



General Assembly

Distr.: General
Original:
Arabic/Chinese/English/French/
Russian/Spanish

ADVANCE UNEDITED VERSION

Seventy-sixth session

Item 99 (d) of the preliminary list*

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

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

Report of the Secretary-General

Summary

The present report presents a consolidated summary of elements from the submissions received from Member States pursuant to resolution 75/36 without prejudice to their individual positions. It addresses: existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth; 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 these views, to the General 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 this report. Views received subsequently have been posted on the website of the Office for Disarmament Affairs in the original language received. Replies received from other entities and non-governmental organizations have also been posted to the same 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 multistakeholder dialogue on the issues identified in resolution 75/36.

4. Sections II through V of this report present a consolidated summary of elements from the submissions received from Member States without prejudice to their individual positions. Section VI includes conclusions and observations by 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 as well as the number of objects in orbit. It has been noted that as more space objects are launched, the number of operational and satellites and debris will grow, increasing the risk of a collision in space. Many space objects are regarded as potentially dual use, raising new concerns for ensuring the security of space systems and efforts for the prevention of an arms race in outer space.

6. Space-based capabilities are seen 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 as well as in telecommunications, and in supporting science and access to education. Accordingly, many States regard outer space as a global commons. Given this growing dependence, the loss of access to these services would 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, communication, command and control, maritime surveillance, border monitoring, search and rescue, disaster relief, early warning of missile launches and verification of arms control agreements. A particular emphasis is placed on the connection between space systems and nuclear weapons, including as elaborated further in this report. It is observed that this 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 comprised of three components: (i) the space segment, including satellites and launch vehicles; (ii) the ground segment, including space monitoring systems, command and control as well as data storage, processing and distribution; and (iii) 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 can disrupt, damage, disable or destroy space systems and include solar storms and related space weather phenomena, geomagnetic storms and micrometeoroids. Such hazards can affect all components of space systems. 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 risks of collisions. The lack of effective communications between space systems and the presence of space objects that are non-functional or incapable of manoeuvring contribute to this risk. It is also observed that the impact of this risk could disproportionately affect States with new space programmes. In addition, 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: ground-to-space, space-to-space, ground-to-ground and space-to-ground. A distinction is also made between threats and security risks with reversible and irreversible effects. Reversible effects are temporary and can include interference with radiofrequency signals or the dazzling of remote sensing systems. Irreversible effects involve damage or destruction of space systems.

12. Many States express concern about space debris as the most significant threats to the space environment. Increasing debris poses a collision risk to space objects. Objects as small as one centimetre in diameter can damage the functions of an active satellite. Objects between one and ten centimetres 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 these 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 as threatening military doctrines that provide for the weaponization of outer space. Another example of national laws and policies that were described as threatening included declaring outer space as a warfighting 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 provide 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 and 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 of 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 are capable of targeting 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 which could negatively impact 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 de-orbit 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 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 radiofrequency 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, or destroy computer systems. These can target satellite command and data distribution networks, ground infrastructure, users and data links. Effects can include disrupting data or sending unauthorized commands to potentially take over operational control of a satellite or its payload. 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 also could be used 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 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.

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 Registration Convention can complicate attempt 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 centers, 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 increase the predictability and general transparency of space operations and therefore reduce 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 maneuverers and of rendezvous and proximity operations, including in order to coordinate operations, 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 undertake 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 on the exploitation of resources; and
- (l) Supporting negotiations for legally binding measures on 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) The testing or simulation of anti-satellite weapons and the testing of direct ascent anti-satellite weapons in particular.
 - (ii) The use of anti-satellite capabilities, launched from the ground or from space, to physically damage or destroy a satellite or result 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) The development of counterspace capabilities, including direct ascent or co-orbital weapons.
 - (ii) The placement of weapons in outer space.
 - (iii) The 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 maneuvers 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 sub-satellites or the ejection of projectile-like fragments in the immediate vicinity of or pointing at satellites of another State.
 - (vii) Failing to de-orbit 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 on 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 for misunderstanding and miscalculation in outer space; 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 carried out without sufficient transparency or prior communication, without consent, 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 or placing unpermitted technology in orbit, as addressed in the Liability Convention and the Registration Convention.
 - (iv) Use of low-cost and low-resilient components on spacecraft, in particular propulsion, power supply, attitude control and on-board data handling subsystems, or insufficient cyber resilience 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 Technical and Scientific 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. Its recommendations are described as a foundation which should be re-examined, made better use of and implemented. It is noted that the group agreed to 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 reducing the risk of unintended escalation. It is noted 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 them. That would reduce the risk of a State misinterpreting an activity as nefarious in cases when 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 behaviors 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 such any new 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, 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 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, inter alia, that the concept of responsible behavior is a vague and unclear and that it would be difficult to define in light of the fast development of technology, this approach could divide the international community into space-faring and non-space-faring nations, 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, inter alia, that it would not be effective, it does not address 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 most effective, practically implementable, actually functioning and gaining more and more supporters initiative, which makes the development of space-based strike systems inexpedient. It is further argued that the annual resolutions adopted by the General Assembly on this initiative enjoys wide support.

28. An argument is also made against the annual resolution in the First Committee on this matter, as it fails to define what a weapon is for this purpose, that there is a risk of increasing mistrust or misunderstanding without such a definition and that States are only encouraged to 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 impacted State.
- (c) Remaining focused on the fundamental goal of preventing an arms race in outer space.
- (d) Subjecting to stringent scrutiny State behaviours that entail consequences for security or that endanger the lives of people.
- (e) Identification of key risky behaviours, which if left unchecked, could lead to the gravest threats to the use of outer space.
- (f) Creating an ability for an impacted 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 feeds 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) Avoid 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 the related international exchange and cooperation.
- (l) Fulfilling the needs of developing countries for the peaceful uses of outer space.
- (m) Consideration of the development of innovative solutions for space sustainability by the private sector.
- (n) Taking into account the legitimate concerns about possible restraints on civil activities.
- (o) Underscoring that 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.
- (p) Incorporating lessons learned or best practices from the work achieved in other forums and in other fields, such as maritime or cyber.

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 behavior. It is noted that a number of these elements reflect or further elaborate measures that have been addressed by various bodies, including, inter alia, 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

Telecommunications Union, the United Nations 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 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 Partial Test Ban Treaty, the Liability Convention, the Environmental Modification Conventions and the Declaration of legal principles governing 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 on the long-term sustainability of outer space and the space debris mitigation guidelines.

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

- (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 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 which would be contrary to its obligations under international law.

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

- (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 defense system, particularly the deployment of missile interceptors in space.
34. In relation to information and communication technologies, possible elements include:
- (a) Recognize the harmful and destabilising consequences of malicious cyber activities targeting space objects and especially their related ground networks.
 - (b) Reaffirm that international law applies in cyberspace.
 - (c) Elaborate best practices or responsible behaviors that avoid using information and communication technologies in a manner that impacts space operations.
 - (d) Encourage responsible reporting of vulnerabilities and the sharing and publicizing 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:
- (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 or best practice for rendezvous and proximity operations, including to prevent misinterpretation and miscalculation, possible elements include:
- (a) Carry out such operations in an open and transparent manner, including by requiring prior consent prior to approaching the satellite of another State.
 - (b) Establish clear communication and information exchange protocols, including through an international system for such operation, and a 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:
- (a) Refrain from testing for 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 behaviors for the safe and professional operation of national security satellites, with due regard in order to avoid potential collisions or other harmful interference.

38. Further elaborate, strengthen, agree and implement transparency and confidence-building measures in outer space activities, including possible elements in the following areas:

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 their 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 to provide timely information to the United Nations Register of Objects Launched into Outer Space.

Risk reduction notifications

- (g) Notifications on: scheduled manoeuvres, including those that could result in risk to the flight safety of another State's space objects; predicted conjunctions; intentional orbital breakups; uncontrolled high risk re-entries; emergency situations; active debris removal operations; or on any potentially dangerous operation.

Policy and operational communication channels and consultative mechanisms

- (h) Establish national points of contact for 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 of national points of contact for 24/7 operational communications, in order to contact or relay information for the coordination and de-confliction of spacecraft manoeuvres and frequency usage.
- (j) Further elaborate consultation mechanisms, building on Article IX of the Outer Space Treaty, including to build understanding on what constitute harmful interference from a security perspective, including kinetic and non-kinetic harmful interference which may not necessarily destroy but degrade, disrupt and damage space systems.
- (k) Establish an international exchange platform tasked with de-confliction 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 objects launches; and demonstrations of space technologies.

39. To further develop space situational awareness, possible elements include:
- (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 on the basis of reliable and comprehensive space situational awareness can contribute to compliance with norms of responsible behaviours.
40. With respect to other measures, possible elements include:
- (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 behaviour.

Process for reducing space threats through developing 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 to discuss 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 suggestion for a mandate could be to elaborate a set of principles, norms and rules for the responsible State behaviour in space, which, in the long run, may constitute the normative basis for eventual negotiations of 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 emphasize that multiple stakeholders should be engaged and that their views should be 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 by 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 geo-political rivalries are being reproduced in earth orbit and beyond. This is increasing the risk that armed conflict could be extended one day into or even be initiated in outer space. These trends are being accompanied by a growing capacity by 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 by 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 to coordinate, as appropriate, in this regard. **It is recommended that Member States study the ideas contained within this report and decide on an inclusive process to take these issues forward at the seventy-sixth session of the General Assembly.**

Annex

I. Replies received from Governments

Australia¹

[Original: English]
[3 May 2021]

Australia welcomes the opportunity to present its submission to the report of the Secretary-General on Resolution 75/36 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. Development and implementation of norms, rules and principles of responsible behaviours to strengthen international security in relation to space would also facilitate certainty and stability necessary to encourage investment in and growth of the commercial space sector.

In furtherance of the goals of 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

1. Recognising that international law, including the United Nations Charter, applies to the exploration and use of outer space and that all states should behave consistently with their international obligations when carrying out activities in the exploration and use of outer space.
2. Sign and comply with obligations under the outer space treaties.
3. Commit not to undertake activities that deliberately or foreseeably create long-lived debris fields.
4. 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

5. Agree rules on rendezvous and proximity operations to ensure that all relevant parties understand the parameters and objectives of those operations.
6. Establish notification, communication and information exchange protocols for when satellites are operating in proximity to each other.
7. Establish shared understandings and practical implementation expectations concerning the concepts, including ‘due regard’, ‘harmful contamination’, and

¹ This is the summary provided by Australia. The full version is available at <https://front.un-arm.org/wp-content/uploads/2021/05/Australian-Submission-to-the-report-on-Resolution-75-36-final.pdf>

‘harmful interference’ articulated in the Outer Space Treaty and act in accordance.

Transparency and confidence building principles

8. Implement the conclusions of the 2013 Group of Governmental Experts report on Transparency and Confidence Building Measures (TBCMs).
9. Agree explicit TCBMs, including in priority risk minimisation areas relating to information exchange, risk reduction notifications, and coordination and consultation mechanisms.

Principles for Further Progress

10. 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

[Original: English]
[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 of Brazil's utmost interest that space remains peaceful, stable, safe and accessible to all nations. In this sense, the country is part 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 (1967 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 Disarmament Conference (CD), the I Committee of the United Nations General Assembly (UNGA) and the Committee for the Peaceful Uses of Outer Space (COPUOS) have been guided by the country's support for the applicability of the UN Charter 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, as well as 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 UN Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space, which issued a benchmark report on the topic (A / 68/189), as well as the Brazilian chairship of the successful 62nd session of COPUOS, in which the 21 Guidelines for the Long-term Sustainability of Outer Space Activities (LTS Guidelines) 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 (PAROS) and to Non-First Placement of Weapons in Outer Space (NFP), having voted in favor of the resolutions on these topics, which are adopted annually by the 1st Committee UNGA.

With regard to the normative evolution of this subject, in recent years, Brazil has consistently supported the commencement of negotiations of a legally binding instrument that would complement and expand the obligations established by the 1967 Outer Space Treaty. This position has borne out of the increasing number of actors (States or private sector) with the capacity to and 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 of Outer Space being converted into a conflict arena, especially due to the development of offensive space capabilities, including cyber capabilities, by several States.

Today, satellites have become essential components of almost all types of critical infrastructure on Earth, and the functioning of essential services for societies and economies in all countries depends largely on them. Any conflict in space, even if of a limited scope, would bring about risks for the sustainable use of Earth's orbits for peaceful purposes. Against 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, the discussion on modalities of negotiations of legally binding commitments on PAROS has been facing recurring stalemates. The most recent Group of Governmental Experts (GGE) on the topic, concluded in 2019 and chaired by Brazil, was unable to reach a consensus report on the basic elements that should guide the negotiations of a new treaty on the matter. At the CD, likewise, discussions on PAROS have been paralyzed 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 favor of resolution A / RES / 75/36, entitled “Reducing space threats through norms, rules, and principles of responsible behaviors”.

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

In this sense, Brazil's position on the subject is structured according to the following topics: i) existing and potential threats to space systems; ii) responsible, irresponsible, and threatening behaviors in Outer Space iii) way forward to the development of norms, rules and principles.

1. 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 technological development, which normally has dual nature, can lead to excessive militarization of Outer Space and to the increase in the potential for 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 that include preparations for the placement of objects in orbit; the use of objects during their life cycle; and actions that enable 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 Objects Launched in Outer Space, is one of them. This procedure allows ample communication about the national elements that are in the Earth's orbit and, in turn, has a fundamental value for the construction of a database that contributes to Spatial Situational Awareness (SSA). The registration of all satellites allows one to know the position and purpose of the objects, mitigating doubts or problems of interpretation about them. Consequently, the absence of information and the use of spatial objects with low-visibility characteristics (or with "stealth" technology) can raise questions about the purpose and application of some spatial objects, increasing the feeling of insecurity in the space environment and subverting States' commitment to transparency in their space activities.

In the operational side, conducting maneuvers or proximity operations without previous warning has also been considered as a potential threat. Some rendezvous activities among satellites in space have been observed and this fact 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 behavior has been considered inappropriate or even threatening, under the allegation 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, cyber operations against space capabilities (in orbit or on land) poses a threat to critical infrastructures both for military and civilian purposes.

Last but not least, the development and proliferation of new anti-satellite (ASAT) weapon systems, either terrestrial or co-orbital, are also threatening activities for 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 due to the damage it might cause to the sustainability of Outer Space and to international security.

2. Responsible, irresponsible and threatening behavior in Outer Space

Brazil, as already mentioned, is fully committed to the confidence-building and transparency measures (TCBMs) established by the 2013 GGE Report (A / 68/189). Brazil also favors the discussion on 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 deals 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 (SSA) are measures consensually recognized as responsible, in line with the report of the 2013 GGE, endorsed by AGNU by consensus, through resolution A / RES / 68/50.

In this sense, it follows a non-exhaustive list of **behaviors considered as responsible** by Brazil:

- Registering satellite objects, as recommended by the Registration Convention;
- Prior or timely communicating maneuvers with space objects, aimed at avoiding damage or interference to space devices in 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, reducing the amount of space debris;
- Sharing information on the monitoring of objects in space, in order to feed international databases and to enable broad spatial 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 (ASAT weapons);
- Observing the principles and precepts of the Outer Space Treaty, the Astronaut Agreement, the Liability Convention and in the Registration Convention;
- Observing the 21 guidelines on Long-term Sustainability of Outer Space Activities (LTS Guidelines) established by COPUOS and adopted by consensus by the UNGA.

