

Baseline

The baseline is understood as the currently applicable scenario. It comprises different work strands which are underway as well as developments taking place at international, EU and Member State levels to ensure the safety, resilience/security and sustainability of space activities.

At **international level**, five United Nations (UN) treaties on outer space¹ have been adopted by the UN Committee on the Peaceful Uses of Outer Space. They enshrine several **high-level principles** that are further supplemented by **non-binding** rules promoting in particular space safety. The additional non-binding rules include the UN Long-Term Sustainability of Outer Space Activities², the Space Debris Mitigation Guidelines (elaborated by the Inter-Agency Space Debris Coordination Committee (IADC)³), the Space Debris Mitigation Guidelines (elaborated by the Committee on the Peaceful Uses of Outer Space)⁴ and the International Telecommunication Union (ITU) guidelines⁵ focussing on radiofrequency and physical interferences.

At the technical level, the International Standardisation Organisation (ISO) and the European Committee for Standardization (CEN) have developed space safety standards⁶ that further elaborate the above-mentioned treaties and non-binding rules. In addition, over the years, **various industry-led initiatives**⁷ have fostered good behaviour by space actors on space safety, including data-sharing, sharing and development of best practices, ratings and information exchanges.

The international space regime does not cover sustainability on Earth. While no international legal regime covers this aspect, there have been **developments within the ISO**, including the elaboration of standards to support organisations in the environmental management activities.⁸

While in the fields of **cybersecurity and resilience** no specific rules are crystallized at international treaty level, some jurisdictions have advanced in tailoring their **risk management / cybersecurity** practices to the space activities and the space systems.

¹ These treaties are: the “Outer Space Treaty (1967), the “Rescue Agreement” (1968), the “Liability Convention” (1972), the “Registration Convention” (1976), the “Moon Agreement” (1984). <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html>.

² Guidelines for the Long-term Sustainability of Outer Space Activities. https://www.unoosa.org/res/oosadoc/data/documents/2018/aac_1052018crp/aac_1052018crp_20_0_html/AC105_2018_CRP20E.pdf

³ IADC, IADC Space Debris Mitigation Guidelines (Rev. 3), IADC-02-01 (June 2021), see https://www.iadc-home.org/documents_public

⁴ Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space. https://www.unoosa.org/pdf/publications/st_space_49E.pdf.

⁵ ITU-R: Managing the radio-frequency spectrum for the world. <https://www.itu.int/en/mediacentre/backgrounders/Pages/itu-r-managing-the-radio-frequency-spectrum-for-the-world.aspx> the ITU framework contains both binding rules (ITU constitution and Radio Regulations) and non-binding guidelines. Environmental protection of the geostationary-satellite orbit. <https://www.itu.int/rec/R-REC-S.1003/en>

⁶ These include procedural standards developed under the ISO/TC 20/SC 14 “Space systems and operations” and CEN-CENELEC/JTC 5. Some examples of procedural standards include the space data and information transfer systems and SSA monitoring. Other standards are technical and engineering standards developed under the same ISO/TC 20/SC 14 and CEN-CENELEC/JTC 5. These standards include space systems, space engineering and space product assurance. Lastly, there are data-related standards developed under ISO/TC 20/SC 13 “Space Data and information transfer systems”, which focus on space data and information transfer systems.

⁷ The initiatives include: the Space Data Association; the Net Zero Space Initiative; the Space Sustainability Rating.

⁸ The family of ISO standards 14000 relate to environmental systems and focus on specific approaches related to audits, life cycle analysis, labelling, communications, climate change, among others.

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/theiso14000family_2009.pdf

Spacefaring jurisdictions, such as the United States (US) are advancing on developing new and tailored approaches both to the space traffic management and the risk management. For instance, the US will continue working to address ‘current and future operational risks’ in the context of the implementation of several US Space Policy Directives on Space Traffic Management⁹ and Cybersecurity Principles of Space systems.¹⁰ On the latter aspect, the US Interagency Reports elaborated by the US National Institute of Standards and Technology (NIST) enshrine detailed principles and practices aimed at applying the NIST Cybersecurity Framework to space the systems¹¹.

