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Space debris

IADC Report on the Status of the Space Debris Environment (2026)

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Inter-Agency Space Debris Coordination Committee

IADC Report on the Status of the Space Debris Environment

Issued by IADC Working Group 2 / Steering Group

Working Group Internal Task 39.2

Contents

Revision History

Issue	Date	Reason for Revision
1	Jan 2023	First Release, reference epoch for the report is 31 Dec 2021
2	Jan 2024	Reference epoch for the report is 31 Dec 2022. Additional sources for debris density profiles, number of fragmentation events per year, mission related objects released, long-term evolution of the environment. New plots: debris density profiles for different epochs; number of fragments per fragmentation cause and event year.
3	Jan 2025	Reference epoch for the report is 31 Dec 2023.
4	Jan 2026	Reference epoch for the report is 31 Dec 2024.

List of Abbreviations

Abbreviations	Description
ASI	Agenzia Spaziale Italiana (Italian Space Agency)
CNES	Centre National d'Etudes Spatiales
CNSA	China National Space Administration
CSA	Canadian Space Agency
DLR	Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center)
ESA	European Space Agency
GEO	Geostationary Earth Orbits
IADC	Inter-Agency Space Debris Coordination Committee
ISRO	Indian Space Research Organization
JAXA	Japan Aerospace Exploration Agency
KARI	Korea Aerospace Research Institute
LEO	Low Earth Orbit
MRO	Mission-Related Object
NASA	National Aeronautics and Space Administration
ROSCOSMOS	Space State Corporation "Roscosmos"
SSAU	State Space Agency of Ukraine
UKSA	UK Space Agency

1 Executive summary

As space debris poses a problem for the near-Earth environment on a global scale, only globally supported solutions can be the answer. This creates the need for internationally accepted space debris mitigation measures. A major step in this direction was taken in 2002, when the Inter-Agency Space Debris Coordination Committee (IADC) published its Space Debris Mitigation Guidelines, which were updated more recently in 2021 [2]. These guidelines have since served as a baseline for non-binding policy documents, national legislation, and as a starting point for the derivation of technical standards.

A need to assess the environment

The IADC Report on the Status on the Space Debris Environment aims to raise global awareness on the state and expected changes in the environment and the importance of adopting debris mitigation practices. The report, which is released annually, is split into three parts: insight into the current state of the environment (Section 3), indications of the latest debris generating events (Section 4) and an outlook on the evolution of the environment (Section 5). It is hoped that by sharing this report that those involved in the design, operation and oversight of space activities will recognise the importance debris mitigation practices and highlight the need for collective action to minimise our impact on the space environment. This executive summary for the report serves to highlight the main findings.

Current status of the environment

Statistical models estimate more than tens of thousands of space debris objects larger than 10 cm in orbit and more than hundreds of thousands objects larger than 1 cm. Collisions with objects smaller than 1 cm are considered to be large enough to destroy sensitive spacecraft components or render the spacecraft inoperable, while collisions with larger fragments may cause a catastrophic break-up of the spacecraft, which particularly in the Low Earth Orbit region, could cause the release of hundreds to thousands of new fragments in orbit.

The space traffic in Low Earth Orbit has seen notable changes since 2015 principally as a result of the deployment of large constellations and a shift towards commercial operators. Launch traffic (Figure 3) is currently around ten times the level observed in the early 2000's. The increase in the number of objects operating on orbit has the potential to increase the risk of operation due to the need for greater coordination and potential for debris generating events. The increase in the number of launched satellites has also started to result in an increasing trend in the number of yearly re-entering spacecraft and orbital stages (Figure 7) with recent counts seeing more than 200 re-entries of spacecraft and upper stages occurring per year.

With the deployment of large constellations the majority of the catalogued objects in some altitude bands are now manoeuvrable (Figure 9). This has started to have implications on the design and operational strategies for spacecraft in these orbits with spacecraft increasingly requiring coordination to perform collision avoidance.

Eleven fragmentation events were observed in the year 2024 covered by the present report (Table 1) and, on average over the last two decades, around 11 on-orbit fragmentations occurred every year (Figure 10). For what concerns the release of space debris objects during operations, the number of objects released by spacecraft has decreased significantly since the 1990s, whereas it remains relatively stable for orbital stages (Figure 12).

One of the core principles of the space debris mitigation guidelines is to remove objects from the LEO and GEO protected regions with a high success rate for those orbits where a natural disposal mechanism is absent [2]. Between 85% and 100% of all spacecraft reaching end-of-life during the last decade in the GEO protected region attempt to comply with space debris mitigation measures and between 60% and 90% do so successfully, with the compliance trend asymptotically increasing (Figure 14), with the exception of 2022 when a number of objects were disposed of below the GEO protected region.

Between 30% and 60% of the orbital stages delivering spacecraft in or near the GEO protected region during the last decade are in compliance with space debris mitigation measures, with the compliance trend increasing also in this case (Figure 16).

Between 80% and 95% of all spacecraft reaching end-of-life during the last decade (2014 – 2024) in the LEO protected region are in compliance with space debris mitigation measures, with the compliance trend increasing (Figure 17). However, this increase in absolute numbers is mainly due to the growth in the rate of spacecraft operating in naturally compliant orbits (as it can be derived from Figure 18). If those objects are discarded in the analysis, one can observe that until 2017 only between 10% and 40% of the spacecraft reaching end-of-life during the last decade are compliant with space debris mitigation measures, which is a very low compliance rate. After this, values reached higher relative compliance rates mainly due to the de-orbiting of one constellation and a low amount of satellites reaching end-of-life in a non-compliant orbit (19).

Between 70% and 95% of the orbital stages delivering spacecraft in the LEO protected region during the last decade are in compliance with space debris mitigation measures, with an increasing compliance trend (Figure 22) mainly due to an increasing number of spacecraft operating in naturally compliant orbital altitudes.

Evolution of the environment

Whereas the trends in the compliance to space debris mitigation practices at a global level is slowly increasing, it is of importance to note that the successful implementation is still not great enough to ensure a sustainable environment into the future. In particular, the extrapolation of the current levels in launch traffic, combined with continued fragmentations and limited post mission disposal success rate could lead to a rapid growth of the debris population, with an estimated number of objects larger than 10 cm more than doubling in less than 50 years (Figure 23). Even in case of no further launches into orbit, it is expected that collisions among the space debris objects already present will lead to a further growth in space debris population.

Consequently, even with widespread adoption of these guidelines and recommendations, or even stricter behaviours, the consensus is that the environmental impacts cannot be removed completely and additional steps may need to be taken, such as enabling the technology for active debris removal. Further research and discussions are encouraged within the global community to develop a consensus view on the definition and route towards a sustainable space environment.

2 Introduction

More than 20 years have passed after the IADC Space Debris Mitigation Guidelines have been issued first in 2002. While mitigation measures have found broad consensus, today, it is of increasing importance to verify their effect in practice and to monitor their level of implementation. Therefore, the members of the IADC have decided on a collaborative effort in analysing and documenting the state of the environment in this comprehensive report and publish it in regular intervals for the awareness of spacefarers, decision takers and the interested public.

To this end, the information in this report is structured into three parts:

- A presentation of the current state of the environment, as a result of measurement and modelling efforts and a presentation of the current launch traffic. This also includes updates on the space traffic, which provides important indications for the future dynamics of the environment.
- A presentation of latest debris generating events in combination with statistics on the conduct of apparent mitigation actions (like post mission disposal, mission-related object release), relying on observation data accessible to IADC members.
- An outlook on the evolution of the environment, projecting the consequences of the current behaviour and attempting to present an overall environment health status.

The IADC considers this information to be a solid reference for the state of the environment and as a tool to identify new traffic or environmental trend and to analyse the need for corrective and additional measures.

3 Current status

This section provides an estimate of the number of objects in classical Keplerian Earth bounded orbits at the reference epoch. The estimate is provided both in terms of object counts and models. Launch statistics and in orbit release, are also reported, with a breakdown in top-level mission classification and mass range. The reference epoch for the report is 31/12/2024.