The lack of transparent behavior 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 perception, the following behaviors can be considered as **irresponsible**:

- Conducting tests of satellite destruction capabilities (use of anti-satellite weapons);
- Performing electronic attacks (jamming and spoofing) or cyberattacks on space systems;
- Refraining from carrying out anti-collision maneuvers between satellites or not communicating to other States about 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 in disagreement with the guidelines and principles recommended by the Technical and Scientific Subcommittee of COPUOS.

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

3. Way forward to the development of norms, rules and principles

Brazil supports furthering and deepening of discussions on security in Outer Space in all appropriate multilateral fora (CD, UNGA 1st and 4th Committee and COPUOS).

Given the need for advancing the systematization of norms, rules and principles that serve as a basis for guiding State behaviour in Outer Space, which may serve as the starting point for a negotiating process for legally binding rules in the future, Brazil supports the establishment of mechanisms of dialogue, within the scope of the UN, aimed at this purpose.

Among the possibilities to be considered by States, Brazil favours the establishment, through a resolution of the UNGA, of an Open-Ended Working Group (OEWG) with a mandate to elaborate a set of principles, norms and rules for the responsible State behaviour in space, which, in the long run, may constitute the normative basis for eventual negotiations of a legally binding instrument on the matter.

Canada

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

This submission provides Canada's views on UN GA A/RES/75/36 Resolution "Reducing Space Threats through norms, rules and principles of Responsible Behaviour." This submission responds to a note verbale from the Office for Disarmament Affairs (ODA/2021-00005/Outer space), pursuant to OP5 and 6 of the above-mentioned resolution, requesting the Secretary-General to seek views of Member States.

The 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, 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 for 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 *International Charter on Space and Major Disasters*, are key to the monitoring 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 man-made threats is made more complex by the rapid expansion of both 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 this submission, Canada defines space systems (civilian or military) as:

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

Differentiating Between Space Security and Space Sustainability/Safety

Importantly, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) 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, frequency interference). For Canada, this work is distinct from the space security issues addressed in this 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 to illustrate 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 an ASAT 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 COPUOS.

Threats/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 what actions can be destabilising 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 the exchange of information in a timely manner to the appropriate audience in order to reduce adverse impacts to space operations or to 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 to 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 space-faring 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/Security Risks and Responsible Behaviours

The following are some initial ideas from a Canadian perspective on potential threats, irresponsible and responsible behaviours to help advance discussion on norms and responsible behaviours.

Damage to space environment or space system: 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 manmade object of any size or composition in space i.e. a satellite is one piece of debris upon ceasing to perform its designed functions. Behaviours that purposefully or by negligence lead to 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 to not undertake development, testing and use of ASAT capabilities which can cause widespread debris. Indeed, Canada supports discussions, in the context of the Conference on Disarmament, on a possible ban on testing and use of ASATs which cause space debris.

In addition, actions/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.

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, communication, or a general malfunctioning of space systems. Responsible behaviour would be refraining from deliberately causing non-consensual interference, such as outlined above, to space systems.

Rendezvous / Proximity Operations: The conduct of non-cooperative Rendezvous and Proximity Operations (RPO) 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 RPO to prevent misinterpretation and miscalculation. Responsible behaviour could include notification of RPO 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 maneuver. To reduce the potential for a peaceful-use system to be mistaken for a weapon, a responsible behaviour could require States to publish the mission plan of all civil on-orbit servicing missions.

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. For example, 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 of Possible Next Steps, Further Development of Norms

Reinforce 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 among others, the four core treaties, especially the Outer Space Treaty (OST), 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 (LTS) and the Space Debris Mitigation Guidelines, should remain a key priority in developing norms.

Pursue Transparency and Confidence-Building Measures (TCBMs) 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, registration of space objects with the UN, and advance notification of launches in accordance with The Hague Code of Conduct are all TCBMs. 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 – including 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 done by the 2013 Group Governmental Experts (GGE) on TCBMs.

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 (SDA) and Space Surveillance and Tracking (SST) 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.

Building on existing expertise: Canada suggests looking at what lessons could be taken from the work achieved in other fora (e.g. COPUOS) to develop protocols such as the Space Debris Mitigation Guidelines and LTS Guidelines or the work by the Inter-Agency Space Debris Coordination Committee (IADC). There may also be value in examining the development of norms and principles of responsible behaviour in other fields such as maritime or cyber for the development of such norms for space.

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 space faring 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.

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 eventual comprehensive, verifiable and legally-binding regime. Canada is open to considering a variety of next steps / recommendations in the Secretary General's report.

Canada will continue to work to advocate for the development of international norms of responsible behavior 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, 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. The space utilization and exploration as well as space technology advancement and its extensive application have brought not only benefits to 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 in related international agenda. The discussions on *responsible behaviors* in outer space could 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 use such discussions as a tool for certain countries to shirk its own responsibility and pin the blame on others. All relevant discussions on *responsible behaviors* in outer space should adhere to multilateralism and avoid being politicized, discriminatory and 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 aspects:

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

Secondly, preventing 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 UN should re-establish the Group of Governmental Experts (GGE) or establish an Open-Ended Working Group (OEWG) on Prevention of an Arms Race in Outer Space (PAROS), under which *responsible behaviors* in outer space could be included as one of the agenda items.

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

Fourthly, 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 on the peaceful uses of outer space should be respected and ensured and related international exchange and cooperation enhanced.

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

I. Overview on outer space security situation

In general, space security and space safety are two different dimensions of outer space issue. Space security refers to the risks of 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 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, 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 could not prevent an arms race in outer space and safeguard peace in outer space, neither security nor safety could be possible.

Above all, the weaponization of and an arms race in outer space becomes more prominent and pressing. The root cause is that certain country sticks to the Cold-War mentality, pursues unilateral military and strategic superiority in space, and increase its attempts, plans and actions to seek dominance in space. It is evident in three aspects:

Firstly, outer space has been increasingly regarded as a new battlefield. The US publicly declares outer space as a new war-fighting domain, establishes an independent Space Force and Space Command, and accelerates the building up of combat system in outer space, in a bid to get ready for a space war. The UK just announced to establish its new Space Command and a military force with space combat capability, and plans to invest tremendously on R&D of space weapons including directed energy weapons. The NATO for the first time defines 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.

Secondly, the vulnerability of outer space security is rising. The development of anti-satellite weapons, missile defense systems and long-rang precision attack weapons has posed challenges to traditional strategic balance and stability. The US was the first country to conduct the anti-satellite weapon tests, and with the most tests

conducted, it created the largest amount of space debris. In its 2019 *Missile Defense Review*, the US stressed the importance of space in missile defense 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 US has been upgrading its space tests, including 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 upgraded Counter Communication System (CCS) systems 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 outer space assets of other countries.

Thirdly, 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 US *National Space Strategy* and the UK *The Integrated Review of Security, Defense, Development and Foreign Policy*. In terms of actions, the US conducted rendezvous proximity operations or fly-overs that endanger other countries' satellites on orbit, tested offensive and defensive space capabilities, and interfered with normal space operations by 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.

II. Comments on *Responsible Behaviors* in outer space

Outer space security issue is very complex. The binary distinction between responsible and irresponsible behaviors 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 our understanding on *responsible behaviors* in outer space, with a view to promoting mutual understanding, seeking to broaden consensus and contributing to the international efforts for preventing an arm race in outer space.

1. *Responsible behaviors* in outer space should observe the following principles:

Firstly, 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 for absolute superiority, absolute freedom and unilateral security in outer space, the strategy and policy pursuing dominance in space, and the approaches that stressing the security of one single country or a small groups of country by undermining the security interests of other countries or even common security of the international community. All countries should not cross the red line of conflict or war in outer space. All parties should enhance understanding and mutual trust through dialogues and avoid confrontation and miscalculation. The countries with the greatest space capabilities bear a special responsibility in this aspect.

Secondly, respecting and abiding by basic principles set out in existing international law. All countries should ensure that its space behaviors are in line with international law and principles governing international relations, which are the basic norms of *responsible behaviors*. All countries should follow the purposes and principles of the *Charter of the United Nations*, abiding by the *Outer Space Treaty (1967)*, the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, *Convention on International Liability for Damage Caused by Space Objects* and *Convention on Registration of Objects Launched into outer space*, and fulfill the obligations of the international law in good faith.

Thirdly, 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 UN should establish a second GGE or an OEWG on PAROS, under which *responsible behaviors* in outer space could be taken as one of the agenda items. While the Conference on Disarmament is yet to reach an agreement on its Programme of Work and starts negotiation, a technical expert group could be established to discuss technical issues such as definition, scope and verification of a future legal instrument on outer space arms control. The TCBMs could play a positive role in this regard, but they should not replace the negotiation of a treaty on outer space arms control.

Fourthly, a balance should be struck between outer space security and peaceful use of outer space. The equal rights of all countries on the peaceful uses of outer space, particularly the interest of developing countries and emerging space-faring 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 peaceful use of outer space as a strong drive of economic and social development of all. Ideological bias, double standards and unilateral sanctions should be abandoned, political divides and technical barriers should be removed, and abuses of such pretext as security threats to hamper the peaceful use of outer space should be avoided.

Fifthly, upholding multilateralism and seeking comprehensive and coordinated solutions. We should support the UN playing a central role as the main platform for outer space governance, and ensure the extensive participation, justice and inclusiveness in related international rule-making, build widest possible international consensus, and avoid imposing the wills of some countries on others. Relevant UN agencies have own mandates and focuses, therefore in the coordinating and cooperating needed, efforts should be made to avoid excessive overlapping and confusion. The CD should play a primary role in preventing an arms race in outer space. Other multilateral platforms such as the First Committee, the Fourth Committee of the UNGA, UNCOPUOS and Disarmament Commission could facilitate relevant discussions within their mandates.

2. In terms of specific actions, China calls upon all countries to take the following actions:

First, supporting the negotiation of a treaty on space arms control. All countries should support the prevention of the placement of weapons in outer space, the threat or use of force in 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 of behaving responsibly.

Second, suspension of confrontation and interference actions in outer space. For example, suspension of unrestrained research and development and deployment of missile defense system, particularly the deployment of missile interceptors in space; suspension of rendezvous proximity operations and space-based tests of technologies that endangers 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 of space arms control. These measures include but not limited to: no first placement of weapons in outer space; space security dialogue and exchanges on national space strategies, policies and intentions; cooperation in space debris mitigation, space objects collision avoidance, space launching notification and space facility visits, seeking to reach bilateral or multilateral arrangements, etc.

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

III. China's policies and practices in maintaining outer space security

China has consistently advocated the peaceful uses of outer space and firmly opposed to 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 aspects:

First, China has actively promoted the negotiation of an arms control treaty on outer space. China and Russia jointly submitted to the CD a *Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, 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 negotiation. Since 2007, China has co-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* at the First Committee of the UN General Assembly. As proposed by China, Russia and some other countries, the UN established the GGE on PAROS in 2017, and held two sessions in August 2018 and March 2019 respectively and open consultations in January 2019. Although the GGE failed to adopt a substantive report due to the blockade by the US, 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 GGE on TCBMs in outer space, made a number of constructive suggestions and supported all parties in actively studying and implementing the report by the GGE in 2013 on a voluntary basis. China released the white paper entitled *China's Space Activities* four times in 2000, 2006, 2011, 2016 respectively and released the 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 the permit approval of launch projects and 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 in 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 21 Guidelines of the *Long-term Sustainability of Outer Space Activities*. China has also actively participated in the cooperation under multilateral fora including the Inter-Agency Space Debris Coordination Committee, IWAN, SMPAG and others, and conducted regular exchange with relevant countries on space debris, satellite collision warning, etc. To integrate with international standards, the Chinese Government has issued *Space Debris Mitigation Requirements*

and other standards. China has offered to employ passivation measures commonly on the upper stage of carrier rockets, which contributed to zero growth of the total number of space debris created by China. China has also proactively carried out off-track operation for end-of-life spacecrafts disposal or transferring to the 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 MoUs 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 of foreign officials and aerospace experts to its launch centers. China has actively conducted international cooperation within the framework of the UN, Asia-Pacific Space Cooperation Organization and BRICS. China has published space application cooperation programs on its Space Station for all countries, in cooperation with the UN. In the first round, 9 projects from 17 countries has been selected to participate in the scientific experiments of China's space station, and a second round of selection will be published in due time.

Conclusion

Space war can not be won and must never be fought. The history of 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 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 actively seek practical and effective solutions against space security threats so as to safeguard the common security of the humankind, in a bid to contribute to the peace, security and sustainability of outer space.

China kindly requests Mr. Secretary-General to take into account of China's views in his substantive report pursuant to paragraphs 5 and 6 of the UNGA resolution 75/36 of 7 December 2020 as well as to include this document as an annex to his report.

Egypt

[Original: Arabic]

[28 April 2021]

أولاً: أبرز التهديدات والمخاطر الحالية والمحتملة والتهديدات الأمنية على الأنظمة الفضائية

1- التهديدات على الشق الفضائي للأنظمة الفضائية:

(1) أنواع تهديدات الشق الفضائي:

- أعمال التدمير الكامل للأجسام الفضائية
- التفجيت المتعمد للأجسام الفضائية
- استخدام أسلحة الطاقة الموجهة لتدمير الأجهزة الإلكترونية للأجسام الفضائية.

(2) أسباب تهديدات الشق الفضائي:

- يعتبر تسليح الفضاء وسباق التسلح به في الوقت الحالي من أخطر مصادر تهديدات النظم الفضائية، عن طريق تدميرها أو تفتيتها، فلم يعد سباق التسلح أمراً حصرياً على الدول المتقدمة تكنولوجياً فحسب، بل تلقى إشكالياته بظلالها على الدول الصاعدة في مجال ارتياد الفضاء. كما تجدر الإشارة في هذا الخصوص إلى أن اتجاهات تسليح الفضاء الخارجي من قبل الدول الكبرى، تجعل استخدام هذا التسليح أحد أدوات إدارة الصراعات المسلحة بين الدول، وهو الأمر الذي يهدد الأمن والسلم الدوليين.

- تشكل ظاهرة الحطام المداري خطراً على السلامة المادية للشق الفضائي، حيث أن تزايد الأجسام والشظايا الحطامية قد يؤدي إلى وقوع أضرار محتملة سواء بتدمير الأجسام الفضائية أو تعطيلها الكلي أو الجزئي نتيجة اصطدامها بالحطام الفضائي.
- قد يعرض عدم انضباط حركة المرور في الفضاء الأجسام الفضائية للاصطدام ببعضها البعض، حيث يتسم الفضاء الخارجي بغياب أية آليات أو أجهزة مركزية لتنظيم حركة مرور الأجسام في الفضاء (على غرار الاتحاد الدولي للاتصالات الذي ينظم الإشارات اللاسلكية وتردداتها بالشكل الذي يمنع تعارضها)، كما أن الوثائق العلنية الحالية المتاحة لا تعتبر دقيقة من أجل ضمان التحكم الفعال في حركة مرور الأجسام في الفضاء، مما يمثل عائقاً وتهديداً أساسياً أما قدرة الدول المنظمة حديثاً لنادى الفضاء على تحديد المدارات المناسبة لإطلاق أقمارها المستخدمة في أغراض التنمية وغيرها من الأغراض السلمية.
- قد يؤدي استخدام مصادر الطاقة النووية في بعض الأجسام الفضائية إلى الإضرار بأجسام أخرى القريبة منها حال حدوث تلف أو تسرب إشعاعي في الفضاء.