At **EU level**, as regards space safety, the **EU SST Partnership**¹² offers services related to collision avoidance to which space EU and non-EU operators can register free of charge and re-entry prediction to EU users. As regards **risk management and cybersecurity**, two recent Directives regulate the resilience of critical entities (CER Directive¹³) and the cybersecurity of essential and important entities (NIS2 Directive¹⁴) with operators of space infrastructures in the scope of these acts.

At **national level**, 11 EU Member States have adopted legislations to regulate space activities, while other Member States are contemplating the possibility of adopting legislation for space. The extent and granularity of the various legislative approaches vary across the single market. Some Member States took a high-level approach (limited obligations in the laws) while others regulate in more detail and with stringent obligations for the space industry. As a common denominator, national legislations establish licenses for carrying out space activities to ensure compliance with international obligations (stemming from the Outer Space Treaties).

The baseline scenario entails that the above-mentioned context will persist and that no additional intervention at the EU level is foreseen in the field of space safety, resilience, and sustainability.

⁹ <https://trumpwhitehouse.archives.gov/presidential-actions/space-policy-directive-3-national-space-traffic-management-policy/>

¹⁰ [Memorandum on Space Policy Directive-5—Cybersecurity Principles for Space Systems – The White House \(archives.gov\)](#)

¹¹ For instance, NIST IR 8270 (Introduction to Cybersecurity for Commercial Satellite Operations) and NIST IR 8401 (Satellite Ground Segment: Applying the Cybersecurity Framework to Satellite Command and Control).

¹² A Partnership composed of 15 EU Member States, which established a network of ground-based and space-based sensors aiming at surveying and tracking space objects to provide data, information and services on space objects orbiting around the Earth. See: <https://www.eusst.eu/>

¹³ Directive (EU) 2022/2557 on the resilience of critical entities and repealing Council Directive 2008/114/EC <https://eur-lex.europa.eu/eli/dir/2022/2557/oj>

¹⁴ Directive (EU) 2022/2555 on measures for a high common level of cybersecurity across the Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022L2555&from=EN>

Option 1: Promote adherence to non-binding standards, best practices and guidelines

This option would entail a proactive development and promotion by the EU of best practices, standards and guidelines (hereinafter referred to as 'non-binding instruments'). To that effect, the Commission would establish mechanisms involving all key players (Member States, industry actors, EU institutions, agencies etc.) notably through the following:

- **A stock tacking exercise** comprising two steps:
 - In a first step, to take stock of all non-binding instruments currently in place at national, European and international levels. The aim of this analytical work is to comprehensively assess them and identify those best fit for industry use and to receive promotion at national and EU levels.
 - In a second step, to identify missing essential rules and elements. The aim will be to check if all key aspects on safety and sustainability and resilience are currently properly covered by the non-binding tools.
- Based on the **stock-tacking** exercise the EU would:
 - **Prepare the ground for the development** of new non-binding instruments at the EU level. The EU would proactively promote the take-up of **new and innovative solutions** notably to fill gaps within the current frameworks.
 - **Stimulate adherence** to existing (and potential new) non-binding tools by relevant stakeholders (industry) and Member States.
The EU could work towards enabling better recognition of non-binding instruments. This can be achieved through the creation of **space labels**.

The Commission would coordinate the overall setup of the **space labels**. A steering committee would set up, review, and revise the criteria needed to obtain the label. The labels would share the same underlying components covering development and maintenance, assessment and certification, the use of the label, and governance, but differing in scope.

The label would entail the adoption of a legislative act that would include horizontal rules on governance and the procedure for determining the technical progress, while the application of the label would be determined by a designated stakeholder committee. The proposal for draft criteria and associated technical report shall be made subject to public consultation.

Requirements for the envisaged non-binding instruments

The development of new non-binding instruments would focus on space activities aiming at addressing the **main sources of risks** for space safety, resilience/security and sustainability during the preparation and the implementation of the space activities.

