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Prevention of an arms race in outer space

Reducing space threats through norms, rules and principles of responsible behaviours

Report of the Secretary-General

Summary

The present report provides a consolidated summary of elements from the submissions received from Member States pursuant to resolution [75/36](#), without prejudice to their individual positions. It presents existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth; a characterization of actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security; and ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space.

* [A/76/50](#).



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I. Introduction

1. In paragraph 5 of its resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviours, the General Assembly encouraged Member States to study existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth, characterize actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security, and share their ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space. In paragraph 6 of the resolution, the Assembly requested the Secretary-General, within existing resources, to seek the views of Member States on the issues referred to in the foregoing paragraph and to submit a substantive report, with an annex containing those views, to the Assembly at its seventy-sixth session, for further discussion by Member States. The present report is submitted pursuant to that request.

2. On 5 January 2021, the Office for Disarmament Affairs sent a note verbale to all Member States drawing their attention to paragraphs 5 and 6 of the resolution and seeking their views on the matter. The views received by 3 May 2021 are reproduced in the annex to the present report. Views received after 3 May have been posted on the website of the Office in the original language received. Replies received from other entities and non-governmental organizations have also been posted on the website.

3. The Office for Disarmament Affairs and the Office for Outer Space Affairs convened a series of webinars on 17, 19 and 21 May 2021 to facilitate multilateral and multi-stakeholder dialogue on the issues identified in resolution [75/36](#).

4. Sections II to V of the present report provide a consolidated summary of elements from the submissions received from Member States, without prejudice to their individual positions. Section VI sets out the observations and conclusions of the Secretary-General.

II. Background

5. Many States regard outer space as becoming increasingly congested, contested and competitive. Outer space is seen as becoming a new frontier of competition among major military powers. The space sector is also becoming increasingly commercialized, resulting in a rapid increase in the number and diversity of actors operating in outer space and the number of objects in orbit. It has been noted that, as more space objects are launched, the number of operational satellites and debris will grow, increasing the risk of a collision in space. Many space objects are regarded as potentially of dual use, raising new concerns for ensuring the security of space systems and efforts to prevent an arms race in outer space.

6. Space-based capabilities are seen as increasingly essential for the welfare of humankind. The benefits of these capabilities are applicable to all States. These benefits include achieving the 2030 Agenda for Sustainable Development, supporting agriculture and fisheries as well as environmental monitoring and disaster response, providing services in the areas of positioning, navigation and timing and in telecommunications, and supporting science and access to education. Accordingly, many States regard outer space as a global commons. Loss of access to these services would therefore have a serious impact on critical infrastructure.

7. Many States emphasize the essential importance of outer space for national and international security. They note in particular that armed forces are increasingly reliant on space systems. These systems support many activities, functions and operations, such as intelligence, surveillance, reconnaissance, communications, command and control, maritime surveillance, border monitoring, search and rescue, disaster relief, early warning of missile launches and verification of arms control agreements. Particular emphasis is placed on the connection between space systems and nuclear weapons, including as elaborated further in the present report. It is observed that the growing military dependence is increasing the potential that a future armed conflict could extend into or be initiated in outer space. A distinction is made between the use of outer space to support military activities, functions and operations generally and the weaponization of outer space.

III. Existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth

8. A number of States define space systems as comprising three components: (a) the space segment, including satellites and launch vehicles; (b) the ground segment, including space monitoring systems and command and control, as well as data storage, processing and distribution; and (c) data links between the two, including uplinks and downlinks, as well as services provided to end users. The complexity of such systems was emphasized.

9. With respect to existing and potential threats and security risks, a distinction is drawn between natural hazards and human-origin threats and security risks. Natural hazards, which include solar storms and related space weather phenomena, geomagnetic storms and micrometeoroids, can disrupt, damage, disable or destroy space systems and can affect all their components. Some States maintain a broader definition of “hazard”, which can also include the risk of accidental collisions with derelict artificial space objects.

10. Many States note that the increasing number of objects in orbit is also increasing the risk of collisions. Moreover, the lack of effective communication between space systems and the presence of space objects that are non-functional or incapable of manoeuvring contribute to that risk. It is also observed that the risk could have a disproportionate impact on States with new space programmes. The increasing number of objects in orbit can also increase the risk of frequency interference between satellites operating in proximity to each other.

11. In their submissions, States largely refer to deliberate acts intended to interfere with, deny, disrupt, degrade, damage or destroy space systems. Such threats against space systems can be divided into four categories: Earth-to-space, space-to-space, Earth-to-Earth and space-to-Earth. A distinction is also made between threats and security risks with reversible and irreversible effects. Reversible effects are temporary and can include interference with radio-frequency signals or the dazzling of remote sensing systems. Irreversible effects involve damage to or the destruction of space systems.

12. Many States express concern about space debris as the most significant threat to the space environment. Increasing debris poses a collision risk to space objects. Objects as small as 1 cm in diameter can damage the functions of an active satellite; objects between 1 and 10 cm can disable or destroy a satellite. Impacts involving larger objects generate hundreds or thousands of pieces of debris. Thus, increasing debris also poses a risk to future access to space, as the cascading generation of debris

could render orbits unusable for generations. While the population of debris in orbit continues to grow predominantly as a result of new launches and the fragmentation of existing objects, the intentional destruction of satellites using kinetic force can exacerbate such risks. It is also noted that threats posed by debris can be mitigated through various steps, including increasing space situational awareness, the on-orbit servicing of satellites, active debris removal and designing satellites either to deorbit or to move to a graveyard at the end of their service life.

13. Several States describe threats emanating from national laws and policies. In this connection, a number of States regard military doctrines that provide for the weaponization of outer space as threatening. Another example of national laws and policies that were described as threatening included declaring outer space as a war-fighting domain. The uncoordinated adoption of national legislation that creates new de facto rules for the use of outer space in the absence of universal rules provided by international treaties was also regarded as a possible threat. Increasing tension and conflict resulting from competition for natural resources in space, in the absence of any internationally agreed procedure for management, was also described as a threat.

14. Many States regard the possible development of various anti-satellite weapons, either deployed on orbit or launched from systems deployed on the ground, in the air or at sea, as a serious cause for concern. Some regard the development and use of such capabilities as a challenge to the security and sustainability of outer space and as a possible threat to international peace and security. States described various concepts for anti-satellite weapons:

(a) Direct-ascent anti-satellite weapons, which a number regarded as a particular concern, can be launched from the ground, air or sea and destroy satellites either through kinetic impact or by detonating an explosive in proximity to a target. It is noted that a number of States reportedly possess such capabilities, most of which can target objects in low Earth orbit, and that such capabilities may derive from anti-ballistic missile systems;

(b) Space-based anti-missile interceptors, designed to target missiles launched from the Earth, were described as a possible threat that could have a negative impact on security and stability in outer space;

(c) Co-orbital anti-satellite weapons are systems placed in orbit that manoeuvre and approach a target. Concepts for such weapons include kinetic impactors or projectiles, harpoons, physical interaction using robotic arms, chemical sprayers and other possible means. These concepts can variously produce reversible or irreversible effects. It is noted that some States have pursued research and development of such capabilities, and it has been alleged that a system with the characteristics of a weapon has been tested in orbit;

(d) Dual-use co-orbital systems include on-orbit servicing and active debris removal. On-orbit servicing satellites can refuel, repair and extend the life of other satellites. Active debris removal systems are intended to deorbit non-operational satellites. On-orbit demonstrations of the latter systems have used nets, harpoons, magnets or robotic arms. While such systems are regarded as important for ensuring the sustainability of outer space activities, such capabilities are inherently of dual use and could be used to damage, degrade or destroy a satellite. It is also noted that any satellite capable of carrying out rendezvous and proximity operations and placed in the same orbit as another satellite could be regarded as a threat;

(e) Directed energy weapons include lasers, microwaves and particle beams. Their effects can be reversible or irreversible, as they could temporarily blind or dazzle sensors, as well as damage, degrade or destroy sensitive components. It is noted that some States may be developing such systems;

(f) Electronic counter-space systems use radio-frequency energy to disrupt, deny, deceive or degrade space services. Their effects can include uplink or downlink jamming and spoofing. Uplink jamming is directed at a target satellite and may have widespread effects; downlink jamming is directed at users on the ground and may have more localized effects. It is noted that such systems are possessed by a number of States and have been used;

(g) Cyber capabilities use software and network techniques to compromise, control, interfere with or destroy computer systems. These can target satellite command and data distribution networks, ground infrastructure, users and data links. Possible effects include data being disrupted or unauthorized commands to potentially take over operational control of a satellite or its payload being sent. It is noted that a number of States can presently employ such capabilities. There is also a concern that such capabilities can be used by organized crime entities to coerce, influence and impact essential sectors supported by space services;

(h) Nuclear weapon detonations could be used to directly damage or destroy satellites and to create harmful electromagnetic effects that could also degrade and destroy satellites, as well as damage terrestrial infrastructure. It is noted that the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water prohibits any nuclear weapon test explosion, or any other nuclear explosion, in outer space. The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty), prohibits placing nuclear weapons or other weapons of mass destruction in orbit around the Earth, installing such weapons on celestial bodies, or stationing such weapons in outer space in any other manner. Therefore, nuclear weapons or other weapons of mass destruction are prohibited from being placed in orbit for any type of attack.

15. Concerns are also raised over other aspects of capabilities of space systems. It is noted that the use of stealth or low-visibility technology on satellites could raise questions about the purpose and application of a satellite in the absence of information about its purpose. A concern is also raised over the possibility that radiation leaked from nuclear power sources on some satellites could cause damage to other satellites.

16. States also describe various types and characteristics of operations and procedures that could be regarded as a threat to the safety or security of their space systems. Rendezvous and proximity operations, if carried out without advance notification, coordination or consent, could be interpreted as a threat or hostile act. The State whose satellite was the object of such a close approach would be unable to know the intent of the manoeuvring satellite. It is also observed that the non-registration of space objects pursuant to the Convention on Registration of Objects Launched into Outer Space (Registration Convention) can complicate attempts to communicate with the owner of a space object that might constitute a collision risk or that might be non-functional. In addition to the capabilities described in paragraph 14 above, it is also noted that physical attacks against ground sites and infrastructure that support space operations, such as data centres, power plants or space launch sites, could also threaten satellite services. A number of States also express concern over so-called hybrid operations, in which systems are intentionally targeted to disrupt their services using means that fall below what a State could consider the threshold for the use of force.

IV. Characterization of actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security

17. States provide many examples of actions and activities that could be considered either responsible or irresponsible. It is noted that a benefit of pursuing responsible behaviours would be increasing the predictability and general transparency of space operations and therefore reducing the potential for hostilities in, from or through outer space. Responsible actions and activities are characterized as those that promote the safety, security and sustainability of outer space activities and the space environment and that respect the safety and security of other actors or of people and critical infrastructure. They can include actions or activities that avoid surprise or that contribute to stability or risk reduction and avoid provocation of tensions.

18. Examples of responsible behaviour provided by States include:

(a) Prior and timely communication to avoid causing misunderstanding, interference or damage to others;

(b) Notification of manoeuvres and of rendezvous and proximity operations, including in order to coordinate operations, to avoid potential misunderstandings or to seek consent;

(c) Refraining from deliberately causing non-consensual interference with space systems, including interference that could cause the loss of control of a satellite or the loss of its capabilities;

(d) Refraining from deliberately damaging or destroying space systems;

(e) Committing not to undertake the development, testing and use of anti-satellite capabilities which can cause widespread debris;

(f) Committing not to place weapons in outer space;

(g) Sharing information on the monitoring of space objects, in order to supply international databases and to enable broad space situational awareness;

(h) Registration of satellites in accordance with the Registration Convention;

(i) Deorbiting space objects at the end of their service life to reduce space debris;

(j) Implementing existing international treaties, agreements and guidelines applicable to outer space;

(k) Continuing efforts to develop mutual confidence-building measures, including on norms and guidelines for the peaceful exploration and use of outer space as well as the exploitation of resources;

(l) Supporting negotiations on legally binding measures for preventing the placement of weapons in outer space or the use of force against space objects.

19. Examples of irresponsible behaviour provided by States include:

(a) Any deliberate, inadvertent or negligent actions that could create long-lived debris, leading to damage to the space environment. Specific examples include:

(i) Testing or simulation of anti-satellite weapons and testing of direct ascent anti-satellite weapons in particular;

- (ii) Use of anti-satellite capabilities, launched from the ground or from space, to physically damage or destroy a satellite or resulting in the creation of long-lived debris, or any act that holds a satellite at such a risk;
- (b) Other acts involving weapons, including:
 - (i) Development of counter-space capabilities, including direct ascent or co-orbital weapons;
 - (ii) Placement of weapons in outer space;
 - (iii) Use of any space object to destroy objects on the ground, in the air or in outer space;
- (c) Intentional acts of interference, including:
 - (i) Actions that threaten or interfere with the normal operation of space objects in peacetime;
 - (ii) Actions that impact, disrupt or impair a service provided by space systems, especially if they affect critical services, resulting in serious risks for the safety and security of people or property. Such critical services can include positioning, timing and navigation systems or other services used by rescue and emergency services, as well as natural disaster and meteorological forecasting;
 - (iii) Actions that interfere with military space systems, either temporarily or permanently;
 - (iv) Disruption of space systems that may affect the ability of States to acquire situational awareness;
 - (v) Actions that interfere with the command and control of a satellite, affecting for example its telemetry, tracking and control system, or that leads to irreversible loss of functionality;
 - (vi) Actions using certain means such as jamming and spoofing, cyber capabilities, laser dazzling or chemical sprays;
- (d) Certain other aspects of space operations, including:
 - (i) Intentionally causing a collision between two space objects;
 - (ii) Intentionally hindering a space object in orbit, forcing it to perform an evasive manoeuvre or otherwise taking any action that requires emergency manoeuvres to lower the risk of collision;
 - (iii) Failing to undertake anti-collision manoeuvres or not communicating about a potential collision;
 - (iv) Carrying out irregular movements in geostationary orbit;
 - (v) Carrying out uncoordinated experimental activities and tests in operational orbits or carrying out uncoordinated military exercises;
 - (vi) Carrying out the uncoordinated release of objects such as subsatellites or the ejection of projectile-like fragments in the immediate vicinity of or pointing at satellites of another State;
 - (vii) Failing to deorbit a satellite at the end of its service life;
- (e) Certain actions or omissions relating to information, including:
 - (i) Omission of information on the impact of satellite constellations, the main characteristics of a satellite or its activities and missions, or the intentions and

purposes of extraordinary activities of a satellite, especially if such activities may interfere with the space systems of other States;

(ii) Lack of transparency on ambiguous behaviours that may lead to a significant risk of misunderstanding and miscalculation in outer space, including plans to intentionally dismantle one's own satellites;

(iii) Sharing misleading information on a satellite's schedule of activities and related parameters;

(iv) Reporting unprovable hostile acts in orbit;

(v) Failing to declare the verifiable service or mission purposes when occupying orbital boxes and orbital planes;

(f) Rendezvous and proximity operations that are carried out without sufficient transparency or prior communication, without consent or without cooperation, that make contact without permission or that are continued after the approached satellite has changed its orbit or mode of operation or after the affected State has requested consultations or a cessation of the manoeuvre;

(g) Other acts, including:

(i) Unnecessary overpopulation of specific orbits and frequency bands;

(ii) Underestimating the impacts of new space programmes on the space environment and on the existing space activities of others;

(iii) Improper operation of unpermitted technology or placing it in orbit, as addressed in the Convention on International Liability for Damage Caused by Space Objects (Liability Convention) and the Registration Convention;

(iv) Use of low-cost and low-resilience components on spacecraft, in particular propulsion, power supply, attitude control and on-board data handling subsystems, or insufficient cyberresilience on ground segments and data links;

(v) Delegation of control of space systems to non-certified or unqualified third parties;

(vi) Use of nuclear power sources in contravention of the guidelines and principles recommended by the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space.

V. Ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space

Approaches to reducing space threats through norms, rules and principles of responsible behaviours

20. States express various views on approaches for developing and implementing norms, rules and principles of responsible behaviours and reduction of the risks of misunderstanding and miscalculations.

21. A number of States refer to the 2013 report of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities (see [A/68/189](#)), whose recommendations are described as a foundation which should be re-examined, made better use of and implemented. It is noted that the Group agreed on a set of activities for implementation by States and international

organizations on a voluntary basis. Those measures included information exchange on space policies; information exchange and notifications related to outer space activities; risk reduction notifications; contact and visits to space launch sites and facilities; international cooperation; consultative mechanisms; outreach; and coordination. The Group also endorsed efforts to pursue political commitments to encourage responsible actions in, and the peaceful use of, outer space, and it recognized that legally binding approaches and transparency and confidence-building measures are not mutually exclusive. The view is also expressed that, while transparency and confidence-building measures can play a certain positive role and usefully supplement legally binding measures, they should not replace the negotiation of a legally binding instrument.

22. Many States support an approach based on behaviours, supported by relevant monitoring capabilities, as the most pragmatic way forward to improve space security today. They note that such an approach could prevent misunderstandings and miscalculation and thus reduce the risk of unintended escalation. It is noted that such an approach could also increase predictability, enhancing operational safety and reducing risks of misperceptions, thus contributing to the prevention of conflict. It is argued that an agreed set of behaviours, based on a shared perspective of what constitutes responsible activity in space, would allow States to question other States' activity that deviates from those behaviours. That would reduce the risk of a State misinterpreting an activity as nefarious in cases where the intention was innocent. It could also offer an opportunity for States to address system or technical faults, thereby preventing unintentional damage by a failing space system. An argument is made that, since behaviours can be observed from the ground and in outer space, they can serve as measurable criteria for identifying potentially threatening activities in the absence of explicit understanding of intent. Many States also argue that such an approach may be more long-lasting, as it may address the risk that the development of technologies overtakes any eventual agreements. It is further argued that this adaptability would allow new and novel uses of space to be explored and allow civil and commercial operators to have more of a voice in their development.

23. Many States support the negotiation of a legally binding instrument on the prevention of an arms race in outer space. It is variously argued that any new such legal instrument should be premised on the understanding that outer space should remain an operationally stable and safe environment, expand the legal obligations contained in the 1967 Outer Space Treaty, completely and comprehensively prohibit space-based strike weapons as well as any land-, air- or sea-based systems designed to destroy objects in outer space, address all threats, including Earth-to-space, space-to-space and space-to-Earth threats, be verifiable, prohibit the use of force in outer space, maintain outer space for peaceful purposes in the interest of all States, be non-discriminatory, with due regard for the principle of equity, and, with widespread acceptance, provide greater certainty and predictability.

24. Many States consider that voluntary and non-binding norms, rules and principles could form the basis for future legal measures, including a comprehensive, effective and verifiable legally binding instrument. Many States also consider that the process launched by the General Assembly in its resolution [75/36](#) does not exclude the possibility of a new legally binding instrument in the future. An argument is also made that a process to negotiate non-binding measures should be launched together with the pursuit of a legally binding instrument.

25. Arguments are made against a behaviour-based approach, including that the concept of "responsible behaviour" is vague and unclear and that it would be difficult to define in the light of the rapid development of technology. Such an approach could divide the international community into space-faring and non-space-faring nations,

could impede technology transfers to emerging space nations and would be difficult to verify by developing countries.

26. Arguments are also made against a capabilities-based approach, including that it would not be effective, that it does not address the dual-use nature of space technology, that it is difficult to define a weapon in space, that the identification of a threat cannot be deduced from the capability or object alone and that such an approach cannot keep up with technological developments.

27. An argument is made in favour of political commitments not to be the first to place weapons in outer space as the initiative that is most effective, practically implementable, actually functioning and gaining more and more supporters, which makes the development of space-based strike systems inexpedient. It is further argued that the annual resolutions adopted by the General Assembly on the initiative enjoy wide support.

28. However, an argument is also made against the annual resolution in the First Committee on the matter, as it fails to define what a weapon is for this purpose, there is a risk of increasing mistrust or misunderstanding without such a definition, and States are encouraged to only make a declaration that they would not be the first to place a weapon in outer space but there is no commitment to never place a weapon in outer space.

Principles and objectives for reducing space threats through norms, rules and principles of responsible behaviours

29. States describe a number of possible principles and objectives for norms, rules and principles of responsible behaviour. These include:

- (a) Reinforcing existing treaties and other international instruments;
- (b) Establishing common understanding between a State carrying out an action and an affected State;
- (c) Remaining focused on the fundamental goal of preventing an arms race in outer space;
- (d) Subjecting to stringent scrutiny State behaviours that have consequences for security or that endanger the lives of people;
- (e) Identifying key risky behaviours, which, if left unchecked, could lead to the gravest threats to the use of outer space;
- (f) Creating the ability for an affected State to understand the intent of an action or the development, deployment or use of a capability;
- (g) Achieving a shared view of how perceptions of threat against space systems feed into escalation calculation;
- (h) Achieving an understanding as to whether there are differences between the two State actors over what is considered generally safe State practice;
- (i) Achieving a proper balance between outer space security and the peaceful and sustainable uses of outer space;
- (j) Avoiding limiting or prohibiting acts that are in conformity with international law;
- (k) Respecting the equal rights of all States in the peaceful uses of outer space and enhancing related international exchange and cooperation;
- (l) Fulfilling the needs of developing countries for the peaceful uses of outer space;

(m) Considering the development of innovative solutions for space sustainability by the private sector;

(n) Taking into account legitimate concerns about possible restraints on civil activities;

(o) Underscoring that maintaining outer space security should be the responsibility of all countries and that those with the most advanced space capabilities bear a special responsibility in preventing an arms race in outer space and ensuring peaceful uses of outer space;

(p) Incorporating lessons learned or best practices from the work achieved in other forums and fields, such as the maritime and cyber fields.

Possible elements for reducing space threats through norms, rules and principles of responsible behaviours

30. The submissions from States reflect many elements that could form the basis for norms, rules and principles of responsible behaviour. It is noted that a number of those elements reflect or further elaborate measures that have been addressed by various bodies, including the Conference on Disarmament, the 2012–2013 Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities, the Committee on the Peaceful Uses of Outer Space, the Inter-Agency Space Debris Coordination Committee, the International Telecommunication Union, the Disarmament Commission and the 2018–2019 Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space.

31. In relation to international law, possible elements include the following:

(a) Affirm the applicability of international law to activities in outer space, including activities in the exploration and use of outer space for peaceful purposes as well as military activities;

(b) Affirm that any outer space activities should be carried out in accordance with existing principles and treaties, including the Charter of the United Nations, the Outer Space Treaty, the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water, the Liability Convention, the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques and the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space;

(c) Affirm that international humanitarian law, and the law of conflict in particular, applies to operations in space conducted in the furtherance of hostilities in armed conflict;

(d) Reaffirm the commitment of States to comply with their international legal obligations and promote information-sharing among States about their practice with regard to the implementation of international law in outer space;

(e) Support adherence to and strengthen the implementation of various existing instruments and regimes, including the Outer Space Treaty, the Registration Convention, the Hague Code of Conduct against Ballistic Missile Proliferation, the Missile Technology Control Regime, the Guidelines for the Long-term Sustainability of Outer Space Activities and the Space Debris Mitigation Guidelines.

32. In relation to actions pertaining to damage to or the destruction of space systems, including actions that could result in long-lasting space debris, possible elements include the following:

(a) Refrain from any deliberate or negligent activity that could result in the generation of long-lasting debris;

(b) Adhere to the Space Debris Mitigation Guidelines, recommended by the Inter-Agency Space Debris Coordination Committee;

(c) Refrain from the use of force leading to the intentional destruction of space objects;

(d) Refrain from destroying, damaging or disturbing the normal functioning of the space objects of other States;

(e) Refrain from anti-satellite weapon tests that would create long-lasting space debris, or elaborate best practices for anti-satellite tests to avoid the purposeful creation of long-lived debris;

(f) Elaborate best practices for avoiding simulating or testing anti-satellite weapons in the direction of, or in close proximity to, another State's satellite;

(g) Commit not to use space objects as a means to destroy any targets on the Earth, in the atmosphere or in outer space;

(h) Refrain from conducting, or knowingly supporting, activity that intentionally damages critical infrastructure, or otherwise impairs the use and operation of critical infrastructure to provide services to the public, in a manner that would be contrary to its obligations under international law.

33. In relation to actions pertaining to the placement of weapons in outer space, possible elements include the following:

(a) Commit not to be the first State to place weapons in outer space;

(b) Refrain from placing a co-orbital weapon or an electronic warfare satellite next to the national security satellite of another State;

(c) Suspend unrestrained research and development and deployment of missile defence systems, in particular the deployment of missile interceptors in space.

34. In relation to information and communications technologies, possible elements include the following:

(a) Recognize the harmful and destabilizing consequences of malicious cyber activities targeting space objects, especially their related ground networks;

(b) Reaffirm that international law applies in cyberspace;

(c) Elaborate best practices or responsible behaviours that avoid using information and communications technologies in a manner that affects space operations;

(d) Encourage responsible reporting of vulnerabilities and the sharing and publicizing of information, where possible, on cyber-related threats to space objects and their related infrastructures, including evidence of malicious activity.

35. In relation to intentional acts of interference with space systems, possible elements include the following:

(a) Recognize that targeting a satellite with a laser and causing its loss of sight could be considered threatening;

(b) Refrain from purposeful interference with satellite command and control systems, including by cyber or electromagnetic means;

(c) Refrain from jamming or spoofing positioning, timing and navigation signals;

(d) Avoid interference with security-related space systems, including any system linked to ballistic missile launch detection.

36. In relation to the development of rules, standards and best practices for rendezvous and proximity operations, including to prevent misinterpretation and miscalculation, possible elements include the following:

(a) Carry out such operations in an open and transparent manner, including by requiring prior consent before approaching the satellite of another State;

(b) Establish clear communication and information exchange protocols, including through an international system for such operations, and provide prior notification of the planned timing, trajectory and objective of the manoeuvre;

(c) Refrain from operations that could impair the safe manoeuvrability of the approached spacecraft or otherwise endanger the spacecraft of other States.

37. In relation to other aspects of space operations, including operations involving national security satellites, possible elements include the following:

(a) Refrain from testing or using crewed spacecraft for military or anti-satellite purposes;

(b) Recognize and observe a minimum safe distance between satellites, including maintenance of a safe separation and safe trajectory when operating national security spacecraft;

(c) Elaborate best practices or responsible behaviours for the safe and professional operation of national security satellites, with due regard to avoiding potential collisions or other harmful interference.

38. In relation to the further elaboration, strengthening, agreement and implementation of transparency and confidence-building measures in outer space activities, possible elements include the following:

Information exchanges on national space policies and military expenditures

(a) Exchange of information and pursuit of dialogue on national space doctrines, goals, policies and strategies, including on national military space doctrines and strategies;

(b) Exchange of information on major military expenditures in outer space and other national security space activities;

Information exchanges on space objects and activities

(c) Exchange of information on the general function and mission objective of objects in Earth orbit;

(d) Exchange of information on national security space activities, including through bilateral or multilateral channels;

(e) Pre-launch notifications, including data on the generic class of the missile or space launch vehicle, the planned launch window, the planned launch area and the planned direction, taking into consideration the practice established under the Hague Code of Conduct against Ballistic Missile Proliferation;

(f) Further enhance the practice of registration of space objects and provide timely information to the Register of Objects Launched into Outer Space;

Risk reduction notifications

(g) Notifications of scheduled manoeuvres, including those that could result in risk to the flight safety of another State's space objects; predicted conjunctions;

intentional orbital break-ups; uncontrolled high-risk re-entries; emergency situations; active debris removal operations; or any potentially dangerous operation;

Policy and operational communication channels and consultative mechanisms

(h) Establish national points of contact for the exchange of information and consultations on policy matters, including for the purpose of consultation and deconfliction, in order to reduce the risk of escalation and conflict in space and to manage perceptions of threat;

(i) Establish national points of contact for round-the-clock operational communications, in order to relay information for the coordination and deconfliction of spacecraft manoeuvres and frequency usage;

(j) Further elaborate consultation mechanisms, building on article IX of the Outer Space Treaty, including to build understanding as to what constitutes harmful interference from a security perspective, including kinetic and non-kinetic harmful interference that may not necessarily destroy but may degrade, disrupt and damage space systems;

(k) Establish an international exchange platform tasked with deconfliction services through the appointment of national experts and existing or new space traffic management tools;

Familiarization visits

(l) Visits to space launch sites, flight control centres and other outer space infrastructure; observations of space object launches; and demonstrations of space technologies.

39. To further develop space situational awareness, possible elements include the following:

(a) Increase cooperation between States regarding their space surveillance and tracking and their space situational awareness services;

(b) Develop a collaborative and open space situational awareness system;

(c) Promote the sharing, collection and dissemination of space debris monitoring information;

(d) Consider how monitoring, verification and attribution of activities in space based on reliable and comprehensive space situational awareness can contribute to compliance with norms of responsible behaviours.

40. With respect to other measures, possible elements include the following:

(a) Develop a common understanding and definitions of operational terms and concepts, including those related to threats;

(b) Adopt and implement appropriate measures to ensure that national non-State space actors adopt such responsible behaviours.

Process for reducing space threats through the development of norms, rules and principles of responsible behaviours

41. The submissions from States include various ideas on the process to take forward the development and implementation of norms, rules and principles of responsible behaviours.

42. It is considered that the United Nations should play a central role as the primary forum for outer space governance and to ensure inclusiveness and the widest possible

international consensus. The First Committee of the General Assembly is considered to be the appropriate forum for discussing the way forward on the issues addressed in resolution 75/36. A number of States considered that either a group of governmental experts or an open-ended working group should be established as the next step.

43. A suggested mandate is to elaborate a set of principles, norms and rules for responsible State behaviour in space, which, in the long run, may constitute the normative basis for eventual negotiations on a legally binding instrument on the matter. It was also argued that the Secretary-General could lead a consultative process, without prejudice to future alternatives, on an appropriate way to advance discussions on the reduction of space-related threats.