2- التهديدات على الشق الأرضي للأنظمة الفضائية

(1) أنواع تهديدات الشق الأرضي:

- أعمال تخريب أو تدمير محطات الاستقبال الأرضية
- استخدام أسلحة الطاقة لإتلاف المعدات الأرضية الفضائية
- الهجمات الإلكترونية على البيانات في المحطات الأرضية

(2) أسباب تهديدات الشق الأرضي:

- الأعمال الإرهابية التي تستهدف الشق الأرضي من الأنظمة الفضائية.
- عدم قدرة بعض الدول على تطوير قدرات فضائية، فتسعى إلى التحصل على معلومات الأنظمة الفضائية بشكل غير شرعي عن طريق سرقة البيانات في المحطات الأرضية أو اختراق قواعد البيانات المرتبطة بها.

3- التهديدات على قنوات الاتصال بين الشق الفضائي والأرضي

(1) أنواع تهديدات قنوات الاتصال:

- أعمال التنصت
- أعمال الإعاقة والتشويش
- التداخل في الترددات بين الأقمار الصناعية المتقاربة

(2) أسباب تهديدات قنوات الاتصال:

- سعي بعض الدول للإضرار بالمنظومات الفضائية للدول الأخرى بقطع الاتصال بين الأنظمة الأرضية والفضائية أو تشويشه أو إعاقة.

ثانياً: تحديد الأفعال والأنشطة التي يمكن اعتبارها سلوكاً مسنولاً أو غير مسنول أو تلك التي تمثل تهديداً في هذا المجال وأثارها المحتملة على الأمن الدولي

1- التمييز بين السلوك المسنول وغير المسنول:

- يتمثل معيار التمييز بين السلوك المسنول والسلوك غير المسنول للدول في هذا المجال في مدى اتساق السلوك أو الأنشطة التي تمارسها الدول مع قواعد القانون الدولي وميثاق الأمم المتحدة والأعراف المتفق عليها بشأن الإبقاء على الفضاء الخارجي كبيئة آمنة ومستقرة ومستدامة، بعيدة عن اعتبارات سبق التسلح والنزاعات.
- تعتبر كل أسباب تهديدات الشق الفضائي والشق الأرضي وقنوات الاتصال بينهما سאלفة الذكر من أمثلة الأفعال التي يمكن اعتبارها سلوكاً غير مسنول للدول في الفضاء الخارجي.
- 2- الآثار المحتملة للسلوك غير المسنول على الأمن الدولي: يترتب على الأفعال التي تعتبر سلوك غير مسنول آثار سلبية عديدة على المجتمع الدولي من ضمنها:
 - نشوب النزاعات السياسية نتيجة التنافس على موارد الفضاء.
 - ارتفاع وتيرة سباق التسلح في الفضاء الخارجي والتهديد باستخدام القوة فيه.

- انعدام وتراجع الثقة بين الدول مما يضر بفرص الاستخدامات السلمية للفضاء.
 - اتجاه الدول لزيادة الاستخدام المزدوج للأقمار الصناعية بما يخالف القواعد والأعراف الدولية.
- ثالثاً: أبرز السبل المقترحة لتطوير تطبيق قواعد وأعراف ومبادئ السلوك المسنول والحد من مخاطر سوء التفاهم والحسابات الخاطئة في الفضاء الخارجي:
- التزام الدول بتوفير بيانات كاملة وصحيحة عن الآتى:
 - مدارات وأعمار الأجسام الفضائية المملوكة لها وتسجيلها في "لجنة الاستخدامات السلمية للفضاء الخارجي" التابعة للأمم المتحدة.
 - ترددات الإشارات اللاسلكية التي تستخدمها الأجسام الفضائية المملوكة لها وتسجيلها في "الاتحاد الدولي للاتصالات".
 - التزام الدول التي تمتلك شبكات رصد ومراقبة للفضاء بنشر بيانات دقيقة للأجسام الفضائية.
 - أهمية صياغة معاهدة / اتفاقية دولية لمنع وتجريم استخدام الأسلحة الإيجابية المتعلقة بالتهديدات على الشق الفضائي والأرضي حتى تكون مكملة للاتفاقيات السابقة بذات الشأن، أو تحديث القائمة منها بالفعل بما يتوافق مع المتغيرات في البيئة الفضائية.
 - أهمية التوصل إلى بروتوكولات ملزمة وقواعد للمبادئ الحاكمة لأنشطة الدول في الفضاء الخارجي وذلك لحين التوصل لاتفاقية قانونية جامعة وملزمة في هذا المجال.
 - ضرورة تشكيل مجموعة عمل على المستوى الدولي تقوم بمهمة إعداد ملف بالتعريفات والمصطلحات (الفنية - التخصصية) الخاصة بالفضاء - مثل مفهوم السلوك المسنول للدول - لتوحيد المفاهيم والاسترشاد بها عند إعداد أى أوراق عمل (اتفاقيات - معاهدات - قواعد سلوك) سواء دولية أو إقليمية أو شبه إقليمية، على غرار ما تم من تعريفات ومصطلحات فى مجال نزع السلاح (التقليدي، فوق التقليدي، النووي، الكيميائي، البيولوجي).
 - التركيز على تدابير الشفافية وبناء الثقة الإضافية مثل إصدار الإشعارات السابقة لإطلاق الأقمار الصناعية، وتنفيذ المبادئ التوجيهية لتخفيف ظاهرة الحطام الفضائي الصادرة عن لجنة الاستخدامات السلمية للفضاء الخارجي.

Finland

[Original: English]

[30 April 2021]

Finland welcomes the opportunity to present a submission to 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 welcome the progress achieved in COPUOS with the adoption of the Long Term Sustainability Guidelines 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 with the highest standards of due diligence and fully respecting 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 the issue of reducing space threats.

The first Finnish satellite was launched in 2017, and currently there are eleven Finnish satellites on orbit, two by a scientific institution and nine by commercial operators. Finland has 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 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 into the national space object registry. All Finnish space objects are also notified to the UN Secretary-General, 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 amongst 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 UN 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 miscalculation 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 (GGE) on Developments in the Field of Information and Telecommunications in the Context of International Security, including in particular the 2015 GGE report.

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

Enhancing transparency and information sharing: Establishing national points of contact for coordination and deconfliction, consultation mechanisms, and best practices for transparency and information exchange, publishing and sharing information on national space security strategies and doctrine, and sharing of situational awareness data.

Strengthening existing mechanisms regarding outer space: Encouraging states to become parties to UN space treaties and 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 to not interfering, 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 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 stemming from space. To benefit from these, concerted efforts are needed not only between state actors but also with other relevant stakeholders including industry, academia and NGOs. Fostering multi-stakeholder partnerships will be instrumental in strengthening security in a multi-layered domain such as outer space.

France

[Original: French]
[3 May 2021]

La France, qui a corédigé et coparrainé la résolution 75/36, soutient pleinement ce processus de réflexion internationale pour la mise en place de normes, règles et principes de comportement responsable dans l'espace.

Il apparaît aujourd'hui important de mettre en place des instruments permettant le maintien d'une utilisation pacifique et d'un libre accès à l'espace par tous, et qui limitent les risques de déstabilisation et de conflit dans l'espace. Malgré les efforts précédents à la Conférence du Désarmement et au GGE sur la prévention de la course aux armements dans l'espace, les propositions faites n'étaient pas de nature à réunir le consensus et n'ont pu aboutir, entraînant un blocage des travaux. Il était donc essentiel de lancer une dynamique nouvelle, inclusive, qui permette d'améliorer de façon concrète, pragmatique et immédiate la sécurité spatiale et de réduire les menaces et les risques de malentendus dans l'espace.

A ce titre, une approche par les capacités visant à interdire certains systèmes n'apparaît pas pertinente et effective. En effet, une grande partie des moyens spatiaux est aujourd'hui duale, rendant difficile la distinction entre des capacités militaires ou civiles, offensives et défensives et, en définitive, le choix d'en interdire certaines plutôt que d'autres. La France rappelle plus largement la difficulté de définir ce qu'est une arme dans l'espace, puisque tout objet spatial peut être une arme par destination (ex : satellite kamikaze). Certaines capacités nécessaires au maintien d'un accès libre et viable à l'espace, comme les capacités de service en orbite et de retrait actif des débris par exemple, peuvent également être utilisées à des fins agressives.

Une approche par les comportements apparaît aujourd'hui comme la plus adaptée afin d'améliorer de manière pragmatique et immédiate la sécurité spatiale, dans la mesure où elle permettra de réduire les risques d'incompréhensions et de malentendus dans l'espace. En encadrant la conduite de certaines activités afin d'éviter qu'elles puissent être perçues comme agressives, cette approche vise à réduire leur potentiel déstabilisateur et à diminuer les risques de

conflits et d'escalade dans l'espace. Par ailleurs, l'approche basée sur les comportements, qui se concentre notamment sur les *effets* de ceux-ci sur les systèmes spatiaux, l'environnement ou les populations, apparaît davantage pérenne car elle ne pourra pas être dépassée par les développements technologiques futurs.

I. L'importance de l'espace aujourd'hui pour nos vies quotidiennes, nos économies et nos intérêts de sécurité entraîne une vulnérabilité accrue des sociétés face aux menaces spatiales.

1. Importance des capacités spatiales pour nos vies et nos sociétés.

Nos sociétés, nos économies et nos modes de vie modernes dépendent aujourd'hui fortement du secteur spatial et de ses capacités. Ce sont les systèmes satellitaires liés au positionnement et à la navigation (par exemple GPS ou GALILEO) qui permettent de synchroniser les systèmes bancaires et boursiers et la distribution d'énergie, de localiser tout type de véhicule et de se déplacer partout sur la planète, et qui permettent le bon fonctionnement des services de secours et d'urgence. Ce sont les capacités d'observation de la Terre qui permettent la prévision météorologique, la prévention des risques naturels et le suivi des changements climatiques et environnementaux, alors même que ces phénomènes devraient s'accroître à l'avenir du fait du dérèglement climatique. Ce sont également en partie des capacités spatiales, celles de télécommunication, qui permettent l'accès aux réseaux de télévision, de téléphonie, ou à internet dans des zones dites « blanches », permettant ainsi de réduire la fracture numérique. Cette utilisation de données satellitaires est croissante, tout comme l'est la dépendance de nos sociétés à celles-ci puisque de nombreuses nouvelles technologies s'appuient sur ces données (connectivité, télémédecine, véhicules autonomes, etc...).

L'espace est également essentiel aux activités militaires et aux interventions sur des théâtres d'opérations. En particulier, la maîtrise de l'observation de la Terre, des télécommunications satellitaires, de la navigation et de la synchronisation par satellite sont autant de capacités nécessaires à l'autonomie nationale d'appréciation de situation, de décision, et d'action. La maîtrise de l'espace est également essentielle pour la protection de nos intérêts de défense nationale, notamment à travers l'alerte avancée qui contribue à la surveillance de la prolifération et des activités balistiques, qui est un élément clé de notre sécurité dans un contexte marqué par le retour du fait nucléaire et de graves crises de prolifération (Corée du Nord, Iran). Enfin, les capacités spatiales jouent un rôle majeur dans la surveillance maritime, en complément des autres capacités, par le biais de détection automatique.

2. Un contexte stratégique dégradé et une augmentation des menaces spatiales

L'environnement spatial connaît aujourd'hui une augmentation considérable du volume d'objets en orbites, entraînant un certain nombre de risques, et en premier lieu le risque de collisions. Ce risque est tout d'abord lié au très grand nombre d'objets présents dans l'espace : il environ 900 000 débris de plus d'un centimètre dans l'espace, lesquels résultent des lancements, des accidents, de l'abrasion des matériaux et des destructions (parfois délibérées) d'objets en orbite. Les débris inférieurs à 1cm peuvent, en cas de collision, créer des dommages qui affectent les capacités et le bon fonctionnement d'un satellite en activité, alors que les débris de 1 à 10 cm peuvent rendre inopérant voire détruire en totalité un satellite actif, alors que les débris de plus de 10cm (environ 35 000 en orbite) non seulement détruisent un satellite mais peuvent également générer des milliers d'autres débris en cas de collision. Ce risque de collision est évidemment accru du fait que ces débris sont inactifs et ne peuvent être manœuvrés pour éviter l'impact. La question de la gestion des débris et du risque de collision est traitée dans le cadre du Comité des utilisations pacifiques de l'espace extra-atmosphérique (CUPEEA) et du Comité inter-agence de coordination des débris spatiaux (IADC). En revanche, il n'existe pas à ce jour de cadre international visant

à prévenir les créations intentionnelles de débris. Or il est important de noter que des destructions intentionnelles d'objets, telles que le tir antisatellite chinois de 2007, ainsi que des collisions accidentelles (entre un satellite de la constellation Iridium et un satellite inactif Cosmos en 2009) ont augmenté significativement le nombre de débris en orbite.

Le risque de collision, et la densification de l'espace sont également liés au nombre croissant de satellites actifs en orbite ; ils sont aujourd'hui plus de 3300 et ce nombre croît du fait du développement de nouvelles technologies et modèles économiques du « New Space ». En plus du risque de collisions, la densification croissante de la population d'objets spatiaux sur certaines orbites augmente la probabilité d'interférences non intentionnelles entre satellites.

Par ailleurs, le contexte stratégique apparaît aujourd'hui dégradé, avec un renforcement de la compétition militaire entre grandes puissances dans tous les domaines, et donc également dans l'espace. Le retour à la logique et aux stratégies de puissance, la remise en question de l'architecture de sécurité et de maîtrise des armements, ainsi que la persistance des crises de prolifération participent de cette dégradation de l'environnement stratégique, qui s'étend également à l'espace. Les tirs antisatellites, les manœuvres de rapprochements, les brouillages et diverses stratégies de prééminence, sont autant d'éléments qui témoignent de ce renforcement de la compétition stratégique et qui peuvent augmenter le risque de malentendus, être déstabilisateurs et provoquer une montée des tensions dans l'espace. Dans le même temps, les Etats sont de plus en plus dépendants du milieu spatial aussi bien pour leurs économies et leurs sociétés, que pour leurs intérêts de défense, devenant ainsi plus vulnérables. Ils cherchent donc à mettre en place de nouveaux instruments et de nouvelles capacités pour pallier à ces vulnérabilités, lesquels peuvent entraîner une course aux capacités spatiales. Certaines puissances développent aujourd'hui de nouveaux systèmes afin de protéger leurs moyens spatiaux et de se prémunir d'éventuelles attaques, allant jusqu'à se permettre de mener des actions inamicales ou agressives.

L'espace est un domaine dans lequel les systèmes sont en grande partie duals et dont la connaissance de l'environnement est par nature difficile. La difficulté de distinguer entre des objets civils ou militaires dans l'espace participe d'un renforcement de l'incertitude et de l'instabilité. De la même manière, la difficulté à surveiller et à attribuer certaines activités, comme cela est d'ailleurs le cas dans d'autres domaines, comme le cyberspace, rend le risque de mauvaises interprétations et de malentendus significatif. En pratique, il est aujourd'hui extrêmement difficile, même pour des grandes puissances spatiales, de détecter l'intégralité des événements spatiaux, de prévoir les risques et les menaces auxquels elles peuvent être confrontées et de déceler, pour un même comportement, son intention potentiellement agressive. Il apparaît par exemple compliqué de distinguer a priori une manœuvre anodine d'un satellite, liée à sa mission, et qui conduirait à une collision ou à un brouillage fortuit, d'une manœuvre visant à nuire intentionnellement. Cette difficulté, renforcée par la forte dualité du milieu spatial, fait peser un risque significatif d'escalade ou de déclenchement d'un conflit dans l'espace.