Scope	Requirement	Examples of concrete measures
Congested space: risk of satellite collision	Satellite tracking	Limit risk of collision through - Registration to a Collision Avoidance service provider

		- Provide name of the entity in charge of Collision Avoidance to an EU registry (to facilitate coordination between operators in case of a risk collision alert)
Congested space: risk of satellite collision	Space Debris Mitigation	Ensure that satellites are designed to limit the risk of releasing debris throughout the mission, through the submission of a space debris mitigation plan. This can be based, for example, on existing international standards or through the development of new more detailed European standards
Congested space: risk of satellite collision	Post Mission Disposal	Ensure that satellite design limits the risk of becoming debris at the end of life through a post mission disposal plan (including means to dispose and requirement to passivate amongst other things)
Increased threat level	Risk Management Cycle	Develop best practices and techniques to be shared among market operators on most effective risk management steps and lessons learned in the detection of incidents, protection measures, business continuity and recovery measures. Analysis of current available cybersecurity frameworks worldwide Possible role of ENISA and EUSPA in promoting such good practices and techniques
Increased threat level	Information security requirements, encryption,	- Share best practices and information, for instance, on necessary technical aspects, such as encryption methods, authentication for satellite communications, how to build effective security to address cyber threats over the potential long lifetime span of satellites, penetration testing for space infrastructures, etc. - Develop practical handbooks - role of ENISA
Increased threat level	Cyber incidents and cyber threats	Share information on cyber threats and remedies applied
Inability to reliably assess and compare the space sectors environmental performance	Environmental Impact Assessment + development of PEFCR	Develop life cycle assessment for space activities based on the PEF method

Purpose

Today, many space companies go far in signing pledges to improve space safety, security and sustainability.¹⁵ The label would create a government-approved mechanism that can certify that companies meet the requirements of the relevant non-binding instruments and have been properly

¹⁵ See for example [The Declaration | Net Zero Space Initiative](#) that has 62 different companies supporting it, or [Space Safety Coalition](#) that has 60 endorsees for their first version of their best practices for sustainability of space operations

verified. Such transparency would help to reduce ‘greenwashing’ and could incentivise behavioural change. In addition, companies may be more willing to choose subcontractors with such a label, because their products are certified to be safer or more secure, thereby limiting risk of future damage to satellites. In addition to such possible incentives for the industry, Member States would be encouraged to use a to-be-developed manual for authorities using the label in their awarding of public contracts. The manual would include certain criteria, based on the label, that Member States should consider when setting requirements for the purchasing of upstream space products and services.¹⁶ Appropriate procedures for monitoring the proper use (and avoiding misuse) of the labels would be put in place.

Overview

Nature of act	Development of a Charter at the EU level (non-binding) Adoption of an EU act establishing a labelling scheme, which is voluntary for industry to adhere to
Scope	Non-binding measures based on current or to be developed standards
Obligations	No obligations
Ex-ante check	(only relevant for the label) Check by competent authority responsible for monitoring compliance with the EU voluntary label
Ex-post enforcement	(only relevant for the label) National competent authorities designated by Member States as responsible for the EU label
Governance	(only relevant for the label) National competent authorities designated by Member States as responsible for the EU label

¹⁶ Similar to the ECO-label.

Option 2: Adopt a binding framework at EU level

This option would entail the adoption of a Commission legislative proposal for an EU regulation setting out key rules relating to the safety and sustainability, resilience and earth environment aspects of space activities.

Requirements for the envisaged binding framework

The requirements related to space safety, resilience/security and sustainability would integrate into the national licensing systems and requirements for space activities, whether already existing or to be developed.¹⁷.

In addition, the Commission legislative proposal would contain requirements for entities to become “notified bodies” (in line with the New Approach), which would be tasked to assist Member States in their conformity assessment of the envisaged EU key requirements on safety, resilience and sustainability. The notified bodies would not be mandated to assess the additional (purely) national requirements in the licenses. The costs of using notified bodies would be borne by the Member State who is responsible for granting the respective space license.

Purpose

The legislative proposal would ensure the development of an effective single market for goods and services related to space activities, by introducing minimum harmonised rules relating to the safety, resilience/cybersecurity, and sustainability of space activities.