44. A number of States emphasized that any process should be inclusive of all States, irrespective of their level of involvement in space activities or level of development. A number of States also emphasized that multiple stakeholders should be engaged and their views considered, including private sector entities, academia and non-governmental organizations. It is also emphasized that any process should provide for the full involvement and equal participation of women and men, as well as the assessment of possible differentiated impacts of space threats.

VI. Observations and conclusions of the Secretary-General

45. We are currently in a period of rapid growth in the use and number of actors operating in outer space. We are also on the verge of a renewed era of space exploration, with active programmes to return humans to the Moon and to travel beyond. Since 1958, in relation to the conduct of space activities for peaceful purposes, the United Nations has worked to strengthen international cooperation and advance the use of space science and technology and their applications.

46. At the same time, outer space is increasingly devolving into an arena for strategic competition. Terrestrial geopolitical rivalries are being reproduced in Earth orbit and beyond. This increases the risk that armed conflict could one day be extended into or even be initiated in outer space. These trends are accompanied by the growing capacity of a number of States to attack space systems with a variety of means, both from space and from the Earth. When it comes to many such counter-space concepts, we still lack a common understanding of the impact and consequences of their use.

47. The normative and legal framework governing outer space is not sufficiently developed to prevent these trends, including any arms race, or to protect against their undesirable consequences. Possible solutions to outer space security can involve a combination of binding and voluntary norms, rules and principles. Work in both of these areas should be further pursued. It is encouraging that Member States reaffirm that voluntary norms, rules and principles, including non-binding transparency and confidence-building measures, can form the basis for legal measures. It is hoped that work in each of these areas can continue to be pursued in a progressive, sustained and complementary manner.

48. As in other areas of emerging technology, deliberations on this topic should include the active participation of all segments of the space policy community, including non-governmental organizations, humanitarian actors, the private sector and academia. Any process must also provide for the full, meaningful and equal participation of women.

49. This work should also leverage all available sources of expertise, including from all relevant United Nations entities as well as from government experts from their capitals, their national space programmes and all locations where international

governance of outer space is discussed. Such efforts could also be facilitated by sustained work by scientific, technical and military experts.

50. The United Nations should remain central to the further development of the regime governing outer space. Relevant entities and organizations of the United Nations system should coordinate, as appropriate, in this regard. **It is recommended that Member States study the ideas contained in the present report and decide on an inclusive process to take these issues forward at the seventy-sixth session of the General Assembly.**

Annex

Replies received

A. Governments

Australia¹

[3 May 2021]

Australia welcomes the opportunity to present its submission for inclusion in the report of the Secretary-General on reducing space threats through norms, rules and principles of responsible behaviours. Australia looks forward to further engagement with other States on these important initiatives.

Threats – or the perception of threats – against space systems contribute to geopolitical instability and insecurity. It is thus vital to reduce these threats by articulating and maintaining responsible behaviours in relation to space systems.

A common understanding of what constitutes responsible (and irresponsible) behaviours will greatly assist in providing a framework to supplement existing international law and guidelines applicable to States in their access to and use of outer space. Such a framework could discourage irresponsible behaviours. The development and implementation of norms, rules and principles of responsible behaviours to strengthen international security in relation to space would also facilitate the certainty and stability necessary to encourage investment in and growth of the commercial space sector.

In furtherance of the goals of General Assembly resolution [75/36](#), Australia offers for consideration the following principles of responsible behaviours that would contribute positively to space security and to the safety and sustainability of the space environment, as well as to broader peace and security.

Key principles

- Recognize that international law, including the Charter of the United Nations, applies to the exploration and use of outer space and that all States should behave in a manner consistent with their international obligations when carrying out activities in the exploration and use of outer space.
- Sign, and comply with obligations under, the outer space treaties.
- Commit not to undertake activities that deliberately or foreseeably create long-lived debris fields.
- Commit to undertake space activities with openness, transparency and predictability, respecting current and future opportunities for all humankind to benefit from the space domain.

Risk reduction principles

- Agree on rules on rendezvous and proximity operations to ensure that all relevant parties understand the parameters and objectives of those operations.
- Establish notification, communication and information exchange protocols for when satellites are operating in proximity to each other.

¹ Full version available at www.un.org/disarmament/topics/outerspace-sg-report-outer-space-2021/.

- Establish shared understandings and practical implementation expectations concerning the concepts articulated in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, including “due regard”, “harmful contamination” and “harmful interference”, and act in accordance with them.

Transparency and confidence-building principles

- Implement the conclusions contained in the 2013 report of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities ([A/69/189](#)).
- Agree on explicit transparency and confidence-building measures, including in priority risk-minimization areas relating to information exchange, risk reduction notifications and coordination and consultation mechanisms.

Principles for further progress

- Develop, on an evolving basis, a framework of norms, rules and principles of responsible behaviours to reinforce those behaviours, and to discourage and enable responses to irresponsible behaviours.

Brazil

[3 May 2021]

Introduction

Brazil attaches great importance to issues related to stability in outer space. As a developing country that has space capabilities, it is in Brazil’s utmost interest that space remain peaceful, stable, safe and accessible to all nations. In that regard, the country is a party to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (Outer Space Treaty), and is an active participant in multilateral discussions on this topic in New York, Vienna and Geneva.

Brazil’s positions within the Conference on Disarmament, the First Committee of the General Assembly and the Committee on the Peaceful Uses of Outer Space have been guided by the country’s support for the applicability of the Charter of the United Nations and international law, including international humanitarian law, to activities carried out in outer space. The country works actively to keep the dialogue alive and to establish initiatives that guarantee the sustainability of outer space activities, and advocates against the use or threat of the use of force through space capabilities or against them.

These principles guided Brazil’s participation in the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities, which issued a benchmark report on the topic ([A/68/189](#)), as well as the country’s chairing of the successful sixty-second session of the Committee on the Peaceful Uses of Outer Space, at which the 21 Guidelines for the Long-term Sustainability of Outer Space Activities were formally adopted.

Regarding the militarization of space systems, Brazil has traditionally reasserted its commitment to the prevention of an arms race in outer space and to no first placement of weapons in outer space, having voted in favour of the resolutions on these topics, which are adopted annually by the First Committee.

With regard to the normative development of this subject, in recent years, Brazil has consistently supported the commencement of negotiations on a legally binding

instrument that would complement and expand the obligations established by the Outer Space Treaty. This position has been borne out by the increasing number of actors (State or private sector) with the capacity to, and an interest in, exploring outer space, as well as of the advancement of space technologies, which are, for the most part, of a dual nature. In recent years, a trend of increasing competition has increased the threat that outer space will be converted into a conflict arena, especially owing to the development of offensive space capabilities, including cybercapabilities, by several States.

Today, satellites have become essential components of almost all types of critical infrastructure on Earth, and essential services for societies and economies in all countries depend largely on them. Any conflict in space, even if of limited scope, would bring risks for the sustainable use of Earth's orbits for peaceful purposes. In this scenario, it is urgent to establish norms, rules and principles to face the emerging security challenges in outer space and their repercussions on Earth.

However, discussions regarding modalities for the negotiation of legally binding commitments on the prevention of an arms race in outer space have faced recurring stalemates. The most recent Group of Governmental Experts on the topic, which concluded its work in 2019 and was chaired by Brazil, was unable to produce a consensus report on the basic elements that should guide the negotiation of a new treaty on the matter. At the Conference on Disarmament, likewise, discussions on the prevention of an arms race in outer space have been paralysed since 2018.

Against this background, Brazil has supported discussions on the gradual development of norms, rules and principles based on political commitments (in what can be described as a "bottom-up" approach).

It was with the objective of promoting the resumption of dialogue and the exchange of views on the topic that Brazil decided to vote in favour of General Assembly resolution 75/36, entitled "Reducing space threats through norms, rules, and principles of responsible behaviours".

Brazil expects that the discussions initiated by this resolution will contribute to the adoption, in the short to medium term, of political commitments and transparency and confidence-building measures in the exploration and responsible use of outer space.

In this regard, Brazil's position on the subject is structured according to the following topics: existing and potential threats to space systems; responsible, irresponsible and threatening behaviours in outer space; and way forward for the development of norms, rules and principles.

Existing and potential threats to space systems

The increasing number of human activities based on space technology and the proliferation of space actors and operators have created the perception that outer space is congested and might be subject to international disputes. In addition, advances in space technology development, which normally has a dual nature, can lead to the excessive militarization of outer space and to an increase in the potential for the weaponization of space technologies. In this environment, risks of misperception and miscalculations become ever more plausible.

It is important to remember that the operationalization of space systems generally involves several activities, including preparations for the placement of objects in orbit; the use of objects during their life cycle; and actions that support the sustainability and safety of the space environment, including decommissioning objects. Nevertheless, the significant expansion of space capabilities in recent years has led to an increase in the number of objects in orbit, which, over time, become

space debris (parts of space vehicles and satellites that are disabled without any possibility of control).

The placement of objects in outer space implies the assumption of a set of responsibilities by the nations that do so, as stipulated in the Outer Space Treaty. The need for registration, in compliance with the Convention on Registration of Objects Launched into Outer Space, is one of them. This procedure allows for ample communication regarding the national elements that are in the Earth's orbit and, in turn, has fundamental value for the construction of a database that contributes to space situational awareness. The registration of all satellites makes it possible to know the position and purpose of the objects, mitigating doubts or problems of interpretation concerning them. Consequently, the absence of information and the use of space objects with low-visibility characteristics (or with "stealth" technology) can raise questions about the purpose and application of some space objects, increasing the feeling of insecurity in the space environment and subverting States' commitment to transparency in their space activities.

On the operational side, conducting manoeuvres or proximity operations without prior warning has also been considered as a potential threat. Some rendezvous activities among satellites in space have been observed, which raises suspicions about the existence of espionage or data collection missions, creating an environment of mistrust and the possible adoption of response measures by States that claim to have had their satellites observed without prior notification. Such behaviour has been considered inappropriate or even threatening, with allegations of non-compliance with the provisions of article IX of the Outer Space Treaty.

The possibility of cyberattacks against satellite systems is also among the biggest concerns of States and private actors with space assets. Cyberattacks may be carried out with a view to taking control of space objects, intercepting information or taking measures that put other satellites at risk. Furthermore, cyberoperations against space capabilities (in orbit or on land) pose a threat to critical infrastructure used both for military and civilian purposes.

Last but not least, the development and proliferation of new anti-satellite weapon systems, either terrestrial or co-orbital, also threaten space systems, as they raise distrust in the international environment. The development and potential use of these capabilities are a serious threat and should be discouraged owing to the damage they might cause to the sustainability of outer space and to international security.

Responsible, irresponsible and threatening behaviours in outer space

Brazil, as already mentioned, is fully committed to the confidence-building and transparency measures established by the 2013 report of the Group of Government Experts (A/68/189). Brazil also favours discussing the subject in such a way as to make space activities, both in orbit and on Earth, more transparent and to improve communications between technicians, operators and political authorities who deal with the area.

Pre-launch notifications, registration of space objects, exchange of information about the intentions of a particular operation as well as the improvement of space situational awareness are measures that by consensus are recognized as responsible, in line with the 2013 report of the Group of Governmental Experts, endorsed by the General Assembly by consensus, through its resolution 68/50.

In that regard, the following is a non-exhaustive list of behaviours considered as responsible by Brazil:

- Registering satellite objects, as recommended by the Registration Convention

- Prior or timely communicating of manoeuvres involving space objects, aimed at avoiding damage to or interference with the space devices of other States
- Maximizing the use of de-orbiting devices in satellites or the removal of parts or components of space vehicles at the end of the life cycle of each space element, thereby reducing the amount of space debris
- Sharing information on the monitoring of objects in space, in order to provide input for international databases and enable broad space situational awareness
- Submitting international notifications on the possibility of collisions involving uncontrolled space objects or de-orbit withdrawals
- Establishing an international commitment aimed at banning tests with anti-satellite weapons
- Observing the principles and precepts of the Outer Space Treaty, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the Convention on International Liability for Damage Caused by Space Objects and the Registration Convention
- Observing the 21 Guidelines for the Long-term Sustainability of Outer Space Activities established by the Committee on the Peaceful Uses of Outer Space and adopted by consensus by the General Assembly

A lack of transparent behaviour regarding States' space capabilities, as well as the conduct of space operations (by either States or companies) without proper notification, creates an environment marked by opacity, in which misinterpretation can lead to inappropriate responses and conflict escalation.

In Brazil's view, the following behaviours can be considered as irresponsible:

- Conducting tests of satellite destruction capabilities (use of anti-satellite weapons)
- Carrying out electronic attacks (jamming and spoofing) or cyberattacks on space systems
- Refraining from performing anti-collision manoeuvres between satellites, or not communicating with other States regarding potential collisions involving satellites, mainly under their international registration
- Not "de-orbiting" space systems at the end of their life cycle
- Employing nuclear reactors in Earth's orbit, contrary to the guidelines and principles recommended by the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space

In addition to irresponsible behaviours, there are a number of behaviours that can be characterized as threatening, such as those mentioned in the following non-exhaustive list:

- Developing direct ascent or co-orbital anti-satellite weapons
- Executing proximity manoeuvres between satellites without prior communication or understanding between the States regarding the registration of space objects
- Developing satellites equipped with armaments and sensors for electronic attacks or cyber-attacks
- Using anti-satellite capabilities to carry out any destruction of satellites in orbit, resulting in the intentional creation of space debris

Way forward for the development of norms, rules and principles

Brazil supports furthering and deepening discussions on security in outer space in all appropriate multilateral forums (Conference on Disarmament, First Committee, Fourth Committee and Committee on the Peaceful Uses of Outer Space).

Given the need to advance towards the systematization of norms, rules and principles that serve as a basis for guiding State behaviour in outer space, which may provide a starting point for a negotiating process on legally binding rules in the future, Brazil supports the establishment of mechanisms of dialogue, within the scope of the United Nations, for this purpose.

Among the possibilities to be considered by States, Brazil favours the establishment, through a General Assembly resolution, of an open-ended working group with a mandate to elaborate a set of principles, norms and rules for responsible State behaviour in space, which, in the long run, may constitute a normative basis for eventual negotiations on a legally binding instrument on the matter.

Canada

[Original: English and French]
[29 April 2021]

The present submission provides Canada's views on General Assembly resolution 75/36, entitled "Reducing space threats through norms, rules and principles of responsible behaviour". It responds to a note verbale from the Office for Disarmament Affairs sent pursuant to paragraphs 5 and 6 of the above-mentioned resolution, in which the Assembly requests the Secretary-General to seek the views of Member States.

Importance of outer space

Canada is a nation defined by its bold efforts in space. Canada has a rich history of making forward-looking commitments to leverage space science, technology and exploration to improve the lives of not only Canadians, but all people. Today, as for all nations, space is an integral part of daily life in Canada, helping connect and inform us, and enabling everything from navigation, cell phone services and television broadcasts to financial transactions. As a vast country with a relatively small population, Canada relies on the information and imagery gathered by space-based systems to observe and monitor our country. These capabilities help us support essential government functions such as environmental monitoring and search and rescue. Space systems are also vital to the Canadian Armed Forces, which rely on them to conduct operations for the defence of Canada and North America and to contribute to global peace, safety and security.

Beyond national borders, space also helps unite nations as we tackle global challenges. Space-based technologies and data play a key role in climate knowledge and science, which is also essential to provide early warning of potential climate disasters. Data from space-based Earth observation satellites can contribute to assessments of the vulnerability of communities to climate change and can help monitor the effectiveness of mitigation strategies. Space is vital for supporting nations facing natural disasters, and efforts such as the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters are key to the monitoring of and response to these challenges.

The viability of space infrastructure is increasingly threatened by space debris and space weather, as well as by the risk of potential hostile activities in space and from the Earth's surface. The challenge of protecting space infrastructure from both

natural and human-made threats is made more complex by the rapid expansion of the number of space actors as well as the lack of a more developed regime of international norms to govern space activities.

Context:

Space systems

In order to situate the views on potential threats and security risks to space systems, for purposes of the present submission, Canada defines space systems (civilian or military) as:

- Space segment (e.g. satellite, launch vehicle)
- Ground segment (e.g. mission control centre, facilities used to store, process or distribute data)
- Data links (e.g. between spacecraft or user terminals)

Differentiating between space security and space sustainability/safety

The Committee on the Peaceful Uses of Outer Space deals with the peaceful uses of space, including space sustainability, safety and related risks and hazards (e.g. existing and new debris, space weather, crowded orbits, light pollution and frequency interference). For Canada, this work is distinct from the space security issues addressed in the present submission, which is focused on actions that could be perceived as deliberate threats by States, or non-State actors, to space systems.

As an example that illustrates the difference between space safety and space security, frequency interference can be accidental, resulting from the close proximity of systems through regular station keeping; this is different from deliberate frequency interference (i.e. jamming). Another example is debris: while newer satellites are capable of conducting de-orbiting measures, older satellites will eventually become debris at their end of life – however, this is vastly different from the creation (or potential creation) of debris from anti-satellite activity. In both examples, the latter instances constitute deliberate acts and should be dealt with under the disarmament agenda, while the former are being addressed in the Committee on the Peaceful Uses of Outer Space.

Threats and security risks to space systems

Canada notes that space is increasingly contested, congested and competitive. In addition, space is a domain in which knowledge of the operating environment is inherently difficult. These factors create opportunities for misunderstanding and miscalculation of risks and consequences, potentially resulting in unintended escalation. It is in every State's interest to ensure a shared understanding of the actions that can be destabilizing and lead to an increase in tensions in space.

Responsible behaviours

Canada views responsible behaviour in space as those behaviours that promote the safety, security and sustainability of outer space activities and the space environment. Responsible behaviours increase the predictability and general transparency of operations and therefore reduce the potential for hostilities in, from or through space. Responsible behaviours include actions such as exchanging information in a timely manner with the appropriate audience in order to reduce adverse impacts to space operations or avoid misunderstandings. This also includes communicating with the other party or parties when there is a space activity perceived as threatening in order to ensure understanding of the intent. The aim of commonly

understood responsible behaviours is to create mutual understanding and trust, through transparency, in order to reduce misperceptions and miscalculations, thereby helping to prevent military confrontation and foster global stability. From Canada's perspective, pragmatic, non-binding standards of responsible behaviours should be applied as soon as possible, which, if accepted by a majority of spacefaring nations, could become legally binding international law in the future.

As the international community works toward reaching a common understanding of responsible behaviours, in Canada's view, even if an action is lawful under international law, in some contexts, such an action may not be viewed as responsible. States should always strive to act responsibly as well as lawfully.

Ideas on threats and security risks and responsible behaviours

Set out below are some initial ideas, from a Canadian perspective, regarding potential threats and security risks and irresponsible and responsible behaviours, to help advance the discussion on norms and responsible behaviours:

(a) **Damage to the space environment or space systems.** Actions that would lead to damage to the space environment could be considered as irresponsible. In Canada's view, the most significant risk of damage to the space environment is the creation of debris. Debris is any non-functional human-made object of any size or composition in space; in other words, a satellite is one piece of debris upon ceasing to perform its designed functions. Behaviours that purposefully or by negligence lead to the creation of debris would be irresponsible, especially in orbits that could impact human spaceflight, such as the International Space Station. Canada views responsible behaviour as committing not to undertake development, testing or use of anti-satellite capabilities that can cause widespread debris. Indeed, Canada supports discussions, in the context of the Conference on Disarmament, on a possible ban on the testing and use of anti-satellite weapons that cause space debris. In addition, actions or activities that may lead to physical damage of space systems could be considered irresponsible and/or threatening. Responsible behaviour would be refraining from deliberately damaging or destroying space systems;

(b) **Interference.** An action that interferes with the command and control of a satellite or leads to irreversible loss of functionality could be viewed as irresponsible and/or threatening. This could include interference with the ability of an operator to control a satellite, or irreversible loss of satellite capabilities such as imagery or communication, or a general malfunctioning of space systems. Responsible behaviour would be refraining from deliberately causing non-consensual interference to space systems;

(c) **Rendezvous and proximity operations.** The conduct of non-cooperative rendezvous and proximity operations could be viewed as irresponsible and/or threatening. For instance, proximity operations such as approaching and/or following another satellite could be viewed as threatening. Norms are needed for safe rendezvous and proximity operations to prevent misinterpretation and miscalculation. Responsible behaviour could include notification of rendezvous and proximity operations to States that may be affected in order to coordinate operations and avoid potential misinterpretation. It could also include seeking consent in advance for the manoeuvre. To reduce the potential for a peaceful-use system to be mistaken for a weapon, responsible behaviour could require States to publish the mission plan of all civil on-orbit servicing missions;

(d) **Secondary damage and impact on human life.** Actions that disrupt or impair the delivery of critical space-based services, resulting in serious risks for the safety and security of people or property, are irresponsible and could be perceived as a threat. These include actions that disrupt a satellite's ability to provide crucial

information to the public, such as navigation information used by aircrafts to avoid collisions, or data used by emergency responders to forecast and/or respond to major disasters. These effects and consequences are expected to increase as more terrestrial activities leverage space to deliver services. Responsible behaviour would be refraining from intentionally placing the safety and security of people and critical infrastructure at risk.

Considerations for possible next steps and further development of norms

(a) **Reinforce the importance of norm-building with adherence to existing treaties and guidelines.** Canada remains fully committed to the international legal framework governing the use of space. This includes the four core treaties, especially the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the cornerstone of space governance. Ratification and adherence to key space treaties, as well as national implementation of these treaties and other international instruments, such as the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space and the Space Debris Mitigation Guidelines, should remain a key priority in developing norms;

(b) **Pursue transparency and confidence-building measures and communication protocols to mitigate threats and security risks.** The exchange of information is a simple and effective way to ensure openness and transparency regarding space activities. In particular, the publication of national policies on the use of outer space, the registration of space objects with the United Nations, and advance notification of launches in accordance with The Hague Code of Conduct against Ballistic Missile Proliferation are all transparency and confidence-building measures. Effective and timely communication will help avoid misunderstanding of intentions, particularly in times of heightened tension. This includes how to undertake consultations, share information and engage in dialogue – encompassing communication between Governments, both bilaterally and multilaterally. Canada believes work could be undertaken to generate ideas around possible protocols and mechanisms to enhance communication, including by leveraging the work of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities;

(c) **Recognize the importance of verification to international peace and security, including to ensure confidence that parties are complying.** Tangible and realistic verification mechanisms enhance credibility, promote transparency and accountability and build confidence among participating States. Space domain awareness and space surveillance and tracking will be important components of verification. Effective verification could include a number of activities and mechanisms, such as data exchanges, state declarations, advance notification of launches and manoeuvres, and a consultation mechanism. The extensive, and growing, dual-use nature of space systems further complicates verification in space, emphasizing the importance of good communication and transparency to signal intent;

(d) **Build on existing expertise.** Canada suggests looking at lessons that could be taken from the work carried out in other forums (e.g. the Committee on the Peaceful Uses of Outer Space) to develop protocols such as the Space Debris Mitigation Guidelines and the Guidelines for the Long-term Sustainability of Outer Space Activities, or the work of the Inter-Agency Space Debris Coordination Committee. There may also be value in examining the development of norms and principles of responsible behaviour in other fields, such as the maritime or cyber domains, for the development of such norms for space;

(e) **Importance of engagement by all States and stakeholders.** As noted above, because space is critical for all nations, Canada believes that discussions on developing norms should include all States, irrespective of their level of national involvement in space activities. Finding ways to identify shared benefits is important for norms to be accepted by all, and norms need to be inclusive and fair for all concerned. As space exploration and use is in the interest and for the benefit of all humankind, factors such as global north/global south, developed/developing and established/emerging spacefaring nations should also be considered. Private sector entities are also stakeholders in maintaining security in outer space and their views should be sought and considered;

(f) **Diversity as a strength.** As a champion of the full, meaningful and equal participation of women in all aspects of disarmament, Canada welcomes the emphasis on the full involvement and equal participation of women and men in discussions on reducing space threats through responsible behaviours and the need to assess the possible differentiated impacts of such threats.

Conclusion

Canada believes that developing norms and principles of responsible behaviour will support more security and stability in space, thereby creating momentum for more ambitious steps, including the possibility of an eventual comprehensive, verifiable and legally binding regime. Canada is open to considering a variety of next steps and recommendations in the report of the Secretary-General.

Canada will continue to work to advocate the development of international norms of responsible behaviour in space. By fostering greater confidence and transparency in the space environment, we can create the climate of confidence necessary to develop future measures that could govern space.

China

[Original: Chinese and English]
[30 April 2021]

Introduction

Outer space is closely related to the security and welfare of humankind, and has striking features of a community with a shared future for humankind. Space utilization and exploration as well as space technology advancement and its extensive application have brought not only benefits for the development and prosperity of human society but also rising challenges and risks. In particular, the rising risks of the weaponization of and an arms race in outer space have become the greatest threat to outer space security.

Preventing an arms race in outer space is the precondition for safeguarding outer space security and ensuring peaceful uses of outer space, as well as one of the most prominent and pressing issues for the international community. Since the existing international legal instruments are insufficient to deal with the new challenges, the conclusion of an arms control treaty on outer space becomes even more important and urgent and should be viewed as the priority and fundamental goal on the related international agenda. The discussions on responsible behaviours in outer space can only serve the fundamental goal of preventing an arms race in outer space. No attempts should be made to dwell on less important issues, mixing up different agendas, or even to use such discussions as a tool for certain countries to shirk their own responsibility and pin the blame on others. All relevant discussions on responsible behaviours in outer space should adhere to multilateralism and avoid being politicized, discriminatory or exclusive.

Outer space security concerns the common security of all humankind. Maintaining outer space security should be the responsibility of all countries, and those with the most advanced space capabilities bear a special responsibility in preventing an arms race in outer space and ensuring peaceful uses of outer space. China believes that outer space should be a new frontier for win-win cooperation rather than a new battlefield of great powers competition. In this vein, to safeguard and ensure outer space security, all countries should make efforts in the following five respects:

First, all countries should be committed to building a community with a shared future for humankind and to maintaining the vision of common, comprehensive, cooperative and sustainable global security. This is the conceptual basis for maintaining outer space security.

Second, preventing the weaponization of outer space and an arms race in outer space in a practical and effective manner is fundamental for maintaining outer space security. It is imperative to conclude an international legally binding instrument at an early date. The United Nations should re-establish the Group of Governmental Experts or establish an open-ended working group on the prevention of an arms race in outer space, for which responsible behaviours in outer space could be included as one of the agenda items.

Third, transparency and confidence-building measures could play a certain positive role and serve as a useful supplement to legally binding arms control measures on outer space. However, discussions on transparency and confidence-building measures should not replace the negotiation of an international legally binding instrument.

Fourth, a proper balance should be struck between outer space security and the peaceful and sustainable uses of outer space. The equal rights of all countries concerning the peaceful uses of outer space should be respected and ensured and related international exchange and cooperation enhanced.

Fifth, the United Nations should play its role as the central platform for outer space governance in order to ensure extensive participation, fairness and inclusiveness in the related international rule-making process. Different United Nations forums should fully respect each other's mandates while maintaining close coordination and cooperation.

Overview of the outer space security situation

In general, space security and space safety are two different dimensions of the outer space issue. Space security refers to the risks of the weaponization of and an arms race in outer space, including actions such as declaring outer space as a new war-fighting domain, developing military capabilities in outer space, establishing an independent space force and space command, deploying weapons and equipment expeditiously and conducting military exercises in outer space. Such actions will increase the risks of strategic miscalculation, accidental clashes, or even conflicts, and therefore are the fundamental threats to outer space. Space safety, which refers to the risks occurring in the process of peaceful uses of outer space, including, inter alia, orbit congestion, collision and space debris, is the common challenge all countries face when conducting space activities. Space security and space safety are issues of a different nature, and the approaches to deal with them should vary accordingly. We should avoid mixing them up and confusing the primary with the secondary. If we cannot prevent an arms race in outer space and safeguard peace in outer space, neither security nor safety will be possible.

Above all, the weaponization of and an arms race in outer space are becoming more prominent and pressing. The root cause is that a certain country sticks to the Cold War mentality, pursues unilateral military and strategic superiority in space and increases its attempts, plans and actions to seek dominance in space. This is evident in three respects:

First, outer space has been increasingly regarded as a new battlefield. The United States publicly declares outer space as a new war-fighting domain, establishes an independent Space Force and Space Command, and accelerates the building up of a combat system in outer space, in a bid to get ready for a space war. The United Kingdom just announced the establishment of its new Space Command and a military force with space combat capability, and plans to invest tremendously in research and development on space weapons, including directed-energy weapons. The North Atlantic Treaty Organization has for the first time defined space as an operational domain, with a view to enhancing synergistic operational capabilities in space. Such actions have exacerbated the trend of an arms race in outer space, increased the risk of turning outer space into a war-fighting domain like the land, sea and air, and dramatically increased the uncertainty of outer space security.

Second, the vulnerability of outer space security is rising. The development of anti-satellite weapons, missile defence systems and long-rang precision attack weapons has posed challenges to traditional strategic balance and stability. The United States was the first country to conduct anti-satellite weapon tests, and with the most tests conducted, it has created the largest amount of space debris. In its 2019 Missile Defense Review, the United States stressed the importance of space in missile defence and its plans to build a network of space-based infrared sensors, develop new type of space sensors and deploy space-based missile interceptors in space. In recent years, the United States has been upgrading its space tests, including by repeatedly testing the X-37B spacecraft, extending the lifespan of a communication satellite (Intelsat 901) in the graveyard orbit after docking with MEV-1 and deploying an upgraded Counter Communication System, which could be used to jam signals and disrupt satellite communications. These technologies can be diverted to offensive military use, thus posing a serious threat to the security of the outer space assets of other countries.

Third, the risk of confrontation and conflict in outer space is rising. In terms of strategy, expressions like competition, adversaries and threat are frequently used in the National Space Strategy of the United States and the Integrated Review of Security, Defence, Development and Foreign Policy of the United Kingdom. In terms of actions, the United States has conducted rendezvous proximity operations or flyovers that endanger other countries' satellites in orbit, tested offensive and defensive space capabilities and interfered with the normal space operations of other countries. Such actions have posed severe threats to the space assets of other countries, aggravated tension in space and increased the risk of military miscalculation and conflict.