II. Caractérisation des actions responsables, irresponsables ou menaçantes au regard de leurs effets, ainsi que de leur impact sur la sécurité internationale.

- **Les comportements entraînant ou pouvant entraîner la destruction de satellites ainsi que des risques accrus de dommages sur l'environnement spatial**, en particulier les actions intentionnelles, telles que les tirs antisatellites, pouvant entraîner la création de débris à longue durée de vie et menacer la liberté d'accès et d'utilisation de l'espace. Ces menaces spatiales peuvent émaner de

capacités antisatellites basées au sol ou co-orbitales. Ces tirs, lorsqu'ils sont opérés depuis le sol, sont facilement attribuables.

- **Les comportements entraînant la perturbation de systèmes spatiaux, que ce soit depuis le sol ou dans l'espace.** Certaines activités peuvent se faire aussi bien depuis le sol que depuis l'espace, comme les éblouissements, l'usage de lasers de puissance, de micro-ondes de forte puissance, le brouillage des liaisons, les cyberattaques, etc. D'autres activités sont généralement effectuées depuis l'espace, et elles sont alors beaucoup plus difficiles à attribuer, et peuvent être confondues avec des activités inoffensives. A cet égard, les rapprochements et manœuvres de proximité peuvent apparaître comme une menace puisque, lors d'un rapprochement, un Etat ne peut connaître l'intention associée à cette manœuvre et donc ne peut pas savoir si l'objectif est de perturber le fonctionnement du satellite, de le détruire ou de le désorbiter, par exemple sous couvert d'une mission de retrait actif de débris.
- **Les comportements pouvant avoir des conséquences sur la sécurité des personnes et des biens.** Ainsi les tirs antisatellites, les éblouissements, les brouillages, l'usurpation (*spoofing*), les cyberattaques, peuvent, utilisés contre certains systèmes spatiaux, entraîner un risque pour la sécurité des biens et personnes, par exemple en causant des perturbations de systèmes de navigation des avions, collisions de bateaux (atteintes aux systèmes de navigation par satellite), en empêchant l'action des services de secours et d'urgence ou encore la prévision de certaines catastrophes naturelles et phénomènes météorologiques.

III. Proposition de normes, règles et principes de comportement

La France propose de mettre en place des normes pragmatiques, immédiatement applicables, et non juridiquement contraignantes, qui constitueraient un « guide du bon utilisateur ». Ces normes n'auraient donc pas pour objet de modifier le droit international applicable, dont la Charte des Nations Unies, y compris le droit à la légitime défense.

La nature, l'esprit et le statut de ces normes de comportement pourraient s'inspirer de la formulation proposée dans le rapport de 2015 du Groupe gouvernemental d'experts chargé d'examiner les progrès de l'informatique et des télécommunications dans le contexte de la sécurité internationale, qui indiquait que : *« des normes facultatives et non contraignantes de comportement responsable des États peuvent contribuer à réduire les risques qui pèsent sur la paix, la sécurité et la stabilité internationales. De ce fait, elles ne cherchent pas à limiter ou à interdire des actes qui respectent le droit international : elles traduisent les attentes de la communauté internationale, fixent des règles de comportement responsable des États et permettent à la communauté internationale d'étudier les activités menées par les États et d'apprécier leurs intentions ».*

Concernant ces normes, la France propose de se pencher en priorité sur des normes relatives à trois catégories de comportements: 1/ les comportements intentionnels susceptibles d'avoir un fort impact sur l'environnement spatial ; 2/ les comportements présentant un risque de malentendus; 3/ les comportements pouvant avoir un impact sur la sécurité des personnes et des biens.

a/ Normes relatives aux comportements intentionnels susceptibles d'avoir un fort impact sur l'environnement spatial

Sur ce point, la France serait favorable à l'adoption de deux normes de comportement :

- 1) **Les Etats devraient s'abstenir de créer intentionnellement ou en connaissance de cause des débris à longue durée de vie.**

- 2) **Les Etats devraient éviter et, en tout cas, minimiser la création intentionnelle de débris.**

b / Normes relatives aux comportements présentant un risque élevé de malentendus et qui pourraient faire l'objet de mesures de confiance et de transparence.

Concernant **les opérations de rendez-vous et les manœuvres de proximité**, elles sont appelées à se multiplier dans les prochaines années, et cette question doit donc être traitée en priorité afin de diminuer les risques d'incompréhensions et de malentendus dans l'espace, et de profiter des opportunités offertes par les capacités associées (services en orbite, retrait actif de débris).

Les opérations de rendez-vous, incluant le retrait actif de débris, font courir de forts risques aux objets spatiaux abordés. Dès lors que le rendez-vous n'est pas consenti, il est possible qu'une telle opération puisse, en certaines circonstances, être interprétée par l'Etat ciblé comme une attaque visant à détruire ou à causer la perte de contrôle de l'objet spatial abordé ou arraisonné.

Pour cette raison, la France considère que ces opérations devraient être soumises au **consentement préalable** et explicite de l'Etat pertinent.

La mise en place de normes concernant les manœuvres de proximité pourra également être étudiée, bien que cette question soit plus difficile à réguler que les opérations de rendez-vous.

c/ Comportements pouvant avoir des conséquences sur la sécurité des personnes et des biens.

La France est favorable à encadrer les comportements qui perturbent les objets spatiaux dans deux cas particulièrement dangereux : les comportements pouvant mener à la perte irréversible de contrôle ou de fonctionnalités d'un objet spatial, ainsi que ceux pouvant avoir des conséquences sur la sécurité des personnes et des biens.

d/ Autres mesures de confiance et de transparence permettant une utilisation plus optimale, plus responsable de l'espace.

Les éléments suivants pourraient être attendus des Etats :

- **Faire preuve de transparence en matière de partage des catalogues de données orbitales.** Ce serait une condition indispensable si nous voulons rendre opérationnel un système de notifications des manœuvres de proximité, éviter les collisions en orbite et enfin donner plus de visibilité aux destructions et aux pertes de contrôle d'objets spatiaux.
- **Adopter et mettre en œuvre des mesures appropriées pour veiller à ce que les acteurs spatiaux nationaux non-étatiques adoptent ces comportements responsables.** Les Etats ne devraient pas permettre sciemment que des objets spatiaux sous leur juridiction adoptent des comportements irresponsables ou menaçants, ni que leur territoire ou leurs installations soient utilisés pour adopter de tels comportements à l'encontre d'objets spatiaux.
- Comme mesure de confiance, **envisager la signature, la ratification, l'adhésion aux traités pertinents.**
- Comme mesure de transparence, les **Etats devraient partager publiquement des éléments sur leur doctrine, politique ou stratégie spatiale, y compris dans les enceintes pertinentes comme la CD.**
- Enfin, les Etats **devraient mettre en place des systèmes bilatéraux ou multilatéraux de points de contacts et des mécanismes de consultations** et de déconfliction, comme cela est le cas dans d'autres domaines que l'espace, afin de réduire le risque d'escalade et de conflits dans l'espace.

Germany

[Original: English]

[30 April 2021]

UN General Assembly Resolution A/RES/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 General Assembly at its upcoming session. This 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 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-technological as well as socio-economic 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 respective cable-based terrestrial infrastructures. Navigation of land, sea and air vehicles relies on space-based positioning, navigation and timing services (PNT) like GPS, Galileo, Glonass or Beidou, which also enable the synchronisation of energy distribution, international information and telecommunication networks and the global banking system. Earth observation satellites provide data for weather forecasts, land survey, 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 optimising the sustainable use of natural resources, a better timing of harvests, water and air quality monitoring, urban planning as well as provision of health care and education to remote and isolated communities. Space assets provide valuable early warning of imminent natural disasters and enable coordination of disaster relief in stricken areas. The smooth functioning of police, emergency and rescue services is in many cases reliant on satellite communication and navigation. Programmes such as UN-SPIDER and the International Charter Space and Major Disasters empower authorities, especially in emerging 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 carry out operations safely and successfully and play a decisive role on the strategic, operational and tactical level. Unimpeded space-based services, in particular reconnaissance and early warning as well as uninterrupted communications and PNT 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 of debris is growing at an accelerating pace, which leads to increased risks of collision. The launches of mega-constellations for satellite-based internet 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 2007 Space

Debris Mitigation Guidelines of the UN Committee on the Peaceful Uses of Outer Space (COPUOS) seek to reduce the creation of space debris and the 2019 Guidelines for the Long-term Sustainability of Outer Space Activities of COPUOS encompass guidance on mutual information exchange, registration of space objects and collision warning. 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 regulative 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 the civilian, but also the military sector enhances the relevance of outer space for security, stability and defence. Due to their exposure and high 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. Along 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 and use of outer space for all States. A destabilized space environment and decreasing outer space security carry a negative impact on all States depending on outer space services. Therefore, 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 a 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. Being aware of the large overlap and blurry line between civil and military use of outer space the following sections will focus on the threats or perceived threats to security and stability in space.

2.1. What impedes a 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:

- 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 holding a satellite at risk, significantly increases the risk of misperceptions, undermines the 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 a 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 as many civilian activities, as e.g. shipping or aviation, depend on accurate provision of PNT or communications services.
- Disruption or impairment of command and control of satellites, early warning and nuclear command and control functions, and PNT signals, since this leads to a substantial risk of misperceptions and unwanted escalation.
- The avoidable creation of space debris caused by deliberate acts or by neglect.

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

2.2. Counter Space Capabilities and Dual-Use Concerns

2.2.1. Counter-space capabilities

Security and stability in outer space are predominately jeopardized 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 an 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, proliferation of space-capable actors, and lack of trust lead States to aim for counter-space capabilities, and an increasing number of States is looking into acquiring such capabilities to enhance their military capabilities and national security.

As the following categorization will show, counter-space activities concern a broad spectrum: attacks or hostile action, operations and activities from space-to-space, from ground-to-space, and from space-to-ground:

(1) Ground-/Air-/Sea-based kinetic Direct-Ascent ASAT

Among our primary concerns is the rapid development of Direct-ascent anti-satellite (DA-ASAT) capabilities. Using DA-ASAT 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 harm other satellites in similar orbits.

(2) Co-orbital kinetic ASAT

Equally concerning are co-orbital ASAT capabilities or activities, i.e. 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 get into close proximity of another satellite.

(3) Directed Energy Weapons

The use of lasers, high-powered microwave (HPM), and electromagnetic pulse (EMP) may result in reversible or irreversible physical effects on satellites and ground stations without making physical contact. It can damage or degrade sensitive components of a space -systems e.g. 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.

(4) Electronic warfare

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

(5) Cyber intrusion

Cyber-attacks target the data itself and systems that use this data, aim at monitoring data, but also at inserting false or corrupted data. Cyber-attacks may result in data loss, widespread disruption, the seizure of control and even 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 fiction. Several tests, activities and operations in outer space in recent years have demonstrated that actors have the capability to potentially use the above-mentioned means and instruments.

2.2.2. 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 for instance from export control. 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 with the aim to destroy or impair space assets of a potential adversary. Here, we focus on two specific examples:

- Rendez-vous and close proximity operations (RPO) are essential for maintenance, repair, fuelling of spacecraft or docking of space capsules. At the same time, mastering RPOs is an essential precondition for developing co-orbital ASAT capabilities. In turn, it allows the use of highly manoeuvrable space-craft not only for the purposes they were designed for 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 (mis)used to manipulate, destroy or damage satellites.

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

2.2.3. 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 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**. Behaving responsibly in outer space includes, in addition to cooperative means such as increased communication, consultation, information exchange and transparency, **refraining from actions, operations and activities that either pose a real threat to security and stability or that might be perceived** as such. 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 – added by sufficient means of notification, communication and means for conflict resolution.

2.3. Threats and perceived threats to space security

2.3.1. Risks of misperception, miscalculation and escalation

The high dependence on the free access and use of space assets for civil but also military purposes comes along with increased risks of miscalculation and escalation. States are getting more concerned about the security of their satellites due to counter-space capabilities developed, tested or already in operation. Thus, developing, testing and fielding counter-space capabilities, which 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 (“counter-space capabilities race”).

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

2.3.2. Irresponsible and threatening behaviour in space.

We believe that the following behaviours are irresponsible or even threatening. Examples of such behaviour are:

- **Demonstrating a DA-ASAT capability to hold space assets of other States at risk.** The targeted and persistent development and testing of a DA-ASAT capability demonstrates a State’s intent to acquire capabilities of 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 DA-ASAT capabilities as well as a lack of transparency on missile tests 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 holding it at risk.** If a satellite is approaching and following a satellite of another State without consent, explanation, or consultation, the affected State(s) cannot exclude the possibility that the other satellite’s conduct aims at interfering or even damaging its satellite. While such concerns need to be balanced with the free access and use of space, we see a clear need for transparency and mutual consideration. In particular, if the Rendez-vous 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 the inadvertent damage or destruction of a satellite. That again causes the creation of long-lived debris.

- Related concerns can emanate from the uncoordinated **release of objects such as sub-satellites** or the ejection of projectile-like fragments in the immediate vicinity of or pointing at satellites of another State.
- **Interference with** the generation, provision, reception and processing of PNT-signals such as Jamming and Spoofing. As civil aviation, maritime navigation and other civilian activities depend on the reliable provision of PNT-services any unexpected disruption may potentially lead to loss of life or damage to property. We therefore consider interference in such critical services to the public irresponsible. The same applies to a cyber intrusion with 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. They are distinct from and without prejudice to binding norms of international law. Intended to form the basis for first realistic, pragmatic and non-legally binding norms, they reflect the expectations of the international community to set accepted practices of responsible behaviour and allow the international community to assess 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 practices of safety are a baseline requirement for 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 aim at establishing a common understanding against which to judge state activities and react to actions not in line with this understanding.

The following draft principles for responsible state behaviour outside armed conflict represent our initial set of ideas, and serve the purpose of contributing to the international debate in the context of the further implementation of UN GA Resolution A/RES/75/36 on 'Reducing Space Threats through norms, rules and principles of Responsible Behaviour'.

1 Considerations with regard to launches

States should conduct launches of missiles and space launch vehicles in a way which ensures 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.

2 Avoidance of debris

States should not purposefully or by negligence, in particular not by disregarding generally accepted rules and best practices of operational safety², 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 rendez-vous and proximity operations or through deliberate kinetic impact.

3 Considerations in relation to rendez-vous operations

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

States should not conduct or knowingly-support rendez-vous operations unless a State has reasonable grounds for the rendez-vous operation and the affected other State has given consent. States should notify such rendez-vous 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.

4 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 greatest possible transparency regarding relevant proximity operations.

5 No interference in the control of space systems and critical services

States should not conduct or knowingly support cyber 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.

6 National point of contact for de-confliction

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 de-conflict spacecraft manoeuvres and frequency usage and clarify questions of space traffic coordination. This would serve as a communication and de-confliction measure, and thus will reduce the risk of miscalculations.

7 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.

8 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 to work on principles of responsible state behaviour we aim for the following **measures for security and confidence-building** regarding outer space in order to implement, strengthen and enforce such principles:

- *Establishing **best practices for transparency and information exchange**;*
- *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, SSA allows to receive a complete picture of the operating environment and to observe, attribute, and call out deviating patterns of life that may potentially be perceived as concerns or threats.*
- *Strengthening **existing regimes with relation to outer space, above all the Outer Space Treaty, the UN Register on Objects Launched into Outer Space**, but also the Hague Code of Conduct against Ballistic Missile Proliferation (HCoC) and the Missile technology control regime (MTCR), **and their implementation**.*
- *Collecting **best practices** from current operations in outer space as well as from other domains with certain similarities such as cyber or maritime security.*

4. 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 key to strengthen the current normative and regulative framework. Politically binding measures will be the most pragmatic and realistic way forward at this stage. We need to increase 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 first ideas for principles of responsible behaviours and confidence-building measures in this paper. However, we see the national contributions of States and the subsequent Report of the UN 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 on norms and principles assessed to be most appropriate to address the threats and risks identified by nations regarding outer space and that are not yet sufficiently dealt with within the existing normative or legal framework.