This legislative proposal would aim at developing a common level playing field in the EU single market while guaranteeing that EU operators do not suffer from distortion of competition by operators established outside the EU applying less stringent standards. This would be achieved, for instance, by imposing equal treatment to EU operators and third country satellite operators intending to provide services within the EU.

Scope	Requirement	Examples of concrete measures
Congested space: risk of satellite collision	Satellite tracking	Limit risk of collision through <ul style="list-style-type: none">- Registration to a Collision Avoidance service provider- Provide name of the entity in charge of Collision Avoidance to an EU registry (to facilitate coordination between operators in case of a risk collision alert)- Obligation to inform about changes to manoeuvres.
Congested space: risk of satellite collision	Space Debris Mitigation	Ensure that the satellite design limits the risk of becoming debris at the end-of-life through a post mission disposal plan - addressing elements such as satellite’s fuel, materials used (including verification and validation)

Congested space: risk of satellite collision	Post Mission Disposal	<p>Ensure that the satellite is designed in a way to limit the risk of becoming debris at the end-of-life, through a post mission disposal plan:</p> <ul style="list-style-type: none"> - Reliable and safe mission disposal - Design reliability for disposal - Passivation (deplete energy storage)
Increased threat level: gaps in the resilience baseline; risk of cyberattacks and electronic interferences	Risk Management Rules	<p>Ensure a proper and coherent risk management of all space infrastructures and assets along the risk management cycle:</p> <ul style="list-style-type: none"> - management of space assets: identification and classification of assets, inventories, and documentation - management and control of access rights for all relevant segments (space, ground, links) - detection of incidents: effectively activate alerts and identification of interferences, cyberattacks, spoofing, jamming, as well as incidents related to the physical infrastructures - cyber and physical protection and prevention measures: encryption, malware protection policy, patch management, increase tolerance to noise, mitigation strategies, back-up management. - business continuity policy, having response and disaster recovery plans - testing the ICT systems - reporting of significant incidents - communication in the emergency protocols
Increased threat level: gaps in the resilience baseline; risk of cyberattacks and electronic interferences	Risk Assessment	<ul style="list-style-type: none"> - Risk assessment covering all lifecycles of the space activities and operations - Specific risk assessment (commercial off the shelf (COTS), non-EU assets) - use of risk scenarios, threat modelling, use case
Increased threat level: gaps in the resilience baseline; risk of cyberattacks and	Reporting of significant incidents	<ul style="list-style-type: none"> - Handling of all incidents - Reporting of significant incidents (cyber and non-cyber related) - Establishment of national monitoring centres with the support of EUSPA

electronic interferences		
Increased threat level: gaps in the resilience baseline; risk of cyberattacks and electronic interferences	Supply chain management	<ul style="list-style-type: none"> - Criteria for the choice of software in the supply chain - Control ICT systems connected for maintenance - Review ICT requirements in the contracts - Non-EU assets inventory
Inability to reliably assess and compare the space sectors environmental performances	Environmental Impact Assessment + development of PEFCR	<ul style="list-style-type: none"> - Ensure life cycle assessment for new upstream space products and services - Develop life cycle assessment for space activities based on the PEF method - Minimise environmental impacts

Overview

Nature of act	EU legislative act (Regulation)
Scope	Binding rules Certain detailed technical requirements (standards) to be developed by the European Standardisation Organisations
Obligations	Binding requirements for satellite operators, manufacturers, and Member States authorities
Ex ante enforcement	Relevant national authority in charge of granting the satellite licenses, with the potential support of certifying bodies (notified bodies)
Ex post enforcement	Relevant national competent authority
Governance	At national level

Option 2+: Adopt a binding framework at EU level, paired with non-binding measures.

This option would build on Option 2 but would envisage the adoption of a space safety, resilience/security and sustainability legislative package. Thus, on top of the above-mentioned regulation in Policy Option 2, Policy Option 2+ introduces a proposal for a Directive that contains supportive measures for the space industry. These measures would support research and innovation in space safety, resilience/security and sustainability, and create an EU toolbox consisting of several non-binding materials, platforms and labels to improve space safety, resilience/security and sustainability.

