



**Norms, Guidelines and Procedures
for Implementation of
Indian Space Policy-2023
in respect of
Authorisation for Undertaking
Planned Re-entry of Space Objects**

*[To be read in conjunction with the “Norms, Guidelines and Procedures in respect of
Authorisation of Space Activities” (NGP), IN:ISP2023:NGP2024/V1.0, May 2024]*



**Indian National Space Promotion and Authorisation Centre
Department of Space
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DOCUMENT AND VERSION CONTROL SHEET

Title	Norms, Guidelines and Procedures for implementation of the Indian Space Policy 2023 in respect of Authorisation for undertaking Planned Re-entry of Space Objects. <i>[To be read in conjunction with the "Norms, Guidelines and Procedures in respect of Authorisation of Space Activities" (NGP), IN:ISP2023:NGP2024/V1.0, May 2024]</i>		
Abstract	This document describes the Norms, Guidelines, And Procedures for implementation of Indian Space Policy 2023 in respect of Authorisation for undertaking Planned Re-entry of Space Objects.		
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AUTHORISATION GUIDELINES FOR UNDERTAKING THE PLANNED RE-ENTRY OF SPACE OBJECTS

[To be read in conjunction with the “Norms, Guidelines and Procedures in respect of Authorisation of Space Activities” (NGP), IN:ISP2023:NGP2024/V1.0, May 2024]

I. DEFINITIONS:

Unless the context otherwise requires

1. “Planned Re-entry” shall mean the return of a launched Space Object or its Re-entry into Earth's atmosphere with an intent to control or configure (partially or throughout), the landing area, time or trajectory of Re-entry through suitable measures.
2. “Post-Mission Disposal (PMD)” shall mean the sequence of planned actions executed at the end of a space object's operational life to minimize the generation of Space Debris and mitigate the risk of in-orbit break-up or collision, with the objective of ensuring the long-term sustainability of the space environment or achieving a safe Re-entry at end-of-mission.
3. “Re-entry” shall mean the planned or un-planned return of a launched Space Object or its Re-entry into Earth's atmosphere with or without recovery.
4. “Space Debris” shall mean any non-functional human-made Space Object, including fragments and elements of it, in Space or entering Earth's atmosphere.

II. GENERAL TERMS & CONDITIONS

- a. Any “Planned Re-entry” of a Space Object by an Indian entity within or outside the Indian Territory needs Authorisation from IN-SPACE.
- b. Non-Indian entities intending to undertake ‘Planned Re-entry’ of its Space Object within Indian Territory shall seek IN-SPACE Authorisation only through Indian incorporated entities (such as Indian subsidiary, joint venture, partnership or collaboration with Indian entities), which shall be responsible for compliance with Indian laws, regulations, and national security requirements.
- c. Only the Space Objects that are designed to survive Re-entry or planned for Re-entry, within or outside the Indian territory, shall need a separate Re-entry authorisation from IN-SPACE.

It is clarified that the Re-entry as part of the post mission disposal plan, typically due to the natural decay of orbit, wherein during atmospheric Re-entry the Space Objects are expected to burn up, melt, fragment, or otherwise be destroyed to a sufficient extent that surviving Space Debris on the ground is minimized in mass,

size, and number, shall not call for a separate Re-entry authorisation. Thus, such Re-entry will not warrant Re-entry Authorisation from IN-SPACE.

The Applicants shall ensure in such cases that Re-entry as PMD measure is brought out in the Space Debris mitigation plan shared as part of the SSA proforma while seeking authorisation.

- d. Authorisation by IN-SPACE for establishment and operation of the satellite/spacecraft or operation of Space Transportation System will account for the Planned Re-entry, if any, of the Space Object including any Re-entry which is part of the post-mission disposal plan.
 - i. Applicant shall specifically declare its intention to undertake Re-entry, if planned, of its Space Object at the time of seeking authorisation for establishment and operation of the satellite/spacecraft or operation of Space Transportation System, as applicable, and will provide all information and risk-analysis in the format prescribed under Appendix-I in respect of the Planned Re-entry as described in the para II-i of this document.
- e. Separate authorisation for “Planned Re-entry” will be provided by IN-SPACE based on evaluation of the Planned Re-entry parameters given at the time of application and re-verification with latest Re-entry parameters about 3 months prior to commencement of the proposed Re-entry activity.
- f. Space Objects for which Re-entry is planned post launch (i.e. risk analysis as per the proposed Planned Re-entry parameters was not brought to the notice of IN-SPACE during the processing of the authorisation for establishment & operation) shall submit the Application to IN-SPACE at least 6 months in advance before commencement of the proposed Re-entry activity.
- g. It is clarified that separate authorisation from IN-SPACE is mandatory for any Planned Re-entry of a Space Object which has already been authorized by IN-SPACE earlier (irrespective of the Space Object is already in orbit or yet to be launched).
- h. The Planned Re-entry should be undertaken in a manner so as to minimize risk to persons, property, and the environment on the ground, at sea, and in airspace. Such Re-entry operations will include prediction of the Re-entry corridor, execution of commanded maneuvers, continuous tracking and monitoring, and the ability to abort or modify the sequence in case of anomalies, as applicable. **The Re-entry shall be conducted in manner that that the risk of expected casualties (Ec) due to Re-entry activity remains below 1 in 10000 (‘threshold risk’).**
- i. Applicant seeking the Re-entry authorisation shall demonstrate at time of application to IN-SPACE that the proposed Re-entry meets the above mentioned ‘threshold risk’. The Applicant shall also submit the corroborating survivability and

ground casualty assessment for the re-entering Space Objects along with the authorisation application in the format prescribed under Appendix-I

- j. Applicants seeking Re-entry authorisation shall provide details of the space object, objective of Re-entry mission, Re-entry mission plan, trajectory and event profile, risk assessment (for Space operations till completion of Re-entry).
- k. Further, for each Re-entry mission, the Applicant shall furnish information such as various failure scenarios, probability of failures, fragmentation pattern, ballistic coefficients, reliability values, de-orbit plan, flight path angle, identification of impact and danger zones, etc. for the technical assessment by IN-SPACE.
- l. **Evaluation of the Planned Re-entry parameters by IN-SPACE:** IN-SPACE shall carry out the evaluation and verify the risk-assessment provided by the Applicant both at the time of processing the authorisation for “establishment and operation of the Space Object” as well as at time of processing the separate Planned Re-entry authorisation (with latest Re-entry parameters) before initiation of the Planned Re-entry. Various factors that would be assessed include the technical parameters, mission planning, casualty assessment, from the viewpoint of conducting a safe Re-entry and minimizing the damages to third parties. The Re-entry parameters or mission planning shall have to be optimised/changed appropriately by the Applicant, if recommended by IN-SPACE. Any change in the de-orbit plan, and nominal injection parameters of spacecraft into the atmosphere shall be intimated to IN-SPACE as soon as possible.

The Applicant shall also provide information and risk assessment, as stated above in para II-i, j and k, at the time of seeking authorisation for the establishment and operation of the satellite/spacecraft or operation of Space Transportation System, as applicable. IN-SPACE shall evaluate the Re-entry parameters and risk-assessment provided in the Application, and may suggest optimization/changes, if found appropriate.

- m. For each Planned Re-entry, the Applicant seeking IN-SPACE authorisation shall obtain an ‘Advisory Note’ from IN-SPACE in order to get the NOTAM / ‘Danger Zone Notification’ including NAVAREA warnings (hereinafter referred to as NOTAM) issued from the relevant authorities, typically 45 (forty-five) days before the scheduled start of Re-entry phase or impact on Earth’s surface (ingress in Earth’s atmosphere). It is therefore advised that the Applicant approaches the relevant authorities well in advance to get NOTAM issued. Further, subsequent confirmations of NOTAM till and after Re-entry are also the responsibility of the Applicant. IN-SPACE shall be copied on all such NOTAM and confirmations. Issuance of the NOTAM shall be one of the mandatory requirements to be complied by the Applicant before IN-SPACE Authorisation.
- n. Applicant shall adhere to the Safety & Security Guidelines for Space Activities as and when brought out by IN-SPACE.

- o. Applicant shall ensure that the Re-entry activities being undertaken do not expose the government of India to any liability under the Liability Convention (1972). Applicant shall undertake the Re-entry at its own risks and peril, and shall be liable for any third-party damage or any other claims arising in consequence of the Re-entry or the associated Re-entry-activities for which IN-SPACE Authorisation is issued. The Applicant shall be liable to indemnify the government of India and any of its agencies for any liability incurred under India's international commitments. The Applicant is therefore advised to obtain adequate insurances, including mandatory third-party liability insurance if prescribed/required by IN-SPACE at time of Authorisation, to cover all such risks and eventualities. The authorisation will only be granted upon satisfactory compliance to third-party liability insurance requirements as prescribed/required by IN-SPACE and the issuance of NOTAM as per the proposed Re-entry.
- p. IN-SPACE Authorisation shall specify a time period/window, within which the Re-entry needs to be completed. Any change in this time period/ window, rescheduling of the Re-entry or change in Danger Zone shall require revised NOTAM (after another 'Advisory Note' from IN-SPACE) and corresponding amendment to the Authorisation as decided by IN-SPACE.
- q. For any change in the aforesaid time period/window, rescheduling of the Re-entry or change in Danger Zone for the launch mission, the Applicant shall immediately inform the NOTAM issuing authorities and IN-SPACE. The Applicant shall take action for issuance of revised NOTAM by seeking an 'Advisory Note' from IN-SPACE to this effect.
- r. Whenever the Re-entry site is within the territorial control of a non-Indian nation (including EEZ), clearance/authorisation from the respective non-Indian nation should be submitted along with the Application.
- s. The Authorisation shall be applicable to a specific Indian Entity for the specified space object and its Re-entry. Any change of ownership or "Management and Control", or in its partnership or trust, as applicable, or shareholding pattern of the Indian Entity, shall be intimated to IN-SPACE as soon as possible, and may require a fresh Authorisation or amendment to the Authorisation as decided by IN-SPACE, for the cases:
 - i. When the shareholding or ownership by any non-Indian beneficial owner(s), directly or indirectly, exceeds ten percent or more
 - ii. Where such change results in shifting of the Ownership or Management & Control from Indian to non-Indian.

Similarly, any change in the Re-entry mission, including the change in the trajectory of return, time of Re-entry or any other parameters declared in the Application, shall be intimated to IN-SPACE as soon as possible, and may require a fresh Authorisation or amendment to the Authorisation as decided by IN-SPACE.

APPENDIX-I

Application Template for seeking Authorization for Undertaking Re-entry of Space Objects		
To be submitted along with Authorization Application for Establishment and Operation of Satellite, or Operation of Space Transportation System, as applicable.		
Sl. No.	Information Required	Applicant Response
General Information		
1	Purpose of submission of this Appendix: <i>(Tick as applicable)</i> - Along with the Authorization application for <i>Establishment and/or Operation of Satellite / Operation of Space Transportation System</i>; - Seeking authorization for Planned Re-entry (3/6 months before Re-entry initiation) - Submission on account of significant change to an initially declared Re-entry profile.	
2	Authorization / Application reference number for <i>Establishment and/or Operation of Satellite / Operation of Space Transportation System</i>	
3	Whether Re-entry operation is being outsourced to a third party, if so, please provide details. Also, all the entities, including Ground station involved in the entire process of Re-entry operations may be listed along with their roles and responsibilities.	
Space Object Details		
4	Provide details of the Space Object relevant to the proposed Re-entry, including: - Name of the Space Object; - NORAD ID or equivalent identification, if already in space - Type of Space Object (Satellite/Launch Vehicle/Orbital Stage/Hosted Platform/Other, to be specified); - Current operational status; - Orbital parameters (apogee, perigee, inclination), where applicable; - Configuration and dimensions of the Space Object at the time of Re-entry; - Mass characteristics (initial, current/latest, and estimated Re-entry mass, as applicable); - Propulsion system and propellant details, including residual propellant, if applicable; - Hazardous materials or systems onboard (e.g., batteries, pressure vessels, pyrotechnics, radioactive materials); - Components, if any, expected to survive atmospheric Re-entry, along with the basis of assessment.	
Mission Details		
5	Provide details of the Planned Re-entry mission profile, including <i>(Attach adequate details/analyses to verify the trajectory and impact/recovery points, wherever applicable)</i> : - Brief Mission objective; - Disposal and De-orbit strategy;	

	iii. Planned trajectory profile and Mission sequence, identifying the full Impact zones of the Re-entry objects iv. Planned Re-entry timeline/window, and NOTAM status, along with coordinates and polygons of the NOTAM/Danger Zone, as applicable; v. Airspace and maritime coordination undertaken or planned; vi. Countries whose airspace/EEZ may be impacted, if any, and non-Indian Government approvals, as applicable; vii. Target impact or recovery region, and corresponding Recovery approvals, as applicable; viii. Tracking and monitoring arrangements; ix. Post-mission disposal and sustainability measures, including passivation, debris mitigation as applicable; and x. Significant deviations, if any, from a previously approved Re-entry or disposal strategy, along with justification.	
Risk Assessment		
6	i. Provide the comprehensive Risk Assessment of the proposed Re-entry, covering the hazards involved, expected casualty risk, environmental considerations and the mitigation measures proposed. The assessment should include the methodology adopted, analytical tools used, survivability and fragmentation analysis, expected casualty assessment, assessment of hazardous surviving components, and the reliability of the proposed Re-entry strategy. ii. Please confirm, whether the casualty risk threshold probability (1/10000) of the Re-entry is complied with	
Attachments		
7	Attach supporting documents, including the Re-entry Mission Plan, Trajectory Analysis, Re-entry Simulation Report, Survivability Assessment, Ground Casualty Assessment, Fragmentation Analysis, Reliability Assessment, applicable Regulatory Clearances and Insurance Documents, as applicable .	
8	Any other information or specific details which IN-SPACE should be aware of for processing this Appendix.	