potential impacts or constraints to airspace where the State is responsible for the provision of ATS, 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 SUA, airspace restrictions or temporary withdrawal of established ATS routes to avoid hazards to civil aircraft and inform affected ATS unit accordingly.

- d) plot hazard/danger area;
- e) ensure the issuance and update of any NOTAM promulgating information on the activity;
- f) ensure the safe and efficient integration of space object launch and re-entry activities into the airspace system; and
- g) conduct post-activity analysis and provide feedback to Launching State Appropriate ATS Authority to improve coordination process.

3.5

General responsibilities of Space Object Launch and Re-entry Operator:

- a) provide tentative launch or re-entry 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 Space Object Launch and Re-entry Operator works with the Launching State Appropriate ATS Authority to determine the necessary steps for coordination of airspace and operations.

3.6

General responsibilities of airspace user:

- a) undertake safety risk assessments in accordance with standard operating procedures; and
- b) comply with promulgated airspace and ATS restrictions.

4. COORDINATION ON SPACE OBJECT LAUNCH AND RE-ENTRY ACTIVITIES

4.1 Pre-Launch Planning and Coordination

4.1.1 Operational coordination to the Affected Appropriate ATS Authorities 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 Launching State Appropriate ATS Authority. 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.

4.1.2 The Launching State Appropriate ATS Authority should begin coordinating with Affected Appropriate ATS Authorities, **at least 10 days (ideally 14 days) prior to the tentative space object launch or re-entry activity**. The following information should be included in the coordination:

- a) **tentative launch or re-entry window** commencement time and duration (primary and, if any, backup timing and dates);
- b) activity time of day and extent of airspace affected. The affected airspace should include an appropriate safety buffer and be defined using geographic coordinates expressed in degrees, minutes, and seconds format (e.g. 012345N 1234567E);

Note: in cases where extent of airspace affected crosses multiple FIRs, individual requests should be developed and sent to each impacted FIR. The Launching State Appropriate ATS Authority should ensure there are shared points for airspace affected spanning across multiple FIRs to ensure safety.

- c) identification of POC in the Launching State ATS Authority;
- d) identification of POCs in the Affected Appropriate ATS Authorities; and
- e) any other necessary supporting information.

4.1.3 The Affected Appropriate ATS Authorities should ensure planning (please see **Appendix A**) and notification are in place for all stages of the activity to include any re-entry/debris possibility, and in accordance with the *Procedures for Air Navigation Services Aeronautical Information Management* (PANS AIM, ICAO Doc 10066). Publication of the NOTAM for all affected FIRs should be completed **at least seven days** in advance and include the following items of information:

- a) launch or re-entry window duration;
- b) activity time of day and extent of proposed danger or restricted area (latitude/longitude coordinates); and

Note: for ease of implementation, each danger area or restricted 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 or restricted 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 controller and flight crew to have precise awareness of danger areas while managing any inflight contingencies.

- c) any other necessary supporting information, such as affected ATS routes, alternate routings, direct routings, etc.

4.2 Tactical Launch Coordination

4.2.1 Launching State Appropriate ATS Authority should provide notice of **three days prior to the start of the tentative launch or re-entry window** via AFTN or AMHS, to all Affected Appropriate ATS Authorities.

4.2.2 Positive coordination between Affected Appropriate ATS Authorities and Launching State Appropriate ATS Authority should be executed to confirm and manage the definitive dates of the activity **within three days, but not less than 24 hours, of the start of the tentative launch or re-entry window**. The definitive information should be shared externally to ensure maximum efficiency of affected airspace.

4.2.3 After confirming coordination via AFTN or AMHS, the Affected Appropriate ATS Authorities should publish a NOTAM for the **definitive launch or re-entry window as soon as practicable, but not less than 24 hours**.

Note: NOTAM are published by the International NOTAM Office (NOF) serving the affected FIR in response to the request/direction of the Appropriate ATS Authorities for that FIRs.

5. RE-ESTABLISHING NORMAL AIRSPACE OPERATIONS FOLLOWING THE END OF ACTIVITIES

5.1 When confirmation from the Space Object Launch and Re-entry Operator of the end of activities potentially hazardous to civil aircraft occurs prior to the end of the coordinated launch or re-entry window, the Launching State Appropriate ATS Authority should notify the Appropriate ATS Authorities to enable timely cessation of mitigations and cancellation of NOTAMs for all affected FIRs. Otherwise, the NOTAMs will expire as published.

5.2 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.

6. POST-ACTIVITY ASSESSMENT

6.1 It is recommended for the Launching State and the Launching State Appropriate ATS Authority conduct a post-activity assessment, which helps in improving the maturity of launch-related airspace management processes. It is recommended that the affected States and the Affected Appropriate ATS Authorities 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.

6.2 States should share lessons learned and proposed revisions to this regional guidance with APANPIRG, through its ATM/SG.

APPENDIX A: SPACE OBJECT CHECKLIST

1. Launch or re-entry required by:
2. Proposed temporary danger area or restricted area (coordinates in degrees, minutes and seconds format):
3. Proposed tentative launch or re-entry window, including backup dates:
Date: DD/MM/YYYY to DD/MM/YYYY Time: XX:XX to YY:YY UTC
4. Proposed definitive launch or re-entry window:
Date: DD/MM/YYYY to DD/MM/YYYY Time: XX:XX to YY:YY UTC
5. Expected exact date of launch: DD/MM/YYYY

<i>Affected FIR</i>	<i>Affected ATS Routes</i>	<i>Affected Flights in Requested Time Window</i>	<i>Option 1: Suggested Revised Time and Date</i>	<i>Option 1: Affected Flights in Revised Time and Date</i>	<i>Option 2: Suggested Revised Time and Date</i>	<i>Option 2: Affected Flights in Revised Time and Date</i>

6. 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 ATS routes affected as well as expected traffic density during the event. Potential mitigations include rerouting traffic around the danger area or delay of traffic to avoid the event window.
7. 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

ICAO Annex 11 *Air Traffic Services*

ICAO Annex 15 *Aeronautical Information Services*

ICAO Doc 4444 *Procedures for Air Navigation Services Air Traffic Management (PANS ATM)*

ICAO Doc 9554 *Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations*

ICAO Doc 9750 *Global Air Navigation Plan*

ICAO Doc 9854 *Global Air Traffic Management Operational Concept*

ICAO Doc 10004 *Global Aviation Safety Plan*

ICAO Doc 10066 *Procedures for Air Navigation Services Aeronautical Information Management (PANS AIM)*

ICAO Doc 10088 *Manual on Civil-Military Cooperation in Air Traffic Management*

Asia/Pacific Regions (APAC) Air Navigation Plan

Asia/Pacific Seamless ANS Plan

FAA Joint Order 7400.2P Procedures for Handling Airspace Matters

Basics of Space Flight Section III. Space Flight Operations (nasa.gov)