Requirements for the envisaged non-binding measures

Scope	Measure	Examples of concrete measures
Safety, resilience/security, sustainability,	Space Labels: while the binding rules (PO2) reflect state-of-the-art technical requirements to be fulfilled by all operators, the label would be awarded to operators who are able to go the extra mile (voluntary)	A safety, sustainability, cybersecurity label: <ul style="list-style-type: none"> - criteria that build upon the baseline requirements in PO2, but set higher requirements towards achieving safety, resilience/security and sustainability - built on the mechanism under PO1: additional criteria based on standards or best-practices that are not binding (outside PO2) - companies would receive the label based on a rating mechanism of e.g. (1) how many additional criteria they meet and (2) how much more ambitious they are as compared to the thresholds set out in the binding rules (PO2)¹⁸
Safety // Sustainability	Platform for sharing best practices on space safety and sustainability, to facilitate coordination and knowledge-sharing among stakeholders	<ul style="list-style-type: none"> - Member States can submit best practices for the implementation of safety requirements - Promotion of existing best practices and principles such as for instance the On-Orbit Servicing¹⁹ best practices developed under Horizon Europe grants²⁰ or eco-design principles - Identification and development of new non-binding instruments under the stakeholder mechanism as identified under PO1
Resilience/Security	Participation in the information-sharing HUB	Participation in information-sharing arrangements where operators of space infrastructures may share cyber threat information (including indicators of

¹⁸ For example, where a binding rule requires a satellite disposal plan of X percentage certainty for successful disposal, the company would receive points if their satellite disposal plan meets a higher threshold of certainty for success.

¹⁹ On Orbit Servicing means satellite repair, refueling and recycling activities. The technology is not sufficiently mature for binding requirements.

²⁰ [PERASPERA \(AD ASTRA\) Plan European Roadmap and Activities for Space Exploitation of Robotics and Autonomy | PERASPERA | Project | Fact sheet | H2020 | CORDIS | European Commission \(europa.eu\)](#)

	with the support of EUSPA (EU SPACE ISAC) Best practices on cyber security going beyond the level established in the legislative proposal (PO2)	compromise, cybersecurity best practices (participating would remain voluntary; the law only frames basic principles for participation) Best practices for instance on encryption (going beyond the level established in the legislative proposal)
Sustainability on Earth	Reduce environmental impact of space activities	Develop and implement a mitigation plan to reduce environmental impacts in the lifecycle of a space activity Communicate on the environmental performance based on PEFCR for space methodology

Purpose

Whereas the binding requirements of the proposed Regulation will have an economic impact for satellite operators, the additional supportive measures to be developed under Policy Option 2+ will act as economic incentive measures for the space companies. Economic incentives can encourage industry not only to meet the minimum regulatory requirements but also to go beyond them and thus set levels of excellence.

In addition, the economic incentives can help offset some of the financial burden imposed by the regulation, as there will be new avenues to seek investment in new technologies or processes. This can lead to cutting-edge solutions for the benefit of industry and all users of space.

Nature of act	Regulation + Directive
Scope	PO2 + non-binding measures (guidelines, information sharing platforms, voluntary label mechanism)
Obligations	Binding requirements for satellite operators, manufacturers, and Member States authority
Ex ante enforcement	PO2 (binding rules) + PO1 (label)
Ex post enforcement	PO2 (binding rules) + PO1 (label) Relevant national competent authorities
Governance	PO2 (binding rules) + PO1 (label)

Option 3: Action at global level: bilateral agreements

If Policy Option 2(+) is selected, the following could be a viable option for the EU to act internationally.

Any action taken at international level would **build upon the content of PO2 through a phased approach**: first, an EU legislative proposal is enacted to address space safety, resilience/security and sustainability, and second, the EU would take action at the international level through the conclusion of a series of bilateral agreements.