3.1 Objects in the environment

According to space debris environment models, at the epoch of August 1st 2024, the estimated number of objects in orbit in the different size ranges is the following:

- [11 000; 48 000] objects greater than 10 cm,
- [210 000; 1 200 000] objects from 1 cm to 10 cm,
- [130; 2 000] million objects from 1 mm to 1 cm,

The distribution of the number of objects as a function of their size is shown in Figure 1. The plot shows the number of objects larger than the threshold size indicated in x-axis. Different curves refer to different environment models, highlighting (with the shaded region) the current uncertainty associated with the modelling of small objects, especially around the 1 mm size range, because this size regime is only poorly covered by measurement data. More details on the comparison between environment models can be found in [1].

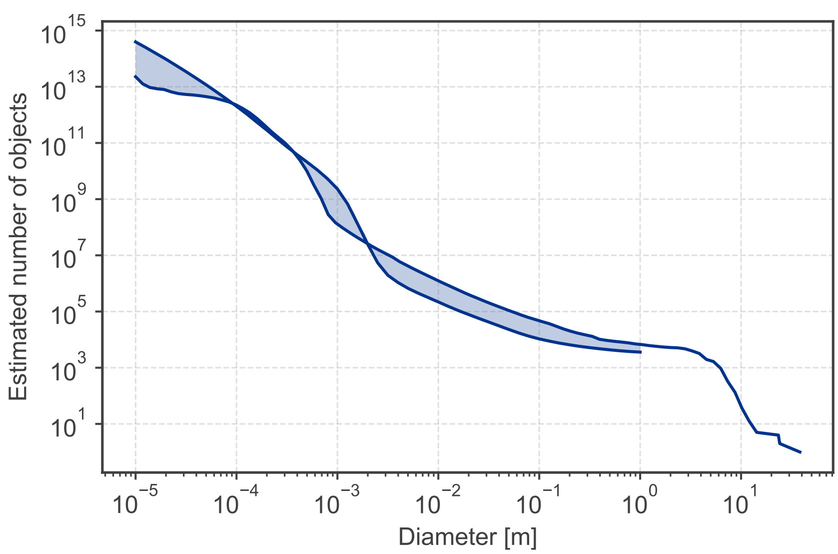

Figure 1: Estimated number of objects as function of object size.

Figure 2 shows the density profiles with altitude corresponding to different minimum object sizes (respectively 10 cm in dark blue, 1 cm in light blue, and 1 mm in green), considering only the LEO region and non-manoeuvrable objects (debris and inactive intact objects). The logarithmic scale is used in the y-axis to consider the different orders of magnitude corresponding to the three populations. As for Figure 1, the shaded region indicates the difference between available environment models. Both Figure 1 and Figure 2 refer to the epoch of November 1st 2024.

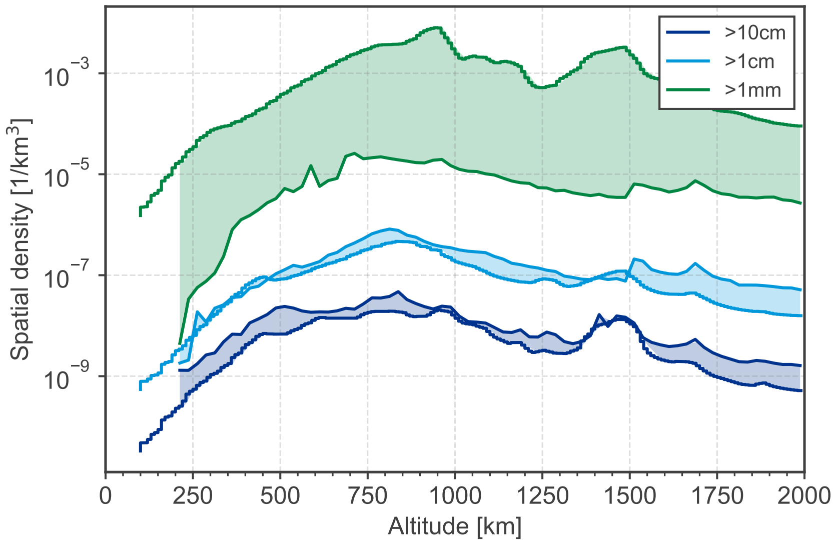

Figure 2: Density profiles in LEO as a function of altitude for different size ranges.

3.2 Launch traffic

This section provides statistics on the number of spacecraft launched into the LEO (Figure 3 and Figure 4) and GEO region (Figure 5 and Figure 6) where the objects are categorised based on the altitude of the perigee (h_p).

To provide further insight into the launch traffic, the spacecraft have been further categorised by:

- Main funding source (Civil, Defence, Commercial, Amateur, where the Amateur category includes those spacecrafts associated with academic institutions when none of the other entities are the driving contributor),
- Satellite dry mass.

While Figure 5 reports constant traffic into GEO region, Figure 4 indicates a significant growth of launches into LEO region. The main consequence of the increase in the number of spacecraft launched into LEO is the increased need for coordination between operators to avoid collisions.

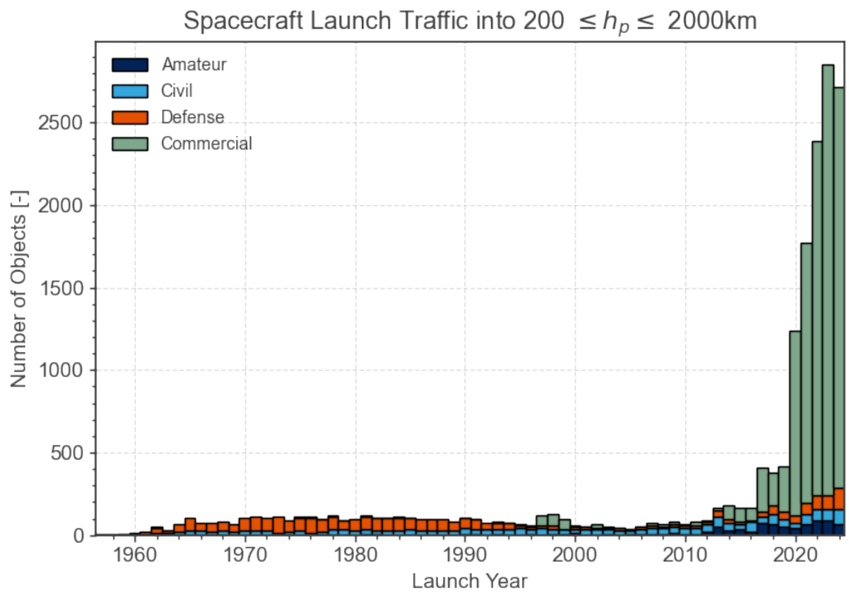

Figure 3: Launch traffic into LEO by mission class.

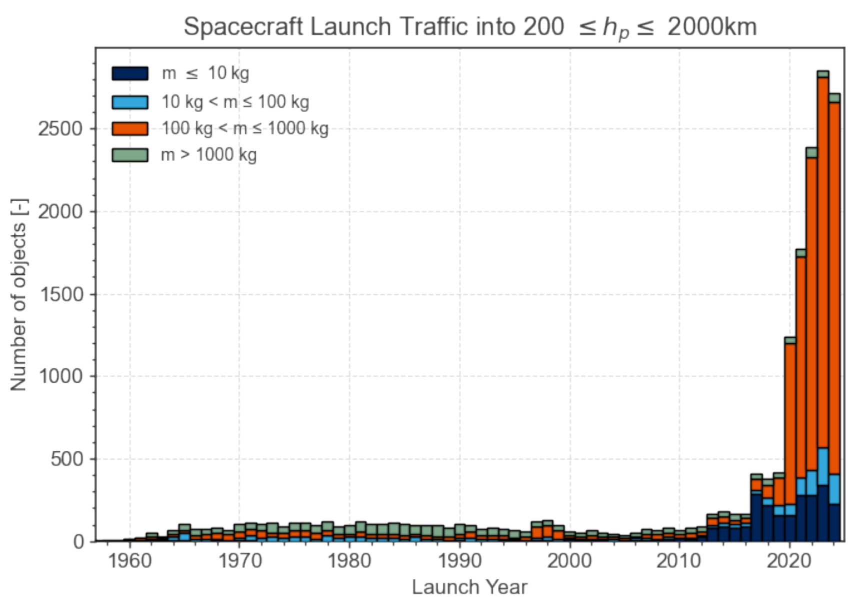

Figure 4: Launch traffic into LEO by mass class.