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

- reaching 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;
- reaching a common understanding among States on which behaviour is responsible and which is in contrast irresponsible or even threatening;
- proposing 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;
- deciding on how to best facilitate the universal consideration and support of those principles, rules and norms, and confidence-building measures;
- considering to make better use of existing or to establish additional fora for communication and dispute resolution;
- proposing 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 as well as the UNGA First Committee in New York play an important role in addressing and debating these questions. Against this background, Germany sees great merit in establishing a GGE or OEWG for further exchange 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 UN processes first and foremost in Geneva, and in New York. We see it as our shared responsibility to safeguard the continued peaceful and sustainable use of outer space for current and future generations.

India

[Original: English]

[29 April 2021]

Space activities increasingly contribute to national socio-economic development, promote scientific research, technological progress and support national self-defense endeavors.

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

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

All countries must carry out activities in space in accordance with international law including 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 national activities in outer space, whether such activities are carried on by governmental agencies and non-governmental entities. All countries must ensure 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 registration of space objects and provide timely information that contributes to transparency and sustainability of outer space activities.

India continues to support substantive consideration of Prevention of Arms Race in Outer Space (PAROS) within the multilateral framework of the UN and remains committed to the negotiation of a universally acceptable and multilaterally negotiated legally binding instrument on PAROS 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 on PAROS, as well as TCBMs and long-term sustainability guidelines. However, while universal and non-discriminatory transparency and confidence-building measures can play a useful complementary role, they cannot 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 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 UN, in order to limit the creation of space debris, avoid on-orbit collisions and work towards effective management of the space orbital utilization. States must all endeavor to improve accuracy of orbital data on space objects, enhance the practice of sharing orbital information on space objects and promote the collection, sharing and dissemination of space debris monitoring information.

Iran (Islamic Republic of)

[Original: English]

[15 April 2021]

On 6th December 2020, at the United Nations First Committee, United Kingdom introduced a draft resolution “Reducing Space Threats through Norms, Rules and Principles of Responsible Behavior” for consideration as an update of the previous draft of "Norms of Behavior". It is subsequently published as A/C.1/75/L and dated 6 December 2020.

The resolution in which 12 UN members voted against and 8 others abstained remains fundamentally flawed. The fundamental flaws inter alia include:

- Responsible Behavior might be an attractive political gesture but still, a vague and unclear phrase for scientists, think tanks as well as operators. A benevolent gesture cannot elaborate under covered political intentions and aims.
- Responsible Behavior is mostly considered as a subjective issue in which its real applicability needs an overwhelmingly review/revise of the 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 Behavior is not a timely proposal because it's neither a demanded idea nor a practicable measure.

- The aforesaid resolution of Responsible Behavior is disregard for:

A) Past events: Most of the ongoing harmful developments in outer space are the results of trial and error activities of space powers. Preceding irresponsible behaviors made outer space a congested area of debris. So, the best and comprehensive interpretation of responsible behavior is the same in which covers past events. No irresponsible behavior in outer space should be neglected when it's a threatening heritage for other States.

B) Current procedures: Responsible Behavior implies a wrong method which says "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 Cast Systems in outer space geopolitics.

C) The reality of equality: There is no doubt that Responsible Behavior will create new norms and subsequently make impediments before new emerging space powers. Fragility of technology transfer as well as making impediments before new emerging space powers by developed countries undermine the real equality of States in outer space.

D) Verification: For developing countries, there is no integral verification regime/technology to help monitor/verify Responsible Behavior standards so; developed countries activities won't be monitored. The flip side is vice versa.

E) Space Arms Race: while some specific countries are publicly supporting and planning to strengthen their space forces and eye new generation of space weapons, Responsible behavior is a deviated path to prevent an arms race in outer space and it does not adjust to the basic adopted principles. Prevention of an arm race in outer space is of the agreed principles that should be marked as critical priorities and stick to it by all States.

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 divisive political agenda of so-called responsible behavior requires establishing an ad-hoc committee to negotiate a long awaited legally binding treaty for it as priority for international security.

The peaceful use of outer space is getting significantly complicated 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 use of Outer Space (COPUOS) 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 set overly high standards or thresholds that could hinder the enhancement of capacity-building and related technology development by developing countries for peaceful use and exploration of outer space.

Ireland

[Original: English]
[3 May 2021]

In accordance with operative paragraphs 5 and 6 of Resolution 75/36, Ireland subscribes to the views submitted by the European Union to the United Nations 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 UN Charter. The 1967 Outer Space Treaty and other applicable international law as well as guiding principles developed in the UN framework constitute the cornerstone of the global governance of outer space. We believed 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, to facilitate equitable access to outer space.

Ireland is particularly concerned by the potential weaponisation of space.

The development and proliferation of anti-satellite weapons, including those launched from the 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 particularly in near earth space. In order to minimise 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 the 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 near earth space is a finite resource with increasingly limited capacity of our orbital highways. We call on all States to refrain from the destruction of space objects that generate space debris, notably multiple 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 on just operations and activities. It is important in this regard to recognise 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, like for example, 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 (TCBMs) 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 TCBMs through various UN bodies, including the United Nations Disarmament Commission. TCBMs 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 can facilitate discussion on the further elaboration of TCBMs and 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 UN Member States as well as multi-stakeholder engagement with private sector and civil society.

Italy³

[Original: English]
[3 May 2021]

The adoption of the UNGA Resolution 75/36 “*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

³ This is the summary provided by Italy. The full version is available at https://front.un-arm.org/wp-content/uploads/2021/05/Italy_contribution_to_the_report_of_the_UN_Secretary-1.pdf

complex scenario, there is a need to promote greater international cooperation to establish a set of norms, rules and principles of responsible behaviours 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 (LEO, MEO, GEO); Lunar and planetary orbits; surface of the 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, 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 maximising the chances of a successful outcome of future negotiations for a binding treaty. The United Nations General Assembly is indeed the appropriate forum to discuss and identify norms of responsible behaviour in outer space, due to 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

[Original: English]
[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 behaviors based on the UN 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 space-faring nations but also for all humankind. Since space systems provide fundamental services for our daily life such as satellite communication and positioning, navigation and timing (PNT) 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 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 (NC2), and verification of arms control instruments. Further, the development and deployment of counterspace capabilities as well as insufficient transparency regarding doctrines, policies and activities are calling for 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 due 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 to identifying space threats through focusing solely on technological capabilities. Rather, it is more feasible to establish a common understanding on patterns of behaviors that are regarded as either responsible or irresponsible. Since

behaviors 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 behaviors awaits further discussion, the international community should strongly discourage such behaviors in light of their potential consequences to peaceful, safe and sustainable use of space. Japan believes that this behavior-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 (TCBMs) to this end.

As a starting point to produce tangible, near-term achievements, Japan suggests the following three areas of focus to be examined in the way 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 First Committee perspective States should be held accountable for the creation of long-lived debris, especially if they arise from deliberate destruction of space systems. In this regard, Japan is concerned about the heightened risk of debris creation through the development and deployment of counterspace capabilities whether from the Earth or in space, including direct-ascent anti-satellite (DA-ASAT) 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 (RPO)

RPO is a promising category of space activities, while security concerns about its potential malign counterspace applications are arising. On-orbit services such as life-extension of satellites and refueling 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 RPO are a usual conduct in outer space, states should articulate possible best practices and standards on responsible RPO both from civil and security perspectives and enhance TCBMs, which are also helpful to promote the development of innovative on-orbit services such as active debris removal (ADR). 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 other states parties' activities. 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 following considerations should be made when articulating norms, rules and principles of responsible behaviors:

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

State behaviors which entail consequences for security and/or endanger lives of people, such as affecting nuclear command and control, early warning (EW), National

technical means of verification (NTM), PNT, should be subject to stringent scrutiny. In addition, irreversibility of potential damage may need to be taken into account when characterizing behaviors.

(b) Communication

Since threat perception is dependent on the intention and contexts of activities, enhanced communication is a key element of TCBMs and reducing risks of misunderstanding and miscalculation. Communicating one's intention to relevant actors before taking an action can generate predictability and trust, though communication does not necessarily justify irresponsible behaviors. In addition, responsible states should respond timely and appropriately to inquiries 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 (HCOB), 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 increase transparency in space activities, development of Space Situational Awareness (SSA) capabilities is encouraged and states should share SSA information to the extent possible, such as orbital elements and category of satellites and also publicly share information on their space doctrine, policy or strategy.

(c) Civil needs

It is important to consider the development of innovative solutions for space sustainability by the private sector as well as fulfilment of potential needs of developing countries for the 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 behaviors, and establishing best practices which can serve as guidance in this field, without prejudice to consideration of legally binding instruments. To that end, TCBMs, especially enhanced communication, should also be sought, building up on the recommendations of the 2013 Report of the Government Experts on TCBMs in Outer Space Activities. Such efforts are not intended to modify the 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 relevant actors.

Jordan

[Original: Arabic]

[24 April 2021]

1- صكوك الأمم المتحدة غير الملزمة قانونياً حول الفضاء الخارجي:

أحاطت اللجنة الفرعية القانونية في دورتها الثامنة والخمسين بمناقشات في إطار البند المتعلق بالتبادل العام للمعلومات بشأن صكوك الأمم المتحدة غير الملزمة قانوناً المعنية بالفضاء الخارجي.

وأحاطت اللجنة علماً مع التقدير بالخلاصة الوافية للآليات التي اعتمدتها الدول والمنظمات الدولية بشأن صكوك الأمم المتحدة غير الملزمة قانوناً المعنية بالفضاء الخارجي، التي أفرد لها المكتب صفحة شبكية لإتاحة الاطلاع عليها.

ودعت اللجنة دولها الأعضاء والمنظمات الحكومية الدولية التي تتمتع بمركز مراقب دائم لديها إلى تقديم ردودها إلى الأمانة لإدراجها في الخلاصة الوافية.

يعتبر الإعلان الخاص بالتعاون الدولي في مجال استكشاف الفضاء الخارجي واستخدامه لفائدة جميع الدول ومصلحتها، مع إيلاء اعتبار خاص لاحتياجات البلدان النامية صك هام لتعزيز التعاون الدولي بهدف تعظيم فوائد التطبيقات الفضائية من أجل كل الدول.

أن حوكمة الفضاء بصكوك قانونية غير ملزمة وزيادة عدد قوانين الفضاء الوطنية يمثلان أحد الاتجاهات القائمة في مجال تطوير قانون الفضاء. على أن من المهم للبلدان أن تنفذ الصكوك ذات الصلة غير الملزمة قانوناً بخطوات فعالة على الصعيد الوطني بالتوازي مع تنفيذها على الصعيد الدولي.

أن الصكوك غير الملزمة قانوناً، مثل المبادئ التوجيهية الواحد والعشرين بشأن استدامة أنشطة الفضاء الخارجي في الأمد البعيد، يمكن أن تؤدي دوراً هاماً ومعياريًا في ضمان السلامة والأمن في الفضاء الخارجي.

2- الحطام الفضائي:

كان هناك فهم عام بأن بيئة الحطام الفضائي الراهنة تشكل خطراً على المركبات الفضائية الموجودة في مدار أرضي. ولأغراض هذه الوثيقة، يعرف الحطام الفضائي بأنه جميع الأجسام المصنوعة، بما فيها شظايا تلك الأجسام وعناصرها، الموجودة في مدار أرضي أو العائدة إلى الغلاف الجوي، غير الصالحة للعمل. ومع استمرار تزايد مجموعات الحطام، سيتزايد تبعاً لذلك احتمال حدوث اصطدامات قد تؤدي إلى وقوع أضرار محتملة. وفضلاً عن ذلك، يوجد أيضاً خطر حدوث أضرار على الأرض إذا تحمل الحطام العودة إلى الغلاف الجوي الأرضي.

• مصادر الحطام الفضائي:

- 1- حالات التشظي العرضية والعمدية التي ينتج عنها حطام طويل العمر.
 - 2- الحطام الذي يطلق عمداً أثناء تشغيل المركبات الفضائية والمراحل المدارية من مركبات الإطلاق.
- ويمكن تقسيم تدابير تخفيف الحطام الفضائي إلى فئتين عريضتين هما: التدابير التي تحد في الأجل القصير من توليد الحطام الفضائي الذي يمكن أن تنتج عنه أضرار؛ والتدابير التي تحد من توليد ذلك الحطام في أجل أطول.
- يوصى بتنفيذ تدابير تخفيف الحطام الفضائي لأن بعض الحطام الفضائي يمكن أن يلحق الضرر بالمركبات الفضائية فيؤدي إلى فقدان البعثات، أو إلى إزهاق الأرواح في حالة المركبات المأهولة. وتدابير تخفيف الحطام الفضائي هامة للغاية بالنسبة لمدارات الرحلات المأهولة، بسبب أثارها على سلامة طواقم المركبات.
- وقد أعدت لجنة التنسيق المشتركة بين الوكالات والمعنية بالحطام الفضائي (اليادك) مجموعة مبادئ توجيهية لتخفيف الحطام الفضائي تبين العناصر الأساسية لتخفيف الحطام الفضائي الواردة في سلسلة من الممارسات والمعايير والمدونات والكتيبات الإرشادية الموجودة التي وضعها عدد من المنظمات الوطنية والدولية.
- ينبغي أن تقوم الدول الأعضاء والمنظمات الدولية طوعاً باتخاذ تدابير، عن طريق الآليات الوطنية أو عن طريق آلياتها الخاصة المنطبقة، لضمان تنفيذ هذه المبادئ التوجيهية، عن طريق الآليات الوطنية إلى أبعد حد ممكن، من خلال ممارسات وإجراءات تخفيف الحطام الفضائي.

• المبادئ التوجيهية لتخفيف الحطام الفضائي:

- 1- الحد من الحطام المنبعث أثناء العمليات العادية.
- 2- التقليل إلى الحد الأدنى من إمكانية حدوث حالات التشظي أثناء الأطوار التشغيلية.
- 3- الحد من احتمال الاصطدام العرضي في المدار.
- 4- تقادي التدمير العمدي وسائر الأنشطة الضارة.
- 5- التقليل إلى الحد الأدنى من إمكانية التشظي اللاحق للرحلة الناجم عن الطاقة المخزونة.
- 6- الحد من الوجود الطويل الأجل للمركبات الفضائية والمراحل المدارية من مركبات الإطلاق في منطقة المدار الأرضي المنخفض بعد نهاية رحلاتها.
- 7- الحد من التداخل الطويل الأجل للمركبات الفضائية والمراحل المدارية من مركبات الإطلاق مع منطقة المدار الأرضي التزامني بعد نهاية رحلاتها.