Process

The experience of the EU proposal of an International Code of Conduct for Outer Space Activities in 2014²¹ shows the complexity of attempts at reaching multilateral consensus, as it was evidenced by difficulties in convincing the international community to subscribe to the ambitious EU-led initiative with a comprehensive scope. However, it is also true that the past decade witnessed an increased awareness on need for rules on space safety, sustainability and security.²² As a result, multiple initiatives launched at the international level demonstrate an increased willingness of the international community to start discussing ways to improve space safety, security and sustainability, either within the UN²³ or outside an established multilateral framework.²⁴

This option could further develop the commitment given by G7 leaders to promoting the safe and sustainable use of outer space by addressing the challenges of space debris and security related challenges of Anti-Satellite Tests.²⁵ The 2024 UN Summit of the Future has been called a 'unique window of opportunity' that may allow the international community to discuss global solutions to the space safety and security challenges.²⁶ This Policy Option would thus build on the momentum expected to be created in the preparation and aftermath of this summit.

These international initiatives show, in particular, the importance of building partnerships and set a clear focus on specific measures with an effect on the safety, sustainability and security of space activities. The bilateral instruments should be concluded with specific partner countries, in particular those with whom the EU is engaged in Space Dialogues and talks in the context of the 3SOS initiative.

Under this Policy Option, the Commission would propose a common set of negotiation directives for approval by the Council. The bilateral agreements would aim to have the similar bilateral effects of NASA's

²¹ Last version of 31 March 2014 at https://www.eeas.europa.eu/sites/default/files/space_code_conduct_draft_vers_31-march-2014_en.pdf.

²² See, for example, the debris created by Russia's ASAT test in 2021 and impact on the safety of the ISS: <https://www.armscontrol.org/act/2021-12/news/russian-asat-test-creates-massive-debris>.

²³ See the parallel discussions of the Working Group on the Long-Term Sustainability of Outer Space Activities in the UN COPUOS Scientific and Technical Subcommittee the Open-ended working group on reducing space threats through norms, rules and principles of responsible behaviours (and the Conference on Disarmament on the prevention of an arms race in outer space).

²⁴ See the example of the bilateral series of NASA Artemis Accords below, and the pledge by 35 countries including a joint commitment by the Member States of the EU to ban ASAT testing [European Union nations join ASAT testing ban - SpaceNews](#)

²⁵ [g7-2023-hiroshima-leaders-communique.pdf \(europa.eu\)](#)

²⁶ See UNGA Resolution A/RES/76/307 of 12 September 2022. Even if the Summit falls short of meeting its ambition to develop a 'single unified governance framework' that covers space traffic coordination, debris and resource management, as well as norms and rules to avoid armed conflict in outer space, it is expected to result in an acceleration in global discussions on global solutions.

Artemis Accords.²⁷ The Artemis Accords have been endorsed by 29 countries, each entering into separate bilateral agreements with the United States. In the same way, this option would entail for the EU to enter separate bilateral negotiations with different third countries, with the goal of establishing agreements that predominantly share the same content.

The negotiations would stipulate content that reflects the established EU position (as resulting from Policy Option 2). The content of such agreements would likely include certain high-level requirements or references to support certain international used standards (as long as not contradicting the European harmonised standards). Negotiations should also seek to promote the use of the label.

The process for entering into bilateral agreements follows Article 218 TFEU. After the Council’s approval of the negotiation directive, the Council would approve a decision authorising the signing and conclusion of the bilateral agreement.

Nature of act	A series of international agreements between the Union and a third country
Scope	Binding measures for the EU and the respective third country
Obligations	Binding requirements for satellite operators, manufacturers, and Member States authority
Ex ante check	Bilateral oversight body/board responsible for the effective functioning of the bilateral agreement
Governance	The bilateral oversight body/board could be composed of the third country’s relevant competent authority, on the one side, and the European Commission, assisted by EUSPA and national competent authorities in the space domain, on the other side
Ex post enforcement	Relevant national competent authorities

²⁷ NASA Artemis Accords, or Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, comets and asteroids for peaceful purposes. Text of 13 October 2020 available at <https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf>