



## Memorandum of Principles for Space Sustainability

28 June 2023

**“We must develop a sustainable way, a durable way, of benefiting from space, just as we must here on the Earth.” King Charles III, 2022.**

The signatories to this Memorandum of Principles seek to promote and facilitate international engagement with, and understanding and management of, the long-term sustainability of outer space activities, and through these efforts establish transparent Space Sustainability Principles of responsible behaviour, based on, expanding and developing the initial principles set out in the Annex. These Space Sustainability Principles will then form a set of Space Sustainability Standards.

The signatories refer to the Secure World Foundation definition of space sustainability: *“Ensuring that all humanity can continue to use outer space for peaceful purposes and socioeconomic benefit now and in the long term”*, recognising the value of space for our life on Earth.

The signatories to this Memorandum of Principles:

**Acknowledge** the profound importance of the peaceful use of space for the prosperity of all people and of the planet, for facilitating geopolitical collaboration and for supporting essential communication, observation, navigation, cultural, scientific and civic purposes. The signatories further acknowledge the importance of space as a shared, unique and fragile environment.

**Recognise** that the use of space has had, and continues to have, broad environmental impacts and that responsible behaviour and environmental stewardship should be encouraged, incentivised and underpinned by strong ethical and accountable governance and appropriate regulation, acknowledging that these components are interlinked and dependent upon each other.

**Recognise** that the commercial space industry can take a leading role in space sustainability by adopting responsible practices, including in the design, operation and disposal of space systems, considering their impact on terrestrial and space resources - allowing all nations, their private actors and people to benefit from a peaceful, safe and sustainable space environment, now and into the future.

**Recognise** that responsible behaviour can be encouraged, supported and promoted by:

- (a) the investment and insurance communities, by facilitating investment and insurance cover for responsible space practices that support the sustainable use of space; and
- (b) governments and regulators, by implementing national incentive-based regulation, licensing conditions and market access requirements, where appropriate.



**Further recognise** that responsible behaviour can be encouraged and promoted:

- (a) by academia, through research and the development of technologies and analysis techniques;  
and
- (b) by the public across the world, by raising awareness and holding all space actors accountable.

**Recognise** that working collaboratively together across all of these sectors offers a mutually beneficial means for encouraging and maintaining responsible and sustainable behaviour across the space industry to the advantage of all.

**Highlight** the importance of greater international engagement and knowledge sharing across governments, policy makers and regulatory systems, with sustainability criteria being common core principles rather than outlier aspirations. The signatories value the involvement of a broad user community, all of whom have a stake in space and are motivated to protect it.

**Acknowledge** that many aspects of outer space, including radio frequency spectrum and orbits, are scarce natural resources that can be depleted and degraded, much like natural resources on Earth. The signatories recognise that we must develop ways to understand and manage the use of these resources efficiently, equitably and sustainably; creating incentives to develop new technologies to allow us to do “more with less”, as we are learning to do on Earth.

**Appreciate** that sharing space means adopting responsible practices for facilitating equitable access to space, and for limiting adverse effects on operational, environmental, scientific and cultural benefits. The signatories further acknowledge that the management challenges related to these effects are likely to increase in complexity as the number of actors, spacecraft and debris in orbit increase.

**The signatories further acknowledge the following:**

The Space Sustainability Principles will set out the principles for responsible and sustainable activities.

Space sustainability and space safety embody the need to share the space environment through the responsible, effective and collective management of all orbital objects, including those already present within the space environment and those yet to be launched. These goals encompass the consideration of the space environment with other environmental, safety, scientific and cultural impacts. The Space Sustainability Principles will provide a common framework for all stakeholders - at international, regional and national levels (including through regulation and licensing) to achieve these broad management goals.

By guiding the design, launch, operation, maintenance and disposal of all orbital objects, the Space Sustainability Principles will promote the means for limiting further environmental impacts, including the generation of space debris, waste and pollution and interference, whilst also enabling measures seeking to remedy the environmental impacts that have already occurred.



The Space Sustainability Principles will promote international cooperation and collaboration and be compatible with, and be applicable to, finance, insurance, market access, international law and regulatory and licensing considerations while aligning with global environmental, social and governance sustainable development values and frameworks.

The Space Sustainability Principles will recognise the value arising from our diverse relationship with space, the Moon and other celestial bodies scientifically, economically, culturally, socially and individually – accepting that space is what all life on Earth has, has had, and will have in common.

It is recognised that each signatory will have to make its own decisions about the implementation of these Space Sustainability Principles and the resulting Space Sustainability Standards.

The signatories to this Memorandum of Principles stand sure and united in their commitment to protect the significance, use and exploration of the space environment, taking a collaborative, international, diverse, inclusive and multi-disciplinary approach.

The signatories recognise the challenges ahead but are proud to contribute their knowledge, experience, and resources to enable the robust pursuit of excellence, innovation and leadership in space sustainability for future generations.

This Memorandum of Principles is not intended to create any legal obligations or legally enforceable rights.

The undersigned, duly authorised, have signed this Memorandum of Principles for Space Sustainability.