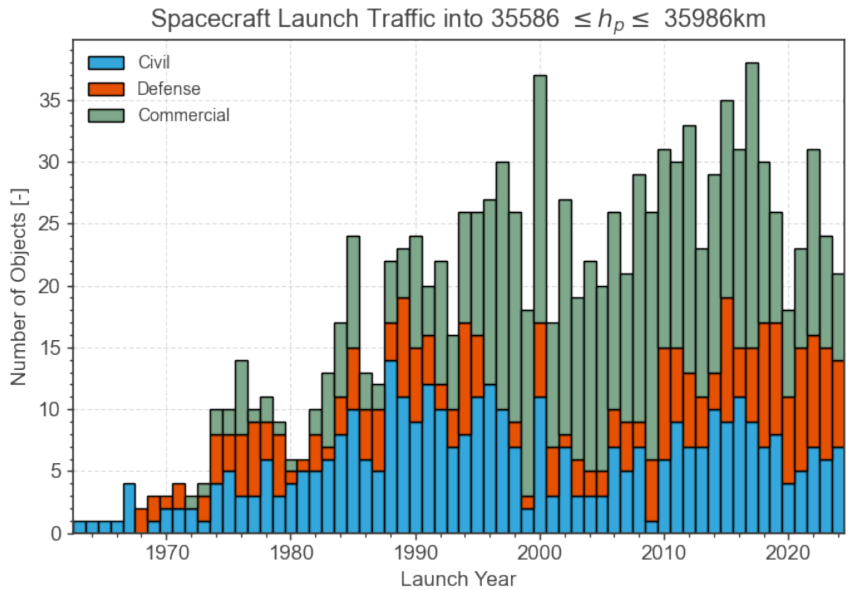

Figure 5: Launch traffic into GEO by mission class.

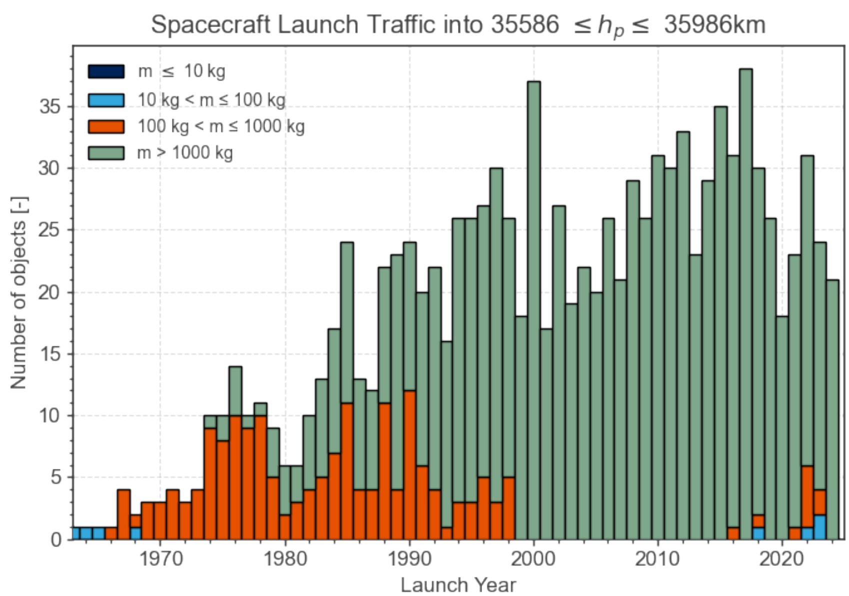

Figure 6: Launch traffic into GEO by mass class.

3.3 Re-entries

Figure 7 shows the evolution in time of the number of re-entering objects each year by object type, excluding space objects related to human spaceflight. The numbers include both controlled and uncontrolled re-entries. In the recent years, the number of re-entering objects has increased significantly, a trend that is expected to continue.

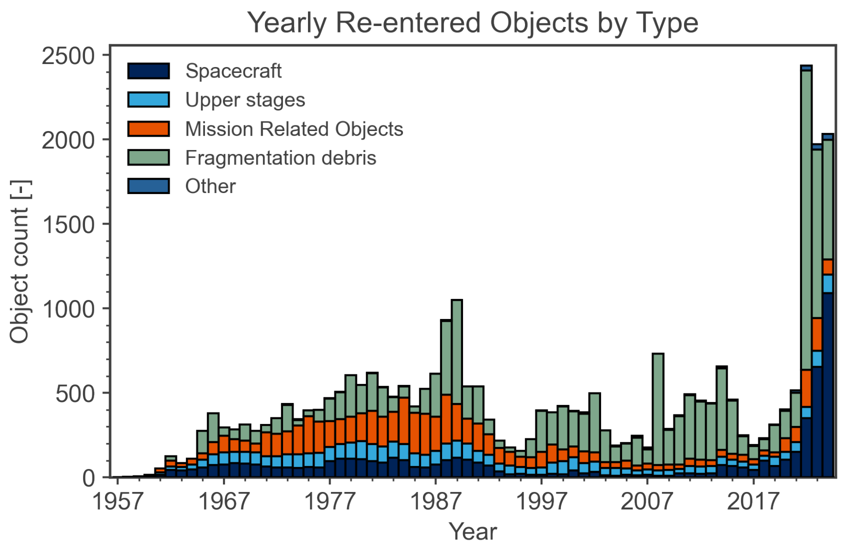

Figure 7: Re-entries of catalogued objects by object type.

Figure 8 shows the evolution in time of the mass of re-entering spacecrafts and rocket-bodies each year, excluding space objects related to human spaceflight.

3.4 Manoeuvrable objects

Figure 9 shows the distribution of manoeuvrable spacecraft in LEO as a function of altitude together with the distribution of non-manoeuvrable objects. The manoeuvrability status is estimated based on space surveillance data, so only spacecraft exhibiting recurring manoeuvre capabilities are classified as manoeuvrable.

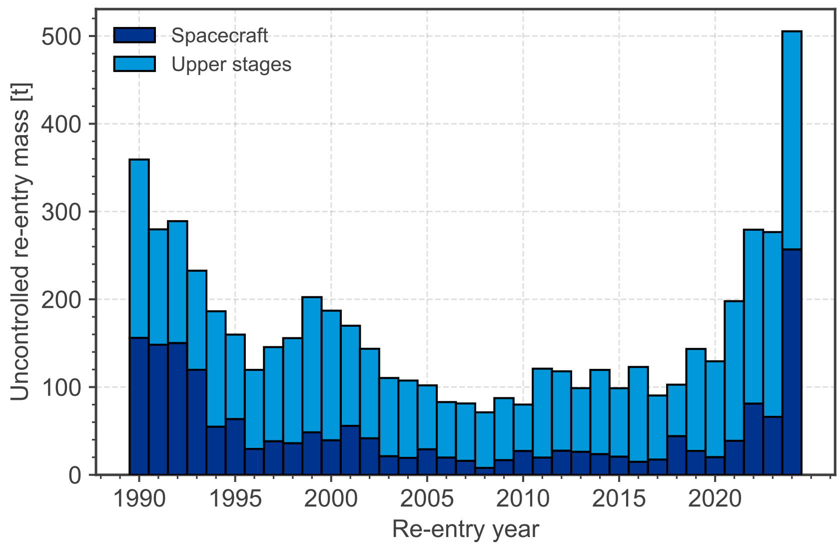

Figure 8: Uncontrolled re-entry mass.

