

## ESA Space Debris Standard & Zero Debris Charter

ESA Council at Ministerial Level in 2022 encouraged ESA to implement “a Zero Debris approach for its missions; and to encourage partners and other actors to pursue similar paths”.<sup>1</sup>

In response to the first part of this mandate, ESA has now completed a revision of its ESA Space Debris Mitigation Policy, that makes the internal “ESA Space Debris Mitigation Requirements” applicable as new ESA standard. The new requirements will be reflected in ESA procurements.

The space debris mitigation requirements will be applicable to all elements of systems launched into, or passing through, Earth orbits and Lunar space, including launch vehicle orbital stages, spacecraft and any parts released.

They aim at meeting and exceeding the relevant international standards on space debris mitigation and space traffic coordination, in-line with state-of-the-art technology, and to improve the effectiveness of the removal in Earth and Lunar orbits of debris and their propagation, so that “zero debris” are left behind by ESA space activities.

For this purpose, design and operational measures are specified to prevent space debris release and proliferation, control system break-up risk, control collision risk, control system failure risk, improve orbital clearance, assure safe re-entry, and minimise impact on astronomy.

Two additional revisions are foreseen in 2026 and 2030, to ensure the full implementation of a Zero Debris approach for all missions entering design phase after 2030.

In response to the second part of ESA’s mandate on Zero Debris from ESA Council at Ministerial Level in 2022, i.e. “to encourage partners and other actors to pursue similar paths”, ESA has initiated the development of the “Zero Debris Charter” through an open and collaborative process,

with ESA as a partner among others.

Participation in the co-development process was not restricted to European space actors, making it a truly global endeavour. More than a hundred registered their interest, with around 40 actively engaging in the co-development.

Co-development was based on the principles that the Charter shall go well beyond existing instruments, aim for the most ambitious targets, foster a community of very motivated actors, and lay the foundation for collaborative capacity building.

During the initiative’s kick-off webinar on 10 July 2023, ESA proposed a draft zero, opening a period (July-August 2023) during which approximately 200 comments were received from Europe and beyond. On this basis, four co-development workshops were held in ES HQ (Paris, 4 September), online (19 and 29 September) and at ESA ESTEC (Noordwijk, 16 October). On average, 35 organisations were represented and active during the workshops.

The outcome of this collaborative effort was released on ESA’s website yesterday.

The Charter is a non-legally binding instrument. Nevertheless, it shall serve as a major contribution towards space safety and sustainability. It shall support existing multilateral and multistakeholder endeavours to achieve space safety and sustainability.

According to its preamble, its signatories

- commend the efforts of the actors of the European and global space sectors committed to the advancement of space safety and sustainability,
- acknowledge the encouragement given to the European Space Agency by its Member States to implement a Zero Debris approach, by which it aims

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<sup>1</sup> ESA/C-M/CCCXIII/Res.1.36.

to stop generating space debris by 2030,

- recognise the role of the European Space Agency in the initiation and facilitation of the Charter, resulting from an open and collaborative process, and
- recall that international and national laws and regulations provide for the sole binding rules applicable to the conduct of space activities.

Paragraph 1 sets principles guiding the collective endeavour towards space safety and sustainability namely that

- space debris should not be intentionally released during space activities and the unintentional generation of space debris should be minimised,
- adverse effects of space debris should be anticipated and mitigated to the greatest possible extent, and
- constant and collaborative efforts should be made to improve our knowledge and understanding of the population of space debris of all sizes, our impact on it and its impact on us.

Under Paragraph 2 of the Charter, its signatories commit to collectively contribute to the progressive achievement of jointly defined targets for 2030, within their respective abilities and constraints. The targets are as follows:

- ensure probability of space debris generation through collisions and break-ups below 1 in 1000 per object during the entire orbital lifetime,
- identify suitable aggregate probability thresholds for constellations of satellites in LEO,
- achieve timely clearance of LEO and GEO regions with a probability of success of at least 99 % after end of mission, including through external means when necessary,
- ensure causality risk from re-entering objects which is significantly lower than 1 in 10 000, and strive towards zero causality,
- identify suitable aggregate risk thresholds for constellations of satellites in LEO,

- facilitate routine and transparent information sharing,
- encourage active participation in strengthening global space traffic coordination mechanisms,
- improve access to timely and accurate data on space objects down to a size of 5 cm or smaller in LEO and 20 cm or smaller in GEO.

Paragraph 3 establishes the framework for the functioning of the Charter.

In this regard, paragraph 3.2 of the Charter makes clear that “any entity demonstrating a strong commitment to advancing space safety and sustainability” can sign the Charter and join the Zero Debris Community, “without requiring the agreement of existing partners”.

Concretely, interested entities should register their intent to sign the Charter by using a form which is available on ESA's website.<sup>2</sup> After a follow-up exchange with ESA to check the validity of the registration, the name of the entity will be added to the public list of entities having registered and later invited to attend one of the signing ceremonies foreseen in the first half of 2024.

In summary, the new ESA Space Debris Requirements establish a bold new standard that will apply to all ESA missions and partnerships from 2030, with continual advancements and improvements in the years before.

The Charter is the first initiative of its kind to bring together the largest array and variety of space actors around the world with the joint goal of creating no more debris by 2030 and making possible the long-term sustainability of space activities.

ESA's commitment towards Zero Debris for its own missions together with the joint goals set in the Charter may serve as a starting point for ambitious, collective activities that will build the technologies, new economies and policies required to make Zero Debris a reality.

**Relevant documents online:**

[Zero Debris Charter](#)

[ESA Space Debris Mitigation Requirements](#)

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<sup>2</sup> [esacontact.esa.int/zero-debris-charter-registration/](https://esacontact.esa.int/zero-debris-charter-registration/)

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