Inter-Agency Space Debris Coordination Committee

IADC activities overview and latest updates of IADC documents

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www.iadc-home.org

IADC Overview

IADC is an international forum of national and international space agencies for the worldwide technical/scientific coordination of activities related to space debris in Earth orbit issues and provides technical recommendations.

The 13 IADC member agencies are:

ASI (Agenzia Spaziale Italiana)

CNES (Centre National d'Etudes Spatiales)

CNSA (China National Space Administration)

CSA (Canadian Space Agency)

DLR (German Aerospace Center)

ESA (European Space Agency)

ISRO (Indian Space Research Organisation)

JAXA (Japan Aerospace Exploration Agency)

KARI (Korea Aerospace Research Institute)

NASA (National Aeronautics and Space Administration)

ROSCOSMOS (State Space Corporation “ROSCOSMOS”)

SSAU (State Space Agency of Ukraine)

UKSA (United Kingdom Space Agency)

Membership

IADC members are national or international space and state organizations that carry out space activities through planning, designing, launching, or operating space objects.

IADC members should **actively undertake space debris research activities** and **contribute to an increased understanding of space debris issues** for the preservation of the orbital environment.

IADC continues to receive expressions of interest from space agencies and governmental entities seeking to become members or observers.

Structure and Purposes

IADC consists of a Steering Group and four specified Working Groups (WGs) covering **Measurements** (WG1), **Environment and Database** (WG2), **Protection** (WG3), and **Mitigation** (WG4).

The primary purpose of the IADC is to

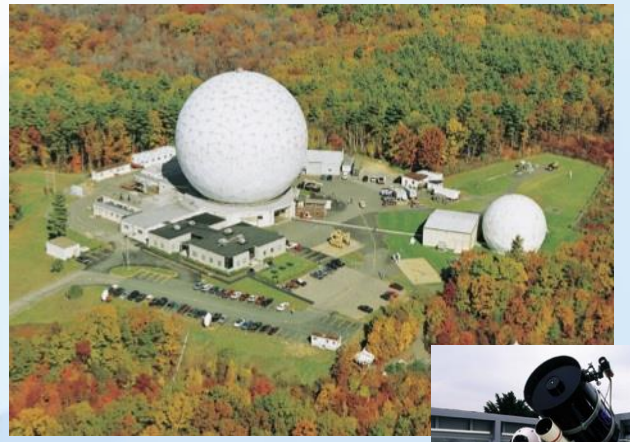
- exchange information on space debris research activities between member space agencies,
- facilitate opportunities for cooperation in space debris research,
- review the progress of ongoing cooperative activities,
- identify debris mitigation options.

IADC provides technical recommendations to the world space communities. It is not a regulatory organization.

WG 1 - Observations

Objectives are to review space debris research efforts in the area of measurement techniques and identify, evaluate and recommend new opportunities for cooperation in the area of measurements of orbital debris.

- Action on „Attitude motion characterization of LEO upper stages using different observation techniques“ – data acquisition ongoing



WG2 – Environment and Database

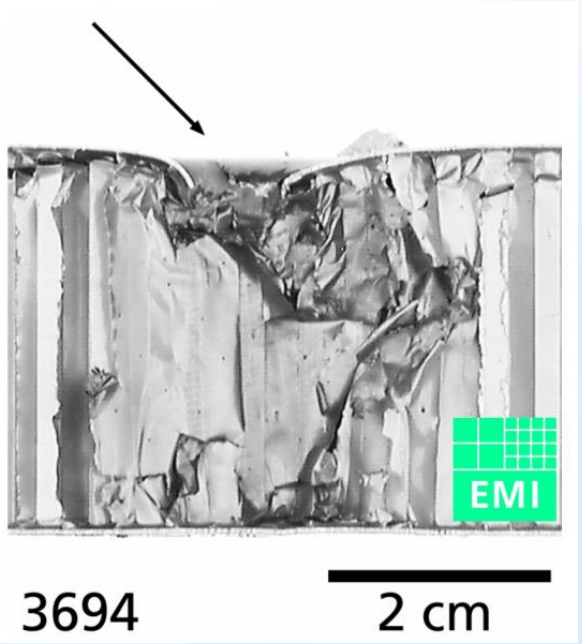
- In 2020, WG2 in close cooperation with WG4 started work on an Action Item to formulate the ingredients and definitions required to assess the impact of space missions to the environment, leading to the definition of a clear metric of an „**Space Environment Index**“.
- A new Action Item „**Space Environment Report**“ under preparation to provide a transparent overview of global space activities and the level of compliance with mitigation guidelines , from the IADC perspective, and an outlook on the evolution of the space environment to raise awareness of the space debris issue in general and to support operators’ efforts to make informed decisions about the design of their missions.

Re-entry Prediction Campaigns (WG2)

To prepare for and respond to high risk re-entry events, the IADC members conduct annual object re-entry prediction campaigns for data sharing exercises and improvement of the prediction techniques.

- 26 campaigns have been conducted since 1998, including:
- 2021-01 Starlink-26 satellite (2019-029F, #44240), re-entered 10-Apr-2021 12:27 UTC
- 2021-02 CZ-5B rocked body (2021-035B, #48275), re-entered 09-May-2021 02:14 UTC

WG3 - Protection



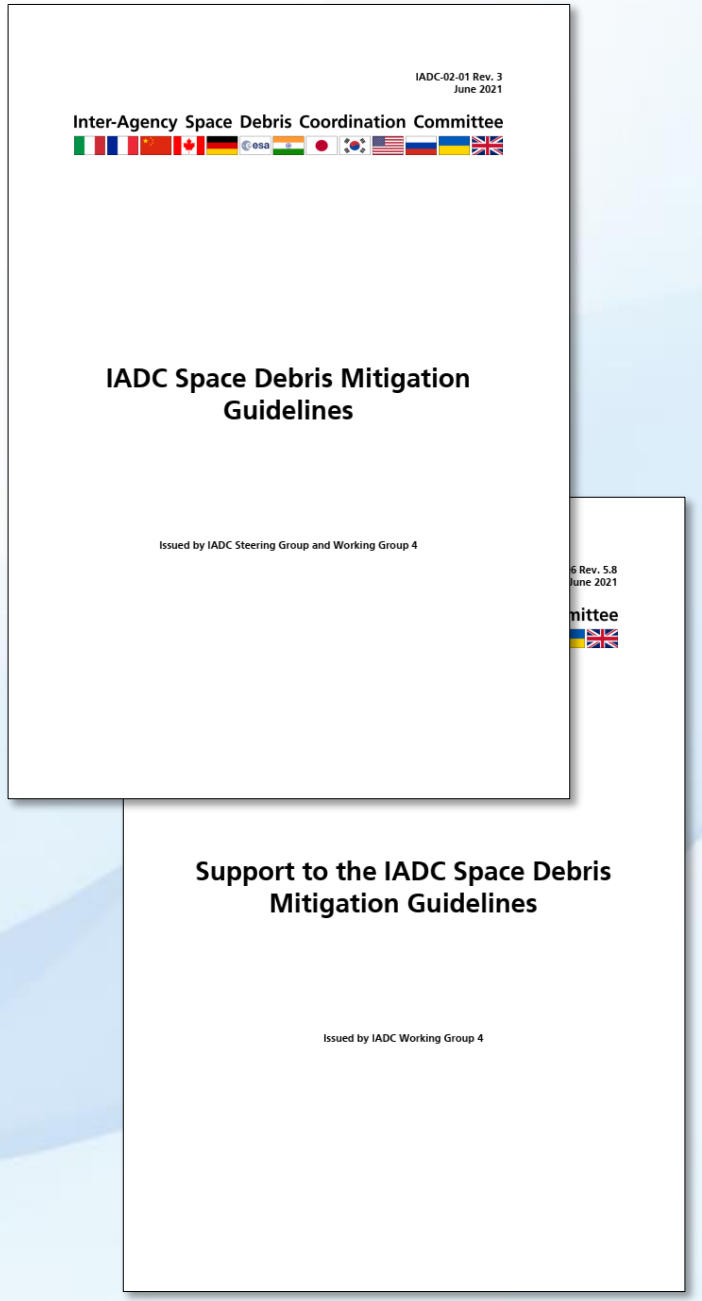
Main document: *Protection Manual* (IADC-04-03) v7.1

- Compendium of meteoroid and orbital debris risk assessment methodology, providing
  - a standard methodology for meteoroid/debris risk assessments,
  - a means to cross-calibrate risk assessment tools,
  - documentation of reliable ballistic limit equations,
  - procedures and results used to calibrate member hypervelocity impact test facilities, and
  - a description of validation activities for hypervelocity impact simulation codes

On-going activities to update *Protection Manual*, *Vulnerability Report* (IADC-13-11), and new Action Item on *Projectile shape effects.*

WG4 - Mitigation

- WG4 concluded a set of updates on the **IADC Space Debris Mitigation Guidelines** and the accompanying **Support Document**, in order to provide numerical figures and rationale for several key points including clarifications and target values on GEO disposal, break-up causes, operational phases, and re-entry risks.



WG4 - Mitigation

- Based on study scenarios agreed with, and analyzed by WG2, and on a wide literature review, an internal report for the action item “Potential Additional Mitigation Measures to Address the Proliferation of Small Satellites and Large Constellations” was finalized.
- The **IADC Statement on Large Constellations of Satellites in Low Earth Orbit** was updated based on the outcome of this Action Item.
- A new AI considering updates to the Debris Mitigation Guidelines based on this report is under preparation.

WG4 - Mitigation

- Following a request by the International GNSS Coordination Group (ICG), IADC is carrying out a technical assessment of the consequences of disposal options in Medium Earth Orbit (MEO).
- An intermediate report was sent for consideration to the ICG, identifying four main disposal strategies:
  i. Passivation in the operational orbit;
  ii. Manoeuvre to stable / minimum eccentricity growth disposal orbit;
  iii. Manoeuvre to unstable / maximum eccentricity growth for long-term re-entry;
  iv. Directed de-orbit.
- On-going study to quantify the risks and benefits of each of the identified four main disposal strategies for satellites in MEO orbits.

Conclusion

- Three main documents have been updated in 2021 and are released on the public section of the IADC Website www.iadc-home.org:
  - **IADC Space Debris Mitigation Guidelines**
  - **Support to the IADC Space Debris Mitigation Guidelines**
  - **IADC Statement on Large Constellations of Satellites in Low Earth Orbit**

Conclusion

- IADC is the internationally recognized technical & scientific authority on space debris.
- IADC participates in and contributes to the UN space debris activities via the Scientific and Technical Subcommittee (STSC) of the Committee on the Peaceful Uses of Outer Space (COPUOS), and provided input to the International Committee on Global Navigation Satellite Systems (ICG).
- IADC will continue to advance the knowledge of space debris and to develop environment management strategies to preserve the near-Earth space for future generations