Comments on responsible behaviours in outer space

Outer space security is a very complex issue. The binary distinction between responsible and irresponsible behaviours in outer space is over-simplified and subjective and can easily be used as a political tool. In spite of this, China is willing to share its understanding of responsible behaviours in outer space, with a view to promoting mutual understanding, broadening consensus and contributing to the international efforts to prevent an arms race in outer space.

Responsible behaviours in outer space should observe the principles set out below.

First, safeguarding common and universal security. All countries should, by building a community with a shared future for humankind and bearing in mind the vision of common, comprehensive, cooperative and sustainable global security, shoulder the responsibility of maintaining outer space security and cope with threats to outer space security through cooperation, with a view to maintaining common and universal security. The major powers should abandon the mindset of unilateralism, the pursuit of absolute superiority, absolute freedom and unilateral security in outer space, the strategy and policy of pursuing dominance in space, and the approaches that stress the security of one single country or a small group of countries by undermining the security interests of other countries or even the common security of the international community. No country should cross the red line of conflict or war in outer space. All parties should enhance understanding and mutual trust through dialogue and avoid confrontation and miscalculation. The countries with the greatest space capabilities bear a special responsibility in this respect.

Second, respecting and abiding by basic principles set out in existing international law. All countries should ensure that their space behaviours are in line with international law and the principles governing international relations, which are the basic norms of responsible behaviour. All countries should follow the purposes and principles of the Charter of the United Nations, abiding by the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the Convention on International Liability for Damage Caused by Space Objects and the Convention on Registration of Objects Launched into Outer Space, and fulfil the obligations of international law in good faith.

Third, persisting in preventing an arms race in outer space. Preventing the weaponization of and an arms race in outer space is fundamental to safeguarding outer space security. The highest priority is to negotiate and conclude an international legally binding instrument on arms control in outer space at an early date. The United Nations should establish a second group of governmental experts or an open-ended working group on the prevention of an arms race in outer space, for which responsible behaviours in outer space could be included as one of the agenda items. While the Conference on Disarmament is yet to reach an agreement on its programme of work and start negotiations, a technical expert group could be established to discuss technical issues such as the definition, scope and verification of a future legal instrument on outer space arms control. Transparency and confidence-building measures could play a positive role in this regard, but they should not replace the negotiation of a treaty on outer space arms control.

Fourth, striking a balance between outer space security and the peaceful use of outer space. The equal rights of all countries concerning the peaceful uses of outer space, particularly the interests of developing countries and emerging spacefaring countries, should be respected and ensured and related international exchange and cooperation enhanced. We should promote international exchanges, technical assistance and cooperation, promote universal and shared benefit of outer space technological development, and promote the peaceful use of outer space as a strong driver of economic and social development for all. Ideological bias, double standards and unilateral sanctions should be abandoned, political divides and technical barriers should be removed, and abuses of such pretexts as security threats in order to hamper the peaceful use of outer space should be avoided.

Fifth, upholding multilateralism and seeking comprehensive and coordinated solutions. We should support the United Nations playing a central role as the main platform for outer space governance, and ensure extensive participation, justice and inclusiveness in related international rule-making, build the widest possible

international consensus and avoid imposing the will of some countries on others. Relevant United Nations agencies have their own mandates and focuses; therefore, in the coordinating and cooperating needed, efforts should be made to avoid excessive overlapping and confusion. The Conference on Disarmament should play a primary role in preventing an arms race in outer space. Other multilateral platforms such as the First Committee and the Fourth Committee of the General Assembly, the Committee on the Peaceful Uses of Outer Space and the Disarmament Commission could facilitate relevant discussions within their mandates.

In terms of specific actions, China calls upon all countries to take the actions set out below.

First, supporting the negotiation of a treaty on space arms control. All countries should support prevention of the placement of weapons in outer space and the threat or use of force anywhere against outer space objects through legally binding measures. Whether a country has the political will to participate in such a negotiation is the touchstone for its sincerity in terms of behaving responsibly.

Second, suspending confrontation and interference in outer space. For example, suspending unrestrained research and development on and the deployment of missile defence systems, particularly the deployment of missile interceptors in space; and suspending rendezvous proximity operations and space-based tests of technologies that endanger other countries' spacecrafts.

Third, taking transparency and confidence-building measures on a voluntary basis. All countries should enhance mutual trust and avoid miscalculation through appropriate and feasible transparency and confidence-building measures, which could be supplementary to the negotiation and conclusion of an international legally binding instrument on space arms control. These measures include but are not limited to: no first placement of weapons in outer space; space security dialogue and exchanges on national space strategies, policies and intentions; cooperation on space debris mitigation, space objects collision avoidance, space launching notification and space facility visits; and seeking to reach bilateral or multilateral arrangements.

Fourth, ensuring long-term sustainability of the peaceful use of outer space. Necessary technical measures should be taken to mitigate space debris in accordance with relevant international rules. Extensive discussions on the long-term sustainability of the peaceful use of outer space and space debris mitigation within the Committee on the Peaceful Uses of Outer Space framework should be continued, with wide participation from all relevant parties. Meanwhile, the legitimate rights and special needs of the developing countries should be fully taken into consideration.

China's policies and practices in maintaining outer space security

China has consistently advocated the peaceful uses of outer space and firmly opposed the weaponization of and an arms race in outer space as well as the extension of armed conflict to outer space. China maintains that the exploration and use of outer space should serve the purpose of promoting the economic, scientific and cultural development of all countries and benefit all humankind. To this end, China has been making unswerving efforts in the following respects:

First, China has actively promoted the negotiation of an arms control treaty on outer space. China and Russia jointly submitted to the Conference on Disarmament a draft treaty on the prevention of the placement of weapons in outer space and of the threat or use of force against outer space objects in 2008 and its updated text in 2014, which provides a good basis for future negotiations. Since 2007, China has sponsored the resolutions entitled "Prevention of an arms race in outer space", "Further practical measures for the prevention of an arms race in outer space" and "No first placement

of weapons in outer space” in the First Committee of the General Assembly. As proposed by China, Russia and some other countries, the United Nations established the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space in 2017, which held two sessions in August 2018 and March 2019, respectively, and open consultations in January 2019. Although the Group failed to adopt a substantive report owing to blocking by the United States, all parties had an unprecedentedly in-depth and substantive discussion on elements of an international legally binding instrument on arms control in outer space, which laid the groundwork for the next step forward in the process of arms control in outer space.

Second, China has attached great importance to transparency and confidence-building measures in outer space. As one of the sponsors of the resolution entitled “Transparency and confidence-building measures in outer space activities”, China has actively taken part in the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities, made a number of constructive suggestions and supported all parties in actively studying and implementing the report prepared by the Group in 2013 on a voluntary basis. China has released a white paper entitled “China’s space activities” four times, in 2000, 2006, 2011 and 2016, and released a white paper entitled “China’s national defense in the new era” in 2019, which fully demonstrate China’s space policy and space activities plan. China has registered relevant information in strict accordance with the requirements of the Convention on Registration of Objects Launched into Outer Space. The Chinese Government issued the Interim Measures on the Administration of Permits for Civil Space Launch Projects to strengthen permit approval of launch projects and the regulation of commercial space activities. China has published significant space launch activities through media or maintained communication and coordination with relevant countries and international organizations.

Third, China has actively engaged in international cooperation on the peaceful uses of outer space. China has actively participated in the work of the Committee on the Peaceful Uses of Outer Space and its working group and has played a constructive role in concluding the preamble and the 21 Guidelines for the Long-term Sustainability of Outer Space Activities. China has also actively participated in the cooperation under multilateral forums, including the Inter-Agency Space Debris Coordination Committee, the International Asteroid Warning Network and the Space Mission Planning Advisory Group, and conducted regular exchange with relevant countries on matters such as space debris and satellite collision warning. To integrate international standards, the Chinese Government has issued Space Debris Mitigation Requirements and other standards. China has offered to employ passivation measures regularly on the upper stage of carrier rockets, which has contributed to zero growth in the total number of pieces of space debris created by China. China has also proactively carried out clearance operations for end-of-life spacecraft, in the form of disposal or transfer to a graveyard orbit, so as to preserve orbital resources to the greatest extent possible.

Fourth, China has actively conducted international space exchanges and cooperation. China has signed more than 130 space cooperation agreements and memorandums of understanding with nearly 40 countries and international organizations, provided satellite service to more than 10 countries and promoted the international application of the BeiDou Navigation Satellite System. China has organized and received visits from foreign officials and aerospace experts to its launch centre. China has actively conducted international cooperation within the framework of the United Nations, the Asia-Pacific Space Cooperation Organization and the Brazil, Russia, India, China and South Africa (BRICS) group. China has published space application cooperation programmes on its space station for all countries, in cooperation with the United Nations. In the first round, nine projects

from 17 countries have been selected to participate in the scientific experiments of China's space station, and a second round of selection will be published in due course.

Conclusion

A space war cannot be won and must never be fought. The history of the nuclear arms race should never be repeated in space. All nations share broad common interests in outer space. We should preserve space as a new frontier for cooperation rather than as a battlefield for competition and confrontation. China stands ready to make joint efforts with other parties in outer space with a view to building a community with a shared future for humankind, and to actively seek practical and effective solutions to space security threats so as to safeguard the common security of humankind, in a bid to contribute to the peace, security and sustainability of outer space.

China kindly requests the Secretary-General to take account of China's views in his substantive report prepared pursuant to paragraphs 5 and 6 of General Assembly resolution [75/36](#) and to include this document in his report.

Egypt

[Original: Arabic]
[28 April 2021]

I. Current and potential threats and risks, and security threats, to space systems

1. Threats to the space segment of space systems

(a) Types of threat to the space segment

- Intentional complete destruction of space objects.
- Intentional fragmentation of space objects.
- Use of directed-energy weapons to destroy the electronic devices of space objects.

(b) Causes of threats to the space segment

- The weaponization of and arms race in space is currently one of the most serious sources of threats of destruction or fragmentation of space systems, and the arms race is no longer the exclusive preserve of technologically advanced nations; rather, the related problems cast a shadow over emerging spacefaring States. The weaponization of space by the great Powers makes it possible for them to use that as a tool for conducting armed conflicts between States, a development that threatens international peace and security.
- Orbital debris threatens the physical integrity of the space segment. The increase in the number of objects and debris fragments could result in space objects being destroyed or totally or partially disabled owing to collisions with debris.
- Lack of discipline in space traffic could result in collisions between space objects. Such traffic is not regulated by any centralized mechanisms or agencies comparable to the International Telecommunication Union, which regulates radio signals and frequencies so that they do not interfere with one another. In addition, the public documents currently available are not accurate enough to ensure that space traffic is effectively controlled. The situation is a major obstacle and threat to the ability of countries that have recently joined the

spacefaring club to determine appropriate orbits for the launch of their satellites for peaceful purposes, including development.

- The use of nuclear power sources in some space objects could damage nearby objects in the event of damage or radiation leakage in space.

2. Threats to the ground segment of space systems

(a) Types of threat to the ground segment

- Sabotage or intentional destruction of ground reception stations.
- Use of energy weapons to destroy terrestrial space equipment.
- Cyberattacks targeting data at ground stations.

(b) Causes of threats to the ground segment

- Terrorist acts targeting the ground segment.
- Attempts by some States that cannot develop space capabilities to obtain information about space systems illegally, by stealing ground-station data or hacking into the associated databases.

3. Threats to channels of communication between space and ground segments

(a) Types of threat to channels of communication

- Eavesdropping.
- Jamming and disruption.
- Frequency interference between satellites in close proximity.

(b) Causes of threats to channels of communication

- Some States seek to damage other States' space systems by cutting, disrupting or jamming communications between ground and space systems.

II. Acts and activities that can be considered responsible or irresponsible behaviour or that pose a threat in this regard, and their potential implications for international security

1. Distinction between responsible and irresponsible behaviour

- The criterion for distinguishing between responsible and irresponsible behaviour by States in this regard is the degree to which States' behaviour or activities comply with the rules of international law, the Charter of the United Nations and agreed practices related to the preservation of outer space as a secure, stable and sustainable environment, free of considerations related to the arms race and conflicts.
- All causes of threats to space and ground segments and the aforementioned channels of communication between those segments are acts that can be considered irresponsible behaviour by States in outer space.

2. Potential effects of irresponsible behaviour on international security

Irresponsible acts have many adverse effects on the international community, including the following:

- Political conflicts resulting from competition for space resources.

- Escalation of the arms race and threat of the use of force in outer space.
- Lack of or decline in trust among States, which damages the prospects for peaceful uses of space.
- Tendency for countries to increase the dual use of satellites, in violation of international rules and practices.

3. Proposed ways of developing the application of the rules, practices and principles of responsible behaviour, and limiting the risk of misunderstandings and miscalculations in outer space

- States should undertake to provide full and accurate data on the following:
 - Orbits and lifespans of their own space objects, and registration of those objects with the United Nations Committee on the Peaceful Uses of Outer Space.
 - Radiofrequencies used by their own space objects, and registration of those frequencies with the International Telecommunication Union.
- States that own space observation and surveillance networks should undertake to publish accurate data on space objects.
- An international treaty or agreement on the prevention and criminalization of the use of offensive weapons to threaten space and ground segments should be drafted to complement previous agreements on the matter or update existing agreements so as to keep them in line with space-related developments.
- Binding protocols and rules on the principles governing States' activities in outer space should be developed, until a comprehensive and binding legal agreement on the matter is concluded.
- An international working group should be formed to prepare a set of technical and specialized space definitions and terms, including the concept of responsible State behaviour, in order to standardize concepts and be guided by them in the preparation of any working papers related to international, regional or subregional agreements, treaties and rules of conduct, as has been done for definitions and terms related to disarmament (conventional, non-conventional, nuclear, chemical and biological).
- Emphasis should be placed on additional measures related to transparency and confidence-building, such as the issuance of pre-launch notifications and the application of the Space Debris Mitigation Guidelines of the Committee.

Finland

[30 April 2021]

Finland welcomes the opportunity to present a submission for the report of the Secretary-General pursuant to General Assembly resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviours. Finland also aligns itself with the positions expressed by the European Union in its contribution.

Finland welcomes international efforts to address security challenges relating to outer space. We support endeavours to increase our common understanding on how to mitigate threats and risks to space security, to promote responsible behaviours in outer space and to reduce the risk of misunderstandings and miscalculations with respect to outer space activities. It is on this basis that we were pleased to support resolution [75/36](#) and will be engaging in its implementation.

Finland remains committed to the peaceful use of outer space in accordance with international law and to the prevention of an arms race in outer space. We will continue to promote the preservation of a safe, secure and sustainable space environment, and we welcome the progress achieved in the Committee on the Peaceful Uses of Outer Space with the adoption of the Guidelines for the Long-term Sustainability of Outer Space Activities and future related work.

We consider outer space a global commons to be used for the benefit of all, and hold the view that all space activities should be carried out to the highest standards of due diligence and in full respect of the security, safety and integrity of space objects.

With societies more and more dependent on space-based assets, space systems are today an integral part of international and national infrastructure. This gives a strong impetus for all States – spacefaring or not – to address issues related to reducing space threats.

The first Finnish satellite was launched in 2017, and there are currently 11 Finnish satellites in orbit: two belonging to a scientific institution and nine to commercial operators. Finland has had national legislation on space activities in place since 2018. The law applies to space activities carried out within the territory of Finland and activities by Finnish citizens or legal persons incorporated in Finland. The law stipulates, *inter alia*, that space activities shall be carried out in a manner that is technically safe and environmentally sustainable and that ensures the sustainable use of outer space. Operators shall seek to ensure that their activities do not generate space debris. The legislation also contains provisions on the registration of space objects in the national space object registry. All Finnish space objects are also notified to the Secretary-General, a step which further promotes transparency, predictability and accountability.

With increasing congestion in space, the risk of misunderstandings and miscalculations leading to unintended escalation is rising. At the same time, Earth-based actions and actions in the cyber domain can directly affect systems in space, impairing the provision of critical space-based services. Enhanced efforts to address space security are thus called for.

There is an urgent need for strengthening information exchange, transparency and confidence-building measures in the space domain. Further understanding of space threats is needed, as well as a common agreement on which behaviours exacerbate tensions and drive competition among States. Due to the interlinked nature of systems in space and on earth, we need to address interactions between the space and earth domains as well as space-to-space and Earth-based actions. Consideration of these security aspects of space should take place in the United Nations disarmament context.

In view of the complexity of space as a domain and the inherently dual-use nature of space systems, we see a behaviour-based approach as the best way forward. Establishing principles of responsible behaviour in space, as proposed in resolution [75/36](#), would serve the purpose of preventing misunderstandings and miscalculations and thus reducing the risk of unintended escalation.

In defining the nature and status of these agreed principles, States could benefit from the work of the successive Groups of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security, including in particular the 2015 report of the Group of Governmental Experts.

The following topics, for example, would in our view merit closer examination in the work ahead:

(a) **Enhancing of transparency and of information-sharing.** Establishing national points of contact for coordination and deconfliction, as well as consultation mechanisms and best practices for transparency and information exchange; publishing and sharing information on national space security strategies and doctrine; and sharing situational awareness data;

(b) **Strengthening of existing mechanisms regarding outer space.** Encouraging States to become parties to United Nations space treaties, strengthening other existing mechanisms related to space activities, such as The Hague Code of Conduct, and enhancing the practical implementation of these commitments.

Non-interference in the control of space systems: committing not to interfere, by cyber or other means, in the control of space systems, in the provision of critical space-based services or in data or communication systems in space.

Avoidance of space debris: agreeing on a commitment by all States to avoid the intentional creation of space debris.

Improving transparency and information-sharing should be a key aim, since it would assist in enhancing space situational awareness, thereby facilitating the possibility of the verification and attribution of activity in space.

Going forward, further discussion is also needed on hybrid threats in the space context. Space assets can be used as part of a hybrid scenario, for example with the intentional disruption of essential services, the social impact of which is then exploited for hostile political purposes.

Finally, new and emerging technologies can also provide effective means to avert threats and mitigate vulnerabilities originating from space. To benefit from these technologies, concerted efforts are needed not only between State actors but also with other relevant stakeholders, including industry, academia and non-governmental organizations. Fostering multi-stakeholder partnerships will be instrumental in strengthening security in a multilayered domain such as outer space.

France

[Original: French]
[3 May 2021]

France, which co-drafted and co-sponsored General Assembly resolution [75/36](#), fully supports international discussions concerning the establishment of norms, rules and principles of responsible behaviours in space.

It is important to establish instruments to ensure the peaceful use of, and free access to, space by all, and to limit the risks of destabilization and conflict in space. Despite previous efforts in the context of the Conference on Disarmament on questions relating to the prevention of an arms race in outer space and the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space, the proposals put forward did not meet with consensus and could not be decided on, resulting in a deadlock. It is therefore essential to develop a new and inclusive strategy designed to improve space security concretely, pragmatically and immediately, and to reduce the threats and risks of misunderstanding in space.

In that connection, a capabilities-based approach aimed at prohibiting certain systems does not seem appropriate or effective. A large proportion of space assets are now dual-use, making it difficult to distinguish between military and civilian capabilities and between offensive and defensive capabilities and, ultimately, to decide which capabilities to prohibit. More broadly, France recalls the challenge of defining what constitutes a weapon in space, as any space object (for example,

kamikaze satellites) can be used as a weapon. Certain capabilities that are necessary for ensuring free and viable access to space, such as on-orbit servicing and active debris removal capabilities, can also be used for aggressive purposes.

A behaviour-based approach is the most appropriate way to improve space security pragmatically and immediately, as such an approach will make it possible to reduce the risks of misunderstanding and misconceptions in space. By establishing guidelines for the conduct of certain activities so that they are not perceived as aggressive, this approach aims to reduce the destabilizing potential of those activities and the risks of conflict and escalation in space. Furthermore, such an approach, which is focused on the effects of behaviour on space systems, the environment or communities, is more sustainable as it cannot be rendered obsolete by future technological developments.

I. Current importance of space in daily life, and for economies and security interests, which makes societies increasingly vulnerable to space-based threats

1. Importance of space capabilities for our lives and societies

Our modern societies, economies and lifestyles are heavily dependent on the space sector and its capabilities. Satellite systems related to positioning and navigation (for example, the Global Positioning System (GPS) or the European Satellite Navigation System (Galileo)) make it possible to synchronize banking and stock exchange systems and energy distribution, locate any type of vehicle, travel all over the planet and ensure the proper operation of rescue and emergency services. Earth observation capabilities facilitate weather forecasting, natural hazard prevention and the monitoring of weather and environmental changes, even as such phenomena are expected to increase in the future as a result of climate change. In addition, space capabilities in the telecommunications sector help to ensure access to television and telephone networks or to the Internet in so-called dead zones, contributing to the reduction of the digital divide. The use of satellite data for such purposes is increasing, as is the dependence of our societies on such data, which are the basis of many new technologies (in such domains as connectivity, telemedicine and autonomous vehicle development).

Space is also essential for military activities and interventions in theatres of operations. In particular, Earth observation, satellite telecommunications and satellite-based navigation and timing capabilities are necessary for independent, national-level situation assessment, decision-making and action. Space capabilities are also essential for the protection of our national defence interests, as they enable early warning, which contributes to the monitoring of proliferation and ballistic activities, a key underpinning of our security at a time when nuclear threats and serious proliferation crises are re-emerging (as demonstrated by the activities of Korea and the Islamic Republic of Iran). Lastly, space capabilities, together with other capabilities, play a major role in maritime surveillance by facilitating automatic detection.

2. A deteriorating strategic context and an increase in space threats

The volume of objects in orbit in the space environment is increasing considerably, contributing to a number of risks, mainly that of collisions. This risk is primarily related to the large number of objects in space: there are about 900,000 pieces of debris larger than 1 cm in space, generated by launches, accidents, the erosion of materials and the destruction (sometimes deliberate) of objects in orbit. During collisions, pieces of debris smaller than 1 cm can cause damage affecting the

capabilities and proper operation of an active satellite, pieces between 1 and 10 cm can render inoperative or even completely destroy an active satellite and pieces larger than 10 cm (of which there are about 35,000 in orbit) can not only destroy a satellite but can also generate thousands of other pieces of debris. The risk of collision is naturally increased because the debris is inactive and cannot be manoeuvred to avoid impact. The issue of debris and collision risk management has been addressed by the Committee on the Peaceful Uses of Outer Space and the Inter-Agency Space Debris Coordination Committee. However, there is currently no international framework for the prevention of the intentional creation of debris. In addition, the intentional destruction of objects, such as the Chinese anti-satellite launch in 2007, and accidental collisions, such as that between a satellite of the Iridium constellation and an inactive Cosmos satellite in 2009, have significantly increased the amount of debris in orbit.

The risks of collision and congestion in space are also linked to the growing number of active satellites in orbit; there are currently more than 3,300 such satellites, a number that is increasing owing to the development of new technologies and economic models in the context of “new space” activities. In addition to the risk of collision, the rising density of the population of space objects in certain orbits is increasing the probability of unintended interference between satellites.

The strategic context has also deteriorated, with an increase in military competition among major powers in all areas, including in space. The return to the logic and strategies of power, threats to the security and arms control architecture and the continued existence of proliferation crises are contributing to this deterioration of the strategic environment, which also extends to space. Anti-satellite launches, proximity manoeuvres, jamming and pre-eminence strategies reflect this heightened strategic competition and may increase the risk of misunderstanding, be destabilizing and lead to growing tensions in space. At the same time, States are increasingly dependent on the space environment for the advancement of their economies, societies and defence interests, and are therefore becoming more vulnerable. They are thus seeking to develop new tools and capabilities to reduce those vulnerabilities, a phenomenon that may lead to a race for space capabilities. Some powers are developing new systems to protect their space assets and guard against possible attacks, even going so far as to carry out hostile or aggressive actions.

In the space domain, systems are largely dual-use and situational awareness is inherently difficult. The difficulty of distinguishing between civilian and military space objects is contributing to increased uncertainty and instability. Similarly, as is also the case in other areas such as cyberspace, the difficulty of monitoring and attributing certain activities makes the risk of misinterpretation and misunderstanding significant. In practice, it is extremely difficult, even for major space powers, to detect all space events, predict the risks and threats that they may face and determine whether the intention behind a particular behaviour is aggressive. For example, at first glance, it is difficult to distinguish an innocuous manoeuvre of a satellite, related to its mission, that leads to an accidental collision or jamming from a manoeuvre aimed at intentionally causing harm. This difficulty, which is compounded by the predominantly dual-use nature of the space environment, poses a significant risk of conflict escalation or outbreak in space.

II. Characterization of responsible, irresponsible or threatening actions in terms of their effects and their impact on international security

- *Behaviours leading or potentially leading to the destruction of satellites and to an increased risk of damage to the space environment*, in particular intentional actions such as anti-satellite launches, may generate long-lived debris and jeopardize the freedom of access to and the use of space. Such space-based threats may stem from ground-based or co-orbital anti-satellite capabilities. Such launches, when carried out from the ground, are easily attributable.
- *Behaviours leading to the disruption of space systems, whether from the ground or in space*. Some activities, such as dazzling, the use of high-powered lasers and microwaves, the jamming of links and cyberattacks, can be carried out from the ground and from space. Other activities are usually carried out from space; they are much more difficult to attribute and may be mistaken for harmless activities. By the same token, approaches and proximity manoeuvres may be seen as a threat because, during an approach, a State cannot know whether the objective is to disrupt the operation of the satellite or to destroy or deorbit it, for example, under the guise of an active debris removal mission.
- *Behaviours potentially affecting the security of persons and property*. When used against certain space systems, anti-satellite launches, dazzling, jamming, spoofing and cyberattacks may pose a risk to the security of property and persons, for example, by disrupting aeroplane navigation systems, causing boat collisions (through attacks on satellite navigation systems) or impeding the operations of rescue and emergency services or the forecasting of certain natural disasters and weather events.

III. Proposed norms, rules and principles of behaviour

France proposes the establishment of pragmatic, immediately applicable and non-legally binding norms that would constitute a “user’s guide” and would thus not be intended to modify applicable international law such as the Charter of the United Nations, including the right to self-defence.

The nature, spirit and status of these behavioural norms is based on the following description, contained in the 2015 report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security: “Voluntary, non-binding norms of responsible State behaviour can reduce risks to international peace, security and stability. Accordingly, norms do not seek to limit or prohibit action that is otherwise consistent with international law. Norms reflect the expectations of the international community, set standards for responsible State behaviour and allow the international community to assess the activities and intentions of States.”

The norms proposed by France relate to three categories of behaviour: (a) intentional behaviours with a potentially significant impact on the space environment; (b) behaviours that present a risk of misunderstanding; and (c) behaviours potentially affecting the security of persons and property.

(a) Norms relating to intentional behaviours with a potentially significant impact on the space environment

France is in favour of adopting two such norms:

(i) States should refrain from intentionally or knowingly creating long-lived debris.

(ii) States should avoid and, in any case, minimize the intentional creation of debris.

(b) Norms relating to behaviours that present a high risk of misunderstanding and could be addressed through confidence-building and transparency measures

As the number of rendezvous operations and proximity manoeuvres is likely to increase, this issue must be addressed as a matter of priority in order to reduce the risk of misunderstanding and misconceptions in space and to leverage the opportunities provided by the associated capabilities (for example, on-orbit servicing and active debris removal).

Rendezvous operations, including active debris removal, pose a high risk to the space objects being approached. When consent has not been obtained for a rendezvous operation, such an operation may, under certain circumstances, be interpreted by the targeted State as an attack aimed at destroying or causing the loss of control of the space object being approached or inspected.

Therefore, France considers that such operations should be subject to the prior and explicit consent of the relevant State.

The establishment of norms relating to proximity manoeuvres could also be considered, although such manoeuvres are more difficult to regulate than rendezvous operations.

(c) Behaviours potentially affecting the security of persons and property

France is in favour of establishing guidelines for two particularly dangerous types of behaviour that disturb space objects: behaviours potentially leading to the irreversible loss of control or functionality of a space object; and behaviours potentially affecting the security of persons and property.

(d) Other confidence-building and transparency measures designed to ensure an optimal, more responsible use of space

States could be expected to take the following measures:

- Share orbital data catalogues transparently. This would be a prerequisite for implementing a proximity manoeuvre notification system, avoiding in-orbit collisions and enhancing awareness of the destruction and loss of control of space objects.
- Adopt and implement appropriate measures to ensure that national non-State space actors adopt these responsible behaviours. States should not knowingly allow space objects under their jurisdiction to engage in irresponsible or threatening behaviours, and should not allow their territories or facilities to be used for engaging in such behaviours against space objects.
- As a confidence-building measure, consider signing, ratifying and acceding to relevant treaties.
- As a transparency measure, States should publicly share information about their space doctrines, policies or strategies, including in relevant forums such as the Conference on Disarmament.
- Lastly, as in other domains that are not space-related, States should establish bilateral or multilateral systems of points of contact and consultation and deconfliction mechanisms in order to reduce the risk of escalation and conflict in space.

Germany

[30 April 2021]

General Assembly resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviour encourages Member States to study threats and security risks to space systems and share their ideas on the further development of responsible behaviours in outer space with the Secretary-General, who will submit a substantive report to the Assembly at its upcoming session. The present paper represents the national contribution by Germany on threats and security risks, actions that could be considered irresponsible or threatening, and first ideas for principles of responsible behaviour.

1. Why space matters to all of us: the growing relevance of security in outer space

Space assets and the services that they provide underpin our way of life as well as the prosperity, safety and security of nations in an unprecedented manner. Outer space services and applications are drivers of scientific and technological as well as socioeconomic development. Germany, like most other States, is increasingly dependent on outer space.

Satellite-based communications allow access to television, mobile communication and the Internet across the globe, in particular in areas which are not connected to equivalent cable-based terrestrial infrastructures. The navigation of land, sea and air vehicles relies on space-based positioning, navigation and timing services like the Global Positioning System (GPS), Galileo, Glonass or Beidou, which also enable the synchronization of energy distribution, international information and telecommunication networks, and the global banking system. Earth observation satellites provide data for weather forecasts, land surveys, mapping, and the monitoring of environmental and climatic changes.

Space science and technology also play a role in achieving the 2030 Agenda for Sustainable Development. They are instrumental in optimizing the sustainable use of natural resources; better timing of harvests, water and air quality monitoring; urban planning; and the provision of health care and education to remote and isolated communities. Space assets provide valuable early warning of imminent natural disasters and enable the coordination of disaster relief in stricken areas. The smooth functioning of police, emergency and rescue services is reliant on satellite communication and navigation in many cases. Programmes such as the United Nations Platform for Space-based Information for Disaster Management and Emergency Response and the International Charter on Space and Major Disasters empower authorities, especially in emerging economies and developing countries, to access and use such space-based services. In our globalized and integrated world, the reliable and secure provision of space services matters to everyone and all States.

Moreover, outer space is of increasing relevance for security and defence. Space-based services, ranging from Earth observation to space-based communication, are key to carrying out operations safely and successfully and play a decisive role on the strategic, operational and tactical levels. Unimpeded space-based services, in particular reconnaissance and early warning as well as uninterrupted communications and positioning, navigation and timing services, are essential for assessing and responding to risks and threats to national security, for crisis management and for military operations.

The use of space and the number of active satellites and pieces of debris are growing at an accelerating pace, which leads to increased risks of collision. The launches of mega-constellations for satellite-based Internet services will significantly improve communication and connectivity. At the same time, the steep increase in the

number of satellites further exacerbates congestion. Aspects of safety have thus become an issue under active consideration within the international community. The Space Debris Mitigation Guidelines (2007) of the Committee on the Peaceful Uses of Outer Space seek to reduce the creation of space debris, and the Guidelines for the Long-term Sustainability of Outer Space Activities (2019) of the Committee encompass guidance on mutual information exchange, the registration of space objects, and collision warnings. Further efforts are being made to explore approaches towards a framework for space traffic management. They seek to ensure the safety and sustainability of outer space for current and future use. However, they do not specifically address emerging security risks and threats to space systems. Here, the current regulatory and normative framework is insufficient to address the threats and risks to security and stability in and related to outer space.

The increasing dependence on space assets of not just the civilian but also the military sector enhances the relevance of outer space for security, stability and defence. Owing to their exposure and high degree of vulnerability, space assets and infrastructure may become a target in future conflicts. Preventing an arms race in outer space and preventing conflicts from extending to outer space are essential for strengthening international security and stability, and for safeguarding the use of the space environment for peaceful purposes in the long run. In the same vein, the prevention of misunderstandings regarding threats in outer space needs to be a high priority for all States.

Germany observes with great concern the development and testing of counter-space capabilities threatening essential civilian and military space systems and services. With real or perceived threats to space systems comes a high risk of misperceptions and unwanted escalation. In addition, some civilian space technologies developed to sustain the use of space, such as active debris removal, may be perceived as threatening if not communicated and explained properly.

Space is a global commons to be used for the benefit and in the interest of all humankind. As the benefits of space activities expand in number and improve in quality, it becomes increasingly important to preserve free access to and use of outer space for all States. A destabilized space environment and decreasing outer space security entail a negative impact on all States that depend on outer space services. Therefore, the international consideration of threats and risks to outer space systems, as well as measures to mitigate and reduce them, is necessary. Agreeing on norms, rules and principles of responsible behaviour will be the first, pragmatic step.

2. Threats and security risks to space systems

It is in our joint interest to ensure safe and secure access to and use of space, and a space environment that is sustainable, peaceful and free from conflict. However, threats and security risks to our essential space infrastructure are growing and are not yet dealt with efficiently within the international framework. In awareness of the large overlap and blurred line between civil and military use of outer space, the following sections will focus on the actual or perceived threats to security and stability in space.

(a) *What impedes secure and sustainable access to and use of outer space?*

From a security perspective, the unhindered access to and use of outer space can be undermined by a number of deliberate actions, most notably those actions which may directly or indirectly, actually or potentially, lead to the following:

- Destruction or infliction of irreversible damage to a satellite. While such actions – once completed – could constitute internationally wrongful acts, we consider that any action that may lead to these outcomes, such as putting a

satellite at risk, significantly increases the risk of misperceptions, undermines overall stability in space and may lead to further escalation and conflict in space.

- Loss of the ability of an operator to control a satellite. While such behaviour may not immediately cause irreversible damage, it greatly increases the risk of collisions, permanent damage to the affected satellite or other satellites, and thereby the creation of debris, which leads to an overall deterioration of the space environment.
- Disruption or impairment of critical space-based services to the public. Such behaviour may ultimately entail surpassing a critical threshold, such as the risk of loss of life or damage to property, since many civilian activities, such as shipping or aviation, depend on the accurate provision of positioning, navigation, timing or communications services.
- Disruption or impairment of command and control of satellites, early warning and nuclear command and control functions, and positioning, navigation and timing signals, since this leads to a substantial risk of misperceptions and unwanted escalation.
- The avoidable creation of space debris caused by deliberate acts or neglect.

Any action, operation or activity that deliberately causes the impacts described above and, as such, impedes free access to and use of outer space and space assets will be perceived as a threat to stability and security and carry the risks of miscalculation and unwanted escalation.

(b) *Counter-space capabilities and dual-use concerns*

Counter-space capabilities

Security and stability in outer space are jeopardized predominately by the use of or the threat to use counter-space capabilities in a way that is inconsistent with a defensive posture. It is essential to underline that it is the combination of capabilities and behaviour that constitutes a threat and undermines stability.

With the increasing relevance of outer space for security and defence, the incentive to develop counter-space capabilities is, regrettably, growing. A combination of rapidly developing technology, the proliferation of space-capable actors and a lack of trust lead States to aim for counter-space capabilities, and an increasing number of States are looking into acquiring such capabilities to enhance their military capabilities and national security.

As the following categorization will show, counter-space activities cover a broad spectrum: attacks or hostile actions, operations and activities from space to space, from Earth to space and from space to Earth:

(a) *Ground-/air-/sea-based kinetic direct-ascent anti-satellite capabilities.*

Among our primary concerns is the rapid development of direct-ascent anti-satellite capabilities. Using such capabilities can lead to the kinetic destruction of satellites by ground-, air- or sea-based missiles that either directly hit a space asset or detonate a warhead in close proximity to a satellite, creating debris that could damage other satellites in similar orbits;

(b) *Co-orbital kinetic anti-satellite capabilities or activities.* Equally concerning are co-orbital anti-satellite capabilities or activities, such as the kinetic destruction of satellites via other satellites or mechanisms that are in orbit and that can close in on the target. Several options are conceivable: satellites directly destroying another satellite by their kinetic impact, satellites with robotic arms inflicting damage on a satellite, or satellites firing projectiles or similar objects

targeting other satellites. Some of these capabilities require manoeuvres that allow one satellite to move into the close proximity of another satellite;

(c) **Directed-energy weapons.** The use of lasers, high-powered microwaves and electromagnetic pulses may result in reversible or irreversible physical effects on satellites and ground stations without making physical contact. They can damage or degrade sensitive components of a space system, for example by dazzling or blinding sensors or degrading solar panels, and even disable a satellite or make it uncontrollable. The use of non-kinetic physical means is less visible and more difficult to attribute than physical ones;

(d) **Electronic warfare.** Electronic counter-space activities target a space asset of an adversary by affecting signals or the data content of signals. Jamming (interference with radio frequency communications) and spoofing (deception by producing a fake signal) may lead to reversible as well as irreversible impairments. The jamming and spoofing of satellite signals is already widespread on Earth. The technology is commercially available, relatively inexpensive and thus accessible to State and non-State actors. Both jamming and spoofing are difficult to detect and attribute. Owing to the civil and military dual-use character of some space-based services, these electronic counter-space activities may result in the disruption of civil space services, such as communication or navigation systems;

(e) **Cyberintrusion.** Cyberattacks target data itself as well as systems that use this data and can be aimed not only at monitoring data but also at inserting false or corrupted data. Cyberattacks may result in data loss, widespread disruption, the seizure of control and even the permanent loss of a satellite. They do not require significant resources and may even be conducted by private groups or individuals. Moreover, they are difficult to attribute in an accurate and timely manner.

The capabilities described above, with no claim to completeness, are not fictional. Several tests, activities and operations carried out in outer space in recent years have demonstrated that actors have the capability to use the above-mentioned means and instruments.

Dual-use concerns

Deriving threatening behaviour from capabilities and attributing intent is further complicated by the inherent dual-use nature of space technologies. In this context, dual-use does not refer to the usual distinction of civil versus military use, as known from export control, for instance. Regarding outer space, dual-use concerns reflect the ambivalent use of capabilities: capabilities and technologies that are essential for preserving the free and sustainable use of outer space might also be misused to destroy or impair space assets of a potential adversary. Here, we focus on two specific examples:

- Rendezvous and close proximity operations are essential for the maintenance, repair and fuelling of spacecraft or docking of space capsules. At the same time, mastering such operations is an essential precondition for developing co-orbital anti-satellite capabilities. In turn, it allows the use of highly manoeuvrable spacecraft not only for the purposes for which they were designed but also for potentially damaging other satellites.
- Satellites with robotic arms or other capture mechanisms are currently under development for the active removal of space debris in order to preserve a sustainable outer space environment. At the same time, those mechanisms might be used or misused to manipulate, destroy or damage satellites.

More generally, most space assets and capabilities can be used to target, disable or even destroy objects in space to a varying degree, although not all were originally designed for such purposes.

The argument for a behavioural approach

In view of such dual-use concerns, threats in outer space cannot be deduced from objects or capabilities alone, but from a combination of capabilities and behaviour, or from the observation of actual actions, operations and activities. As a consequence, traditional arms control approaches, such as prohibiting specific types of objects in outer space, are inadequate and do not solve the security problem.

This underlines the notion that the most pragmatic and realistic way to increase security and confidence in outer space is to agree upon norms, rules and principles on responsible behaviour. In addition to cooperative means such as increased communication, consultation, information exchange and transparency, behaving responsibly in outer space includes refraining from actions, operations and activities that either pose a real threat to security and stability or might be perceived as posing such a threat. What is of significance is attribution and the knowledge or recognition of intent – for instance, by observing and detecting deviations from the normal pattern of life (the usual movement) of a satellite – aided by sufficient means of notification, communication and means for conflict resolution.

(c) *Threats and perceived threats to space security*

Risks of misperception, miscalculation and escalation

The high dependence on free access to and use of space assets for not only civil but also military purposes comes with increased risks of miscalculation and escalation. States are becoming more concerned about the security of their satellites owing to counter-space capabilities that have been developed or tested or are already in operation. Thus, developing, testing and fielding counter-space capabilities that are not in line with a defensive posture triggers threat perceptions that may result in misunderstanding, miscalculation and escalation spirals and an increased development of counter-space capabilities (a “counter-space capabilities race”).

As laid out above, threats cannot be derived solely from the existence or availability of such capabilities or technologies. Rather, a lack of information on function, mission and intent, along with insufficient communication or coordination and a lack of transparency (including with regard to outer space strategies and doctrine) increases the risk of misunderstanding, miscalculation and unwanted escalation, including conflict in outer space. These risks are further increased by the lack of a common understanding on which actions, operations, activities and behaviour in and around outer space are irresponsible or even threatening.

(d) *Irresponsible and threatening behaviour in space.*

We believe that the following behaviours are irresponsible or even threatening:

- **Demonstrating a direct-ascent anti-satellite capability to put space assets of other States at risk.** The targeted and persistent development and testing of a direct-ascent anti-satellite capability demonstrates the intend of a State to acquire capabilities for targeting and destroying satellites of a potential adversary. This might include satellites of crucial importance, for instance, for military command and control, navigation or communication, and therefore poses a threat to national security. We consider the development of direct-ascent anti-satellite capabilities as well as a lack of transparency on missile tests to be problematic. If such tests lead to the creation of debris, this sends an even more

threatening signal and, moreover, impedes the sustainable use of outer space for all States;

- **Approaching and/or following another satellite and putting it at risk.** If a satellite is approaching and following a satellite of another State without consent, explanation or consultation, the affected State or States cannot exclude the possibility that the other satellite's conduct is aimed at interfering with or even damaging its satellite. While such concerns need to be balanced with free access to and use of space, we see a clear need for transparency and mutual consideration. In particular, if the rendezvous and proximity operation is continued after the approached satellite has changed its orbit or mode of operation and/or after the affected State has requested consultations or a cessation of the manoeuvre, such behaviour may be considered threatening. In addition, risky co-orbital manoeuvres can lead to inadvertent damage to or destruction of a satellite, which again causes the creation of long-lived debris;
- **Releasing objects such as subsatellites without coordination.** Related concerns can arise from the uncoordinated release of objects such as subsatellites or the ejection of projectile-like fragments in the immediate vicinity of or towards satellites of another State;
- **Interfering with the generation, transmission, reception and processing of positioning, navigation and timing signals by means such as jamming and spoofing.** As civil aviation, maritime navigation and other civilian activities depend on the reliable provision of positioning, navigation and timing services, any unexpected disruption may lead to loss of life or damage to property. We therefore consider interference in such critical services to the public to be irresponsible. The same applies to cyberintrusion with an equivalent effect.

3. Proposals to mitigate threats and security risks

The aim of defining principles for responsible behaviour in space is to prevent misunderstandings, misconceptions and miscalculations, and thus to reduce the risk of unintended escalation. The principles are distinct from and without prejudice to binding norms of international law. Intended to form the basis for initial realistic, pragmatic and non-legally-binding norms, they reflect the expectations of the international community to establish accepted practices of responsible behaviour and allow that community to assess the activities and intentions of States.

Safety and security are equally important for preserving outer space as a peaceful, safe, stable, secure and sustainable environment for the benefit of humankind. Whereas best safety practices are a baseline requirement for the responsible use of and free access to space, principles for responsible State behaviour need to go beyond safety and address security aspects. Defining principles for responsible State behaviour should be aimed at establishing a common understanding against which to judge State activities and react to actions that are not in line with this understanding.

The following draft principles for responsible State behaviour outside armed conflict represent our initial ideas and serve the purpose of contributing to the international debate in the context of the further implementation of General Assembly resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviour:

- (a) **Considerations with regard to launches.** States should conduct launches of missiles and space launch vehicles in a way which ensures the maximum possible safety for the operation of satellites, including crewed space stations. States should exchange pre-launch notifications including data on the generic class of the missile

or space launch vehicle, the planned launch window, the planned launch area and the planned direction;

(b) **Avoidance of debris.** States should not purposefully or by negligence, and in particular not by disregarding generally accepted rules and best practices of operational safety,² cause, risk or knowingly support the creation of debris, in particular when launching ballistic missiles or space launch vehicles, releasing payloads into orbit, conducting orbital rendezvous and proximity operations, or through deliberate kinetic impact;

(c) **Considerations in relation to rendezvous operations.** States should not conduct or knowingly support rendezvous operations unless a State has reasonable grounds for the rendezvous operation and the affected other State has given consent. States should notify such rendezvous operations to affected States and should submit a request for consent to these States in advance of the manoeuvre. Notifications leading to consultations should include at least the planned timing, trajectory and objective of the manoeuvre;

(d) **Considerations in relation to proximity operations.** States should not conduct or knowingly support proximity operations which impair the safe manoeuvrability of the approached spacecraft. To reduce the risk of misperceptions and misinterpretations, States should aim for the greatest possible transparency regarding relevant proximity operations;

(e) **No interference in the control of space systems and critical services.** States should not conduct or knowingly support cyberinterference or electromagnetic interference that damages space systems, leads to a loss of operational control over or permanent loss of the space system, or impairs the provision of critical space-based services to the public;

(f) **National point of contact for deconfliction.** States should establish a national point of contact which is operational 24/7 and which allows other States to contact or relay information to any satellite operator in order to coordinate and deconflict spacecraft manoeuvres and radio frequency usage and clarify questions of space traffic coordination. This would serve as a communication and deconfliction measure and thus reduce the risk of miscalculations;

(g) **General measures for transparency and information-sharing.** States should seek to make national space security policies, strategies and doctrine publicly available and share open-access space situational awareness data and catalogues to the greatest extent possible;

(h) **Involvement of national private-sector space actors.** States should adopt and implement appropriate measures, including by establishing a regulatory and supervisory framework, to ensure that their national private-sector space actors follow these principles of responsible behaviour;

In parallel with work on principles of responsible State behaviour, we are aiming for the following security and confidence-building measures regarding outer space in order to implement, strengthen and enforce such principles:

- Establishing best practices for transparency and information exchange

² Including but not limited to the Space Debris Mitigation Guidelines (2007) and Guidelines for the Long-Term Sustainability of Outer Space Activities (2019) of the Committee on the Peaceful Uses of Outer Space.

- Mechanisms for consultation and conflict resolution with the aim of implementing and operationalizing these principles of responsible State behaviour, but also offering a forum for broader exchange and debate
- Verification and attribution of activity in space on the basis of reliable and comprehensive space situational awareness, providing effective data from a variety of sources; as such, space situational awareness makes it possible to obtain a complete picture of the operating environment and to observe, attribute and call out deviating patterns of life that may be perceived as concerns or threats
- Strengthening existing regimes in relation to outer space, in particular the Outer Space Treaty and the Register of Objects Launched into Outer Space, but also The Hague Code of Conduct against Ballistic Missile Proliferation and the Missile Technology Control Regime, as well as their implementation
- Collecting best practices from current operations in outer space as well as from other domains with certain similarities, such as cybersecurity or maritime security

4. The way ahead

Germany regards outer space as a global commons to be used for the benefit of all States. Satellites and other space-based assets are vital for the functioning of today's societies and the global economy and trade, for the prosperity, safety and security of our nations. At the same time, outer space is an area where we are observing new and growing challenges to our security.

It is essential to strengthen the current normative and regulatory framework. Politically binding measures will be the most pragmatic and realistic way forward at this stage. We need to increase the transparency and predictability of space activities, to build trust and confidence between States, to reduce the risks of misunderstanding and miscalculation and to establish a common understanding of responsible behaviour in outer space. Ultimately, this might even pave the way for a comprehensive, effective and verifiable legally binding instrument designed to cover all relevant threats related to outer space.

Germany has proposed initial ideas for principles of responsible behaviours and confidence-building measures in the present submission. However, we see the national contributions of States and the subsequent report of the Secretary-General only as a starting point, not the end of a process to address threats and risks and to increase security and stability in outer space. The international community needs to work together in seeking and agreeing upon norms and principles assessed to be the most appropriate to address the threats and risks that are identified by nations regarding outer space and not yet sufficiently dealt with within the existing normative or legal framework.

In a joint and inclusive effort, the international community should aim:

- To reach a better joint understanding and awareness of threats and risks to outer space security, including threats and risks from space to Earth, from space to space and from Earth to space
- To reach a common understanding among States on which behaviour is responsible and which is, in contrast, irresponsible or even threatening
- To propose, on the basis of the report by the Secretary-General and further work principles, rules and norms of responsible behaviours and further measures for security and confidence-building related to outer space that are widely accepted among the international community

- To decide how to best facilitate the universal consideration and support of those principles, rules, norms and confidence-building measures
- To consider how to make better use of existing forums or whether to establish additional forums for communication and dispute resolution
- To propose measures to strengthen the application and implementation of the Outer Space Treaty and other regimes related to outer space security

The Conference on Disarmament in Geneva and the First Committee of the General Assembly in New York play an important role in addressing and debating these questions. Against this background, Germany sees great merit in establishing a group of governmental experts or an open-ended working group for further exchange on and discussion of threats to the security of outer space and principles of responsible behaviour in a constructive and inclusive manner.

Given our common interests in space, Germany will continue to engage actively in the various United Nations processes. We see it as our shared responsibility to safeguard the continued peaceful and sustainable use of outer space for current and future generations.

India

[29 April 2021]

Space activities increasingly contribute to national socioeconomic development, promote scientific research and technological progress, and support national self-defence endeavours.

India believes that outer space should remain an ever-expanding frontier of cooperative endeavour rather than conflict. It is incumbent upon all spacefaring nations and others to contribute to safeguarding outer space as the common heritage of humankind, and to preserve and promote the benefits flowing from space technology and its applications for all.

India's focus is on the use of space for "welfare", not for "warfare". India is opposed to the weaponization of outer space and India has not, and will not, resort to an arms race in outer space.

All countries must carry out activities in space in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation. All countries must bear international responsibility for their national activities in outer space, whether such activities are carried out by government agencies or non-governmental entities. All countries must ensure the equitable, rational and efficient use of the radio frequency spectrum and various orbital regions used by satellites. All countries should further enhance the practice of registering space objects and provide timely information that contributes to the transparency and sustainability of outer space activities.

India continues to support substantive consideration of the prevention of an arms race in outer space within the multilateral framework of the United Nations and remains committed to the negotiation of a universally acceptable and multilaterally negotiated legally binding instrument on the prevention of an arms race in outer space in the Conference on Disarmament. India remains committed to playing a leading and constructive role together with other Member States in deliberations and negotiations on legally binding measures to prevent an arms race in outer space, as well as transparency and confidence-building measures and long-term sustainability guidelines. However, while universal and non-discriminatory transparency and

confidence-building measures can play a useful complementary role, they cannot be a substitute for legally binding instruments in this field. Any new international legal framework in outer space must be premised on the understanding that outer space should remain an operationally stable and safe environment that is maintained for peaceful purposes in the interest of all countries, without discrimination of any kind and with due regard for the principle of equity.

In the light of increasing congestion in space, all countries should adhere to the internationally accepted space debris mitigation guidelines recommended by the Inter-Agency Space Debris Coordination Committee and the United Nations in order to limit the creation of space debris, avoid in-orbit collisions and work towards effective management of the orbital utilization of space. States must all endeavour to improve the accuracy of orbital data on space objects, enhance the practice of sharing orbital information on those objects and promote the collection, sharing and dissemination of space debris monitoring information.

Iran (Islamic Republic of)

[15 April 2021]

On 12 October 2020, at a meeting of the First Committee of the General Assembly, the United Kingdom introduced a draft resolution entitled “Reducing space threats through norms, rules and principles of responsible behaviour” for consideration as an update to the previous draft on the norms of behaviour. It was subsequently adopted as Assembly resolution [75/36](#) on 7 December 2020.

The resolution, against which 12 Member States voted and from which 8 others abstained, remains fundamentally flawed. The fundamental flaws include, inter alia, the following:

- Responsible behaviour might be an attractive political gesture but is still a vague and unclear phrase for scientists, think tanks and operators. A benevolent gesture cannot be elaborated under the cover of political intentions and aims.
- Responsible behaviour is mostly considered a subjective issue, the real applicability of which needs an overwhelming review of all agreed international conventions and resolutions in the field of space law. Defining the applicability is even harder during the fast-paced development of technologies.
- While most of the space-related basic principles unanimously adopted through resolutions or conventions in the field of space law are still pending, coining new terms and phrases is an illogical measure.

Therefore, the idea of responsible behaviour is not a timely proposal, because it is neither a demanded idea nor a practicable measure.

The aforesaid resolution on responsible behaviour does not take account of the following:

(a) **Past events.** Most of the ongoing harmful developments in outer space are the result of trial-and-error activities of space powers. Preceding irresponsible behaviours have made outer space a congested area of debris. Therefore, the best and comprehensive interpretation of responsible behaviour is that which covers past events. No irresponsible behaviour in outer space should be neglected when it threatens the heritage of other States;

(b) **Current procedures.** Responsible behaviour implies a wrong method which says that “being a dependent and powerful space power has only a single way, and the way is blocked right now”. In other words, two categories of space-faring

States and non-space-faring States are fragile caste systems in outer-space geopolitics;

(c) **The reality of equality.** There is no doubt that responsible behaviour will create new norms and subsequently make impediments for new emerging space powers. The fragility of technology transfer and the creation of impediments for the new emerging space powers by developed countries undermine real equality of States in outer space;

(d) **Verification.** For developing countries, there is no integral verification regime or technology to help to monitor or verify responsible behaviour standards, so the activities of developed countries will not be monitored. The same is true vice versa;

(e) **Space arms race.** While some countries are publicly supporting and planning to strengthen their space forces and eyeing a new generation of space weapons, responsible behaviour is a deviated path to prevent an arms race in outer space and it does not conform to the basic adopted principles. Prevention of an arms race in outer space is an agreed principle that should be deemed a critical priority and upheld by all States;

The prevention of an arms race in outer space has been one of the four core issues of the Conference on Disarmament agenda, which, instead of the divisive political agenda of so-called responsible behaviour, requires establishing an ad hoc committee to negotiate a long-awaited legally binding treaty for disarmament as a priority for international security.

The peaceful use of outer space is complicated significantly by the announced plans for the deployment of rules and norms in outer space, which would affect the work of both the Committee on the Peaceful Uses of Outer Space and its subcommittee. The ill-timed, inefficient, unworkable and unreasonable measures, especially in the field of making new rules and norms, are, as always, doomed to fail.

The Islamic Republic of Iran insists that measures, rules and regulations that would limit access to space for nations with emerging space capabilities should be avoided, and that States should refrain from further developing the international political framework in a manner that sets overly high standards or thresholds that could hinder the enhancement of capacity-building and related technology development by developing countries for the peaceful use and exploration of outer space.

Ireland

[3 May 2021]

In accordance with paragraphs 5 and 6 of resolution [75/36](#), Ireland subscribes to the views submitted by the European Union to the Secretary-General on existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth. Ireland submits the following views in a national capacity.

Ireland is strongly committed to the prevention of an arms race in outer space and to the preservation of a safe, secure and sustainable space environment and the peaceful use of outer space on an equitable and mutually acceptable basis for all.

Space is a global common good, and it requires global rules. Ireland stresses the importance of conducting space activities in accordance with international law, including the Charter of the United Nations. The Outer Space Treaty of 1967 and

other applicable international law, as well as guiding principles developed in the United Nations framework, constitute the cornerstone of the global governance of outer space. We believe that space activities must take place within a multilateral rules-based system.

The resolution is timely because of the increasing complexity of the space operational environment. In this regard, it is important to strengthen commitments to avoid potentially harmful interference with the peaceful exploration and use of outer space in order to facilitate equitable access to outer space.

Ireland is particularly concerned by the potential weaponization of space.

The development and proliferation of anti-satellite weapons, including those launched from Earth, is a particular cause for concern. There are particular risks associated with these weapons, including the generation of long-lived debris. All States should refrain from launching anti-satellite weapons.

Ireland would like to see a greater focus on the issue of debris, in particular in near-Earth space. In order to minimize the creation of space debris and to mitigate its impact in outer space, States should endeavour to limit, to the greatest extent practicable, any activities in the conduct of routine space operations, including during the launch and entire orbital lifetime of a space object, which may generate long-lived space debris. This is particularly important given that near space orbit is increasingly congested and contested and that near-Earth space is a finite resource with increasingly limited capacity for our orbital highways. We call upon all States to refrain from the destruction of space objects that generate space debris, in particular multiple pieces of long-lived debris.

Ireland would like to see a continued focus on the prevention of an arms race in outer space and the preservation of a safe, secure and sustainable space environment and the peaceful use of outer space on an equitable and mutually acceptable basis for all. In this regard, norms, rules and principles of responsible behaviours should be considered across the full range of space activities in order to promote security, safety and sustainability in outer space.

Without excluding the possibility of a legally binding instrument in the future, Ireland believes that voluntary measures constitute a pragmatic way forward at the moment, starting with norms, rules and principles of responsible behaviours, through an incremental and inclusive process initiated by resolution [75/36](#). Ireland supports the approach outlined in the resolution which will allow for greater focus on “behaviours”, rather than just on operations and activities. It is important in this regard to recognize the dual-use nature of objects in space.

Space diplomacy has established several important norms which need to be maintained, including relating to weapons of mass destruction in outer space and the protection of satellites used to monitor treaty compliance against purposeful, harmful interference. However, there are notable gaps, such as the testing and use of destructive methods against satellites that are not prohibited by any treaty, even though such tests could produce large debris fields that indiscriminately endanger satellites and other space operations for many decades. This could be a potential area for international cooperation within a multilateral framework.

Ireland is supportive of voluntary transparency and confidence-building measures in outer space activities, in particular those contained in the 2013 report of the Group of Governmental Experts ([A/68/189](#)). That report referred to a number of opportunities to advance the implementation and further elaboration of such measures through various United Nations bodies, including the Disarmament Commission. Transparency and confidence-building measures could form the basis for the development of future legally binding instruments and their verification. It would be

useful if the process foreseen by this resolution could facilitate discussion on the further elaboration of those measures and on how they could be applied. Increased cooperation between States regarding their space surveillance and tracking and their space situational awareness services would also be helpful.

Finally, Ireland welcomes the opportunity afforded by this resolution to intensify efforts to address challenges in outer space, with the involvement of all Member States as well as multi-stakeholder engagement with the private sector and civil society.

Italy³

[3 May 2021]

The adoption of the General Assembly resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviours is a timely step to reduce threats and risks related to outer space. As the space domain is becoming a more complex scenario, there is a need to promote greater international cooperation to establish a set of norms, rules and principles of responsible behaviours in order to prevent outer space from becoming an arena of conflict. Accidental risks and intentional threats – both conventional and asymmetric – increasingly affect the stability of outer space, with different impacts depending on the specific space environment in which these are performed: Earth orbits (low Earth orbit, medium Earth orbit, geostationary Earth orbit); lunar and planetary orbits; and on the surface of celestial bodies. It is therefore necessary, once a set of shared criteria to identify irresponsible behaviours has been defined, to gradually reach an agreed classification of behaviours as a basis for developing norms, rules and principles of responsible behaviours, including transparency and confidence-building measures. A number of these norms stem from the fundamental principle of non-harmful interference in outer space, which is the general principle of transparency and notification. The adoption of voluntary measures and responsible behaviour commitments of a non-legally binding nature could be an important intermediate step in maximizing the chances of a successful outcome of future negotiations for a binding treaty. The General Assembly is indeed the appropriate forum to discuss and identify norms of responsible behaviour in outer space, given its universal membership and ability to address all issues of a cross-cutting, multi-committee nature. Further discussions are certainly needed to encourage the sharing and elaboration of different proposals among the greatest number of States. Thus, an open and inclusive process can significantly contribute to identifying effective norms, rules and principles of responsible behaviour in outer space.