3- حركة المرور في الفضاء

أن وجود نظام دولي شامل لإدارة حركة المرور في الفضاء سوف يعزز تسيير الأنشطة الفضائية على نحو آمن ومستدام، ويمكن أن يشمل ما يلي: تحسين التبادل المتعدد الأطراف للمعلومات بشأن التوعية بأحوال الفضاء؛ وتعزيز إجراءات التسجيل الدولية؛ والآليات الدولية للتبليغ عن عمليات إطلاق الأجسام الفضائية ومناوراتها في المدار

وإعادتها إلى الغلاف الجوي وتنسيقها؛ والأحكام الخاصة بالأمان والبيئة. إضافة إلى تزايد أهمية هذا الأمر في سياق تشكيلات السواتل الكبيرة جداً، التي يمكن أن تزيد من المخاطر التي تهدد سلامة الأنشطة الفضائية واستدامتها، خصوصاً فيما يتعلق بتخفيف الحطام الفضائي ويمكن أن تشكل تحديات لعمليات الرصد الفلكي.

لا سيما في ضوء تزايد تعقّد البيئة الفضائية واكتظاظها بسبب تنامي عدد الأجسام في الفضاء الخارجي، وتنوع الجهات الفاعلة في الفضاء الخارجي، وتزايد الأنشطة الفضائية، وهي ظواهر تشكل تحدياً لسلامة الأنشطة الفضائية واستدامتها.

Luxembourg

[Original: English]

[3 May 2021]

Luxembourg has been active in the commercial and public space sectors since the early 1980's. More recently, the government has launched an ambitious space vision, which will advance within Luxembourg'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 fulfil critical EU and NATO defence capabilities shortfalls. These assets can also be made available for UN 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 (ICT), including space-based, are at the very centre of this 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 organisations 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 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 been observing counter-space technologies deployed, 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 purposes of social, economic and technological activities. In this context, safe, secure and sustainable use of outer space has come to the forefront of the UN work. 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.

The UNGA's resolution 75/36 of 7 December 2020 reaffirms 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.

Most concerning trends are the development and fielding of space-based military technologies and the ever-increasing volume of space debris enhanced by 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 Luxembourg's reliance 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 UNGA resolution 75/36 on responsible behaviours in space. We are in the process of reinforcing our national legislative framework applicable to space activities and reviewing the implementation of the COPUOS' Guidelines on the Long Term Sustainability of Outer Space Activities. We provide financial support to the UNOOSA project "Space Law for New Space Actors" with the objective of furthering the adherence to the UN's treaties and principles governing outer space activities, thereby aiming to ensure a wide applicability of and adherence to international law. We have supported UN 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 are 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, 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 UN space treaties.

2. The rapid rise of risks are threatening the 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 of space-

based assets for defence and security purposes as well as 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 of 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-than-later. This attitude generates the risk of rushed launches of technologically immature objects only multiplying the risk of debris. Congestion of space and the resulting risks to safety and security have a direct impact on the right to freely access space. This is a direct threat to the fundamental right of equal access guaranteed by the UN 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 are 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 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. Today on earth, tomorrow potentially in space. Terrestrial conflicts extending into space to deny a party's space based military operations assets are very real risks we cannot afford 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 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 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 UN 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 improving space situational awareness, satellite tracking, collision avoidance manoeuvring and active debris removal systems. A system alerting 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 the development of space situational awareness assets makes this 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 confidence building and accident avoidance. In addition, there is a crucial lack of mutually agreed understanding of what consists potential hostile behaviour such as 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 as well as 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 timeframe. Our primary objective must be to diminish the risks of misunderstandings and to increase transparency through the development of mechanisms that nurture 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 advance in norm-making and 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:

- A strong respect for the fundamental principles enshrined in the outer space treaties which States have ratified respectively,
- A strict adherence to existing best practices for safe space operations,
- A continued, dedicated and good faith effort in implementing the COPUOS LTS of 2019 as a baseline for guaranteeing a safe and sustainable space environment,
- An intensification of cooperation between State and non-State actors to raise awareness of the need to improve space governance,
- A 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 UN initiatives,
- Developing best practices for proximity operations avoidance so as to guarantee safe manoeuvrability of space objects,
- Continued adherence to existing regimes like the Hague COC against missile proliferation, and efforts to get underway to strengthen these regimes for the specific purposes of the safety of space operations and exploitation,
- Discussions to start towards the setting up of a multinational “joint task force”, “clearing house” or “operational exchange platform” tasked with de-confliction services through the appointment of national experts/Points of Contact (and remaining under national control) and access given to (existing or yet to be set up) 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, which if left unchecked, could lead to the gravest threats to the use of outer space and develop legally binding norms in this regard as a matter of priority,
- Support to public awareness initiatives of space governance issues,
- Continued support to the UN Secretary-General’s efforts.

Mexico

[Original: Spanish]
[3 May 2021]

En relación con la resolución A/75/36, “Reducción de las amenazas relacionadas con el espacio mediante normas, reglas y principios de conductas responsables”, adoptada por la Asamblea General de las Naciones Unidas el 7 de diciembre pasado; en particular, en atención a su párrafo operativo 5 que *“Alienta a los Estados Miembros a que examinen las amenazas a los sistemas espaciales y los riesgos para*

su seguridad existentes y potenciales, incluidos los derivados de acciones, actividades o sistemas en el espacio ultraterrestre o en la Tierra, caractericen las acciones y actividades que puedan ser consideradas como responsables o irresponsables o que puedan constituir amenazas y sus posibles efectos en la seguridad internacional e intercambien ideas para perfeccionar y aplicar normas, reglas y principios de conductas responsables y reducir los riesgos de que se produzcan malentendidos o errores de cálculo en relación con el espacio ultraterrestre”, y teniendo presente la invitación del Secretario General para que los Estados partes proporcionen sus opiniones al respecto, el Estado mexicano presenta la siguiente opinión:

Aspectos generales

México está convencido de que el uso y exploración del espacio ultraterrestre debe realizarse exclusivamente con fines pacíficos. Por ello, la militarización del espacio ultraterrestre y su uso con fines militares es una constante preocupación, considerando que no existen disposiciones específicas en los tratados internacionales que regulen de manera detallada e inequívoca estos aspectos.

México impulsa la cooperación internacional a favor de los usos pacíficos del espacio ultraterrestre. El uso y exploración del espacio ultraterrestre deben realizarse en beneficio de los intereses de todos los Estados, basado en los principios de cooperación y asistencia mutua, teniendo en cuenta su importancia en materia de desarrollo social, económico, científico y tecnológico. En este contexto, es necesario el perfeccionamiento de régimen jurídico internacional para regular los aspectos relacionados con su utilización.

México reconoce la importancia y urgencia de prevenir una carrera armamentista en el espacio ultraterrestre; lo anterior, en concordancia con su compromiso con la conservación del espacio ultraterrestre para fines exclusivamente pacíficos, así como con la búsqueda del desarme general y completo, bajo estricto control internacional. Por ello, México ha apoyado resoluciones adoptadas en el marco de la Primera Comisión sobre prevención de la carrera armamentista en el espacio ultraterrestre; medidas de transparencia y fomento de la confianza en las actividades relativas al espacio ultraterrestre; así como sobre cooperación internacional para la utilización del mismo con fines pacíficos.

México considera que todas las armas de destrucción en masa, incluyendo las nucleares y todas las de efecto indiscriminado o inhumano, deben ser prohibidas y eliminadas, independientemente de su clase o ubicación. Por tal razón, rechaza el emplazamiento de cualquier tipo de arma en el espacio ultraterrestre. El emplazamiento de armas en el espacio exterior sería contrario a los tratados internacionales vigentes, tales como el Tratado sobre los principios que deben regir las actividades de los Estados en la exploración y utilización del espacio ultraterrestre, incluso la Luna y otros cuerpos celestes (1967) y el Acuerdo que debe regir las actividades de los Estados en la Luna y otros cuerpos celestes (1979).

México reitera que todas las armas nucleares deben ser prohibidas y eliminadas, independientemente de su clase o ubicación, en concordancia con el Tratado sobre la Prohibición de las Armas Nucleares.

1. Amenazas a los sistemas espaciales y riesgos para la seguridad, existentes o potenciales

El incremento del número actores genera mayores posibilidades de incidentes con los sistemas espaciales y, por ende, mayor riesgo de conflictos. El creciente número de Estados y actores no estatales involucrados en actividades espaciales, si bien está generando innovación y beneficios, también implica la existencia de competencia en el espacio.

En este contexto, los Estados están explorando el desarrollo de capacidades ofensivas y defensivas para proteger los sistemas espaciales de eventuales ataques. Además, los Estados están reorganizando sus actividades espaciales con fines de seguridad nacional. Estos crecientes usos y dependencia del espacio ultraterrestre para la seguridad nacional, así como el incremento de capacidades del control del mismo espacio, genera un riesgo mayor de que eventuales incidentes en el espacio ultraterrestre puedan desencadenar o intensificar conflictos.

Riesgos vinculados con la congestión orbital y el incremento de la basura espacial (*space debris*).

Los sistemas basados en el espacio sustentan una amplia gama de actividades (tanto civiles como militares) que pueden ser vitales para la economía global.

Sin embargo, los riesgos de la congestión orbital y la basura espacial, así como las amenazas de las tecnologías o la incertidumbre sobre los comportamientos orbitales, siguen multiplicándose. El aumento significativo y continuo del número de objetos espaciales ha hecho que las órbitas estén cada vez más congestionadas, aumentando el riesgo de colisiones.

En efecto, la cantidad de basura espacial en la órbita sigue creciendo debido a nuevos lanzamientos y a las fragmentaciones de los objetos existentes. Además, la gran mayoría de los desechos orbitales potencialmente dañinos no son objeto de un seguimiento regular. Aunque el cumplimiento de las directrices existentes para la mitigación de los desechos orbitales ha mejorado un poco, los índices actuales (entre el 40 y el 60%, según el régimen orbital) están lejos de lo necesario para evitar el crecimiento continuo de las colisiones entre desechos.

Las actuales directrices sobre desechos orbitales, y en concreto la llamada "regla de los 25 años", se basaba en suposiciones sobre el entorno espacial, número de satélites y promedio de vida útil de éstos que ya no son válidas. El creciente número de satélites pequeños, la reducción de la vida útil de los satélites y la posibilidad de crear grandes constelaciones comerciales de miles de satélites plantean nuevos retos. Al mismo tiempo, el aumento de las opciones de conocimiento de la situación del espacio comercial, el servicio en órbita de los satélites y la eliminación activa de los desechos podrían proporcionar algunos beneficios, aunque estas actividades también crean desafíos políticos y legales propios.

Aunque hay un mayor esfuerzo comercial y político para rastrear, supervisar y eliminar activamente los desechos, por la dimensiones del problema seguirá siendo un desafío en el futuro.

En este contexto de congestión orbital y de incremento *space debris*, México estima que el riesgo de malentendidos o errores de cálculo entre los operadores de los sistemas espaciales aumenta, así como de eventuales conflictos. Por lo tanto, las conversaciones transparentes para entender las intenciones son vitales, considerando que mantener un diálogo abierto y colaborativo explicando la naturaleza de las acciones genera confianza.

Militarización del espacio ultraterrestre. El espacio es, desde hace tiempo, un escenario de interés y relevancia geopolítica. Las consideraciones sobre su militarización son un componente estratégico de la agenda de seguridad de las principales potencias militares.

Algunas de las principales potencias militares han anunciado la creación de comandos espaciales. Algunos Estados persiguen el desarrollo de controvertidas capacidades militares hipersónicas, misiles a propulsión nucleares, armas cinéticas para neutralizar misiles balísticos intercontinentales y diferente armamento radioelectrónico con potentes emisiones de interferencia.

En un contexto de posible militarización del espacio ultraterrestre, México estima que resulta prioritario iniciar un proceso de negociación multilateral para adoptar un código de fomento de la confianza y transparencia en las actividades espaciales, junto con medidas jurídicamente vinculantes que establezcan directrices racionales a la peligrosa competencia militar en el espacio. Ese objetivo urgente debería, entre otras cuestiones, prohibir el despliegue y uso de armas convencionales de última generación y reafirmar que el espacio exterior es un ámbito compartido para uso pacífico y de desarrollo, conforme a los principios de cooperación ya adoptados desde 1963 en el seno de la Organización de las Naciones Unidas.

México estima importante definir conceptos subjetivos como el de percepción de amenaza y llegar a un consenso sobre lo que esto implica. Debe seguirse trabajando en las medidas de transparencia y fomento de la confianza para eliminar percepciones erróneas y las preocupaciones de seguridad, y poder caracterizar de manera más específicas, las acciones que puedan ser consideradas irresponsables o amenazas.

2. Acciones y actividades que puedan ser consideradas como responsables o irresponsables o que puedan constituir amenazas

Es necesario tener presente que el artículo IX del Tratado sobre los principios que deben regir las actividades de los Estados en la exploración y utilización del espacio ultraterrestre, incluso la Luna y otros cuerpos celestes de 1967, establece que los Estados deberán llevar a cabo todas sus actividades en el espacio ultraterrestre teniendo "debidamente en cuenta los intereses correspondientes de todas las demás Estados partes".

Además, se han añadido nuevos compromisos basados en los principios de prevención, diligencia debida y no injerencia perjudicial para reducir los peligros de malentendidos o errores de cálculo de las actividades que puedan dar lugar a recelos, especialmente en una situación en la que los Estados carecen de información clara y oportuna.

Las medidas de transparencia y fomento de la confianza (TCBM) que puedan adoptar los Estados pueden ayudar a eliminar las percepciones erróneas y las preocupaciones de seguridad subyacentes, proporcionar garantías sobre las intenciones, reducir el peligro de conflictos involuntarios (por ejemplo, proporcionando indicadores de alerta temprana) y crear mejores condiciones para la introducción de medidas más estrictas en general.

Desde 2015, en virtud de la resolución 69/38, se ha alentado a los Estados miembros con actividades espaciales militares y de seguridad nacional a que incluyan en su informe dichos gastos espaciales militares, así como otras actividades espaciales de seguridad nacional, según corresponda.

En todo caso, México considera que la transparencia y las medidas de fomento de confianza relevantes siempre y cuando estén orientadas hacia la adopción de un instrumento jurídicamente vinculante.

México estima que es necesario considerar que la seguridad internacional es indivisible. Por lo tanto, las acciones que favorezcan la seguridad de un Estado en detrimento de la seguridad colectiva, pueden entrañar actividades hostiles y una amenaza para la seguridad internacional.

En todo caso, México estima que la iniciativa de impulsar conductas responsables en el espacio ultraterrestre, no debe descartar o impedir el avance en el camino de la prohibición del emplazamiento de armas en el espacio ultraterrestre o la prohibición del desarrollo de cualquier arma que ponga en riesgo los objetos espaciales y que impliquen el uso no pacífico del espacio ultraterrestre. En otras

palabras, debe estar encaminada hacia la adopción de un instrumento jurídicamente vinculante.

3. Perfeccionamiento y aplicación de normas, reglas y principios de conductas responsables y reducir los riesgos

México siempre ha defendido la necesidad de establecer un acuerdo internacional jurídicamente vinculante, que cumpla con los principios de equidad, viabilidad y verificación que permita adoptar las medidas necesarias encaminadas a preservar el espacio ultraterrestre como patrimonio común de la humanidad, prohibiendo su utilización con fines bélicos y, en particular, prohibiendo todo emplazamiento de armas, de modo que solo se favorezca la cooperación internacional para su utilización pacífica.

Además, por lo que respecta a la regulación del riesgo que representan los “desechos espaciales”, México ha apoyado la iniciativa de Canadá, Alemania y la República Checa para crear un compendio de acciones para mitigar estos desechos, presentada como una contribución a la agenda del 53º periodo de sesiones de la Subcomisión Legal de COPUOS, y que constituye el primer documento con información directa de los Estados miembros sobre sus medidas de regulación para la reducción y eliminación de desechos espaciales.