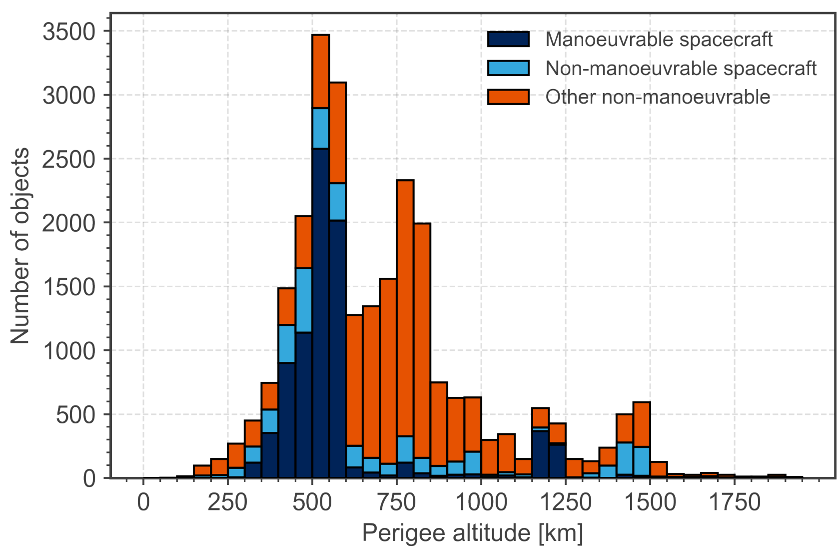

Figure 9: Distribution of manoeuvrable and non-manoeuvrable objects in LEO as a function of altitude.

4 Contributors to the space debris issue

4.1 Fragmentations

4.1.1 Fragmentation events in 2024

Table 1 lists the fragmentation events reported in the period of analysis (year 2024), with information on the event epoch and cause, together with the parent type and orbit. The table also reports the total number of catalogued debris objects: this indicates the total number of fragments associated to the break-up event, which may include objects that have already decayed at the time of compilation of the report. Much more debris, too small to be catalogued but that could still cause serious damage and threaten missions, is also generated from each breakup event. A range of values is provided for this entry when the sources available for this analysis present different values.

Table 1: Fragmentation Events in the period of analysis (year 2024).

Event Epoch	Event cause	Catalogued debris objects	Parent orbit	Parent type
02 Apr 2024	Propulsion	[0]	LEO	Upper Stage
08 Apr 2024	Propulsion	[0-1]	HEO	Spacecraft
27 May 2024	Unknown	[1]	GEO	Spacecraft
26 Jun 2024	Unknown	[18-19]	LEO	Spacecraft
05 Jul 2024	Propulsion	[0]	LEO	Upper Stage
19 Jul 2024	Unknown	[4]	LEO	Spacecraft
06 Aug 2024	Propulsion	[663-664]	LEO	Upper Stage
06 Sep 2024	Propulsion	[0-843]	GTO	Upper Stage
19 Oct 2024	Propulsion	[18-1104]	GEO	Spacecraft
01 Dec 2024	Unknown	[0]	LEO	Upper Stage
19 Dec 2024	Unknown	[0]	LEO	Spacecraft

4.1.2 Historical fragmentations

Figure 10 shows the historical trend of the number of fragmentation events per year and Figure 11 shows the number of fragments generated by the events classified by the fragmentation cause. For these visualisations, the contributions from different sources were aggregated considering the highest number of fragmentation events per year and generated fragments per year reported by each source.

Each generated debris increases the risk of collision with active spacecraft. Furthermore, the majority of fragmentation events are due to propulsion (Figure 11), underlying the importance of IADC guideline regarding passivation measures [2].

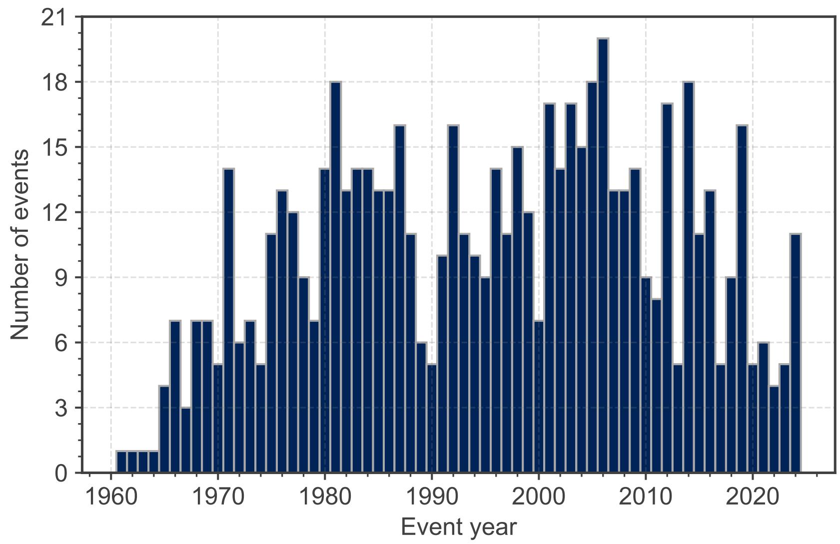

Figure 10: Number of fragmentation events per event year.

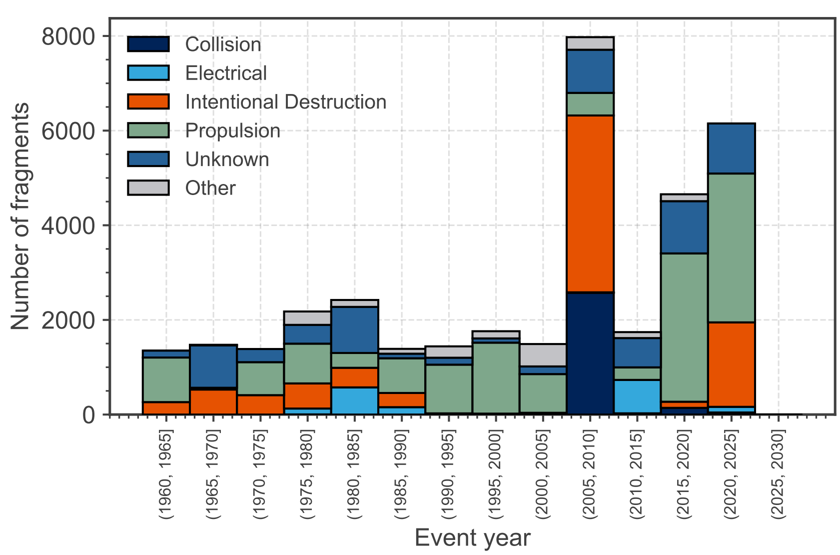

Figure 11: Number of fragments per fragmentation cause and event year (5-year bin).

4.2 Mission-Related Objects Release

Figure 12 shows the absolute number of released and catalogued mission-related objects (MROs) by spacecraft and orbital stages. Figure 13 shows the yearly fraction of MRO release events over the total amount of spacecraft and orbital stages injected into the space environment during that year. Both figures show a reduction in the number of MROs in the recent years.

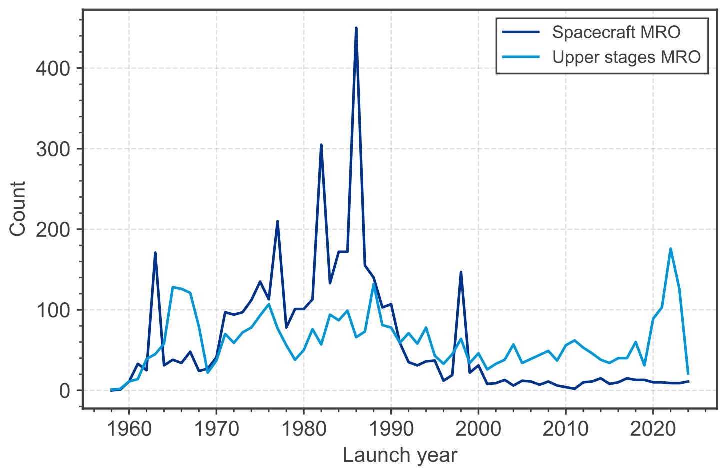

Figure 12: Total number of catalogued mission-related objects released.

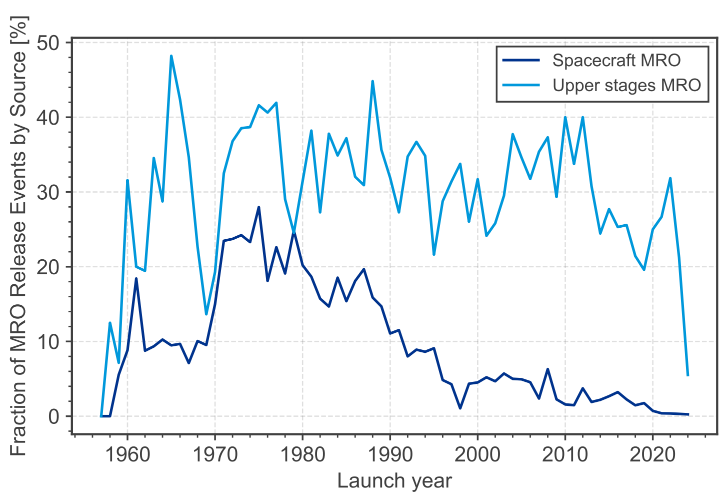

Figure 13: Fraction of mission-related objects releases per year with respect to the total amount of payloads and rocket bodies injected into the space environment during that year.

4.3 Disposal statistics

The analysis performed by the different contributing members of the IADC are summarised in this section. The figures show the mean value of the analysed parameter (e.g., compliance rate, no attempt rate) for each year with a round marker, whereas the interval indicates the spread of minimum and maximum values recorded by all participating members. It should be noted that across different editions of this report, reclassification of past data can occur. The data shown in the following sections includes the assessment of satellites that were launched before mitigation measures were introduced and, in general, recent improvements in reliability or increases in compliance will only be visible once these new generations of spacecraft reach their end-of-life. For reference, the typical operational lifetime for satellites is around 15 years in GEO and 6 years in LEO (excluding satellites operating in naturally compliant orbits with the 25-year rule).

4.3.1 GEO

This section covers:

- Disposal of spacecraft operating in GEO (Figure 14, Figure 15),
- Disposal of launch vehicle orbital stages used for the insertion of spacecraft targeting GEO (Figure 16).

In particular, Figure 14 and Figure 16 show the rate of compliance, i.e., the number of spacecraft disposed of in a given year being compliant with the IADC Space Debris Mitigation Guidelines over the total number of spacecraft that reached end-of-life in that year. Figure 15 shows instead the rate of no disposal attempts for the analysed years.

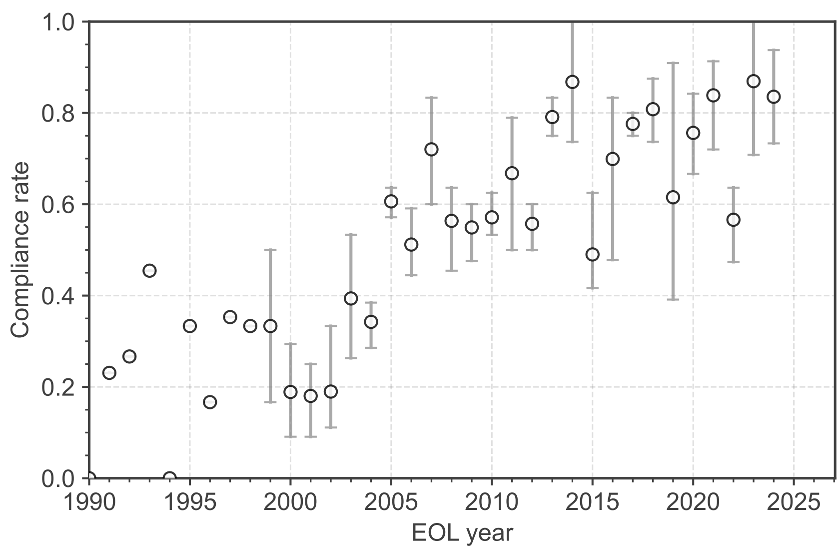

Figure 14: General rate of successful disposal attempts for spacecraft in GEO as assessed by the contributing agencies.

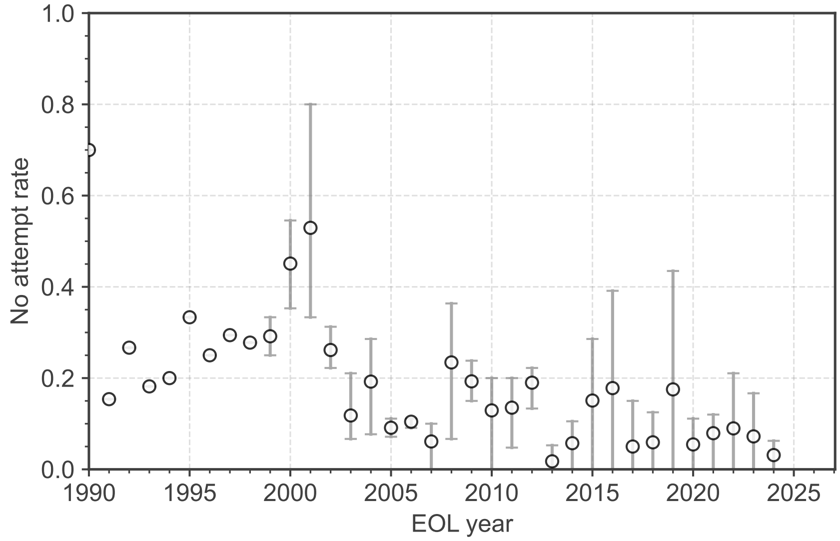

Figure 15: General rate of no disposal attempts for spacecraft in GEO as assessed by the contributing agencies.

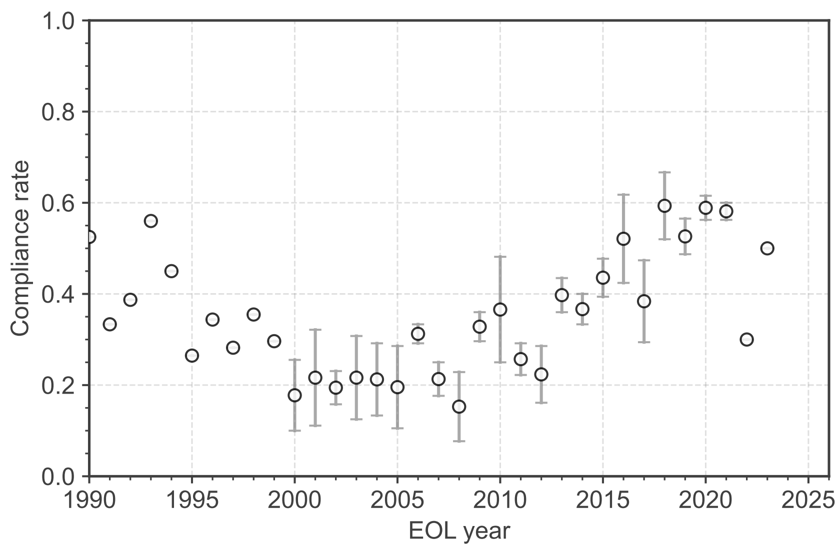

Figure 16: General rate of compliant objects for orbital stages used to insert spacecraft in GEO as assessed by the contributing agencies.

4.3.2 LEO

This section covers:

- Disposal of spacecraft operating in LEO,
- Disposal of launch vehicle orbital stages in LEO,
- Disposal of spacecraft and launch vehicle orbital stages crossing LEO.

For the classification, above-LEO graveyard disposal is considered as non-compliant, in accordance with the IADC guidelines [2]. Human spaceflight related objects (including space tugs) are excluded from the analysis.

The notation naturally compliant is used to indicate orbital stages and spacecraft that operate in an orbit such that they naturally re-enter within 25 years (i.e.,without requiring an appropriate manoeuvre into a decay orbit with residual orbital lifetime that is no more than a maximum of 25 years).

Figure 17 shows the general rate of compliance for spacecraft in LEO, i.e., the sum of the number of naturally compliant objects and of the number of successful disposal attempts over the total number of spacecraft reaching end-of-life in a given year. Figure 18 shows instead the rate of compliance considering only non-naturally compliant satellites. The 90% level represents the minimum probability of success for disposal manoeuvres, as stated in the IADC guidelines [2]. In other words, spacecraft that need to manoeuvre in order to be compliant shall succeed with a probability of at least 90%. According to the data in Figure 18, the combined compliance rate for non-naturally compliant satellites that reached end-of-life from 2017 onwards is estimated to be 60%. Figure 19 shows the share of naturally compliant spacecraft over the total number of spacecraft reaching end-of-life in the year of analysis.

Figure 20 shows the general rate of compliance for spacecraft in LEO considering the classification in main funding source introduced in Section 3.2. Figure 21 shows the general rate of compliance for spacecraft in LEO considering whether they belong to a constellation (see List of Definitions).

Finally, Figure 22 shows the general rate of compliance for orbital stages targeting or crossing LEO.

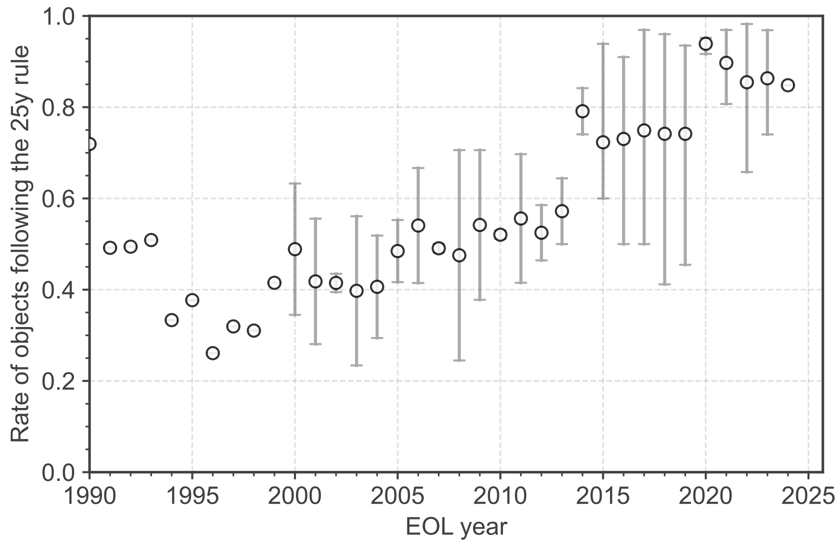

Figure 17: General rate of compliant spacecraft in LEO as assessed by the contributing agencies. This includes naturally compliant objects and successful disposal attempts. Note: because of the adopted methodologies, the value for the last year always needs re-confirmation in the report coming in the following year.

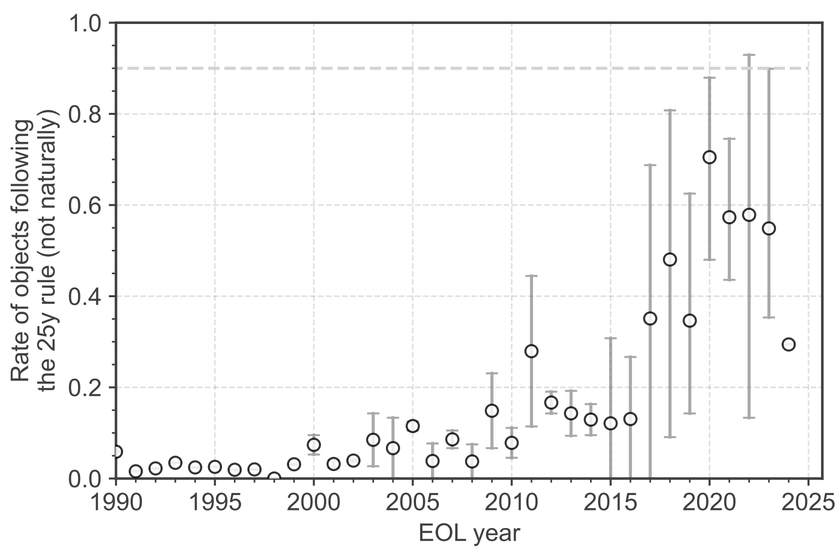

Figure 18: General rate of compliant spacecraft in LEO considering only not naturally compliant objects as assessed by the contributing agencies. The dashed horizontal line at 90% represents the minimum probability of success for disposal manoeuvres, as stated in the IADC guidelines. Note: because of the adopted methodologies, the value for the last year always needs re-confirmation in the report coming in the following year.

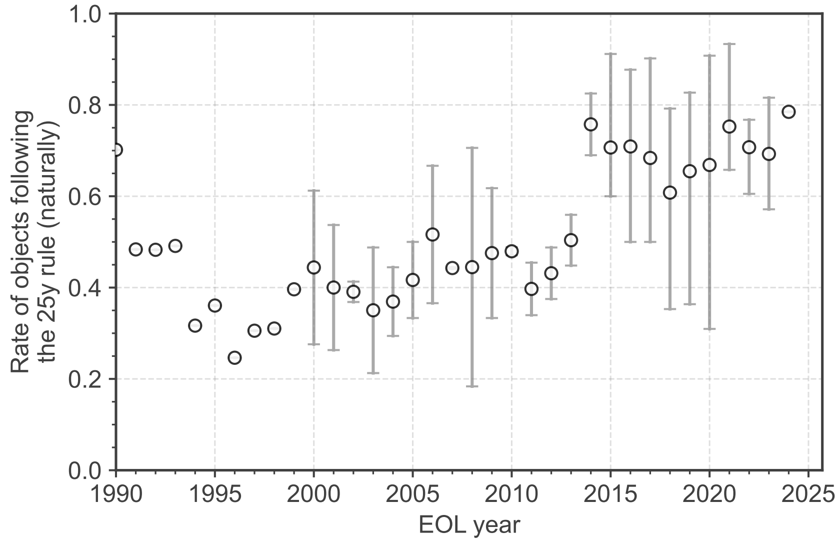

Figure 19: General rate of naturally compliant spacecraft in LEO over total as assessed by the contributing agencies. Note: because of the adopted methodologies, the value for the last year always needs re-confirmation in the report coming in the following year.

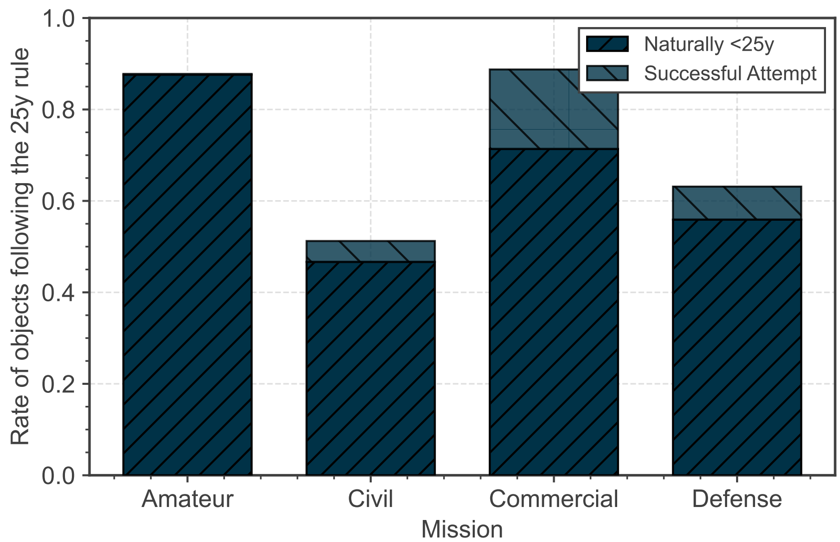

Figure 20: General compliance rate for spacecraft in LEO by mission type as assessed by the contributing agencies.

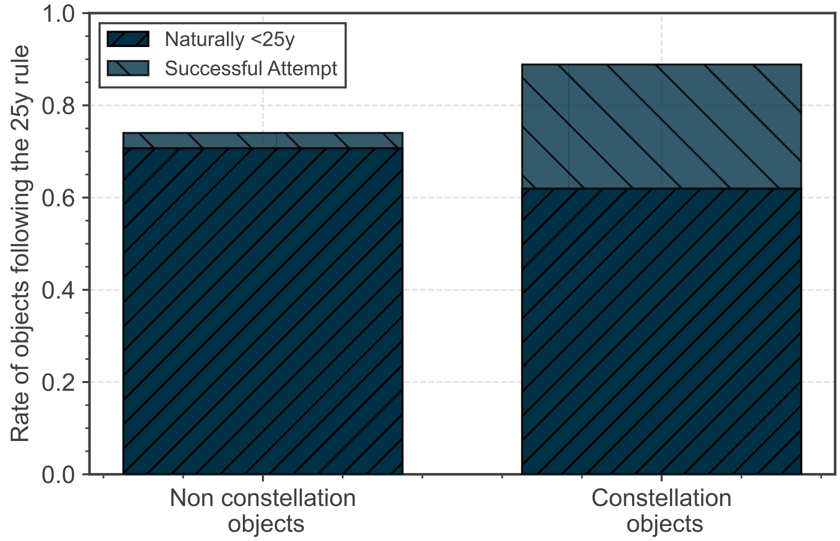

Figure 21: General compliance rate for constellation and non-constellation objects as assessed by the contributing agencies.

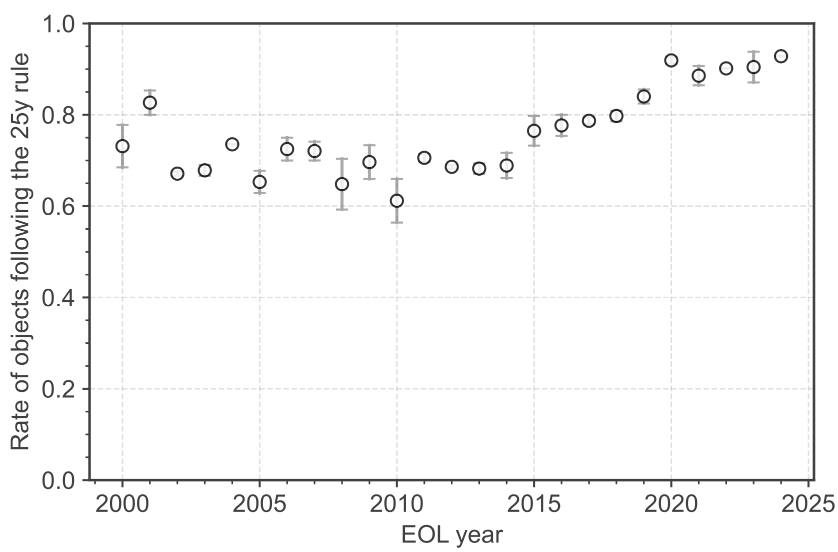

Figure 22: General rate of compliant orbital stages in LEO as assessed by the contributing agencies. This includes naturally compliant objects and successful disposal attempts.

5 Environment Evolutions

The simulation of the future evolution of the debris population can be used to assess the efficacy of proposed mitigation actions and of current behaviours. In particular, two scenarios are presented in this section:

- A defined extrapolation of the current behaviour in terms of launch traffic, explosion rates, and disposal success rates,
- No further launches (NFL), where it is assumed that no launch takes place after the reference epoch.

The definition of trends in launch traffic, explosion rates, and disposal success rates is based on the data available to the contributing agencies and on the analysis contained in this report. The same inputs are used for each simulated scenario, whereas each agency uses its own model for the simulation of the long-term evolution of the environment over 200 years, performing at least 100 Monte Carlo runs per scenario. The parameters for the scenario definition are summarised below.

For both scenarios, the reference population used for the analysis is an extraction of the DISCOS population at the reference epoch (31/12/2024). For each object, physical characteristics such as mass, cross-sectional area, and orbital parameters are retrieved. For orbital stages and spacecraft, launch information is also stored. For spacecraft specifically, information is also stored on which orbital regional they perform their normal operation and whether they belong to a constellation. Normal operation is defined as beginning at at the end of the launch phase or when released on-orbit and ends at the end of the disposal phase.

The yearly explosion rate is taken from the last decade statistics on non-system related fragmentations. In addition, for the NFL scenario, no explosion event is simulated after the first 18 years; this is motivated by the fact that it has been observed that 95% [4] of the non-system related fragmentation events occur within that time interval from launch.

For the extrapolation scenario, a launch traffic model is also needed as input for the simulations. This was obtained by repeating the launch traffic between 2017 and the reference epoch, discounting the contribution from constellations. For each of the constellations currently in orbit, a model of deployment and replenishment was defined using the publicly available data. A capability to successfully perform collision avoidance manoeuvres is assumed for as long as a spacecraft is active in the simulation.

A fixed operational lifetime of eight years is assumed for spacecraft not belonging to a constellation instead of the values derived in this report, in-line with current long-term space debris environment modelling practices. Specific values are used for spacecraft belonging to constellations, based on the available information on the current constellation designs where possible. Post-mission disposal success rates are derived from the observed values reported in Section 4.3, considering the performance for objects with end-of-life equal or later than 2017. A value of 90% is used for constellation objects, which is above the historically observed rates, but statistically valid rates could not yet be derived from the current active population. It should be noted that within the space debris mitigation guidelines it is identified that the probability of successful post-mission disposal should be at least 90% with a goal of 99% or better. Therefore, using 90% within the simulations is taking the lower recommended limit for this value. As such, it is set to the bare minimum identified in the IADC guidelines.

The evolution of the number of objects larger than 10 cm and the cumulative number of catastrophic collisions, i.e., collisions leading to the complete destruction of target and impactor, are shown in Figure 23 and 24. The dark line represents the mean value over all the Monte Carlo runs and the light shaded region indicate the envelope of results (i.e. defined by the minimum and maximum case). This representation was selected to visualise the variability across the runs without introducing standard deviation bands as they may be not representative of the result distribution [3].

The results in Figure 23 and Figure 24 show a spread in the number of objects and collisions due not only to the intrinsic variability across different Monte Carlo runs (e.g. related to the conditions under which a collision will take place), but also due to the differences across the models available to the contributing agencies. For example, different models for the solar activity were used in the simulations, and previous work identifies this as a significant contribution to the variability of the results [6].

To compensate for this effect, a normalisation process was applied as follows:

- For each contributing agency, the mean curve in the No further launches scenario is computed (both for the number of objects and the cumulative number of catastrophic collisions);
- For each contributing agency, the individual outcome of the Monte Carlo runs in the Extrapolation scenario is normalised with the reference case at the point above;
- An overall mean is computed considering the normalised outcome from all simulations.

The results of this process for the number of objects and the number of catastrophic collisions are shown in Figure 25 and Figure 26, respectively. In spite of the variability of the results in Figure 23 and Figure 24, the normalised plots show a good level of consistency, with the Extrapolation scenario resulting in around four times more objects than the No further launches case, and almost six times more catastrophic collisions.

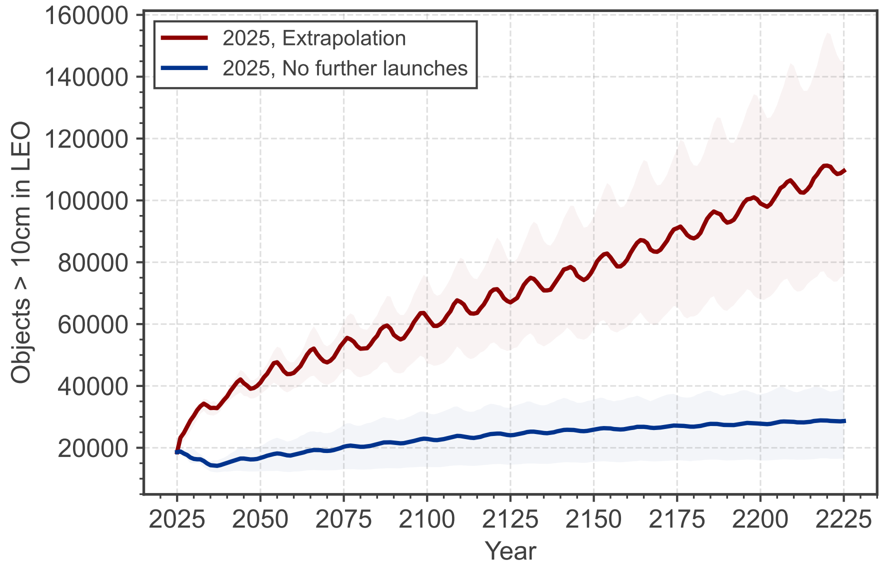

Figure 23: Number of objects larger than 10cm in LEO in the simulated scenarios of long-term evolution of the environment.

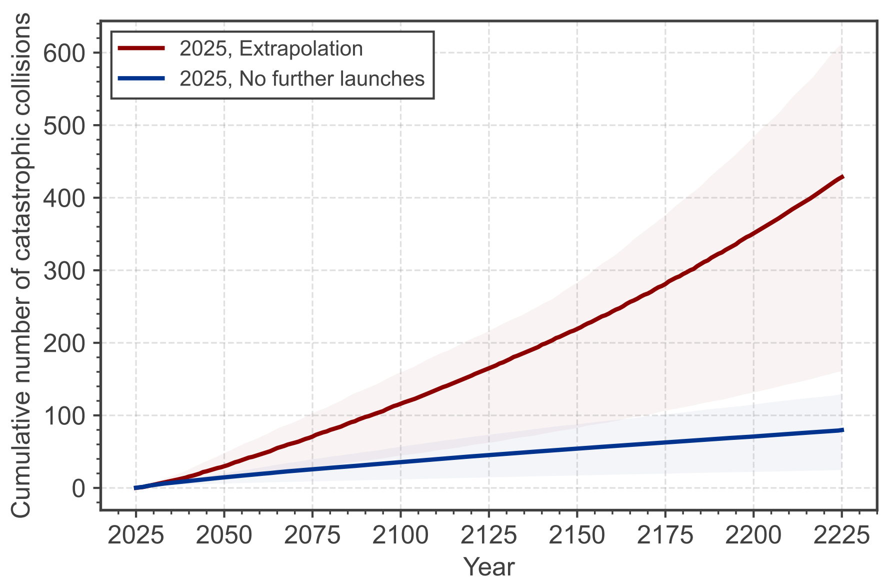

Figure 24: Cumulative number of catastrophic collisions in LEO in the simulated scenarios of long-term evolution of the environment.

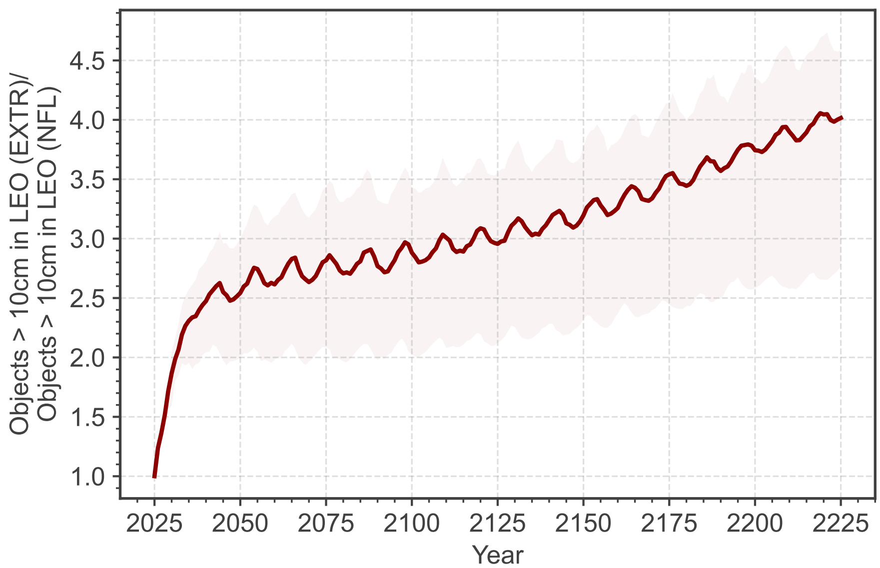

Figure 25: Number of objects larger than 10cm in LEO in the simulated scenarios of long-term evolution of the environment.

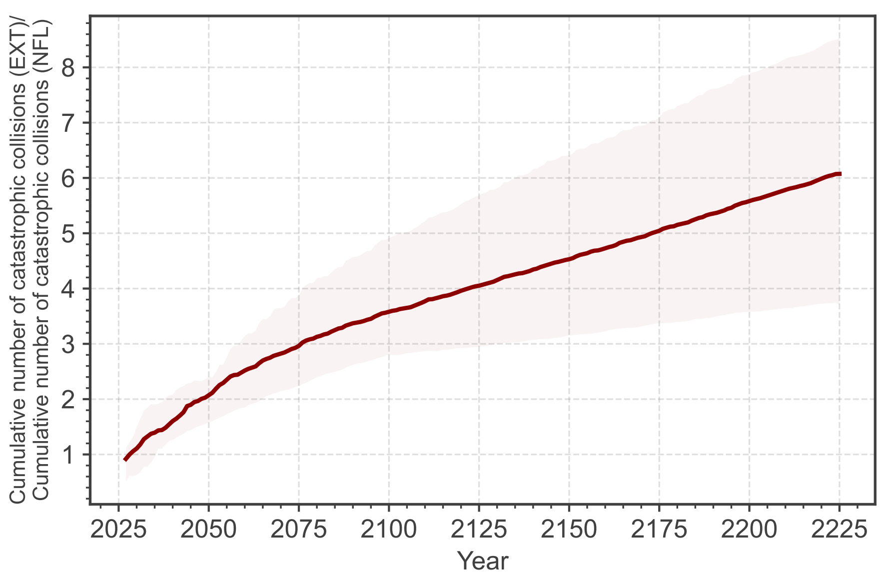

Figure 26: Cumulative number of catastrophic collisions in LEO in the simulated scenarios of long-term evolution of the environment.

6 Sustainable space

The United Nations has previously defined sustainability as *the ability to maintain the conduct of space activities indefinitely into the future [...] in order to meet the needs of the present generations while preserving the outer space environment for future generations* [5]. Building upon this, the IADC is performing work to set metrics to define a sustainable space environment. It is hoped that future releases of this report will include the outcome of this work and this section will build upon this research by providing a quantitative interpretation of the space environment status and forecasts. Ahead of this and using the results provided in this report, the following observations can be made concerning the current and future state of the space environment:

- The most accelerated change in the launch traffic has been seen in LEO, particularly from 2019, due to the deployment of large constellations and a shift towards commercial operators, as shown in Figure 3 and Figure 4;
- The widespread adoption of the COPUOS and IADC space debris mitigation guidelines and the IADC recommendations for large constellations of satellites continue to remain the most effective method to reduce the long-term environmental impacts of global space activity by slowing the rate of growth of the space debris population observed;
- With an increasing number of active satellites collision avoidance is also becoming increasingly important, so as the need for coordination between operators;
- Adoption of the IADC space debris mitigation guidelines is not yet at a level that is sufficient to induce substantial benefits or slowing of the population growth;
- With the current level of adoption of the IADC guidelines and recommendations, the extrapolation of current space launch activity could lead to the rapid growth of the orbital object population. The environmental evolution results in Section 5 identified that a doubling of the space debris population may occur in less than 50 years;
- Critically, in the case of no further launches into orbit, it is expected that collisions among space debris objects already present will lead to a further growth in space debris population;
- The IADC continues to encourage widespread adoption of the IADC guidelines and its recommendations. However, even with widespread adoption of these guidelines and recommendations, or even stricter behaviours, the consensus is that the environmental impacts cannot be removed completely and additional steps should to be taken, such as enabling the technology for active debris removal;
- Further research and discussions are encouraged within the global community to develop a consensus view on the definition of a sustainable space environment. The IADC will continue to perform research in this area and will provide regular releases of this environment report to support these discussions, including at the UN sessions.

7 Bibliography

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