Japan

[29 April 2021]

Japan is strongly committed to maintaining outer space as a peaceful, safe, stable, secure and sustainable environment and reducing space threats through norms, rules and principles of responsible behaviours on the basis of General Assembly resolution [75/36](#). Japan also supports, in principle, the objective of preventing an arms race in outer space.

Today, all States are reliant on space systems for peace and prosperity on Earth. As such, space security, which underpins the safe operation of space systems, is of utmost importance not only for major spacefaring nations but also for all humankind.

³ Full version available at www.un.org/disarmament/topics/outerspace-sg-report-outer-space-2021/.

Since space systems provide fundamental services for our daily life, such as satellite communication and positioning, navigation and timing, as well as their critical application, including air and maritime traffic management, interference with those services could lead to enormous economic loss, serious social disorder and, in extreme cases, loss of lives. The increasing number of both State and non-State space actors and the diversification of their activities raise potential risks of misunderstanding and miscalculation which could escalate tension and entail conflict. From an arms control perspective, space systems play an essential role in deterrence and strategic stability as they are used in, for example, missile warning, nuclear command and control, and the verification of arms control instruments. Furthermore, the development and deployment of counter-space capabilities as well as insufficient transparency regarding doctrines, policies and activities call for the attention of all States.

Outer space is a domain where even innovative technologies developed with benign intention may, if used inappropriately, pose a serious threat owing to their dual-use nature. In turn, this dual-use nature brings complexity to verification, which is one of the essential components of all arms control instruments and poses difficult challenges for identifying space threats through focusing solely on technological capabilities. Rather, it is more feasible to establish a common understanding on patterns of behaviours that are regarded as either responsible or irresponsible. Since behaviours can be observed from the ground and even in outer space, they can serve as measurable criteria for identifying potentially threatening activities in the absence of explicit intention. While the legality of such irresponsible behaviours awaits further discussion, the international community should strongly discourage the behaviours in the light of their potential consequences for the peaceful, safe and sustainable use of space. Japan believes that this behaviour-based approach will contribute to enhancing security in outer space by mitigating threats through reducing risks of misunderstanding and miscalculation which could entail increased tension and conflict. Moreover, it underscores the importance of increased transparency and confidence-building measures to achieving this end.

As a starting point to produce tangible, near-term achievements, Japan suggests the following three areas of focus to be examined going forward in studying existing and potential threats and security risks to space systems:

(a) **Creation of debris by deliberate destruction of space objects.** Space debris can damage all space systems indiscriminately. From the perspective of the First Committee, States should be held accountable for the creation of long-lived debris, especially if they arise from the deliberate destruction of space systems. In this regard, Japan is concerned about the heightened risk of debris creation through the development and deployment of counter-space capabilities, whether from Earth or in space, including direct-ascent anti-satellite weapons. Japan believes that States should refrain from using or testing those capabilities in a way that generates negative impacts on the space environment, especially through the creation of long-lived debris which could hamper the freedom of access to and use of outer space;

(b) **Rendezvous and proximity operations.** Rendezvous and proximity operations are a promising category of space activities, although security concerns about its potential malign counter-space applications are arising. In-orbit services such as satellite life extension and refuelling can be beneficial to space actors by contributing to space sustainability, yet the same technologies can also be used to capture or disrupt satellites in a hostile manner. In order to create an environment where consensual rendezvous and proximity operations are usual conduct in outer space, States should articulate possible best practices and standards on responsible rendezvous and proximity operations from both civil and security perspectives and enhance transparency and confidence-building measures, which are also helpful to

promote the development of innovative in-orbit services such as active debris removal. Japan believes that those standards should reflect best practices accumulated by actors involved in actual operations;

(c) **Harmful interference.** Article IX of the Outer Space Treaty provides that States parties shall undertake international consultations in advance if they believe that their planned activities would cause potentially harmful interference with the activities of other States parties. Building on the existing instruments, States should further discuss what amounts to harmful interference with space activities from a security perspective. The scope of such discussion may include both kinetic and non-kinetic harmful interference which may not necessarily destroy but degrade, disrupt and damage space systems, and thus might increase the risk of misunderstanding and miscalculation

Furthermore, Japan believes that the considerations set out below should be noted when articulating norms, rules and principles of responsible behaviours.

Consequences for security and/or endangering peoples' lives (irreversibility)

State behaviours which entail consequences for security and/or endanger lives of people, such as affecting nuclear command and control, early warning, national technical means of verification, and positioning, navigation and timing, should be subject to stringent scrutiny. In addition, the irreversibility of potential damage may need to be taken into account when characterizing behaviours.

Communication

Since threat perception is dependent on the intention and contexts of activities, enhanced communication is a key element of transparency and confidence-building measures and of reducing risks of misunderstanding and miscalculation. Communicating one's intention to relevant actors before taking an action can generate predictability and trust, although communication does not necessarily justify irresponsible behaviours. In addition, responsible States should respond in a timely and appropriate manner to enquiries from relevant actors. States should further study and discuss expected patterns of communication for each category of space activities, including the establishment of national points of contact. The Hague Code of Conduct against Ballistic Missile Proliferation, which has made an important contribution to enhanced transparency and confidence-building in launch activities, might provide a good example of a potential communication mechanism.

Further to increasing transparency in space activities, the development of space situational awareness capabilities is encouraged, and States should share space situational awareness information, such as orbital elements and category of satellites, to the extent possible, and also publicly share information on their space doctrine, policy or strategy.

Civil needs

It is important to consider the development of innovative solutions for space sustainability by the private sector as well as the fulfilment of the potential needs of developing countries for peaceful uses of outer space. States should take into account legitimate concerns about potential restraints on civil activities.

In order to reduce space threats as well as risks of misunderstanding and miscalculation with respect to outer space, it would be necessary to further promote discussions on space security issues, including the areas of focus mentioned above, with a view to clarifying responsible and irresponsible behaviours, and establishing best practices which can serve as guidance in this field, without prejudice to the

consideration of legally binding instruments. To that end, transparency and confidence-building measures, and in particular enhanced communication, should also be sought, building upon the recommendations of the 2013 report of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities. Such efforts are not intended to modify existing international law, and Japan reaffirms the applicability of international law to activities in outer space, including the Charter of the United Nations. In this regard, Japan believes that the existing regimes, forums and instruments regarding outer space are important and should be enhanced in promoting a peaceful, safe, stable, secure and sustainable use of outer space and preventing an arms race in outer space, and calls for close collaboration with the relevant actors.

Jordan

[Original: Arabic]
[24 April 2021]

1. Non-legally binding United Nations instruments on outer space

At its fifty-eighth session, the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space held discussions under the agenda item on the general exchange of information on non-legally binding United Nations instruments on outer space.

The Subcommittee noted with appreciation the compendium of mechanisms adopted by States and international organizations in relation to non-legally binding United Nations instruments on outer space, which the Office of Outer Space Affairs had made available on a dedicated web page. The Subcommittee encouraged States members of the Committee and international intergovernmental organizations having permanent observer status to submit their responses to the Secretariat for inclusion in the compendium.

The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, is an important instrument for the promotion of international cooperation with a view to maximizing the benefits of space applications for all States.

Space governance through non-legally binding instruments and the increase in the number of national space laws are one of the established trends in the development of space law, but countries should implement relevant non-legally binding instruments with effective national steps in parallel with international implementation.

Non-legally binding instruments, such as the 21 Guidelines for the Long-term Sustainability of Outer Space Activities, can play an important normative role in ensuring safety and security in outer space.

2. Space debris

There was a general understanding at the session that the current space debris environment posed a threat to spacecraft in Earth orbit. For the purpose of this document, space debris is defined as all man-made objects, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional. As the population of debris continues to grow, the probability of collisions that could lead to potential damage will consequently increase. In addition, there is also the risk of damage on the ground, if debris survives Earth's atmospheric re-entry.

- **Sources of space debris**

1. Accidental and intentional break-ups which produce long-lived debris.
2. Debris released intentionally during the operation of launch vehicle orbital stages and spacecraft.

Space debris mitigation measures can be divided into two broad categories: those that curtail the generation of potentially harmful space debris in the near term and those that limit their generation over the longer term.

The implementation of space debris mitigation measures is recommended since some space debris has the potential to damage spacecraft, leading to loss of mission, or loss of life in the case of manned spacecraft. For manned flight orbits, space debris mitigation measures are highly relevant due to crew safety implications.

A set of mitigation guidelines has been developed by the Inter-Agency Space Debris Coordination Committee, reflecting the fundamental mitigation elements of a series of existing practices, standards, codes and handbooks developed by a number of national and international organizations.

Member States and international organizations should voluntarily take measures, through national mechanisms or through their own applicable mechanisms, to ensure that these guidelines are implemented, to the greatest extent feasible, through space debris mitigation practices and procedures.

- **Space debris mitigation guidelines**

1. Limit debris released during normal operations.
2. Minimize the potential for break-ups during operational phases.
3. Limit the probability of accidental collision in orbit.
4. Avoid intentional destruction and other harmful activities.
5. Minimize potential for post-mission break-ups resulting from stored energy.
6. Limit the long-term presence of spacecraft and launch vehicle orbital stages in the low-Earth orbit region after the end of their mission.
7. Limit the long-term interference of spacecraft and launch vehicle orbital stages with the geosynchronous Earth orbit region after the end of their mission.

3. Space traffic

A comprehensive international space traffic management system will enhance the safe and sustainable conduct of space activities, and could include the following: improved multilateral sharing of information on space situational awareness; enhanced international registration procedures; international mechanisms for the notification and coordination of launches, in-orbit manoeuvres and re-entry of space objects; and safety and environmental provisions. The matter is also important in relation to very large constellations of satellites, which can increase risks to the integrity and sustainability of space activities, particularly with regard to space debris mitigation, and can pose challenges to astronomical observation, especially in the light of the increasing complexity and congestion of the space environment owing to the growing number of objects in outer space, the diversification of actors in outer space and the increase in space activities, developments that jeopardize the integrity and sustainability of such activities.

Luxembourg

[3 May 2021]

Luxembourg has been active in the commercial and public space sectors since the early 1980s. More recently, the Government has launched an ambitious space vision that will advance the country's overarching strategic objective to foster economic diversification.

In the context of its national defence policy, Luxembourg has also fielded projects aimed at increasing its national security resources for security and defence purposes by developing satellite communication and imagery assets designed to fill in the critical shortfalls in the defence capabilities of the European Union and North Atlantic Treaty Organization. These assets can also be made available for United Nations purposes.

More generally, Luxembourg is deploying a strategy for data-driven innovation and economy aimed at making the country the most trusted data economy in Europe. The strategy aims in particular at six core sectors: industry 4.0, eco-technologies, health technologies, logistics, space and financial services. Information and communication technologies, including space-based technologies, are at the very centre of that endeavour. As regards the space sector, Luxembourg is fully taking part in the space economy expansion. Our objectives are to develop the Luxembourg space ecosystem and create synergies with businesses and organizations outside the space sector, encourage the development of key skills and expertise and develop Luxembourg and its space sector internationally through intensified international cooperation.

In the light of the increased reliance of human development on space systems, government and private funding for space technologies have increased in substantial ways over the past five years. While private investors have invested in commercial-purpose space projects, more and more countries are integrating space-based technologies into their national security strategies and into their military doctrines. The increased global interest in outer space activities has created a situation where space has become congested, contested and competitive. More concerning, we have observed the deployment of counter-space technologies, Earth-based and space-based. Given these sustained trends, we now observe never-before-seen risks and threats to the maintenance of outer space as a peaceful, safe, stable, secure and sustainable environment for the benefit of all and for the purposes of social, economic and technological activities. In this context, the safe, secure and sustainable use of outer space has come to the forefront of the work of the United Nations. Safety and sustainability are two sides of the same coin. Our common objective must remain to ensure a safe, secure and sustainable use of outer space, for peaceful purposes and for the benefit of all countries and all humankind, bound by the principle of cooperation and mutual assistance.

In its resolution [75/36](#), the General Assembly reaffirmed the applicability of international law to activities in outer space and the right of all States to explore and use outer space without discrimination of any kind, on a basis of equality and in accordance with international law. The new challenges are manifold and encompass multiple types of space-based as well as earth-based civil and/or military technologies, as well as space debris, the increasing congestion of outer space, but also a lack of transparency, which can lead to misunderstandings and, potentially, to accidents and conflict.

The most concerning trends are the development and fielding of space-based military technologies and the ever-increasing volume of space debris from the placement in orbit of large satellite constellations: if outer space is not made safer,

more secure and sustainable, these challenges will create increasing risks for the safety of operations and for human security on Earth.

Given the reliance of Luxembourg on a safe, secure and sustainable outer space environment, we intend to take an active part in furthering international discussions on responsible behaviours in space. Luxembourg voted in favour of resolution 75/36 and is in the process of reinforcing its national legislative framework applicable to space activities and reviewing the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space. We provide financial support to the Office for Outer Space Affairs project on space law for new space actors with the objective of furthering the adherence to United Nations treaties and principles governing outer space activities, thereby aiming to ensure a wide applicability of and adherence to international law. We have supported United Nations events aimed at raising awareness or sharing knowledge in space technologies and space exploitation.

The current international awareness on these issues is auspicious and sets the right conditions to deploy further joint efforts toward the eventual development of norms and standards through a common framework defining legally binding rules to govern a set of critical risky behaviours. Such a framework will be essential for the safety, security and sustainability of outer space in the long term. Such a framework can draw upon existing guidelines and practices and further regulate the behaviours of all actors, public and private.

1. Space-based technologies essential to human development

Space-based technologies have now become so important, if not systemic, to human development. Communication technologies have spawned the internet and mobile devices, which enhance our daily lives. Many individual applications like health, medicine and personal data, which are key for individual personal development are powered by data transported via space-based applications. Space based technologies augment living conditions for humans. They are used for agriculture, environment, cartography, navigation, fight against climate change, scientific, infrastructure, disaster management, humanitarian and emergency assistance purposes. National, international and institutional actors, public and private, are dependent on the availability, reliability, resilience and continuity of technologies based in space. It is not an exaggeration to say that given the extensive reliance on such technologies, lives now depend on the availability and resilience of these technologies. Businesses rely on the sustained availability of data and connectivity to perform their services or manufacture their products. This is also why space-based technologies represent such a vast potential for jobs, business growth and the quality of human life which all States and actors must be allowed to take advantage of. To do so we need a level playing field of access, safety and security, guaranteed by United Nations space treaties.

2. Rapid rise of risks threatening equal access to space

Considering the growing number of space objects planned for launch, the development of even newer technologies, the ever faster-growing reliance on space-based assets for defence and security purposes and the fast-growing volume of space debris, actors who want to be sure their objects are launched and placed into orbit are racing to do this. Almost one million pieces of human-made material bigger than 1 cm are estimated to be in orbit around our planet.

This trend drives the risks to safety of launches, and competition for safe orbital positions is growing. Launches are becoming more complex. Clear launching paths are becoming more and more difficult to find; paths have to weave between objects.

We already see the need to reserve multiple paths for a single launch. More and more private space actors are warning of this uncontrolled congestion. Launching objects into space is fast becoming riskier, including from an insurance perspective. Even if national legislations or regulations are asking space actors to comply with an increasing number of norms and standards, the future risk of orbital overcrowding is only driving the race to launch sooner rather than later. This attitude generates the risk of rushed launches of technologically immature objects, which only multiplies the risk of debris. Congestion of space and the resulting risks to safety and security have a direct impact on the right to gain free access to space. This is a direct threat to the fundamental right of equal access guaranteed by United Nations space treaties, whether it is access to the physical realm of space or to the benefits for human life generated from space exploration. Access denied is opportunity denied. Access denied is security denied.

3. Space-based technologies essential for human and national security but generate risks

Space-based technologies have come to play a key role in ensuring national security, enabling peacekeeping operations and crisis management as well as ensuring the safety of military operations on Earth. Space capabilities are key for national security. Nearly all military operations on Earth rely on space-derived data, services and assets. Intelligence, surveillance, reconnaissance and communication are critical for military operations, whether fielded for offensive or defensive operations on Earth or for the support of humanitarian and disaster relief missions.

However, technologies deployed to protect and to deter may also be deployed to generate hostile activities. This inherent feature of most space technologies makes it all the more difficult to have certainty about the intention behind a certain action or behaviour in space.

Indeed, as in the terrestrial domain, civilian space technologies can be used for military action (of special concern is dual-use technology, which may also be used to develop cruise or ballistic missiles). We see this dual-use characteristic increasingly taking shape in space, as civilian technologies are increasingly used for military purposes. Defence policies rely on civilian technologies or outsource them for military purposes. Life-augmenting civilian technologies can be used for hostile or destructive purposes, by accident or by design. The critical importance of and reliance on space capabilities has sparked the development and now increasingly the deployment or testing of offensive counter-space capabilities, whether the goal is to protect or to enhance military operations. What happens today on Earth could happen tomorrow in space. Terrestrial conflicts that extend into space to deny a party's space-based military operations assets are very real risks that we cannot afford to take and should strive to avoid at all costs.

Already we see proximity, interference (dazzling, jamming, spoofing), cyberattacks and (anti-satellite) destruction technologies in development, if not already deployed or tested in space. These systems will most certainly proliferate in the years to come. More anti-satellite tests will worsen the already dramatic situation around space debris. Yet, despite the growing physical risks to multi-billion-dollar investments and the derived services, debris mitigation is managed only by observation, space situational awareness and space traffic management technologies and by non-binding international best practices. Regulation remains permissive. There is evidence that actors may take advantage of the lack of clarity of rules and laws to act aggressively in space. National security and/or military strategies suggest a low threshold for the aggressive use of space-based objects, justified by the inherent right of self-defence. Irresponsible or even hostile behaviour threatens commercial enterprise as well as national security.

The risk of a serious degradation of safety and security in space will become a substantial obstacle to equal access to space. This is regardless of States' and/or corporations' level of technology: if objects cannot safely be launched or maintained in orbit, equal access is denied.

4. International norms of behaviour are the only remedy to mitigate these risks, and the United Nations must play a key role in the development of such norms and rules

One answer to offset the risks highlighted above would be to build an appropriate infrastructure and invest in technologies that improve space situational awareness, satellite tracking, collision avoidance manoeuvring and active debris removal systems, for example, a system that alerts satellite operators to potential collision paths and allowing for course corrections where possible. However, space situational awareness is expensive, and the smaller the object tracked the more expensive the tracking becomes. The cost of developing space situational awareness assets makes these technologies accessible to only very few actors, public and/or private.

While all space actors are claiming to behave responsibly in their operations, we see that transparency is lacking. More organized transparency would go a long way towards building confidence and accident avoidance. In addition, there is a crucial lack of mutually agreed understanding of what consists potential hostile behaviour, such as the actions illustrated above. It is understood that spacefaring nations and those who wish to become one in the future do not wish to be limited in the exploitation of outer space.

Non-binding norms and standards of behaviour remain an important instrument for trying to organize a common space governance. The need for some kind of joint space governance is recognized, both from State and from non-State actors. Although a legally binding instrument appears, at this stage, difficult, given national positions and general mistrust, a common framework defining legally binding rules to govern a set of critical risky behaviours, respected by and applied to all actors in space, should remain the ambition for the future and remain a desired end state. Given the growing congestion, lack of transparency, lack of agreed definitions and mechanisms and divergent interpretations of the existing space treaties, the risk of uncertainty and misunderstandings provoked by contest and competition is growing. We should now look for ways to improve voluntary best practice governance in the short to medium term time frame. Our primary objective must be to diminish the risks of misunderstandings and to increase transparency through the development of mechanisms that nurture a better understanding of each other's intentions. A more proactive exchange of information, for instance, ahead of placing a space payload in orbit, or sharing a mission's objective would go a long way to allow for a better comprehension of a payload's behaviour.

At the same time, as stated above, the international community should continue to uphold the vision of a common framework defining legally binding rules to govern a set of critical risky behaviours. The international community should now focus on a set of recurrent critical problems and behaviours that pose the highest risks, so as to make advances in establishing norms, on which there is already some degree of agreement. Our aim should be to define global norms of behaviour rather than technological restrictions. A common level playing field is what will guarantee safety and security, both from a legal and an operational point of view. This security would be important for investors, public and private, who are looking at developing new business ventures for space for the benefit of all humankind.

The path to the desired long-term end goal of a common framework defining legally binding rules on a set of critical risky behaviours should lead the international community to include the following steps:

- Strong respect for the fundamental principles enshrined in the outer space treaties that the respective States have ratified
- Strict adherence to existing best practices for safe space operations
- Continued, dedicated and good faith efforts in implementing the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space as a baseline for guaranteeing a safe and sustainable space environment
- Intensification of cooperation between State and non-State actors to raise awareness of the need to improve space governance
- Continued investment in space situational awareness technologies, such as tracking and collision avoidance, through preference given to the development of multilateral/multinational projects, possibly through United Nations initiatives
- Development of best practices for proximity operations avoidance, so as to guarantee the safe manoeuvrability of space objects
- Continued adherence to existing regimes, such as the Hague Code of Conduct against Ballistic Missile Proliferation, and initiated efforts to strengthen those regimes for the specific purposes of the safety of space operations and exploitation
- Discussions to start towards the creation of a multinational joint task force, clearing house or operational exchange platform tasked with deconfliction services, through the appointment of national experts/points of contact (remaining under national control) and the provision of access (existing or to be set up) to space traffic management tools; inspiration would be taken from such multinational agencies existing in the area of law enforcement; the mechanism would encourage transparency and information-sharing under rules of strict confidentiality and originator information control rules
- Continued adherence to transparency and information-sharing on national space doctrines, policies and strategies
- If the development of comprehensive binding norms for space governance remains elusive as a result of the lack of will of the international community, aim to identify a limited number of key risky behaviours that if left unchecked could lead to the gravest threats to the use of outer space, and develop legally binding norms in that regard as a matter of priority
- Support to public awareness initiatives of space governance issues
- Continued support to the Secretary-General's efforts

Mexico

[Original: Spanish]
[3 May 2021]

In relation to General Assembly resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviours, adopted on 7 December 2020, and in particular its paragraph 5, in which the Assembly “encourages Member States to study existing and potential threats and security risks

to space systems, including those arising from actions, activities or systems in outer space or on Earth, characterize actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security, and share their ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space”, and bearing in mind the invitation extended by the Secretary-General to Member States to provide their views in that regard, the State of Mexico hereby submits the views set out below.

General

Mexico is convinced that activities in the use and exploration of outer space should be carried out exclusively for peaceful purposes. Therefore, the militarization of outer space and the use of outer space for military purposes are constant concerns, as there are no specific provisions in international treaties that address those matters in a detailed and unequivocal manner.

Mexico promotes international cooperation in the peaceful uses of outer space. The use and exploration of outer space should be carried out in the interests of all States, in accordance with the principles of cooperation and mutual assistance, taking into account its importance for social, economic, scientific and technological development. It is therefore necessary to improve the international legal regime relating to the use of outer space.

Mexico recognizes the importance and urgency of preventing an arms race in outer space, in accordance with its commitment to the maintenance of outer space for exclusively peaceful purposes and to the pursuit of general and complete disarmament under strict international control. Mexico has therefore supported resolutions adopted by the First Committee on the prevention of an arms race in outer space, on transparency and confidence-building measures in outer space activities and on international cooperation in the peaceful uses of outer space.

Mexico believes that all weapons of mass destruction, including nuclear weapons and all weapons with indiscriminate or inhumane effects, should be prohibited and eliminated, regardless of their type or location. Mexico therefore rejects the placement of any type of weapon in outer space. The placement of weapons in outer space runs counter to current international treaties, such as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (1967) and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979).

Mexico reiterates that all nuclear weapons should be prohibited and eliminated regardless of their type or location, in accordance with the Treaty on the Prohibition of Nuclear Weapons.

Existing and potential threats and security risks to space systems

The growing number of actors is leading to an increased likelihood of incidents involving space systems and, therefore, to a greater risk of conflict. Although the growing number of States and non-State actors involved in space activities is leading to innovation and benefits, it is also contributing to competition in space.

In this context, States are exploring the development of offensive and defensive capabilities in order to protect space systems from attack. They are also reorganizing their space activities for national security purposes. The growing use of and dependence on outer space for national security, as well as the growth of capabilities to control space, are increasing the likelihood that incidents in outer space could trigger or escalate conflict.

Risks related to orbital congestion and increased space debris

Space systems support a wide range of both civilian and military activities that are vital to the global economy.

However, the risks of orbital congestion and space debris, as well as the threats posed by technology and uncertainty concerning orbital behaviour, are continuing to rise. The significant and continuous increase in the number of space objects has made orbits more and more congested, increasing the risk of collisions.

The amount of space debris in orbit continues to grow as a result of new launches and the fragmentation of existing objects. Furthermore, the vast majority of potentially harmful orbital debris is not regularly monitored. Although compliance with existing guidelines on orbital debris mitigation has improved to some extent, the current rates of compliance (between 40 and 60 per cent, depending on the orbital regime) are far from those needed to prevent a continued increase in debris collisions.

The current orbital debris guidelines, in particular the so-called 25-year rule, are based on assumptions about the space environment and the number and average lifetime of satellites that are no longer valid. The growing number of small satellites, the decreasing lifetime of satellites and the ability to create large commercial constellations of thousands of satellites are posing new challenges. At the same time, the increase in commercial options for space situational awareness, on-orbit servicing of satellites and active debris removal could provide some benefits, although these activities present their own political and legal challenges.

Although there have been increased commercial and political efforts to actively track, monitor and remove debris, the problem will remain a challenge in the future owing to its scale.

Against this backdrop of orbital congestion and increased space debris, Mexico believes that the risk of misunderstanding, miscalculations and conflict between space system operators is increasing. Therefore, transparent conversations are vital to ensure that intentions are understood, as open and collaborative dialogue focused on explaining the nature of actions builds confidence.

Militarization of outer space

Space has long been a domain of geopolitical interest and importance. Considerations relating to its militarization are a strategic component of the security agendas of the major military powers.

Some major military powers have announced the establishment of space commands. Some States are continuing to develop controversial hypersonic military capabilities, nuclear-powered missiles, kinetic weapons designed to neutralize intercontinental ballistic missiles and various radioelectronic weapons that generate powerful jamming emissions.

In view of the potential militarization of outer space, Mexico believes that a multilateral negotiation process aimed at adopting a code on confidence-building and transparency in space activities, together with legally binding measures establishing rational guidelines concerning dangerous military competition in space, should be initiated as a matter of priority. The goals of that process should be, among others, to prohibit the deployment and use of state-of-the-art conventional weapons and to reaffirm that outer space is a shared domain for peaceful use and development, in accordance with the principles of cooperation adopted within the framework of the United Nations in 1963.

Mexico believes that it is important to define subjective concepts such as perceived threats and to reach consensus on what they encompass. Further work must be done on transparency and confidence-building measures in order to eliminate misperceptions and security concerns and be able to more specifically characterize actions that could be considered irresponsible or threatening.

Actions and activities that could be considered responsible, irresponsible or threatening

Article IX of the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies provides that States parties shall conduct all their activities in outer space with “due regard to the corresponding interests of all other States parties”.

New commitments based on the principles of prevention, due diligence and non-harmful interference have been added in order to reduce the risks of misunderstanding or miscalculations posed by activities that may inspire mistrust, in particular in situations in which States lack clear and timely information.

Transparency and confidence-building measures adopted by States can help to eliminate misperceptions and the underlying security concerns, provide assurances about intentions, reduce the risk of unintended conflict (for example, by providing early warning indicators) and create better conditions for the introduction of stricter measures overall.

Since 2015, pursuant to General Assembly resolution [69/38](#), Member States that engage in military and national security space activities have been encouraged to report on their military space expenditure and other national security space activities, as appropriate.

In any case, Mexico considers transparency and confidence-building measures to be valuable as long as they are geared towards the adoption of a legally binding instrument.

Mexico also believes that international security must be viewed as indivisible. Consequently, actions that favour the security of one State to the detriment of collective security may result in hostile activities and threats to international security.

In any event, Mexico believes that the initiative to promote responsible conduct in outer space should not preclude or impede progress in prohibiting the placement of weapons in outer space or in prohibiting the development of any weapon that poses a risk to space objects and involves the non-peaceful use of outer space. In other words, this initiative must be geared towards the adoption of a legally binding instrument.

Further development and implementation of norms, rules and principles of responsible behaviour and the reduction of risks

Mexico has always recognized the need to establish a legally binding international agreement that is compliant with the principles of equity, viability and verification and would facilitate the adoption of the measures necessary for maintaining outer space as the common heritage of humankind, prohibiting its use for military purposes and, in particular, prohibiting any weaponization, so that only international cooperation in the peaceful use of outer space would be promoted.

With respect to space debris risk management, Mexico has supported the initiative of Canada, Czechia and Germany to establish a compendium of actions designed to mitigate such debris, which was submitted for consideration by the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space at its fifty-third

session and constitutes the first document with direct information from Member States regarding the regulatory measures they have taken to reduce and remove space debris.

Mexico has participated in the dialogues of the United Nations Institute for Disarmament Research and took part in the three open-ended consultations aimed at developing a code of conduct on space objects and space activities. The objective of this code, which is not a binding instrument and is primarily a confidence-building measure, is to establish norms for the peaceful use of outer space, security and sustainability and confidence-building measures for space activities.

Mexico believes that the development of norms for the governance of outer space should be inclusive. All States, including developing States, should take part in the establishment of norms and rules for the inclusive use and exploration of outer space.

In addition, as mentioned above, Mexico believes that steps should be taken to adopt a legally binding instrument prohibiting any weaponization of outer space. This international instrument should promote confidence and transparency in space activities.

Mexico believes that, considering the importance of the topic and without prejudice to future alternatives, a consultative process led by the Secretary-General is an appropriate means by which to advance discussions on the reduction of space-related threats.