México ha participado en las convocatorias del Instituto de Naciones Unidas para la Investigación sobre el Desarme (UNIDIR) y tomado parte en las tres reuniones de consultas abiertas para elaborar un Código de Conducta sobre Actividades Espaciales. La intención de este código es crear normas para el uso del espacio ultraterrestre con fines pacíficos, la seguridad y medidas de sostenibilidad y creación de confianza para actividades espaciales. El Código no constituye un instrumento vinculante y, principalmente, es una medida para mejorar la generación de confianza.

México estima que el desarrollo de normas para gobernanza del espacio ultraterrestre debe ser inclusivo. Todo los Estados, incluidos aquellos en desarrollo, deben tomar parte en la creación de normas y reglas que permita el uso y exploración inclusivos del espacio ultraterrestre.

Además, como se indicó anteriormente, México considera conveniente avanzar hacia la adopción de un instrumento jurídicamente vinculante que prohíba todo emplazamiento de armas en el espacio ultraterrestre. Este instrumento internacional debe fomentar la confianza y transparencia en las actividades espaciales.

México estima que, considerando la relevancia del tema, un proceso de consultas impulsado por el Secretario General -que no prejuzgue sobre las alternativas futuras- es una forma adecuada de avanzar en las discusiones sobre la reducción de las amenazas relacionadas con el espacio.

México reconoce que hay aspectos de la actividad espacial en los que es difícil distinguir entre actividades militares y civiles, o entre usos pacíficos y hostiles, por lo que es importante que haya una discusión sobre este tema de manera amplia y democrática en la Asamblea General.

Dentro de las consultas que se realicen sobre el tema, se debe tomar en cuenta el desarrollo exponencial de las actividades espaciales por un número mayor de Estados, así como por empresas privadas que han pasado a ser actores principales en la exploración espacial, con propósito de naturaleza civil, militar y de uso dual.

México estima que, ante las crecientes amenazas a la seguridad internacional, los Estados deben privilegiar los procesos multilaterales y la cooperación. El espacio ultraterrestre debe permanecer abierto a todos los Estados para que puedan utilizarlo con fines exclusivamente pacíficos. Asimismo, es indispensable que sea inclusivo el

proceso de elaboración de normas que regulen el uso y exploración y que prohíba el emplazamiento de cualquier tipo de arma en el espacio ultraterrestre.

Netherlands

[Original: English]

[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 UN's Sustainable Development Goals (SDGs). 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

Today's growing dependency on information and services provided by satellites for processes and systems around the world emerged in the past 10-20 years, which was a relatively stable and calm period internationally. However, due 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 commercialised: 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 (LEO). 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 UN General Assembly resolution 75/36 adopted last year, all UN member states 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 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 UN member states). By procuring satellite-related

⁴ The Netherlands recognises 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 UN treaties on outer space, the Netherlands takes the view that this use of outer space should 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.

services, a large number of UN 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 NGOs – 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 UN framework.

The Netherlands does not advocate duplicating 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 the one term to denote both 'security' and 'safety'. That is not to say that the distinction is not made at national level: in our view space security concerns the countering of 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 to actively clear up space debris can also be used to intentionally disable an adversary's satellites temporarily or even permanently. And technology used for inspecting, repairing or refuelling satellites in orbit can also be used to intentionally 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 summarised 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%, the number of satellites for technology development by 40%, and the number of earth observation satellites by almost 25%. These are phenomenal figures and they are only a taste of things to come, especially given developments in the area of miniaturised 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 UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), the Space Debris Mitigation Guidelines of the Inter-Agency Space Debris Coordination Committee (IADC) and standards developed by the International Organization for Standardization (ISO) and the European Cooperation for Space Standardization (ECSS). 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 (ASATs). Ground-launched weapons or the intentional creation of space debris can also be used to deny use of reconnaissance and communications satellites in low Earth orbit. Lastly, 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 and timing (PNT) data are part of our critical infrastructure, which includes electricity supplies and mobile phone and data networks. We can no longer imagine our 'smart' world without reliable weather forecasts, digital payments or track & 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 GPS-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 (GNSS) 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 - The Netherlands' view on responsible behaviour/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 characterises 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 cyber operations;
 - 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 outer space and 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 (RPOs) **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 - The Netherlands' view on strengthening the normative framework

In the Netherlands' view, 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 cyber activities.

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 **MILAMOS⁵ Project**. If we look at the treaty framework in practice, however, we see that **not all States are party to all UN treaties on outer space**. The Netherlands also appreciates initiatives, both past and present, by UN 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 Outer Space Treaty⁶ (1967) 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 UN member states of their national policies, strategies and doctrines with regard to space, including safety and security aspects.⁷ 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 United Nations 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 (HCoC)**. Through this forum, established in the international city of peace of 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 satellite density, time is an important factor in this respect. Points of contact that can be reached 24/7 are therefore indispensable, especially in cases where there is uncertainty about a party's intentions. Harmonised communication protocols which 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.

⁵ Manual on International Law Applicable to Military Uses of Outer Space.

⁶ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

⁷ 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 UN member states. The recent letter to parliament on this matter has therefore been included as an annexe to this contribution.

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 & 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 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 Netherlands' view, such steps could be taken on the basis of a **political commitment** and further **operationalised** by means of **norms, standards and principles**. The process started by UN General Assembly resolution 75/36 provides an important forum for all stakeholders in the public *and* private sectors, as well as NGOs, 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 cyber activities. 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 (ITPGRFA). 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

[Original: English]
[29 April 2021]

Norway is a steadfast proponent of seeking multilateral solutions to global challenges and welcomes resolution 75/36 of the UN General Assembly which enables 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.

The 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 (PNT), 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 (SAR) 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 Norway's overarching approach 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 recognise 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 PNT-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 Outer Space Treaty, international law applies to the conduct of states in outer space. This suggests that an exchange of views on how principles from existing regulatory regimes may be extended or applied to space and orbital systems could be beneficial. For example, on 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.

Resolution 75/36 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

[Original: English]

[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. Due 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 defense**, at the same time, the future of warfare is highly dependent on space: satellite information, ISR (Intelligence, Surveillance and Reconnaissance) capabilities, Command and Control (C2) systems, radar, missiles and missile defense 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 (ROK) believes that activities in space are imperative for **both prosperity and security**. For instance, in the ROK's *Space Development Promotion Act*, Article 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 citizen's lives by systemically promoting the development of outer space and by efficiently using and managing space objects." This epitomizes the ROK's view *vis-a-vis* space.

2. Risks/Hazards and Threats

With the advent of a New Space era, space is becoming **increasingly congested, contested, and competed** 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 which 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 **with limited capabilities to verify, combined with 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 backdrop, the ROK Government's preliminary view on the concept of "risks/hazards" and "threats" are as follows:

Space Risks/Hazards

The ROK Government believes the concept of space hazards include consequences **not caused by deliberate actions**. In ROK's domestic law, we already have the definition of space hazards. In the abovementioned ROK's *Act*, Article 2 defines the term "space hazards" as risks of crash, collision of space objects in outer space. In the *1st National Basic Plan for Space Hazards (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 which could give damage, injury, or harm to people's safety and space assets.

The hazards in outer space include any risks or/and dangers causing damage, injury, or harm to life and property in space or on ground caused by any space objects

or/and phenomena emerged naturally or/and artificially, which include both 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 that States are not certain about the intention of others' activities. With lack of understanding on the intentions behind any given activities and lack of transparency, more countries will rely on counter-space measures for defense and this will make the **spiral of cyclical escalation of tensions** towards **potential weaponization of space** and even **aggressive actions**. Thus, space threats and perceptions of those threats, no matter how we define them, will impact international security.

We could find that some try to define space threats based on the *capability itself* such as kinetic, non-kinetic, electronic, and cyber capabilities. Use, demonstration, or testing of those capabilities could threaten others. On the other hand, threats could be defined based on the *intention* of certain actions or activities to the space system and people, and the ROK Government preliminarily sees threat in that point of view. The ROK Government believes that any activities **intended to destroy, damage, deny, disturb, or degrade** space assets of other States should be deemed as a threat.

The ROK 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 LTS Guidelines or Space Debris Guidelines, provide some regulation of hazards and risks in outer space. On the other hand, the ROK 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, as well as the difficulty in identifying 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 of 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 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 ROK Government views that responsible behaviour includes measures to **increase transparency and build confidence**.

Already put in place in the final report of the UN Group of Governmental Experts on Space TCBMs, 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 maneuvers, uncontrolled high risk re-entries, emergency situations, intentional orbital breakups; and voluntary visits to launch sites and command and control centers, and demonstrations of space and rocket technologies*. Also in this context, the ROK Government believes that **space situational awareness (SSA)** is

imperative. In order to enhance visibility and predictability in space, sharing information gathered through States' SSA is increasingly necessary.

On the other hand, the ROK Government feels that irresponsible behaviour could include the very concept of a "space threat" mentioned in this report, particularly the types of behaviour that constitute a violation of the United Nations Charter or key principles of international humanitarian law. One example would be deliberately, in an armed conflict, hampering the functions of a satellite predominantly used for civilian purposes.

Irresponsible behaviour could also include activities that are not themselves threats, but those that have the objective possibility of provoking 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 norm, principles, and regulations unattended, and letting actors exercise free hands in outer space would be detrimental in light of the ever-increasing use of space.

The ROK Government views that this resolution is not 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 clarify the content of international legal norms so as to illuminate their scope of application to space security issues, and facilitate their application in light of rapid changes in space technology.

Russian Federation

[Original: Russian]
[26 April 2021]

В соответствии с пунктами 5 и 6 резолюции ГА ООН 75/36 от 7 декабря 2020 г. Российская Федерация имеет честь представить свой национальный вклад к докладу Генерального секретаря ООН 76-й сессии ГА ООН для дальнейшего обсуждения государствами-членами.

В последнее время риски превращения космоса в плацдарм агрессии и войны приобрели вполне реальные очертания. Военной доктриной Российской Федерации 2014 г. в качестве основной внешней военной опасности рассматривается намерение разместить оружие в космосе, в качестве военной угрозы – нарушение функционирования систем контроля космического пространства.

При этом под «военной опасностью» понимается состояние межгосударственных или внутригосударственных отношений, характеризующее совокупностью факторов, способных при определённых условиях привести к возникновению военной угрозы. Понятие «военная угроза» определено как состояние межгосударственных или внутригосударственных отношений, характеризующее реальной возможностью возникновения военного конфликта

между противостоящими сторонами, высокой степенью готовности какого-либо государства (группы государств), сепаратистских (террористических) организаций к применению военной силы (вооружённому насилию).

В этом контексте требует особого внимания и активной реакции со стороны международного сообщества и ООН реализация рядом государств-членов установок на размещение оружия в космосе, а также наращивание потенциала силового воздействия (как кинетического, так и некинетического) на космические объекты и использование космического пространства для ведения боевых действий. Осуществляются масштабные программы по разработке систем вооружений, предназначенных для применения силы или угрозы силой в космосе, из космоса или в отношении космоса.

Речь идёт о создании некоторыми государствами-членами ООН противоракетной группировки космического базирования (в т.ч. средств перехвата), а также средств несанкционированного воздействия на объекты орбитальной космической инфраструктуры. Вызывает вопросы и вывод на орбиту масштабной группировки малых спутников. Потенциал задействования данных средств для нанесения ущерба орбитальным объектам государств-членов ООН возрастает. При этом массовое размещение таких космических аппаратов негативно влияет на возможности других государств по осуществлению безопасных пусков ракет-носителей и не способствует обеспечению долгосрочной устойчивости космической деятельности.

Шаги, нацеленные на использование космического пространства для проведения военных операций (как «оборонительных», так и «наступательных», включая действия превентивного характера), продиктованы установками на достижение военного превосходства. Они оказывают самое негативное воздействие на международный мир и безопасность, чреваты резкой дестабилизацией обстановки и гонкой вооружений в космическом пространстве, что полностью подрывало бы перспективы ограничения и сокращения вооружений в целом.

Гонка вооружений в космосе, если её не удастся своевременно предотвратить, поглотит огромные материальные ресурсы, создаст непреодолимые преграды для международного сотрудничества в мирном освоении космического пространства и для использования результатов научно-технического прогресса в этой области в мирных целях.

В этой связи сейчас как никогда важно, чтобы полное исключение космоса из сферы гонки вооружений и его сохранение для мирных целей на благо всего человечества стали неукоснительной нормой национальной политики государств-членов ООН, общепризнанным международным обязательством. Необходимо не допустить пересмотра решений Первой спецсессии ГА ООН по разоружению 1978 г., направленных на проведение исследований и использование космоса сугубо в мирных целях, предотвращение гонки вооружений в космосе (ПГВК) и запуск соответствующих переговоров в русле Договора о космосе (ДК) 1967 г.

Для этого от государств-членов ООН требуется подтвердить приверженность действующим международно-правовым нормам и принципам, регламентирующим деятельность в космосе. В частности, речь о положениях Устава ООН, ДК, Договора о запрещении испытаний ядерного оружия в атмосфере, в космическом пространстве и под водой 1963 года, Декларации правовых принципов деятельности государств по исследованию и использованию космического пространства 1963 года, Конвенции о международной ответственности за ущерб, причинённый космическими

объектами 1972 года, Конвенции о запрещении военного или любого иного враждебного использования средств воздействия на природную среду 1977 года.

Статья 2 Устава ООН закрепляет принцип воздерживаться в международных отношениях от угрозы силой или её применения, в т.ч. в космосе, из космоса или в отношении космоса.

В соответствии со Статьей 3 ДК и пунктом 4 Декларации правовых принципов деятельности государств по исследованию и использованию космического пространства государства обязуются осуществлять «деятельность по исследованию и использованию космического пространства, в том числе Луны и других небесных тел, в соответствии с международным правом, включая Устав ООН, в интересах поддержания международного мира и безопасности и развития международного сотрудничества и взаимопонимания».

Статья 4 ДК предусматривает, что государства обязуются не выводить «на орбиту вокруг Земли любые объекты с ядерным оружием или любыми другими видами оружия массового уничтожения, не устанавливать его на небесных телах и не размещать такое оружие в космическом пространстве каким-либо иным образом. Луна и другие небесные тела должны использоваться (...) исключительно в мирных целях». Более того, Статья 1 Договора о запрещении испытаний ядерного оружия в атмосфере, в космическом пространстве и под водой обязует государства «запретить, предотвращать и не производить любые испытательные взрывы ядерного оружия и любые другие ядерные взрывы в любом месте, находящемся под его юрисдикцией или контролем: в атмосфере; за её пределами, включая космическое пространство; под водой, включая территориальные воды и открытое море».

Статья 4 ДК также запрещает «создание на небесных телах военных баз, сооружений и укреплений, испытание любых типов оружия и проведение военных манёвров». При этом разрешается использование военного персонала для научных исследований или в каких-либо иных мирных целях, а также любого оборудования или средств, необходимых для мирного исследования Луны и других небесных тел.

Согласно Статье 7 ДК, «каждое государство-участник Договора, которое осуществляет или организует запуск объекта в космическое пространство, включая Луну и другие небесные тела, а также каждое государство-участник Договора, с территории или установок которого производится запуск объекта, несёт международную ответственность за ущерб, причинённый такими объектами или их составными частями на Земле, в воздушном или в космическом пространстве, включая Луну и другие небесные тела, другому государству-участнику Договора, его физическим или юридическим лицам».