SIGNED by \_\_\_\_\_  
a duly authorised signatory of

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## **Annex**

### **The signatories intend that the Space Sustainability Principles will cover the following:**

The signatories intend that the Space Sustainability Principles will address the need to consider the environmental impacts of space activity, taking a holistic approach, and to understand, manage and remedy the impacts of collective human activity in space. To this end, the Space Sustainability Principles will cover the following:

#### **Spacecraft design and manufacturing**

These Principles will cover:

- the importance of designing space systems, including multi-spacecraft systems, to include requirements for responsible practices supporting space sustainability and space safety including requirements for minimising their environmental, safety, scientific and cultural impacts, with consideration of all aspects of the lifecycles of the spacecraft;
- the value of designing space systems and selecting orbits in ways that respect and support the sharing of limited spectrum and orbital resources, enabling equitable access to the benefits afforded by space; and
- the need to design and manufacture space systems in ways that minimise use of finite natural resources, and reduce waste, pollution and impacts on the terrestrial environment using appropriate methods and technologies.

#### **Launch and propulsion**

These Principles will cover:

- the value of the transition away from toxic and harmful propellants and towards environmentally sustainable propulsion options;
- the need for launch vehicles to safely and sustainably re-enter Earth's atmosphere on a timely basis after completion of their missions; and
- the need to address the impact of related ground activity, such as transportation emissions in the supply chain.

#### **Space operations**

These Principles will cover:

- the importance of prompt registration and cataloguing of space objects for enabling situational awareness and effective coordination;
- the importance of sharing timely and accurate information, including orbit and manoeuvre data, and coordination among spacecraft operators and other stakeholders to ensure the safe and sustainable use of the space environment; and
- the need for continued international research collaboration to improve our understanding of the Sun and its effect on the orbital space environment.

#### **Rendezvous and Proximity Operations**

These Principles will cover:

- the importance of safe and transparent rendezvous and proximity operations (RPO) practices for in-orbit services (IOS) to human-made objects, recognising that these



services aim to extend the life of space assets, remove space debris, reuse products and materials, eliminate waste and pollution and remediate the space environment.

### **Disposal**

These Principles will cover:

- the need for effective passivation, post-mission disposal and re-entry strategies for space systems and launch vehicle orbital stages, including the use of Active Debris Removal (ADR), to mitigate the generation of space debris; and
- the need to minimise the risk of casualties, damage to property and harm to the environment from space objects that re-enter Earth's atmosphere.

### **Space debris mitigation and remediation**

These Principles will cover:

- the need for space systems and launch vehicle orbital stages to be designed and operated in a way that avoids the creation of space debris;
- the need to manage the space debris population through a variety of approaches, technologies, responsible behaviours and coordination of space traffic; and
- the benefits of space environment remediation through a variety of approaches, to address any environmental damage that may be caused by space activities.

### **Dark and quiet skies**

These Principles will cover:

- the importance of the natural night sky to all humans, especially indigenous peoples, as a central part of our shared cultural heritage;
- the recognition that dark and quiet skies are crucial for conducting fundamental research in astronomy, enabling important public services such as planetary defence and high-precision geolocation and allowing certain indigenous peoples to timekeep and regulate their societies.
- the appreciation that spacecraft should minimise their impact on dark and quiet skies through responsible design and operational choices; and
- the recognition that governments and regulators should establish regulations and licensing conditions that mitigate negative impacts on dark and quiet skies.

### **Earth monitoring**

These Principles will cover:

- the important role of spacecraft in monitoring Earth's environment across spatiotemporal scales, including applications for meteorology, atmospheric science, pollution monitoring, agricultural and land use studies, deforestation, oceanography, geophysics, climatology, migration monitoring and enforcement of environmental regulations;
- the importance of space astronomy and in-situ space physics studies for understanding the space environment and the effects of the Sun, solar system and extrasolar phenomena on Earth; and
- the need to provide sufficient information about Earth monitoring products to enable value and trust in data used to derive sustainability conclusions.



### **Resource management**

These Principles will cover:

- the need for responsible use of non-terrestrial resources, including in-situ resource utilisation of the Moon and other celestial bodies;
- the need for terrestrial resources used by the space industry to be sourced responsibly, sustainably and ethically; and
- the need to protect extra-terrestrial planetary environments.

### **Economy and environmental, social and governance (ESG) criteria**

These Principles will cover:

- **Finance**
  - the need for demonstrable space sustainability measures as part of good governance procedures to contribute to improved investment decisions and risk-return profile;
  - the need to apply existing and forthcoming best practices in terrestrial ethical investment to the space environment; where possible, setting the terms at the time of entry, applying responsible stewardship and guidance and reporting on financial and ESG metrics over the life of the investment; and
  - the need for economic viability of the industry to include ESG factors in the investment analysis and decision-making processes given the large-scale nature of investment.
- **Insurance**
  - the need for sustainable behaviour in space to encourage ethical investment, foster the development of principled businesses and support commitments under the UN Convention on the International Liability for Damage Caused by Space Objects while improving the risk profile;
  - the need to understand efficient space sustainability stewardship and governance norms to reduce liabilities, anticipate and mitigate potential claims, and ensure responsible resource management to strengthen the sector's resilience; and
  - the value of the role insurance plays in enabling spacecraft activity and encouraging responsible conduct in space.
- **Law and regulation**
  - the need for all entities conducting space activities to do so responsibly and consistently with space sustainability practices and principles in compliance with commitments under international law, regulation and guidelines, including the UN Outer Space Treaty, the UN Convention on the International Liability for Damage Caused by Space Objects, the UN Guidelines for the Long-term Sustainability of Outer Space Activities and UN resolutions;
  - the need for robust, flexible and dynamic legal, regulatory and licensing frameworks at the national level to incentivise compliance with space sustainability principles; and
  - recognition of the drive towards a globally harmonised legal and regulatory framework that is accessible internationally and encourages space sustainability practices in compliance with international law.