Mexico recognizes that, in some cases, it is difficult to distinguish between military and civilian space activities and between peaceful and hostile uses of space. Comprehensive and democratic discussions on this issue should therefore be held by the General Assembly.

Consultations on the subject should take into account the exponential development of space activities by an increasing number of States and by private companies that have become major actors in the area of space exploration for civilian, military and dual-use purposes.

Mexico believes that, in the face of growing threats to international security, States should give priority to multilateral processes and cooperation. Outer space should remain open to all States for exclusively peaceful purposes. It is also essential that the development of norms setting standards for use and exploration and prohibiting the placement of any type of weapon in outer space be inclusive.

Netherlands

[3 May 2021]

1. Introduction

Space technology is present all over our planet in numerous – often critical – economic, social, scientific and security-related applications. For instance, satellite services, data and technology play a crucial role in the achievement of all 17 of the Sustainable Development Goals. In the Netherlands, too, space and space technology have come to play a vital role in our high-value knowledge economy and national security.⁴

⁴ The Netherlands recognizes the importance of space for military operations within the applicable existing international frameworks. Such military use can take various forms: military activities can be conducted from, in, through and towards outer space. As a State party to the five United Nations treaties on outer space, the Netherlands takes the view that this use of outer space should

Today's growing dependency on information and services provided by satellites for processes and systems around the world emerged in the past 10 to 20 years, which was a relatively stable and calm period internationally. However, owing to technological and geopolitical developments in that same period, the use of outer space is under increasing pressure. Outer space is quickly becoming congested, as the number of satellites continues to grow exponentially. Space technology is also becoming increasingly commercialized: more and more private companies are now developing and launching their own satellites. This can be seen, for instance, in the sharp growth of "mega constellations" of small satellites in low earth orbits. At the same time, space is increasingly becoming a contested domain: more and more countries are developing capabilities with which they can limit or even deny other users' access to space assets. These developments heighten the risk of accidents and misunderstandings. So far, none of this has had any major ramifications, but that can no longer be taken for granted.

The consequences of failure of space technology applications are greater than ever, and could lead to major disruption in economic, social and security terms. The way space and space assets are used is not always immediately visible, so these potential consequences are not always known to the wider public, and in any case it would be practically impossible to enumerate every possible risk. It is therefore important that, within the framework of the broadly supported General Assembly resolution [75/36](#), all States Members of the United Nations have been invited to present their views on the vulnerability of space. We believe that transforming those views into a joint vision on this subject will be a useful and necessary starting point for engaging in an international dialogue on this matter and reducing the vulnerability of space through an inclusive process. That is why the Netherlands voted in favour of resolution [75/36](#).

The international community has a collective responsibility with regard to space. Space and space technology are by definition international matters: space cannot be claimed at a national level, and no country can operate independently in outer space without affecting others. Moreover, the use of space assets is certainly no longer the prerogative of major powers. The use of space technology applications is not even limited to countries that have their own satellites (currently some 80 Member States). By procuring satellite-related services, a large number of Member States now have access to the many possibilities offered by space technology applications, ranging from agriculture to disaster response. This provides Member States with opportunities for further socioeconomic development. International cooperation based on transparency, mutual trust and the exchange of knowledge and experience is therefore an important element in addressing the challenges relating to space. Given the major interests at stake, and the views associated with them, which may be different for each Member State, it is important for this to be an inclusive process, in which the Netherlands believes there should be a role for the private sector too.

The Netherlands participates actively in this process. The present contribution was drafted on the basis of a broader national process in which the various stakeholders – elements of central Government, industry partners and non-governmental organizations – have contributed. With this vision, the Netherlands wishes to contribute to a common picture of threats, behaviour in space and solutions, as a starting point for a step-by-step approach to the challenges in this area, and as part of the work already being done in the framework of the United Nations.

be peaceful and, in particular, that no weapons of mass destruction should be placed in orbit around Earth or any other celestial body. The Netherlands continues to endeavour to prevent an arms race in outer space.

The Netherlands does not advocate the duplication of existing efforts by the international community to guarantee the safe, secure and sustainable use of outer space. However, in our view, the current situation shows that the existing system is not yet sufficiently robust to guarantee unrestricted access to space systems by all States, now and for future generations. We believe solutions should be based on the further development of regimes concerning the safe, secure and sustainable use of outer space and on behaviour and its consequences. An approach purely from the point of view of technical systems and capabilities is in our view not a robust one: major technological advances mean that systems and capabilities will always change faster than any framework the international community can create. We therefore approach the topic of outer space in the broadest sense as a single system, including both the ground-based segment and space vehicles (including satellites), and the connections between the two.

Another important principle in the Netherlands' vision is that there is not always a sharp distinction to be made between space safety and space security. This can manifest itself even in purely linguistic terms: some languages, including Dutch, have just one term to denote both "security" and "safety". That is not to say that the distinction is not made at the national level: in our view, space security concerns countering the threats and risks caused by intentional actions, and space safety involves working to achieve safety in outer space by mitigating the dangers caused by non-intentional actions. It should be noted however, that both concepts relate to unrestricted access to space assets. The inherently dual-use nature of space assets – they can be used for both civil and military purposes – is another reason that space safety and space security are becoming increasingly intertwined. For instance, the technology required actively to clear up space debris can also be used intentionally to disable an adversary's satellites temporarily or even permanently. Furthermore, technology used for inspecting, repairing or refuelling satellites in orbit can also be used intentionally to hinder or cause physical damage to other satellites. These developments in the wider world continue at speed and require our urgent attention. We therefore believe that it would be unwise to allow the important work being done by the international community to be delayed by procedural discussions about terminology.

2. Threats and security risks

The greatest challenge facing the international community is the fact that space is becoming congested and contested. A key development in this respect can be summarized as "new space": more satellites, more parties (including commercial parties) and the lower cost of launching cargo into space. Since the launch of the Sputnik satellite on 4 October 1957, more than 9,000 satellites have been sent into orbit. Nearly a quarter of these objects were launched in just the past four years. Since 1 January 2019, the number of communications satellites has grown by more than 50 per cent, the number of satellites for technology development by 40 per cent, and the number of Earth observation satellites by almost 25 per cent. These phenomenal figures are only a taste of things to come, especially given developments in the area of miniaturized satellites (CubeSats). Moreover, more than half of all active satellites are in low Earth orbits, below an altitude of 2,000 km, and satellite density (the number of satellites per unit of space) is currently greater than it has ever been.

There are already various long-standing civil initiatives to guide these developments effectively, such as the Guidelines for the Long-term Sustainability of Outer Space Activities adopted by the Committee on the Peaceful Uses of Outer Space, the Space Debris Mitigation Guidelines of the Inter-Agency Space Debris Coordination Committee and standards developed by the International Organization for Standardization and the European Cooperation for Space Standardization.

However, these efforts have not yet led to concrete agreements to enable civil and military space activities to take place safely in parallel. As things stand, the growing number of actors, satellites and new activities, such as maintenance in space and the active removal of space debris, is increasingly likely to lead to misunderstandings and related threats and risks. There is an additional security dimension to this issue if military satellites are involved, as at the moment it is difficult to distinguish between intentional and non-intentional actions in space.

In addition, more and more countries are developing capabilities with which they can limit or even deny other users' access to space assets. This leads to a wide array of threats, ranging from the disruption and degradation of space assets to their physical destruction. Examples include the deployment of assets for electronic warfare (such as jamming equipment to disrupt satellite navigation and communication signals), forcing satellites into orbital manoeuvres that will reduce their lifespan and manipulating satellites in space. Much of the technology needed for this is dual-use in nature. Satellites can also be threatened by directed energy weapons (lasers, high-power microwaves and particle beams) or kinetic attacks using anti-satellite weapons. Ground-launched weapons or the intentional creation of space debris can also be used to deny the use of reconnaissance and communications satellites in low Earth orbit. Last, hybrid operations (a combination of political, military, economic, intelligence and cyber assets (hacking), deployed below the threshold of military force) can also pose a threat to satellites and their ground infrastructure.

The risks arising from these threats are substantial and not always visible. Every day, civilian and military parties make large-scale use, both directly and indirectly, of satellites and related infrastructure for communication, navigation and Earth observation. Satellites that transmit positioning, navigation and timing data are part of our critical infrastructure, which includes electricity supplies and mobile telephone and data networks. We can no longer imagine our "smart" world without reliable weather forecasts, digital payments or track and trace systems in logistics. There are also risks to States' national security. Nowadays, military operations are often heavily dependent on the use of the space domain: communication with deployed units, use of global positioning system-guided precision munitions and intelligence analyses based on satellite imagery.

The consequences of any failure of satellites and related infrastructure are thus significant: widespread disruption of global navigation satellite systems would have a direct impact on the functioning of global logistics links and flows. Damage to or destruction of Earth observation satellites would have major consequences for global meteorological and climatological models and predictions. Large-scale disruption or destruction of satellites could even cause a chain reaction in which the accumulation of space debris increases the likelihood of new collisions and thus the creation of even more space debris and so on (the Kessler syndrome). As a result, frequently used orbits could become unusable for satellite operations for long periods of time. An additional risk is that any activity directed against space assets may be interpreted by the satellite's country of origin as a hostile military act, thus directly contributing to the escalation of a nascent military conflict.

3. View of the Netherlands on responsible behaviour and activities

On the basis of our view that solutions to the challenges concerning the vulnerability of space should be rooted in behaviour and its effects rather than technical systems and capabilities, the Netherlands characterizes a number of actions and activities as threatening behaviour on account of their impact on national and international security:

- Intentionally damaging/destroying objects in outer space. Examples include:
 - Disrupting the operation of sensors by means of laser dazzling
 - Damaging or disabling satellites using chemical sprays or high-power electromagnetic radiation
 - Kinetically damaging or disabling satellites by means of ground-based attacks
 - Using a space object to physically manipulate other space objects or intentionally causing a collision between two space objects
- Permanently disrupting satellite operations. Examples include:
 - Disrupting guidance commands by jamming radio signals or conducting cyberoperations
 - Intentionally jamming and/or spoofing satellite signals
 - Disabling ground stations and other infrastructure used to control and operate satellites
- Intentionally creating long-lived space debris, including rendering satellite orbits unusable by intentionally dispersing (“seeding”) space debris in those orbits;
- Intentionally damaging and/or destroying objects on the ground, in the air or in outer space, using objects in orbit, as a result of which those objects in turn could be targeted by a counterattack.

Using satellites to approach or make physical contact with other operational satellites by means of rendezvous and proximity operations without the permission of the owner of the satellite that is the target of the operation can in certain cases be considered irresponsible behaviour. This includes intentionally hindering a space object in orbit and/or forcing it to perform an evasive manoeuvre.

4. View of the Netherlands on strengthening the normative framework

In the view of the Netherlands, the current international legal framework should serve as the basis for the use of outer space, both now and in the future. Additional national legislation can further promote the responsible use of outer space. At the same time, the Netherlands observes that technical and geopolitical factors have changed considerably since the conclusion of the space treaties. The use of outer space is intensifying, and not just for commercial or scientific purposes; outer space is increasingly becoming a domain for military operations. We therefore believe it is necessary to further develop the normative framework, including in relation to military operations, so as to reduce the risk of misunderstanding and miscalculation. To that end, we should apply or develop the same international management structures, norms, rules and principles as those already used in the traditional domains of land, air and sea, but these should also tie in with initiatives launched by the Netherlands and others in the area of cyberactivities.

The Netherlands does not advocate duplicating existing efforts by the international community to guarantee the safe, secure and sustainable use of outer space. Important steps have already been taken to adapt the existing legal framework to the current situation, such as the development of the Woomera Manual and the Manual on International Law Applicable to Military Uses of Outer Space project. If we look at the treaty framework in practice, however, we see that not all States are party to all United Nations treaties on outer space. The Netherlands also appreciates initiatives, both past and present, by Member States with regard to the normative framework and transparency- and confidence-building measures. However, in our

view, the current state of space security shows that these initiatives will not suffice in order to be able to continue to guarantee unrestricted access to space systems and their applications by all States, now and for future generations. A contributing factor is that, although the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies prohibits the placing of weapons of mass destruction in orbit or on celestial bodies, it otherwise does not place sufficient limits on other activities in outer space that could result in the above-mentioned threats or risks to space assets.

In view of the above, and in line with the general policy pursued by the Netherlands to contribute to transparency- and confidence-building measures, arms control, enhancing international security cooperation and the further promotion of the normative framework and the international legal order with regard to space, the Netherlands takes an active role in addressing the vulnerability of space.

Transparency and mutual trust play an important part in this respect. This concerns matters such as the publication by Member States of their national policies, strategies and doctrines with regard to space, including safety and security aspects.⁵ Transparency about space operations, such as launches and manoeuvres, can already be achieved in part through existing mechanisms, including the timely provision of information to the Register of Objects Launched into Outer Space. Also worthy of particular attention in this context is the Hague Code of Conduct against Ballistic Missile Proliferation. Through this forum, established in the international city of peace and justice almost 20 years ago, States can inform each other about activities relating to space launch vehicles for satellites. Transparency and trust can also be enhanced by further international cooperation in the area of space situational awareness and the exchange of information on this subject between States.

Effective international communication is also crucial, particularly with regard to satellite operations. Due to the high velocities at which objects move through outer space and the increased density of satellites, time is an important factor in this respect. Points of contact that can be reached 24 hours a day 7 days a week are therefore indispensable, especially in cases where there is uncertainty about a party's intentions. Harmonized communication protocols that allow quick and decisive action, for instance, if control of a satellite is lost, can be very valuable, both for satellite operators and other users of space assets.

The Netherlands believes another key area in the further dialogue on strengthening the existing framework with regard to outer space is the recognition and observance of a minimum safe distance between satellites. More generally, the basic principle underlying all activities with regard to space should be to guarantee the safety and security of satellites and other manned and unmanned space vehicles. In our view, moreover, a responsible approach is to leave outer space in the same state it was in when the activity began. Technological development plays an important supporting role in this respect, for instance, in ensuring that satellites can be made more robust (to prevent premature failure), space objects can be observed more clearly in order to prevent collisions (space surveillance and tracking), satellites can be brought back down to Earth in a controlled manner, cooperation can take place on detecting space weather and space debris can be cleared up. The above applies not only to States: given developments in the area of new space, commercial players can also be encouraged by Governments to take part, and industry can remain closely involved by providing input on technological best practices. Here too, international

⁵ To underscore the importance of doing this, the Netherlands would like to take this opportunity to share its recently adopted space security policy with the other Member States. The recent letter to parliament on this matter has therefore been included as an annex to its contribution (available at www.un.org/disarmament/topics/outerspace-sg-report-outer-space-2021/).

cooperation is crucial in order to foster a level playing field and prevent a downward spiral if there are vast differences between various States' approaches.

The Netherlands is committed to contributing constructively to the international dialogue, addressing the vulnerability of space by means of a step-by-step approach which could lead to further legally binding measures. The international community must not lose sight of the continuing developments and their impact on space. In the view of the Netherlands, such steps could be taken on the basis of a political commitment and further operationalized by means of norms, standards and principles. The process started by General Assembly resolution [75/36](#) provides an important forum for all stakeholders in the public and private sectors, as well as non-governmental organizations, to come to the table on a voluntary basis, but not without obligations. The international community has already had positive experiences with this approach in other areas, such as cyberactivities. A successful example of a similar step-by-step approach eventually leading to legally binding measures is the International Treaty on Plant Genetic Resources for Food and Agriculture. The Netherlands is therefore hopeful that lessons drawn from previous initiatives by the international community can further contribute to the success of efforts with regard to space.

Norway

[29 April 2021]

Norway is a steadfast proponent of seeking multilateral solutions to global challenges and welcomes General Assembly resolution [75/36](#), which enables the discussion and eventually adoption of norms, rules and principles of responsible behaviour in space. As the importance of outer space continues to increase, so too does the importance of reducing space threats.

Significance and complexity of space systems

Norway is a highly connected society dependent on digital services, where space-based systems are essential for communications, positioning, navigation and timing, as well as situational awareness. Activities outside the Norwegian mainland present challenges where space systems enable efficient and safe operations, support operational security and bolster the exercise of jurisdiction in large areas, e.g. search and rescue operations in the Arctic.

Norway is geographically well-situated for two-way communication with satellites in polar orbits, and Norwegian companies provide related services to customers across the globe. Norway is host to other ground-based infrastructure for space systems and is in the process of establishing a launch capability for small satellites. Space security and risk reduction are thus high on the political agenda. The national white paper on space policy from 2019 sets forth the overarching approach of Norway to space security. Work is also proceeding on a new national space law, which will replace the current law from 1969.

A complete understanding of space systems must include a recognition of their complexity, with components in space as well as on Earth. Some systems can even be entirely ground-based and do not communicate with satellites, but instead use radars, lasers or other sensors for atmospheric and space research or surveillance. Such systems can potentially affect the security of on-orbit components of space systems.

Some existing and potential threats and security risks

There are several risk factors that may give rise to potential threats to systems in space. Military space assets constitute a small but significant and increasing

number of on-orbit systems. Some of their operations may potentially increase the risk of misunderstanding and should therefore be carried out with caution. Ground-based anti-satellite missile or laser systems are being developed in some States. Whether a threat to a space component emanates from Earth or space makes little difference to the risk to which the system is exposed. Moreover, disruption of space systems may affect the ability of States to acquire situational awareness, which might threaten strategic stability and increase the risk of conflict.

Any intentional disruption, damage or destruction of a space system can present a potential threat to international security. Particular risks apply in the event of physical damage to or destruction of an orbital component, where the resulting space debris may further disrupt or damage other spacecraft. The dual-use nature of many space systems complicates the issue: the disruption of a military capability may also affect critical civilian services. Furthermore, space systems can be disrupted in the ground segment. Norway has experienced several instances of intentional disruption of positioning, navigation and timing signals in the Arctic, affecting commercial aviation safety, threatening safe navigation and increasing the risk of accidents. Avoiding such disruption is significant for all States dependent on space systems for essential services.

Ideas on further development and implementation

The aforesaid complexities and risk factors clearly indicate the need for further discussion that takes into account the complexity and often dual-use nature of space systems. As reflected in article III of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, international law applies to the conduct of States in outer space. This suggests that it could be beneficial to have an exchange of views on how principles from existing regulatory regimes may be extended or applied to space and orbital systems. For example, this could cover how concepts from regimes for maritime or aviation regulation, as well as disarmament and verification, can be applied to space activities.

States should refrain from any intentional disruption, damage or destruction of any space system, except for decommissioning of their own systems in a safe and non-disruptive manner. Some legitimate operations in space, such as close proximity or inspection operations, can easily be mistaken for dangerous or even hostile operations. A principle of responsible behaviour would at least dictate maximal operational transparency in order to avoid affecting the space systems of other States, or creating a risk of misunderstanding or escalating tensions. It might be beneficial to consider an international system for notification of such operations.

In its resolution [75/36](#), the General Assembly invites States to engage in dialogue on reducing space threats. Norway would welcome initiatives to take this dialogue forward in a multilateral format.

Republic of Korea

[3 May 2021]

1. Why space matters

As the sphere of human activities in terms of economic, scientific and security expands beyond the Earth toward space, it has become more important to maintain safety, security and sustainability in space. Owing to wide-ranging applications from telecommunications to navigation and weather forecasting, with data collected, transferred and transmitted through satellites and communication devices, the world

is increasingly dependent on space-based services and the broader space domain in our daily lives.

In terms of national defence, at the same time, the future of warfare is highly dependent on space: satellite information; intelligence, surveillance and reconnaissance capabilities; command and control systems; radar; missiles and missile defence systems; and other high-tech military capabilities are all inseparable from space activities, which have become concerns in terms of arms control.

As a space-faring nation, the Republic of Korea believes that activities in space are imperative for both prosperity and security. For instance, article 1 of its Space Development Promotion Act 1 states that its purpose is to facilitate the peaceful use and scientific exploration of outer space and to contribute to national security, the sound growth of the national economy and the betterment of citizens' lives by systemically promoting the development of outer space and by efficiently using and managing space objects. This epitomizes the view of the Republic of Korea with respect to space.

2. Risks, hazards and threats

With the advent of a new space era, space is becoming increasingly congested, contested and competed for by a number of actors and objects. Even non-State actors are actively participating in space activities. The cross-cutting nature of space technology means that the challenges we are facing require responses that include both civilian and military aspects. As most space activities have dual-use characteristics, it is therefore hard to distinguish their purposes or intentions in advance. Some benign technologies or activities in space, unless used for such purposes, might become a serious concern to one's security. Due to such nature, and with limited capabilities to verify combined with a lack of transparency, a certain move, action or activity in space could constitute a threat or a perception of a threat to other countries. Against such a backdrop, the preliminary view of the Government of the Republic of Korea on the concept of "risks/hazards" and "threats" are laid out below.

Space risks and hazards

The Government believes that the concept of space hazards include consequences not caused by deliberate actions. Republic of Korea domestic law already defines space hazards: article 2 of the abovementioned Act defines the term "space hazards" as risks of crash, collision of space objects in outer space. In the first national basic plan for space hazards for the period 2014–2023, which is an official plan established on the basis of the Act, "space hazards" are defined as any risks caused by a crash or collision of natural space objects and/or artificial space objects or solar storms that could cause damage, injury or harm to people's safety and space assets.

Hazards in outer space include any risks and/or dangers causing damage, injury or harm to life or property in space or on the ground caused by any space objects and/or phenomena emerging naturally and/or artificially, including natural space objects such as asteroids, meteoroids or any other objects formed naturally in space, and artificial space objects designed and manufactured for use in outer space, including space launch vehicles, artificial satellites, spaceships and the components thereof.

Threats and impacts of space threats

The arms race in space will continue to spiral under the circumstances in which States are uncertain about the intention of others' activities. With a lack of

understanding on the intentions behind any given and a lack of transparency, more countries will rely on counter-space measures activities for defence, which will lead to a spiralling of the cyclical escalation of tensions, towards the potential weaponization of space and even aggressive actions. Thus, space threats and perceptions of those threats, no matter how we define them, will have an impact on international security.

Some definitions of space threats could be based on the capability itself, for example, kinetic, non-kinetic, electronic or cyber. The use, demonstration or testing of those capabilities could threaten others. Threats could also be defined on the basis of the intention of certain actions or activities with respect to the space system and people, and the Government preliminarily sees a threat in that point of view. The Government believes that any activities intended to destroy, damage, deny, disturb, or degrade the space assets of other States should be deemed as a threat.

The Government is of the view that existing international legal instruments, including “hard law” documents, such as the five outer space treaties, as well as “soft law” mechanisms, such as the Guidelines for the Long-term Sustainability of Outer Space Activities or the Space Debris Mitigation Guidelines, provide some regulation of hazards and risks in outer space. On the other hand, the Government believes that there is no international legal regime specifically dealing with the deliberate threats of States to space assets or activities of other States. This may be partly attributed to the fact that the focus has been on regulating weapons or capabilities themselves.

This lack of progress, and the difficulty in identifying the intent behind certain space activities of States, suggests that an approach based on observable behaviour is appropriate in regulating “threats” in outer space. Such an approach should focus on regulating deliberate threats from States, as well as mitigating the possibility of misperceptions of threats that may provoke unnecessary tensions between States.

3. Responsible versus irresponsible behaviour

Since verifying intention in space is difficult and challenging without official declarations from a space object’s operator, we can only judge in the light of what we can observe. In this context, we should encourage space actors to behave transparently and responsibly and discourage irresponsible behaviour.

In this sense, the Government views that responsible behaviour includes measures to increase transparency and build confidence.

Already put in place in the final report of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities, we could refer to the specified measures to build trust in space, including: information exchange on national space policy and goals and exchange of information on military space expenditures; information exchange on activities in outer space, including orbital parameters, possible conjunctions, natural space hazards and planned launches; notifications on risk reductions, such as scheduled manoeuvres, uncontrolled high risk re-entries, emergency situations and intentional orbital breakups; and voluntary visits to launch sites and command and control centres, as well as demonstrations of space and rocket technologies. Furthermore, in this context, the Government believes that space situational awareness is imperative. In order to enhance visibility and predictability in space, sharing information gathered through States’ space situational awareness is increasingly necessary.

On the other hand, the Government feels that irresponsible behaviour could include the very concept of a “space threat” mentioned in the present report, in particular the types of behaviour that constitute a violation of the Charter of the United Nations or key principles of international humanitarian law. One example

would be the deliberate hampering, in an armed conflict, of the functions of a satellite predominantly used for civilian purposes.

Irresponsible behaviour could also include activities that are not themselves threats but that have the objective possibility of provoking the miscalculation or misperception of threats among States. One specific example of this would be the testing or use of direct ascent anti-satellite weapons in a way that creates long-lived space debris without appropriate international consultations, with potentially affected States.

4. Way forward

Due to differences in space capabilities among States, including difficulties in reaching agreement on core concepts, such as space weapons and verification issues, it is premature to formulate a legally binding treaty in the field of space security. However, leaving the vacuum of norms, principles and regulations unattended, and letting actors exercise free hands in outer space, would be detrimental in the light of the ever-increasing use of space.

The Government is of the view that the resolution is neither prescriptive nor exhaustive in our joint search for legally binding norms in the prevention of an arms race in outer space, which would be desirable as an ultimate goal. In the meantime, we believe that our collective efforts towards defining threats and responsible behaviours will serve as meaningful stepping-stones toward the creation of legally binding norms in the area of space security. These efforts may also help to clarify the content of international legal norms, so as to illuminate their scope of application to space security issues and facilitate their application in the light of rapid changes in space technology.

Russian Federation

[Original: Russian]
[26 April 2021]

In accordance with paragraphs 5 and 6 of General Assembly resolution [75/36](#) of 7 December 2020, the Russian Federation has the honour to submit its national contribution to the report of the Secretary-General to the Assembly at its seventy-sixth session for further discussion by Member States.

In recent times, the risks of outer space becoming a launching pad for aggression and war have become very real. According to the 2014 Military Doctrine of the Russian Federation, the intention to place weapons in outer space is the main external military risk, and the disruption of the functioning of systems for the monitoring of outer space is a military threat.

Military risk is understood as a state of relations between or within States characterized by a combination of factors that, under certain circumstances, could lead to the emergence of a military threat. Military threat is defined as a state of relations between or within States characterized by a real possibility of military conflict between opposing sides and a high degree of readiness of a given State (or group of States) or separatist (terrorist) organizations to use military force (armed violence).

In this context, the international community and the United Nations must pay special attention and respond effectively to the placement by a number of Member States of weapons in outer space, as well as to the increase in force capabilities (both kinetic and non-kinetic) against space objects and the use of outer space for military

purposes. Ambitious programmes are being implemented to develop weapon systems designed for the threat or use of force in, from or against outer space.

At issue is the development by certain States Members of the United Nations of a space-based missile defence system (including means of interception) and of means of unauthorized interference with orbital infrastructure facilities. The placement in orbit of a large constellation of small satellites also raises questions. There is a growing potential for these tools to be used to compromise the orbital objects of States Members of the United Nations. Furthermore, the mass deployment of such spacecraft hinders the ability of other States to safely launch space launch vehicles and does not contribute to the long-term sustainability of space activities.

Steps towards using outer space for military operations (both “defensive” and “offensive” operations, including preventive activities) are motivated by the pursuit of military dominance. They are detrimental to international peace and security and could result in severe instability and an arms race in outer space, which would completely undermine the prospects for arms limitation and reduction in general.

An arms race in outer space, if not prevented in time, would devour large amounts of material resources and create insurmountable obstacles to international cooperation in the peaceful exploration of outer space and to the peaceful use of the results of scientific and technological progress in that area.

In that regard, it is more important than ever for the complete exclusion of outer space from the arms race and the preservation of outer space for peaceful purposes for the benefit of all humankind to become a strict norm of the national policy of States Members of the United Nations and a universally recognized international commitment. It is important to avoid renegotiating the decisions of the first special session of the General Assembly devoted to disarmament, held in 1978 with the aim of encouraging the exploration and use of outer space for strictly peaceful purposes, preventing an arms race in outer space and launching relevant negotiations in accordance with the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 1967.

This requires the States Members of the United Nations to reaffirm their commitment to the existing international legal norms and principles governing outer space activities, in particular the Charter of the United Nations, the Outer Space Treaty, the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water of 1963, the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space of 1963, the Convention on International Liability for Damage Caused by Space Objects of 1972 and the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques of 1977.

The principle of refraining in international relations from the threat or use of force, including in, from or against outer space, is enshrined in Article 2 of the Charter.

In accordance with article III of the Outer Space Treaty and paragraph 4 of the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, States must carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter, in the interest of maintaining international peace and security and promoting international cooperation and understanding.

Under article IV of the Outer Space Treaty, States undertake not to place “in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such

weapons in outer space in any other manner. The Moon and other celestial bodies shall be used ... exclusively for peaceful purposes”. Furthermore, under article 1 of the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, States undertake “to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control: in the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas”.

Article IV of the Outer Space Treaty prohibits “the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies”. However, the use of military personnel for scientific research or for any other peaceful purposes and the use of any equipment or facility necessary for peaceful exploration of the Moon and other celestial bodies are permitted.

According to article VII of the Outer Space Treaty, “each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies”.

Article IX of the Outer Space Treaty provides that “if a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may request consultation concerning the activity or experiment”.

In accordance with article 1 of the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, States undertake “not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party”. However, the use of environmental modification techniques for peaceful purposes is permitted under article 3.

In addition to reaffirming the existing international legal principles governing outer space activities, the States Members of the United Nations should also make an international commitment not to place any type of weapons in outer space (including in orbit around the Earth and on celestial bodies). Furthermore, the threat or use of force against and with the use of space objects should be prohibited.

Accordingly, Member States should make the following commitments:

- Not to use space objects as weapons against any targets on Earth, in the air or in outer space
- Not to destroy, damage, disrupt or alter the trajectory of the space objects of other States

- Not to construct, test or deploy space weapons, regardless of where they are based, for any purpose, including for missile defence or as anti-satellite capabilities, for use against targets on Earth or in the air, and to eliminate any such systems already in the possession of States
- Not to test or use inhabited spacecraft for military purposes, including anti-satellite purposes
- Not to assist other States, groups of States or international, intergovernmental or non-governmental organizations, including non-governmental entities established, incorporated or located in territory under their jurisdiction and/or control, in engaging in the above-mentioned activities and not to encourage them to do so

In accordance with the decisions of the first special session of the General Assembly devoted to disarmament of 1978, the Russian Federation proposes reaching a principled agreement on the prevention of an arms race in outer space and the preservation of outer space for peaceful purposes and introducing a complete and comprehensive ban on strike weapons in outer space and on any land-, air- or sea-based weapons designed to destroy objects in outer space.

These objectives are set forth in the 2014 Military Doctrine of the Russian Federation. In particular, the Doctrine serves to address attempts by individual States (or groups of States) to gain military dominance through the placement of weapons in outer space, the conclusion of an international treaty on the prevention of the placement of any type of weapons in outer space and the negotiation, within the United Nations, of elements of a regulatory framework for the safe conduct of outer space activities, including the safety of space operations in general.

The Russian Federation has consistently advocated starting negotiations on an international legally binding instrument for the prevention of an arms race in outer space and the preservation of outer space for peaceful purposes that prohibits the placement of any type of weapons in outer space and the threat or use of force in, from or against outer space. To that end, the Russian Federation and the People's Republic of China submitted, for the consideration of the Conference on Disarmament, a draft treaty on prevention of the placement of weapons in outer space and of the threat or use of force against outer space objects in 2008 and its updated version, reflecting the comments and proposals made by a number of States, in 2014. This comprehensive document, which is currently under discussion by the Conference, should form the basis for the elaboration of an appropriate multilateral instrument.

The initiative and political commitment of no first placement of weapons in outer space, which was put forward by the Russian Federation and has already gained international support, is intended to bring stability while such a multilateral instrument is being elaborated. Thirty States have already fully committed themselves to not be the first to place weapons in outer space.

This political commitment, which is gaining more and more supporters, is the most effective, practical and efficient way to make the development of space strike systems unviable. As one of the transparency and confidence-building measures for the prevention of an arms race in outer space, the initiative on no first placement of weapons in outer space has, in recent years, become a major political factor in strengthening international peace, ensuring equal and indivisible security for all and increasing the predictability and sustainability of the activities of States related to the exploration and use of outer space for peaceful purposes.

The annual General Assembly resolutions on no first placement of weapons in outer space and on transparency and confidence-building measures in outer space

activities, which enjoy wide support, show that the majority of the States Members of the United Nations support the approach taken by the Russian Federation to preventing an arms race in outer space and preserving outer space for peaceful purposes and keeping it free of any type of weapons.

The United Nations should advocate reaching appropriate, closely monitored and legally binding multilateral agreements as soon as possible through negotiations.

Preventing an arms race in outer space and preserving outer space for peaceful purposes is the only way to ensure its use for the benefit of humankind and its exploration for innovation rather than destruction.

Another important factor in space security is the long-term sustainability of outer space activities, which, as agreed by the States Members of the United Nations, is defined as the ability to maintain the conduct of space activities in a manner that realizes the objectives of equitable access to the benefits of the exploration and use of outer space for peaceful purposes, in order to meet the needs of the present generations while preserving the outer space environment for future generations

The Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space were developed to address natural and human-made hazards that could pose a risk in outer space and compromise long-term outer space activities.

Space debris, the long-term sustainability of outer space activities and other related issues have historically been and continue to be addressed by the Committee on the Peaceful Uses of Outer Space. In 2019, the Committee, at its sixty-second session, approved by consensus the 21 Guidelines for the Long-term Sustainability of Outer Space Activities and the preamble thereto. By the same decision, the Committee provided for the establishment of a new specialized working group of the Scientific and Technical Subcommittee of the Committee.

In the preamble, it is expressly stated that the Committee on the Peaceful Uses of Outer Space is the principal forum for continued dialogue on issues related to the implementation and review of the guidelines. It also sets out a procedure for reviewing the guidelines to ensure that they continue to provide effective guidance to promote the long-term sustainability of outer space activities.

It is clear, as embodied in the preamble to the guidelines, that the objectives of ensuring and enhancing the long-term sustainability of outer space activities are inextricably linked, thus entailing the need for continuous improvements in the way that States and international intergovernmental organizations, while developing, planning and executing their outer space activities, remain committed to the use of outer space for peaceful purposes. It is clear that the long-term sustainability of outer space activities cannot be ensured without addressing the preservation of outer space for peaceful purposes. However, preventing an arms race in outer space and keeping outer space free of any type of weapons falls outside the mandate of the Committee on the Peaceful Uses of Outer Space and is the responsibility of the United Nations disarmament machinery.

The Russian Federation is of the view that the full spectrum of issues related to the safety of outer space activities (with the exception of the prevention of an arms race in outer space) is the responsibility of the Office for Outer Space Affairs and should not be duplicated in other forums, including within the United Nations.

The Russian Federation requests the Secretary-General to take into account the views outlined above in his substantive report pursuant to paragraphs 5 and 6 of General Assembly resolution [75/36](#) of 7 December 2020 and to include the present document in the annex to his report.

Slovenia

[3 May 2021]

I. Introduction

Slovenia welcomes the opportunity to make the following national submission pursuant to General Assembly resolution 75/36, on reducing space threats through responsible behaviours. In addition to the joint contribution by the European Union, Slovenia decided to contribute to the substantive report of the Secretary-General for two main reasons, namely, its strong support for resolution 75/36 as one of its co-sponsors and its gradually more active engagement in outer space affairs in recent years.

In the view of Slovenia, the adoption of resolution 75/36 offers an opportunity for a cooperative and inclusive process to reach “a common understanding of how best to act to reduce threats to space systems in order to maintain outer space as a peaceful, safe, stable and sustainable environment, free from an arms race and conflict, for the benefit of all.”

II. Role of peaceful exploration and use of outer space

There has always been a deep symbolic attachment of the Slovenian public to space exploration, mainly as a consequence of past activities of Slovenians in this field. The most prominent one was Herman Potočnik Noordung, also known as the father of astronautics on account of his ground-breaking 1929 work *The Problem of Space Travel: The Rocket Motor*. As such, not only did he intrigue Slovenian artists of the 1980s and 1990s, but he also inspired the establishment of the Government-sponsored Herman Potočnik Noordung Centre of Space Technologies in 2012, which aims to add a cultural and humanistic dimension to space exploration.

Slovenia recognizes outer space as a global commons to be shared and used peacefully for the benefit of all nations. In that connection, it is important that all space activities are conducted in accordance with international law, including the Charter of the United Nations, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies and other applicable international instruments, which govern outer space activities.

Today’s space systems are integral to national security and daily lives of every citizen on our planet, as well as a major driver of sustainable development. There are clear benefits provided by satellites in navigation, communication and observations, to which Slovenia attaches particular importance. It is for this reason that Slovenian companies developed several important applications for processing space data, used in agriculture, water monitoring, spatial planning and rescue and early warning operations.

Space science and technology also ensure solutions for the protection of the environment and better mitigation of and adaptation to the impacts of climate change, as well as for enhancing the transport, finance and health sectors. There are also economic benefits of space technologies, which are international and always growing. The use of space technologies can significantly support economic growth and recovery after a pandemic, thus contributing to improvements in the quality of life around the world. Space technologies also often overlap in civilian and military applications, and choices made about the uses of outer space have a direct impact on international peace, safety and security.

At the same time, we face a continuing trend of a growing number of countries becoming spacefaring nations and increasing their space capabilities and resources. Slovenia joined this group of States in 2020 when it launched its first two satellites, Nemo HD and TriSat, into space. Currently, Slovenia is in the process of adopting its first space law, which will also provide the basis for a national space object registry. The first national strategy on outer space, which is also under way, will act as a vehicle for the future peaceful activities of Slovenia in space.

III. Threats and security risks in outer space

Owing to rapid technological advances in the past few decades, the outer space environment is becoming increasingly congested, contested and competitive. Such a complex environment, with various interests and a wide range of space actors, makes it more complicated to protect space assets against security risks and to identify possible threats.

The growth of space objects in orbit primary carries the risk of collision and creation of space debris, which is a real issue of concern, since it can threaten the continued use of near-Earth space. The very close proximity of active satellites could also result in their frequency interference. Such situations can be accidental, but sometimes also deliberate.

Due to the dual-use nature of space systems, it has lately become increasingly difficult to clearly categorize military and civil activities or make a distinction between defensive and offensive intentions in outer space. This aspect is even more important due to the rapidly evolving international security environment and strategic competition in all fields, including space. Any possible development of disruptive and destructive counter-space capabilities could increase the risk of miscalculation and lead to increasing tensions or even outbreak of conflict in outer space. In addition, civilian and commercial activities might also unintentionally contribute to the escalation of tension among space actors through their own improvement of space capabilities.

All these challenges highlight the importance of strengthening space security and ensuring stability in a pragmatic manner. In this context, Slovenia recognizes the need for reinforcing transparency and confidence-building measures to deepen mutual understanding and trust among space actors, reduce the risks of misunderstanding, misinterpretation and miscalculation and therefore help prevent potential military confrontation, and improve responsible behaviour in outer space through consensus-building.

IV. Main characteristics of irresponsible activities in space

Threats to vital space systems and capabilities are emerging, as a result of both natural and man-made hazards and possible counter-space capabilities. There are different threats that might lead to the physical destruction of space objects.

One form of such irresponsible behaviour stems from the potential use of kinetic anti-satellite capabilities, be it ground-based or co-orbital. Any intentional activity, such as anti-satellite testing, would result in satellite destruction and the creation of space debris, possibly long-lived. At the same time, this situation also creates a risk of miscalculating the response of those who would feel threatened by such action.

Detrimental to space assets are also non-kinetic threats, such as those of an electromagnetic nature, and the use of high-powered lasers or cyberattacks, which could occur from the ground or from space, but without any physical effect on the

targeted object and without direct contact. Uncertainties around rendezvous and proximity operation missions could also be perceived as threatening since the intentions of such manoeuvres cannot always be clearly predictable, especially if non-consensual.

Slovenia therefore believes that actors in outer space should refrain from irresponsible activities. This is even more important since the threat of this type of approach goes beyond a single object and poses a major challenge to the long-term sustainability of space activities, as well as to safety and security.

V. Norms, rules and principles of responsible behaviours in space

Slovenia is of the view that General Assembly resolution [75/36](#) offers a prospect for an inclusive process on managing space threats by establishing a realistic, pragmatic and non-legally binding framework of accepted practices of responsible behaviours in space as a complementary approach and without prejudging or excluding potentially new legally binding instrument in the future. Slovenia also shares the understanding that future norms, rules and principles of responsible behaviours as such would not limit or prohibit activities permissible by international law.

Space safety and security, as mutually interconnected aspects, are equally important for the preservation of outer space for peaceful use and exploration. However, Slovenia believes that the elaboration of norms, rules and principles for responsible State behaviours in space goes beyond the issue of safety and therefore serves as a useful and concrete response to space security challenges. At the same time, we also consider this approach an effective tool for preventing mishaps, misinterpretations and miscalculations and subsequently a potential increase of tensions and conflict in outer space.

In terms of ideas on the further development and implementation of norms, rules and principles of responsible behaviours, Slovenia shares the view that it would be appropriate to start with norms of behaviours, which would prevent intentional generation of debris, particularly long-lived. Additional areas of consideration might also be norms related to the regulation of rendezvous manoeuvres and proximity operations.

Furthermore, it is important to reinforce transparency and confidence-building measures, not only to support a more responsible use of space, but also to underpin future framework of behaviours. In this context, the following measures would merit further attention: (a) information-sharing about national space policies, goals, strategies and doctrines; (b) the adoption of measures to ensure compliance with norms, rules and principles of responsible behaviours by national non-space actors; (c) the establishment of consultative mechanisms for the de-escalation of tension and risk reduction; (d) the establishment of a direct line of communication between Governments, including relevant space authorities, for the management of perception of threats; and (e) strengthening the implementation of existing architecture governing the activities in outer space.

VI. Conclusion

Slovenia believes that the elaboration of norms of responsible behaviours in space provides important impetus for redoubling our joint efforts effectively to address present and future challenges to peaceful exploration and the use of outer space. Slovenia will therefore remain a reliable and constructive partner in this important quest.

Sweden

[3 May 2021]

Sweden fully aligns itself with the submission by the European Union and wishes to also submit the present contribution in its national capacity to the Secretary-General's substantive report according to General Assembly resolution 75/36, in response to the letter from the Office for Disarmament Affairs.

Sweden regards outer space as a global commons, to be used for the benefit of all. Sweden reaffirms the applicability of international law, including the Charter of the United Nations, to activities in outer space, as also reflected in article 3 of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. States, when developing, planning and executing their space activities, must conduct their activities in accordance with their obligations under international law.

Sweden remains strongly committed to strengthening international security and stability and to the prevention of an arms race in outer space, which is essential for safeguarding the long-term use of the space environment for peaceful purposes. To these ends, Sweden co-sponsored and welcomes the adoption of resolution 75/36 as an important step forward. Sweden underlines the importance of a continued multilateral process with the purpose of agreeing on norms, rules and principles for responsible State behaviour in outer space. Without excluding the possibility of future legally binding measures, Sweden believes that voluntary norms of responsible behaviour constitute the best way forward at this moment.

Threats and risks to space systems and the services that they provide

Outer space resources and the services that are provided by space systems are essential for many sectors in today's society. Weather forecasting, communication and navigation are all essential space-based components integrated in modern society, and space infrastructure and data are equally important for progress on crucial global issues, such as combatting climate change, managing the COVID-19 pandemic and society's post-pandemic recovery and contributing to the overall achievement of the Sustainable Development Goals, in everything from sustainable food production to clean water and sanitation.

As our reliance on space services is growing rapidly, risks and vulnerabilities are also increasing. Outer space is becoming increasingly congested, and the rapid increase in the number of objects in orbit is creating new challenges. Space debris constitutes the single largest threat to our space environment, both in a short-term and long-term perspective. In-orbit collisions with space debris present a growing risk to satellites, leading to an increased debris population and further increased risk of future collisions, jeopardizing long-term investments made by society in space infrastructure and risking a disruption to the collection of essential data for the services on which society has come to rely. This adds complications to space operations and increases both the technical requirements and costs, for example, those associated with collision avoidance. These challenges risk limiting the peaceful use of outer space, in particular in the most demanded orbits. In the light of the risks posed by space debris in particular, a possible crisis or conflict extending into space could have catastrophic consequences for the space environment and thereby on Earth.

In order to limit the risks to space systems and the space environment and safeguard the peaceful use of outer space for future generations, multilateral efforts are needed to ensure the safety, security and long-term sustainability of outer space activities. Sweden welcomes the important progress made by the Committee on the

Peaceful Uses of Outer Space with the establishment of multilaterally agreed guidelines on space debris mitigation and, most recently, with the adoption of the preamble and 21 Guidelines for the Long-term Sustainability of Outer Space Activities. It is important that these guidelines are implemented to the fullest extent possible by all space actors and that the work of the Committee is continued. Similar steps must now be taken also in the security and disarmament forums for outer space.

The global security environment has deteriorated over a number of years, with increasing polarization and lack of trust between States. This is reflected also in the outer space arena, where we have seen rapid military developments and increasing tensions. The development, testing and use of various counter-space weapons, both kinetic and non-kinetic, affect the perception of threats in outer space and against space systems. In addition, the dual-use nature of many space systems, combined with a lack of transparency and ambiguities in their purpose, could lead to increased risks of misunderstanding and miscalculations and contribute to an outer space arms race.

Sweden would like to highlight the following security threats and risks to space systems that deserve our immediate attention:

(a) **Deliberate creation of space debris through the use of kinetic force against space systems.** A visible threat seen in recent years is that of kinetic anti-satellite weapons tests. Whether conducted from Earth or from space, intentional kinetic attacks against or deliberate collisions with space objects are uncontrollable events that risk creating large amounts of space debris. They thereby constitute a threat not only to the targeted space object, but also to other space objects, the services that they provide and the space environment as a whole, thereby threatening the access to and use of space for other States. As space, in particular low Earth orbit, is becoming increasingly congested, the risks connected to space debris will only increase. The conducting of anti-satellite tests may also increase the perception of threats, deteriorate confidence between States and increase the risks for miscalculations. Sweden therefore believes that the deliberate creation of debris, in particular long-lived debris, through the destruction of space objects, as in the case of kinetic anti-satellite tests, should be considered irresponsible. Sweden urges States to refrain from this behaviour;

(b) **Rendezvous and proximity operations.** Recent technical advances in the field of manoeuvring satellites have many potential benefits for the long-term sustainable use of outer space, as they enable services such as active debris removal and on-orbit servicing. However, owing to their dual-use nature, the same technologies can be used for activities such as inspection, jamming or even as an on-orbit weapons system capable of incapacitating other satellites. If rendezvous and proximity operations are carried out in a non-transparent manner or without proper consent, they risk being perceived as threatening by States, even if that was not the actual intention. In combination with the lack of established norms and rules regarding such operations, this constitutes a risk of creating misunderstandings and miscalculations, and through that a risk of escalation of conflict in outer space or on Earth. Sweden believes that rendezvous and proximity operations carried out in a hostile, dangerous or non-transparent manner or without proper consent could therefore be considered irresponsible;

(c) **Non-kinetic threats against space systems.** Other non-kinetic threats against space systems include, inter alia, cyberattacks, laser blinding, jamming and spoofing. Even though these actions could be reversible, they may still have severe consequences. For example, they could disturb or disrupt important space services that fulfil vital civilian functions, such as airline navigation, or lead to the loss of control of space objects, which in turn may lead to cascading incidents, thus potentially endangering the safety of people or goods. The use of such capabilities

could also risk initiating or escalating a conflict, including in outer space. Sweden believes that these activities may be considered irresponsible when they jeopardize the safety and security of people and goods, whether on Earth or in space.

Norms, rules, and principles of responsible behaviours

Sweden underlines the importance of continued multilateral efforts to strengthen security and prevent an arms race or conflict in outer space. Without excluding the possibility of legally binding measures in the future, Sweden believes that voluntary measures constitute the best way forward at the moment. Given the fact that many space objects or systems can be used for both military and civilian purposes, and considering the challenges in verifying the nature of outer space objects and their intent, Sweden sees great merit in an approach centred around agreeing voluntary norms of responsible behaviour and the reduction of risks.

Sweden therefore underlines the importance of a continued inclusive multilateral process with the purpose of agreeing norms, rules and principles for responsible State behaviour in outer space. Such norms should be elaborated through multilateral discussions and be in accordance with the existing body of multilateral space treaties and principles. Sweden suggests that the following elements should be included:

- Norms against destructions of space objects and similar deliberate actions that create space debris or in other ways have a strong negative impact on the space environment and other space systems, including kinetic anti-satellite weapons tests
- Norms regarding rendezvous and proximity operations, which could include norms for transparency, communication and consent
- Norms regarding other activities against space systems that may damage vital functions, cause a loss of operational control of a satellite or disturb or disrupt space-based services or in other ways jeopardize the safety and security of people, goods or infrastructures

Sweden also underlines the importance of transparency and confidence-building measures. Multilateral discussions to promote responsible behaviours and reduce risks could also include discussions on transparency and confidence-building measures, such as openness about States' outer space activities, doctrines and policies, promotion of relevant instruments, such as the Hague Code of Conduct against Ballistic Missile Proliferation, measures to strengthen communication between States, increased cooperation regarding space situational awareness and strengthening capacities for the verification of events. Sweden also underlines that the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities, as well as the continued work of the Committee, could also strengthen transparency, confidence and security.

A common understanding against which to judge State activities will hopefully contribute to building transparency, confidence and security by reducing threats and risks of misperception, miscalculation and unintended escalation of conflict. A continued multilateral process with the purpose of agreeing norms, rules and principles for responsible behaviours could thereby also help to create the momentum for further steps in the future.

Switzerland

[Original: French]
[3 May 2021]

Introduction

In the present submission, Switzerland sets out its views on threats and risks to the security of space systems, and on responsible and irresponsible behaviours in outer space. It also proposes ideas for the further development and implementation of norms of responsible behaviour in outer space, as requested by the Secretary-General in accordance with General Assembly resolution [75/36](#). As a co-sponsor of that resolution, Switzerland believes that a behaviour-based approach could contribute to enhancing security in outer space, in conjunction with other efforts, approaches and instruments. All space activities, including military activities, must be compliant with existing international law, including the Outer Space Treaty, the Charter of the United Nations and, in the context of armed conflict, international humanitarian law.

Outer space is critical for the prosperity of humankind. All States are increasingly dependent on space applications, and the number of activities and actors in space is growing. The resulting congestion and competition among States is contributing to increased safety and security challenges in space and on Earth. To overcome these challenges, efforts must be made to strengthen the implementation of existing international law, norms and standards, and to further clarify the content thereof. Switzerland notes that, although progress has been made and processes are under way to address risks and dangers in outer space, threats to space security remain largely unaddressed at the international level.

In that regard, Switzerland welcomes the adoption of General Assembly resolution [75/36](#) and the approach for gradually addressing space security challenges set forth therein. Switzerland believes that it would be useful to advance the consideration of the various issues mentioned in the resolution in a structured manner, within the framework of a United Nations-mandated body, which should preferably be inclusive in nature.

Threats and risks to the security of space systems

As a result of growing dependence on space systems for both civilian and military purposes, security threats and risks are increasing. Some of these threats could jeopardize stability in space and undermine the sustainability of the use of space for peaceful purposes.

A growing number of States are seeking to use space to enhance their military capabilities and national security. Many military operations on land or in the air rely on space-based technologies, including command and control systems. In response to these developments, an increasing number of countries are establishing counter-space capabilities, including kinetic and non-kinetic capabilities, electronic capabilities (such as jamming or spoofing) and cybercapabilities. The use of counter-space capabilities poses risks to military, civilian and commercial space systems. In addition, the targeting of military space systems can pose serious threats to international security, as some command and control systems are used for both conventional and nuclear capabilities.

Kinetic counter-space capabilities that cause permanent and irreversible destruction exacerbate risks to the peaceful use of outer space by creating space debris. The development, testing and potential use of direct-ascent anti-satellite capabilities are of particular concern.

Non-kinetic counter-space capabilities, including optical capabilities, electronic capabilities and cybercapabilities, can also pose a threat to civilian and military space assets. Although such capabilities do not necessarily cause permanent physical damage, they can temporarily disable critical space assets and affect their reliability. Such behaviour may trigger retaliatory measures or result in space assets becoming inoperative and then turning into space debris, presenting an additional security risk. In addition, some non-kinetic counter-space capabilities are more accessible than kinetic counter-space capabilities, and their use is harder to detect and attribute.

Hostile rendezvous and orbital proximity operations pose a threat to the safety and security of space systems. Deliberate approaches towards foreign satellites without coordination, prior notice or consent may be interpreted as hostile acts. Rendezvous and proximity operations can be used to observe, disable or threaten another country's satellites. The threat of hostile rendezvous and proximity operations can lead countries to equip satellites with defensive capabilities, resulting in the potential militarization of space.

The placement of weapons in outer space in the form of space-ground weapons or missile interceptors may also increase the risk of transforming space into a realm of military confrontation and undermine space security and stability. Countermeasures to such threats would pose additional risks to space security and stability.

Lastly, concerns about threats or risks to space systems relate not only to the development of counter-space capabilities but also to the adoption by some States and military alliances of doctrines indicating that they view space as a realm of military confrontation.

Many of the above-mentioned threats and risks relate to both safety and security issues, which are closely linked. Debris can be created by peaceful activities, such as satellite launches, or deliberately, by anti-satellite weapons. Once created, long-lived space debris poses a significant risk to the safety of other space activities, including those carried out for peaceful purposes. Efforts to enhance both the safety and security of space are essential for the sustainability of space activities. However, although the peaceful uses of space and the related risks and dangers are being discussed in the context of international processes, the growing threats to space security remain largely unaddressed. It is essential that these security challenges be addressed within the framework of a specific process or body.

Responsible and irresponsible behaviours and their potential impact on international security

Some behaviours can contribute positively to international security, while others undermine and destabilize international security in space. Given the difficulties inherent in the verification of space activities, in particular the difficulty of determining the intention behind certain actions, a behaviour- and results-based approach seems promising. By focusing on behaviours and their consequences, stakeholders can determine the results of a given action independently of its presumed or actual intention.

The full implementation of existing obligations relating to outer space is the cornerstone of the responsible behaviour of States. Universal compliance with those obligations would contribute positively to international security. In addition, a broad range of transparency and confidence-building measures, including the sharing of information, in particular on national military space policies and programmes, pre-launch notifications for missile and space launches and for orbital proximity manoeuvres and operations, and the registration of space objects in a national registry or with the United Nations, could enhance international security and reduce the risk

of escalation. Another potentially useful conflict prevention measure would be the establishment of a collaborative and open space situational awareness system, which would not only ensure the transparency of space activities but would also be essential for cooperation. A multilateral space situational awareness system would also help to address challenges to the safety of space activities.

Responsible behaviour also includes refraining from actions that are likely to lead to misperceptions and, therefore, to the risk of escalation. For example, States should refrain from non-consensual approaches or from rendezvous and proximity operations without coordination, prior notice or consent. Similarly, all possible measures should be taken to reduce the likelihood of the inadvertent creation of space debris.

Switzerland also considers it important that military space doctrines reflect the principle that the exploration and use of outer space should be carried out for peaceful purposes and for the benefit and in the interests of all countries, in accordance with the Outer Space Treaty. Space doctrines should also minimize the possibility of armed conflict in outer space and incorporate the principles of international humanitarian law.

There are a range of space-related behaviours that could be perceived as threatening to other space systems and to international security. One of the most obvious examples of irresponsible behaviour is the placement of weapons in space. There are many other activities that can destabilize and undermine international security, including non-consensual and non-transparent actions such as hostile rendezvous and proximity operations and kinetic or non-kinetic interference with space objects. Because of the long-term risk posed by space debris, any activity that could lead to the creation of such debris, including the development and testing of debris-generating anti-satellite capabilities, is of particular concern and should be considered irresponsible.

As space-based systems are increasingly essential to human activity on Earth, the above-mentioned irresponsible behaviours adversely affect security on land. Threats to space systems can disrupt vital civilian and military operations and, as a result, increase the risk of escalation and conflict. Moreover, perceived threats from and to space objects are mutually reinforcing and can lead to an arms-race dynamic.

As a result of what has been described as a growing entanglement of nuclear and non-nuclear space command, control, communications, computers and intelligence infrastructure, threats to these space systems could create ambiguity and lead to nuclear escalation if (mis)interpreted as an attack on the nuclear command and control system.

Ideas for the further development and implementation of norms, rules and principles of responsible behaviours in outer space

It is essential to promote compliance with existing international law and the full implementation of existing norms and standards. The application and evaluation thereof are prerequisites for determining whether new rules or norms are necessary.

In addition to legal obligations, States should agree on what constitutes responsible behaviour in the context of space activities, including in relation to information-sharing, notification and registration of space objects. Given the significant safety and security risks associated with the use of kinetic counter-space capabilities in particular, a ban on debris-generating anti-satellite weapons could be an initial priority.

Given the risk of unintended escalation posed by actions that are misunderstood or wrongly perceived as threats, the establishment of open lines of communication among space actors, which can be used for incident notification and timely communication, is a useful measure. Similarly, the development of collaborative and open space situational awareness capabilities would contribute to increased transparency.

In addition, Switzerland encourages States and military alliances to adopt space doctrines based on the principle that outer space should be used for peaceful purposes only, and to refrain from viewing outer space as a realm of military confrontation.

It is also important to take into account the increasing role of non-State actors, such as those in academia and industry, in space activities. For example, cooperation with commercial space actors may be beneficial for developing common standards for responsible behaviour in space.

Switzerland believes that it would be particularly useful to continue discussions on this multidimensional issue within the framework of a United Nations-mandated body, in order to reach a common understanding of what constitutes responsible behaviour and what constitutes irresponsible or threatening behaviour. The aim of such discussions should be to achieve concrete results, to be adopted and implemented by all Member States. Such a body should be inclusive in nature, as the issue of space security and sustainability is relevant to all Member States.

United Kingdom of Great Britain and Northern Ireland⁶

[30 April 2021]

The present submission from the United Kingdom of Great Britain and Northern Ireland is in response to the note verbale relating to the submission of the report of the Secretary-General on resolution 75/36. In total, 164 Member States voted in favour of that resolution, demonstrating broad international consensus around the need to tackle threats to space systems and that seeking agreement on what might constitute responsible behaviour in space could reduce the chances of miscalculation and escalation leading to conflict. It is crucial that we do not pass up the opportunity presented by this new approach and that nations now work constructively to prevent an arms race in outer space.

Space is fundamental to the way of life for all people on Earth. Our economies and societies are increasingly dependent on access to space systems. Space systems provide essential services in the fields of development, agriculture, environmental monitoring, disaster relief, trade and business, science and education and national security. It is vital that all nations can operate these systems safely and securely.

More countries and private organizations are investing in space capabilities. However, that increased interest in space comes with challenges. Space is more contested by States, an increasing number of which already have the capabilities to damage, or deny access to, other countries' satellites and the information they provide. It is more competed in, with rapid technological developments outpacing internationally agreed best practice and regulation. And it is ever more congested by a growing volume of satellites and debris, posing a threat to the sustainability of this increasingly important domain.

In order to address these challenges, the international community must consider them holistically. A space system is composed of three equally important segments:

⁶ Full version is available at https://front.un-arm.org/wp-content/uploads/2021/05/national-submission-of-the-United-Kingdom-in-connection-with-resolution-75_36.pdf.

the satellites that operate in space; the ground-based infrastructure that controls or launches the satellites; and the data (both content data and command and control data) that flows between the satellite and the Earth-based infrastructure. All three segments are intrinsic to the provision of space services and a perceived threat to any of them would likely cause significant concern to the operator.

Operating in space is difficult, and space operators must deal with a number of challenges. These can be divided into two broad categories. First, “hazards” that could harm a space system, which are generally naturally occurring in the space environment or are the result of space activity (for example, debris). The international community has made progress in mitigating many of these hazards, not least through the Guidelines for the Long-term Sustainability of Outer Space, which the Committee on the Peaceful Uses of Outer Space adopted in 2019. A number of other mechanisms and organizations, such as the Inter-Agency Space Debris Coordination Committee and the International Telecommunication Union, as well as industry bodies, such as the Consortium for Execution of Rendezvous and Servicing Operations, have also made a contribution to improving the sustainability and accessibility of the space environment.

However, that progress has not been matched by international action to deal with the second category of challenges to operating in space: threats. Threats in this context are those actions or activities using capabilities that threaten⁷ the space systems of another State. A number of States already have the ability to threaten the space systems of other countries. Current capabilities include: direct ascent weapons; co-orbital weapons; directed energy weapons; electronic weapons; and cybercapabilities. In the face of these already-deployed technologies, the call not to place weapons in space looks reliant on an outdated concept and ignores the wide variety of capabilities that threaten space systems today.

Without a shared understanding of what constitutes normal, non-threatening and responsible operation of these capabilities, States may miscalculate. This could lead to a conflict in space, potentially leading to catastrophic impacts that would fundamentally challenge our space-dependent economies and societies.

While the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, alongside other bodies of international law, such as the Charter of the United Nations, provide a legal framework for space activity, multilateral negotiations have not adequately addressed space threats. Discussions stalled over the proposal for a treaty on the prevention of the placement of weapons in outer space, the threat or use of force against outer space objects, mainly because it considered only threats in space, rather than, for example, Earth-based threat systems, and did not address the challenge of verifying capabilities in space. However, many nations support a legally binding treaty and agree with the ambition to prevent the “weaponization” of space. The United Kingdom would not in principle be opposed to some form of legally binding agreement but sees the current proposal as fatally flawed. Against this international backdrop, the United Kingdom sought to make a constructive step forward to build trust and increase transparency in space.

That ambition was behind the draft resolution submitted by the United Kingdom to the General Assembly at its seventy-fifth session, on reducing space threats through norms, rules and principles of responsible behaviours. In its adopted resolution [75/36](#), the Assembly “Encourages Member States to study existing and potential threats and security risks to space systems, including those arising from actions, activities or

⁷ The use of the term “threat” in the present submission includes, but is not necessarily limited to, the threat of the use of force as referred to in article 2 (4) of the Charter of the United Nations.

systems in outer space or on Earth, characterize actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security, and share their ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space.” The United Kingdom believes that doing so would lead to increased transparency and reduce the likelihood of conflict occurring in space.

Discussions of those responsible behaviours should focus on the issues of most concern to all nations. The United Kingdom believes that seven types of activity would benefit from further, expert-level discussion: (a) destruction of, or threat to destroy, a satellite; (b) direct ascent anti-satellite use; (c) non-kinetic threats, such as lasers; (d) threats aimed at creating loss of imagery/sight of space assets; (e) interference with positioning, navigation and timing signals from satellites; (f) reducing the ability of a ground operator to control a satellite; and (g) rendezvous operations and proximity operations.

The United Kingdom does not wish to be prescriptive in setting out how we might address these types of activity. Nevertheless, the present submission sets out, as a means of beginning a global discussion, some exemplars of how responsible behaviours might reduce risks related to these areas. These exemplars – covered in the submission in greater depth – include suggestions that States might agree that:

1. Anti-satellite missile testing is unacceptable, or unacceptable whenever a strike leads to the creation of debris;
2. It is unacceptable to place a co-orbital weapon or an electronic warfare satellite next to the national security satellite of another nation;
3. Lasing a satellite with loss of sight could be considered threatening and revealing of a nation’s intent to hide activity, including preparations for conflict;
4. States should not conduct or knowingly support activity, for example, the jamming or spoofing of positioning, navigation and timing signals, which intentionally harms the systems of civilian operators such as emergency responders or normal aircraft operations;
5. It is unacceptable to take over manoeuvring control of an active satellite without the consent of its owner;
6. States should consider how best to cooperate to exchange information, set up contact lists for emergencies, assist each other and implement other cooperative measures to address threats to space systems;
7. Rendezvous operations should be conducted in an open and transparent manner, include pre-manoeuve communications and follow an understood and shared set of procedures.

The overwhelming support the responsible space behaviours initiative received in 2020 suggests that the weight of international opinion is behind a new effort aimed at providing a constructive way forward, without prejudice to other initiatives. States should, under United Nations auspices, give serious consideration to this proposal and establish an expert-level conversation to deepen understanding and explore the space for agreement on these behaviours. Success would reduce the risk of miscalculation and escalation and keep the space environment sustainable. Failure to do so would allow threats to grow unchecked – casting a shadow over all humanity’s reliance on space as an essential domain, free and accessible to all.

United States of America

[3 May 2021]

Introduction

Outer space provides many benefits to humanity, and space-based capabilities are integral to modern life in the United States and to countries around the world. Space activities provide national benefits, with new technologies and services creating new economic opportunities in established and emerging markets. Space exploration has brought benefits to humankind, from basic science research to greater understanding of the Earth, the solar system and the universe. On Earth, space systems are relied upon for critical missions such as communications, weather prediction, navigation, ocean monitoring and climate modelling. Space systems are also used for early warning and situational awareness to preserve international peace and security. For decades, States parties to arms control treaties, including the recently extended new Strategic Arms Reduction Treaty, have relied on space-based national technical means of verification to monitor compliance.

The December 2020 National Space Policy states that it is the policy of the United States that “all nations have the right to explore and to use space for peaceful purposes and for the benefit of all humanity, in accordance with applicable law”. In that regard, the United States believes that it is in the shared interest of all nations and all space actors to act responsibly in space to ensure the safety, stability, security and long-term sustainability of outer space activities. Responsible space actors operate with openness, transparency and predictability to maintain the benefits of space for all humanity. The National Space Policy further directs us to “lead the enhancement of safety, stability, security, and long-term sustainability in space by promoting a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior”. As such, the Interim National Security Strategic Guidance, issued by President Biden in March 2021, affirms that the United States will lead in promoting shared norms and forging new agreements on outer space.

1. Existing and potential threats and security risks to space systems

Space is a naturally hazardous environment and is increasingly congested, contested and competitive. Space assets face many threats, both natural and human-made. Natural threats to satellites include solar activity, radiation and natural orbital debris, whereas examples of human-made threats include satellite launch debris, radiofrequency interference, malicious cyberactivity and anti-satellite weapons such as directed energy systems or direct-ascent missiles.

Some States are developing, operationalizing and stockpiling a variety of anti-satellite weapons that could be used to, or have the potential to, deny, disrupt, degrade or destroy civil, commercial or national security space capabilities and services. Some of these anti-satellite weapons could be used to deny or disrupt space services temporarily, while others are designed to permanently degrade or destroy satellites.

These threats against satellites and their supporting systems can generally be divided into four categories: (a) ground-space; (b) space-space; (c) ground-ground; and (d) space-ground. Within these categories, the threats can be described as: (a) reversible, which includes temporary effects such as interference with radiofrequency signals or the dazzling of remote sensing systems; or (b) irreversible, which includes measures that degrade or destroy a satellite. The consequences of all categories of threats could include loss of mission data; decreased lifespan or capability of space systems or constellations; the loss of positive control of space

vehicles, potentially resulting in collisions that could impair systems or generate harmful orbital debris; or damage to or destruction of the space system.

Ground-space. In this category, an anti-satellite weapon is based terrestrially, either on the ground, in the air or at sea, and is designed to be used against objects in orbit. This vector has seen the greatest proliferation of anti-satellite capabilities as a result of the ease of access to mature technology and the significant advantages that accrue to systems based on the ground, such as line-of-sight access to multiple overhead targets.

Space-space. In this category, an anti-satellite weapon is based in outer space and is designed to be used against other objects in orbit. Unlike ground-based systems, there is no easy access to the systems once they are launched, there are limits to the power that can be generated by the satellite and size and weight are a factor that must be taken into account in order to launch a satellite into orbit. Anti-satellite weapons placed in orbit must be able to manoeuvre into position relatively close to their target to conduct their mission and such systems have a finite operating lifetime while in orbit.

Ground-ground. In this category, weapons are terrestrially based and are designed to be used for attacks against the terrestrial infrastructure that supports satellite operations or the user segment. These types of attacks can include malicious cyberactivity or physical strikes on ground systems, such as command and control systems, data reception stations or launch infrastructure. This category can also include threats to the user segment, which is also susceptible to spoofing, denial of service or malware.

Space-ground. In this category, weapons are based in orbit and are designed to be used against targets on the land, at sea or in the air. Although there are many conceptual proposals for such space-to-ground weapons, this is one of the least developed areas in terms of actual capabilities.

Some examples of threats to space systems within these categories include, but are not limited to:

Radiofrequency interference. Such interference is used to disrupt, deny, deceive or degrade space services, including satellite communications and positioning, navigation and timing services. Purposeful interference may prevent users from receiving intended signals and can be accomplished by two primary methods: uplink jamming or downlink jamming. Uplink jamming is directed towards the satellite, and must operate at the same frequency and approximate power level as the target signals. Effects can be widespread. Downlink jamming is directed at users on the ground, and its effects are more localized.

Directed energy weapons. Anti-satellite directed energy weapons are designed to produce reversible or non-reversible effects against space systems by emitting highly focused radiofrequency or laser energy. Types of directed energy weapons could include lasers, microwaves and particle beams. Reversible effects include temporarily blinding optical sensors, which may remove the ability to locate, monitor and track objects. Non-reversible effects include permanently damaging or destroying sensors or other satellite components.

Cyberthreats to satellite command and control. Satellite command and data distribution networks could expose space systems, ground infrastructure, users and the links connecting these segments to cyberthreats. Malicious cyberactivities from ground-based sites directed at satellite command and control links could range from disrupting data or sending unauthorized commands to potentially taking over operational control of a satellite or its payload from its authorized owner/operator.

Attacks on terrestrial space infrastructure. Physical attacks against ground sites and infrastructure that support space operations, such as data centres, power plants or space launch sites, could also threaten satellite services.

Anti-satellite missiles. Anti-satellite missiles could be launched from spacecraft in orbit or from systems on the ground, in the air or at sea for the purpose of degrading or destroying targeted satellites. Anti-satellite missiles could use explosives, kinetic impact or other means to degrade or destroy a satellite.

Robotics and other in-orbit threats. Concepts for space-based anti-satellite systems vary widely and include designs that use satellites placed in Earth orbit to carry anti-satellite missiles (as noted above) or spacecraft subsystems capable of producing reversible and non-reversible counter-space effects. These capabilities could include space robotics systems, chemical sprayers and other concepts.

Nuclear detonations/weapons placement. Nuclear detonations in outer space could be used to directly damage or destroy satellites, and also could be used to create harmful electromagnetic effects that could also degrade and destroy satellites as well as damage terrestrial infrastructure. The 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water, which is sometimes called the Limited Test Ban Treaty, already prohibits any nuclear weapon test explosion, or any other nuclear explosion, in outer space. Moreover, article IV of the 1967 Outer Space Treaty prohibits placing nuclear weapons or other weapons of mass destruction in orbit around the Earth, installing such weapons on celestial bodies or stationing such weapons in outer space in any other manner. As such, nuclear weapons or other weapons of mass destruction are prohibited from being placed in orbit for any type of attack.

Dual-use challenge

Many space capabilities and technologies are inherently dual-use, which presents both practical and conceptual problems when attempting to identify and respond to potential threats. All satellites with manoeuvring capabilities, if launched into the proper orbit, could technically be used to attempt to collide with another satellite, even if not optimized to do so.

Currently, States and commercial entities are developing on-orbit servicing satellites and active debris removal capabilities. On-orbit servicing satellites could allow for the extension of the life of satellites, and in the future may be able to repair and build satellites in orbit. Active debris removal systems may have the ability to de-orbit non-operational satellites, rocket bodies and other debris, thereby helping to preserve the outer space environment. Both on-orbit servicing and active debris removal satellites would require various mechanisms to grab or attach themselves to their target satellites. Some in-orbit demonstrations have included the use of a net, harpoon or magnet to accomplish this task. Robotic arms could also be used for this type of activity. This capability to grapple another satellite is inherently dual-use – such a capability could be used to repair or service another satellite, or to degrade or destroy another satellite.

Table 1 summarizes the various types and capabilities that could be used as anti-satellite weapons, the threat categories, and whether those capabilities could potentially provide beneficial, dual-use functions. It also sets out whether the capabilities could create effects considered to be reversible, non-reversible or both. The table is not meant as an exhaustive list, but as an example of how the threats, risks and challenges arising from these systems could be considered.

Table 1
Summary of anti-satellite weapons types or weaponizable capabilities

<i>Capabilities</i>	<i>Category</i>	<i>Dual-use</i>	<i>Damage type</i>
Kinetic anti-satellite	Space-space, ground-space	No	Non-reversible
Robotic arm anti-satellite	Space-space	Yes	Both
Radiofrequency interference	Space-space, ground-space	Yes	Reversible
Directed energy weapon low power anti-satellite	Space-space, ground-space	Yes	Reversible
Directed energy weapon high power anti-satellite	Space-space, space-ground, ground-space	No	Non-reversible
Nuclear weapon	Ground-space, ground-ground	No	Non-reversible
Orbital bombardment	Space-ground	No	Non-reversible
Command and control interference	Ground-space, ground-ground	Accidental/non-malign intent possible	Both
On-orbit servicer	Space-space	Yes	Both
Active debris removal	Space-space	Yes	Both
Malicious cyberactivity	All	No	Both

Distinguishing between the civil, commercial and/or national security uses of these systems – combined with the challenge of discerning the operators’ intent – makes it extremely difficult to craft a meaningful definition of what constitutes an “anti-satellite weapon”. The way these systems are operated will be an important consideration in whether States perceive a threat from them. If the pattern of life of a satellite, for example, is consistent with that of its stated intent, then there will likely be less concern about its operations. However, even if a system is operated in ways consistent with the typical pattern of life for its stated mission, operating in a relatively transparent manner, or limiting its proximity operations to those requesting support, then such a system might still be perceived as a threat.

2. **Categories of behaviours, efforts or measures that could be considered during further development and implementation of norms, rules and principles of responsible behaviours**

States must be committed to maintaining a peaceful and secure outer space environment. In this regard, the United States offers a selection of general points and factors that could be considered or evaluated during further discussions of norms, rules and principles regarding national security-related activities in outer space.

Compliance with international law. International law, including the law of armed conflict, applies to activities in outer space. In particular, the Charter of the United Nations; the Treaty on Principles Governing the Activities of States in the Exploration

and Use of Outer Space, including the Moon and Other Celestial Bodies (1967); the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968); the Convention on International Liability for Damage Caused by Space Objects (1972); and the Convention on Registration of Objects Launched into Outer Space (1976) provide the foundation of the international legal framework for outer space.

Development and implementation of transparency and confidence-building measures. The international community has recognized the importance and usefulness of transparency and confidence-building measures, which can significantly contribute to the promotion of peace, security and disarmament. According to the consensus report of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities (A/68/189), “States should implement [transparency and confidence-building] measures to the greatest extent practicable, consistent with their national interests and obligations”. Such measures can be developed and implemented by States and intergovernmental organizations unilaterally, bilaterally, regionally and multilaterally.

Enhancement/improvement of communications. Developing or improving communications between satellite operators, especially national security satellite operators, facilitates the efficient and timely sharing of information and consultation and coordination related to potentially urgent matters. Exchanging appropriate information about spacecraft operations in orbit may facilitate effective responses to orbital collisions, orbital break-ups and other events that may ultimately pose a risk to human lives, property and/or the environment. Such communications could contribute to risk reduction by helping to avoid misunderstandings and miscalculations.

Types and conduct of and actions relevant to space operations. Further work is needed by States with regard to elaborating best practices and responsible behaviours for security-related satellites and operations in peacetime. Key to this effort is the understanding of national security space actions or operations resulting in perceived threatening behaviour, apparent interference or attacks. The following is a non-exhaustive list of some space actions or operations that may warrant additional discussion.

- **Conduct of satellite operations.** The ways in which spacecraft interact with one another, including the degree to which their operations are transparent and predictable, affects the potential for misinterpretation and miscommunication. Unpredictable or non-transparent operations conducted in deliberate proximity to other spacecraft may be viewed as posing a safety risk or a threat, owing to the potential for collisions or other interference.
- **Radiofrequency interference.** Interference with radiofrequency transmissions of satellites by space-related information and communications technologies could disrupt services such as environmental monitoring, communications, and positioning, navigation and timing that support vital public safety functions. Moreover, the effects of jamming conducted against positioning, navigation and timing satellites is unlikely to be localized within the borders of the State conducting the interference. States already have certain existing obligations to avoid harmful radiofrequency interference under the provisions of relevant treaties such as the Constitution and Convention of the International Telecommunication Union (ITU) (1992), as amended, and the ITU Radio Regulations (1979), as amended. ITU has also further considered how ITU member States may contribute to these efforts with regard to space-based radiocommunication services through ITU resolution 186, entitled

“Strengthening the role of the ITU with regard to transparency and confidence-building measures in outer space activities”.

- **Interference with security-related space systems.** Security-related space systems can provide several important strategic functions: command and control of nuclear forces; strategic missile warning or attack assessment; and national technical means of verification. Each provides important early warning, intelligence and situational awareness of terrestrial and space activities that can contribute to preventing conflicts, avoiding misperception and misunderstandings and reducing tensions. Some of these capabilities, such as space-based national technical means, have underpinned the verification and credibility of the successful implementation of generations of arms control treaties. Actions that interfere with these systems either temporarily or permanently could undermine efforts to maintain international peace and security.
- **Interference with command and control.** Activities that compromise the ability of space operators to issue commands and maintain control of orbiting objects, for example, a satellite’s telemetry, tracking and control system, could result in the unrecoverable loss of control of another State’s spacecraft, and may constitute a hazard to the safety of space operations.
- **Weapons testing.** Tests or simulations of attack of anti-satellite weapons in the direction of, or in close proximity to, another State’s satellite could cause misperceptions and misunderstandings and increase tensions or lead to conflict between States.
- **Debris generation.** Failure to mitigate generation of space debris, especially long-lived space debris, during anti-satellite tests or other activities, would have a negative impact on the outer space environment and could negatively affect the ability of States to use space for peaceful purposes.

3. Norms, rules and principles of responsible behaviours with regard to outer space

Voluntary, non-legally binding norms, rules and principles of responsible State behaviour with regard to outer space can reduce risks to international peace, security and stability, including by playing an important role in increasing predictability, enhancing operational safety and reducing risks of misperceptions, thus contributing to the prevention of conflict. All stakeholders should use space systems in a manner that does not endanger international peace and security. The United States believes it is possible to reduce the risk of conflict in outer space by cooperating in the development and implementation of voluntary, non-legally binding norms of responsible State behaviour with regard to outer space that strengthen the stability and security of the outer space environment. The United States believes that States should examine and develop ideas for responsible behaviours that would maintain outer space as a safe, stable, secure and sustainable environment.

The United States believes there are advantages to focusing on voluntary, non-legally binding norms of responsible behaviour with regard to outer space, such as the ability to adapt quickly to changing circumstances or technologies, to allow new and novel uses of space to be explored and to allow civil and commercial operators to have more of a voice in their development. This does not mean that States should cease engaging on and discussing space security issues at the Conference on Disarmament or in other international forums. Taken progressively, these could be a first step to addressing mistrust arising from misunderstandings between States. As such, confidence-building measures and “norms, rules and principles” may lay the foundations for arrangements and agreements on outer space in the future.

In addition to the expectation that States will comply with their obligations under international law, the United States offers the following for consideration as a concise set of starting points towards developing more specific voluntary, non-legally binding “norms, rules and principles of responsible behaviour” for space operations, intended to complement the existing international legal framework pertaining to national security space activities:

- Reaffirm commitment to international law, including the Charter of the United Nations and relevant outer space treaties
- Communicate and make notifications to enhance the safety and stability of the outer space domain
- Operate national security spacecraft with due regard to others and in a professional manner
- Maintain safe separation and safe trajectory when operating national security spacecraft
- Limit the purposeful generation of long-lived debris

Table 2 summarizes how the concepts discussed in the present section can be applied to some of the areas for consideration in the section of the present submission entitled “Categories of behaviours, efforts or measures that could be considered during further development and implementation of norms, rules and principles of responsible behaviours”.

Table 2
Summary of concepts and areas for further consideration

<i>Starting point</i>	<i>Areas for further consideration</i>
Respect for international law	States could reaffirm their commitment to complying with their obligations under international law, including the Charter of the United Nations and existing treaties relating to outer space activities to which they are parties.
Respect for international law	States could encourage efforts to promote respect for the application of international law in outer space, including efforts to encourage accession to and implementation of relevant outer space treaties.
Respect for international law	States could promote information-sharing among States about State practice with regard to the implementation of international law in outer space.
Communicate and make notifications	States, along with intergovernmental organizations, could consider developing and implementing transparency and confidence-building measures unilaterally, bilaterally, regionally and multilaterally.
Communicate and make notifications	States could consider bilateral and multilateral exchanges of information on national security space activities and policies, or exchanges of information on national security space activities of specific concern.
Communicate and make notifications	States could consider developing best practices and responsible behaviours that enhance communications, especially with regard to national security satellite operators.
Communicate and make notifications	States could consider developing common definitions and understandings of operational terms and concepts.

<i>Starting point</i>	<i>Areas for further consideration</i>
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviours for the safe and professional operation of national security satellites, with due regard to avoiding potential collisions or other harmful interference.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviours that avoid using information and communications technologies in a manner that has a negative impact on space operations.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviours in order to avoid interference with security-related space systems.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviours that avoid purposeful interference with satellite command and control systems.
Maintain safe separation and safe trajectory	States could consider elaborating best practices or responsible behaviours that avoid simulating or testing anti-satellite weapons in the direction of, or in close proximity to, another State's satellite.
Limit the purposeful generation of long-lived debris	States could consider elaborating best practices or responsible behaviours for anti-satellite tests or other activities in order to avoid the purposeful creation of long-lived debris.

The United States reaffirms that the “norms, rules or principles of responsible behaviour” that are the subject of these discussions do not replace or alter States’ obligations or rights under international law, but rather provide additional specific considerations on what constitutes responsible State behaviour related to outer space.

In addition, regular dialogue is critical to enhancing the shared objectives of strengthening international peace and security and preventing conflicts in outer space. Regional, cross-regional and interorganizational exchanges can establish new avenues for collaboration, cooperation and mutual learning with regard to space threats and responses to those threats.

B. European Union

[3 May 2021]

The European Union and its member States welcome the adoption of General Assembly resolution [75/36](#) on reducing space threats through norms, rules and principles of responsible behaviours, which is a timely step to reduce threats and risks related to outer space.

The European Union and its member States consider the adoption of the resolution as a first step in a pragmatic and cooperative process, involving all United Nations Member States, aiming at “a common understanding of how best to act to reduce threats to space systems in order to maintain outer space as a peaceful, safe, stable and sustainable environment, free from an arms race and conflict, for the benefit of all”. The European Union and its member States entirely support this process as they entirely support the resolution.

The European Union and its member States have been historically engaged in concretely improving space security, and are strongly committed to the prevention of an arms race in outer space, which is essential for strengthening international security

and stability. They continue to promote the preservation of a safe, secure and sustainable space environment and the peaceful use of outer space on an equitable and mutually acceptable basis for all.

The European Union and its member States regard outer space as a global commons, to be used for the benefit of all. The European Union and its member States stress the importance of conducting space activities in accordance with international law, including the Charter of the United Nations. The 1967 Outer Space Treaty and other applicable international law, as well as guiding principles developed within the United Nations framework, constitute the cornerstone of the global governance of outer space. The European Union and its member States stress the importance of conducting space activities in accordance therewith.

At the same time, the space environment is becoming increasingly congested, contested and competitive. The dual-use nature of many space objects and systems poses challenges when it comes to protecting space assets and identifying threats, and distinguishing between innocuous behaviours and potentially threatening ones.

The European Union and its member States highlight the importance of the mutually reinforcing role of transparency and confidence-building measures in reducing the risks of misperception, miscalculation and unintended conflict escalation, and the need to advocate for responsible behaviour in outer space.

Furthermore, they stress the need to strengthen commitments to avoid irresponsible behaviours that could impair the secure and stable use of outer space.

Improving space security today is essential, as all States are increasingly reliant on space systems and services. Satellites and other space-based assets, their corresponding ground segments and their associated signals are vital to the functioning of today's societies and global economy and trade, as well as to progress on crucial global issues such as combating climate change and achieving the United Nations Sustainable Development Goals. The digital economy, the fourth industrial revolution, agriculture, transport (land, water and air), fishing, energy, finance, urban development, telecommunications, environmental monitoring, and the broad security chain, from civil protection to security and defence, are among the space-reliant sectors. These sectors and others are vulnerable should space assets be at risk. The economy, the security and the daily life of contemporary societies are vulnerable, both in spacefaring nations and, more broadly, in all countries that are increasingly using modern technologies.

Space assets are vulnerable in this increasingly contested space environment. In addition to the capabilities of its member States, the European Union owns two civil space constellations of satellites: the Galileo constellation and the Copernicus/Sentinel constellation, which provide space-based services for global use. The safety and security of its space assets, as well its ability to provide the related services to its population, is a core concern, as they constitute a major interest for the European Union.

Against this background, the European Union and its member States underline the need to better tackle the increasing risks and threats that arise from these developments, and result in challenges to our security.

It is therefore urgent and in the interest of all States to pragmatically and immediately improve space security. Given the dual-use nature of many space systems, the European Union and its member States believe that an approach based on behaviours, supported by relevant monitoring capabilities, is the most pragmatic way forward to improving space security today, as it will help reduce the risks of misunderstanding, misperception and miscalculation, and it will therefore help decrease the risk of conflicts and escalation in outer space. This kind of approach may

be more long-lasting, as it may address the risk that the development of technologies overtakes any eventual agreements.

The process launched with General Assembly resolution [75/36](#) might help create the momentum for more ambitious steps, which do not exclude the possibility of a new legally binding instrument in the future.

Nowadays, the number of threats to space systems has increased. The most visible of them are kinetic anti-satellite tests. Be they ground-based or co-orbital, their effects are the destruction of the targeted satellite as well as the collateral generation of space debris, which is potentially long-lived. Increased debris levels risk a cascading process that could render orbits unusable for human activities for the generations to come and jeopardize access to space. The more objects in orbit, the higher the risk of accidents and collisions. With each collision, the population of long-lived space debris increases, thereby increasing the odds of further collisions.

Apart from the possible effects of kinetic anti-satellite activities, the conduct of such tests may lead States to perceive a risk to their space assets, and as such the conduct of those tests could be irresponsible or threatening, as it increases the risk of miscalculation and unintended escalation. These activities are dangerous and highly destabilizing. They may lead to deteriorating confidence between space actors and increases in the perception of threats, and could lead to an escalation of violence owing to their potential catastrophic consequences.

The European Union and its member States urge all States to refrain from the irresponsible behaviour of destroying space objects in a way that generates space debris, especially multiple items of long-lived debris.

Non-kinetic threats (such as cyberattacks, jamming and other electromagnetic interference or direct energy weapons) can affect the use of space assets as well, and impair services of the targeted satellite for its users; they can also target ground stations. Some of these activities can be carried out from the ground, whereas others can be carried out from space. They can be very difficult to attribute. However, these activities may be considered by the European Union as constituting irresponsible behaviour when they jeopardize the security of people and goods, whether on Earth or in space.

Technologies allowing in-orbit rendezvous operations and proximity/docking operations can be used for activities such as active debris removal or on-orbit servicing. Rendezvous operations and proximity operations may, however, also be perceived as a threat and be (mis)understood as hostile actions, since they can also be used to disrupt the operations of other satellites or destroy or de-orbit them, and a State may not know the intention associated with the manoeuvre.

If these operations are not performed with sufficient transparency, they could be considered irresponsible or threatening, as they could increase the risk of miscalculation and unintended escalation. The European Union and its member States consider that conducting or knowingly supporting rendezvous operations that affect another State without the consent of that State constitutes irresponsible behaviour. Agreement on norms, rules and principles of responsible behaviour regarding these operations, and especially rendezvous operations, is therefore crucial.

Norms, rules and principles of responsible behaviours should be considered across the full range of space activities in order to promote security, safety and sustainability in outer space. On the safety and sustainability side, the European Union and its member States welcome the progress achieved in the Committee on the Peaceful Uses of Outer Space with the adoption of the Guidelines for the Long-term Sustainability of Outer Space Activities and future related work.

It is also essential to make progress on the security side. Without excluding the possibility of a legally binding instrument in the future, the European Union and its member States believe that voluntary measures constitute a pragmatic way forward at the moment, starting with norms, rules and principles of responsible behaviours, through an incremental and inclusive process initiated by resolution 75/36. This process could start with norms against the deliberate creation of space debris, in particular multiple items of long-lived debris, norms on rendezvous operations and norms on close-proximity orbital operations.

The European Union and its member States emphasize that any future legally binding framework with regard to the scope of space security should be effective, should be verifiable and should cover all relevant threats, be they Earth-to-space, space-to-space, or space-to-Earth.

Finally, the European Union and its member States also emphasize the importance of transparency and confidence-building measures in reducing the risks of misperception, miscalculation and unwanted escalation. They are a key instrument to further strengthen the current normative framework. In this regard, the European Union and its member States believe that publishing and sharing information about space doctrines, policies and strategies is responsible and would help create confidence between actors. Sharing information on space launch vehicle programmes, including pre-launch notifications, is already established practice under the Hague Code of Conduct against Ballistic Missile Proliferation. The European Union and its member States encourage all States to subscribe to the Hague Code of Conduct. In addition, the European Union and its member States believe that increasing cooperation between States regarding their space surveillance and tracking and their space situational awareness services would also be helpful.

The European Union and its member States consider it important to jointly pursue and intensify efforts to address challenges in outer space, with the involvement of all United Nations Member States. The European Union and its member States therefore continue to be fully committed to engaging constructively in discussions on this initiative.