Статья 9 ДК предписывает, что «если какое-либо государство-участник Договора имеет основания полагать, что деятельность или эксперимент, запланированные этим государством-участником Договора или гражданами этого государства-участника Договора в космическом пространстве, включая Луну и другие небесные тела, создадут потенциально вредные помехи деятельности других государств – участников Договора в деле мирного исследования и использования космического пространства, включая Луну и другие небесные тела, то оно должно провести соответствующие международные консультации, прежде чем приступить к такой деятельности или эксперименту. Государство-участник Договора, имеющее основание полагать, что деятельность или эксперимент, запланированные другим государством – участником Договора в космическом пространстве, включая Луну и другие небесные тела, создадут потенциально вредные помехи деятельности в деле мирного исследования и использования космического

пространства, включая Луну и другие небесные тела, может запросить проведения консультаций относительно такой деятельности или эксперимента».

В соответствии со Статьей 1 Конвенции о запрещении военного или любого иного враждебного использования средств воздействия на природную среду государства обязуются «не прибегать к военному или любому иному враждебному использованию средств воздействия на природную среду, которые имеют широкие, долгосрочные или серьёзные последствия, в качестве способов разрушения, нанесения ущерба или причинения вреда любому другому государству-участнику». При этом Статьей 3 допускается использование средств воздействия на природную среду в мирных целях.

Помимо подтверждения действующих международно-правовых принципов космической деятельности, государствам-членам ООН необходимо также зафиксировать международное обязательство о том, что в космосе (в т.ч. на орбите вокруг Земли и на небесных телах) не должно размещаться оружие любого вида. Требуется также запрет на применение или угрозу применения силы в отношении космических объектов, а также с их использованием.

Следовательно, государства-члены должны взять на себя обязательства:

- не задействовать космические объекты в качестве средства поражения любых целей на Земле, в воздушном и в космическом пространстве;
- не уничтожать, не повреждать, не нарушать нормального функционирования и не изменять траекторию полёта космических объектов других государств;
- не создавать, не испытывать и не развёртывать космическое оружие любых видов базирования для выполнения любых задач, в т.ч. для противоракетной обороны, в качестве противоспутниковых средств, для использования против целей на Земле или в воздухе, а также ликвидировать уже имеющиеся у государств такие системы;
- не испытывать и не использовать в военных, в том числе противоспутниковых, целях пилотируемые космические корабли;
- не оказывать содействие и не побуждать другие государства, группы государств, международные, межправительственные, а также любые неправительственные организации, включая неправительственные юридические лица, учреждённые, зарегистрированные или расположенные на территории, находящейся под их юрисдикцией и/или контролем, к участию в указанной выше деятельности.

Таким образом, в соответствии с решениями Первой спецсессии ГА ООН по разоружению 1978 г. Российская Федерация предлагает договориться о принципиальном решении вопроса по предотвращению гонки вооружений в космическом пространстве и сохранении космоса для мирных целей – ввести полный и всеобъемлющий запрет на космические ударные вооружения, а также на любые средства наземного, воздушного или морского базирования, предназначенные для поражения объектов в космосе.

Указанные задачи закреплены в Военной доктрине Российской Федерации 2014 г. В частности, она предусматривает противодействие попыткам отдельных государств (групп государств) добиться военного превосходства путём размещения оружия в космическом пространстве, заключение международного договора о предотвращении размещения в космическом пространстве любых видов оружия и согласование в рамках ООН элементов нормативного регулирования безопасного осуществления космической

деятельности, включая безопасность операций в космическом пространстве в их общетехническом понимании.

Российская Федерация последовательно проводит линию на запуск переговоров по разработке международного юридически обязывающего инструмента по предотвращению гонки вооружений в космическом пространстве и его сохранению для мирных целей, запрещающего размещение в космосе любых видов вооружений, а также применение силы или угрозы силой в космосе, из космоса или в отношении космоса. В этих целях в 2008 г. Российская Федерация и КНР внесли для рассмотрения Конференцией по разоружению (КР) проект договора о предотвращении размещения оружия в космическом пространстве, применения силы или угрозы силой в отношении космических объектов, а в 2014 г. – его обновлённую версию, учитывающую высказанные рядом государств замечания и предложения. Документ находится на столе переговоров КР, имеет всеобъемлющий характер и должен стать основой для выработки соответствующего многостороннего инструмента.

Стабилизировать ситуацию на период, пока такой многосторонний инструмент будет вырабатываться, призвана выдвинутая Российской Федерацией и ставшая уже международной инициатива/политическое обязательство о неразмещении первыми оружия в космосе (НПОК). Полноформатными участниками НПОК стали уже три десятка государств.

Данное политобязательство является наиболее эффективной, практически реализуемой, реально функционирующей и набирающей всё большее число сторонников инициативой, делая разработку космических ударных систем нецелесообразной. Будучи одной из мер транспарентности и доверия, осуществляемой в целях ПГВК, инициатива по НПОК за последние годы стала существенным политическим фактором, способствующим укреплению международного мира, обеспечению равной и неделимой безопасности для всех, а также повышению предсказуемости и устойчивости деятельности государств по исследованию и использованию космического пространства в мирных целях.

Принимаемые ГА ООН на ежегодной основе резолюции по НПОК и по мерам транспарентности и доверия в космической деятельности, пользующиеся широкой поддержкой, свидетельствуют о том, что большинство государств-членов ООН разделяют подходы Российской Федерации в пользу предотвращения гонки вооружений в космическом пространстве, а также его сохранения для мирных целей, свободным от любых видов вооружений.

ООН призвана возвысить свой голос в пользу скорейшего достижения посредством переговоров соответствующих надёжно контролируемых юридически обязывающих многосторонних соглашений.

Только гарантированное предотвращение гонки вооружений в космическом пространстве и сохранение космоса для мирных целей обеспечит возможность его использования на благо человечества, его освоения в целях созидания, а не разрушения.

Важным фактором в контексте космической безопасности также является обеспечение долгосрочной устойчивости космической деятельности, под которой в соответствии с согласованным государствами-членами ООН определением понимается способность поддерживать осуществление космической деятельности таким образом, чтобы обеспечивать достижение целей справедливого доступа к результатам исследования и использования космического пространства в мирных целях, чтобы удовлетворить потребности

нынешних поколений и сохранить космос свободным для мирного использования будущими поколениями.

При разработке Руководящих принципов обеспечения долгосрочной устойчивости космической деятельности преследовались задачи устранения неблагоприятных факторов природного и антропогенного характера, которые могут представлять угрозу в космосе и долгосрочной космической деятельности.

Исторически сложилось так, что проблематикой космического мусора, долгосрочной устойчивости космической деятельности и другими смежными вопросами занимался и продолжает заниматься КОПУОС. В 2019 г. 62-я сессия КОПУОС консенсусным решением утвердила 21 руководящий принцип обеспечения долгосрочной устойчивости космической деятельности и преамбулу к ним. Тем же решением предусматривалось создание новой профильной Рабочей группы Научно-технического подкомитета КОПУОС.

Более того, непосредственно в тексте преамбулы закреплён принцип, согласно которому главной площадкой для продолжения диалога по вопросам, касающимся осуществления и обзора руководящих принципов, является КОПУОС. Предусмотрена также процедура пересмотра руководящих принципов с тем, чтобы они служили действенным руководством в деле обеспечения долгосрочной устойчивости космической деятельности.

Очевидно, что цель обеспечения и повышения долгосрочной устойчивости космической деятельности неразрывно связана, и это также закреплено в преамбуле к Руководящим принципам, с необходимостью неуклонного улучшения того, как государства и международные организации остаются приверженными использованию космического пространства в мирных целях в процессе разработки, планирования и осуществления своей космической деятельности. Понятно, что без решения задачи сохранения космического пространства в мирных целях невозможно обеспечить долгосрочную устойчивость космической деятельности. Вместе с тем предотвращение гонки вооружений в космическом пространстве, сохранение его свободным от оружия любого вида лежит вне мандата КОПУОС и относится к компетенции разоруженческого механизма ООН.

Российская Федерация исходит из того, что весь широкий спектр вопросов, связанных с обеспечением безопасности при ведении космической деятельности (за исключением проблематики предотвращения гонки вооружений в космическом пространстве), относится к ведению Комитета ООН по вопросам космического пространства и не должен дублироваться на других площадках, в т.ч. в рамках ООН.

Российская Федерация просит Вас, господин Генеральный секретарь, учесть представленные выше соображения в Вашем содержательном докладе во исполнение пунктов 5 и 6 резолюции ГА ООН 75/36 от 7 декабря 2020 г., а также включить настоящий документ в приложение к Вашему докладу.

Slovenia

[Original: English]
[3 May 2021]

I. Introduction

The Republic of 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 UN 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 Slovenia's view, 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. The 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 work *The Problem of Space Travel: The Rocket Motor* of 1929. As such, he did not only intrigue Slovenian artists of the 1980s and 1990s, but also inspired the establishment of the government-sponsored Herman Potočnik Noordung Center 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 this connection, it is important that all space activities are conducted in accordance with international law, including the UN Charter, the Outer Space Treaty and other applicable international instruments, which govern outer space activities.

Today's space systems are integral to national security, daily life of every citizen on our planet and 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 environment and better mitigation of and adaptation to the impacts of climate change as well as 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 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 only recently, 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 underway, will act as a vehicle for Slovenia's future peaceful activities 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

complex environment with various interests and a wide range of space actors makes it more complicated to protect space assets against security risks as well as to identify possible threats.

The growth of space objects in orbit primarily 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 (ASAT) capabilities, be it ground based or co-orbital. Any intentional activity, such as ASAT testing would result in satellite destruction and 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 electromagnetic, and use of high-powered lasers or cyber-attacks, which could occur from the ground or from space, but without 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 approaches 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 through 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 serve 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 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 the norms related to 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;

- 1) information sharing about national space policies, goals, strategies and doctrines;
- 2) adoption of measures to ensure compliance with norms, rules and principles of responsible behaviours by national non-space actors;
- 3) establishment of consultative mechanisms for de-escalation of tension and risk reduction;
- 4) establishment of direct line of communication between governments, including relevant space authorities for the management of perception of threats; and
- 5) 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 to effectively address present and future challenges to peaceful exploration and use of outer space. Slovenia will therefore remain a reliable and constructive partner in this important quest.

Sweden

[Original: English]
[3 May 2021]

Sweden fully aligns itself with the submission by the European Union and wishes to also submit this contribution in its national capacity to the Secretary-General's substantive report according to UN General Assembly Resolution 75/36, in response to the letter of the Office for Disarmament Affairs with reference ODA/2021-00005/Outer space.

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 Outer Space Treaty. 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 UNGA Resolution 75/36 “Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours” as an important step forward. Sweden underlines the importance of a continued multilateral process with the purpose of agreeing norms, rules, and principles for responsible state behavior 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 of 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 to disrupt collection of data essential for services on which society has come to rely. This adds complications to space operations and increases both the technical requirements and costs, for example associated with collision avoidance. These challenges risk limiting the peaceful use of outer space, in particular in the most demanded orbits. In 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 in COPUOS with the establishment of multilaterally agreed guidelines on space debris mitigation and, most recently, with the adoption of the Preamble and 21 Guidelines on the Long-Term Sustainability of Outer Space Activities (LTS). It is important that these guidelines are implemented to the largest extent possible by all space actors, and that the work in COPUOS is continued. Similar steps must now be taken also in the security and disarmament fora 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:

- **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 conduction of ASAT 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 destructions of space objects as in the case of kinetic anti-satellite tests, should be considered irresponsible. Sweden urges states to refrain from this behaviour.
- **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 it enables services such as active debris removal and on-orbit servicing. However, due 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 this was not the actual intention. In combination with the lack of established norms and rules regarding such operations, this constitutes a risk for misunderstandings and miscalculations, and thereby 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 thereby be considered irresponsible.
- **Non-kinetic threats against space systems:** Other non-kinetic threats against space systems include inter alia cyber attacks, 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 in or outside outer space. Sweden believes that these activities may be considered irresponsible when they jeopardise 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 behavior 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, 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 (TCBM). Multilateral discussions to promote responsible behaviours and reduce risks could also include discussions on TCBM's, 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 verification of events. Sweden also underlines that the implementation of the COPUOS Long-Term Sustainability Guidelines, as well as the continued work in COPUOS, 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 behaviors could thereby also help to create the momentum for further steps in the future.

Switzerland

[Original: French]
[3 May 2021]

Introduction

Le présent document offre les vues de la Suisse sur les menaces et les risques pour la sécurité des systèmes spatiaux ainsi que sur les comportements responsables et irresponsables dans l'espace extra-atmosphérique. Cette soumission propose des idées sur la poursuite de l'élaboration et de l'application de normes de comportement responsable dans l'espace extra-atmosphérique, comme demandé par le Secrétaire général conformément à la résolution 75/36 de l'Assemblée générale. En tant que co-sponsor de la résolution, la Suisse considère qu'une approche comportementale pourrait contribuer à accroître la sécurité dans l'espace extra-atmosphérique, en complément d'autres efforts, approches et instruments. Toutes les activités spatiales, y compris les activités militaires, doivent respecter le droit international existant. Cela inclut notamment le Traité sur l'espace extra-atmosphérique, la Charte des Nations Unies et, dans le contexte d'un conflit armé, le droit international humanitaire.

L'espace extra-atmosphérique est crucial pour la prospérité de l'humanité. Tous les États sont de plus en plus dépendants des applications spatiales avec une multiplication des activités et des acteurs dans l'espace. La congestion et la concurrence entre États qui en résultent entraînent des défis accrus en matière de sûreté et de sécurité dans l'espace et sur Terre. Pour surmonter ces défis, il faut s'efforcer de renforcer la mise en œuvre effective du droit international, des normes et des standards existants, ainsi que des efforts pour en clarifier davantage le contenu. Dans ce contexte, la Suisse note que, bien que des progrès aient été possibles ou des processus soient en cours pour faire face aux risques et dangers dans l'espace extra-atmosphérique, les menaces pour la sécurité dans l'espace restent largement non adressées au niveau international à ce stade.

Dans ce contexte, la Suisse se félicite de l'adoption de la résolution 75/36 de l'AGNU et de l'approche qu'elle propose pour relever progressivement les défis en matière de sécurité spatiale. La Suisse estime qu'il serait utile de faire avancer les différents éléments soulevés dans la résolution de manière structurée dans le cadre d'un organe mandaté par l'ONU, qui devrait être de nature inclusive de préférence.

Menaces et risques pour la sécurité des systèmes spatiaux

Une dépendance croissante à l'égard des systèmes spatiaux à des fins tant civiles que militaires se traduit par une augmentation des menaces et des risques pour la sécurité. Certaines de ces menaces pourraient mettre en péril la stabilité dans l'espace et avoir une incidence négative sur la durabilité de l'utilisation de l'espace à des fins pacifiques.

Un nombre croissant d'États cherchent à utiliser l'espace pour renforcer leurs capacités militaires et leur sécurité nationale. Diverses opérations militaires terrestres ou aériennes reposent sur des technologies spatiales, y compris des systèmes de commandement et de contrôle. En réponse à ces développements, un nombre croissant de pays développent des capacités contre-spatiales, dont des capacités cinétiques et non cinétiques, électroniques (telles que le brouillage (jamming) ou le leurrage (spoofing)) et cybernétiques. L'utilisation de capacités contre-spatiales présente des risques pour les systèmes spatiaux tant militaires que civils (et commerciaux). En outre, le ciblage des systèmes spatiaux militaires peut entraîner de graves menaces pour la sécurité internationale, car certains systèmes de commande et de contrôle sont utilisés à la fois pour les capacités conventionnelles et nucléaires.

Les capacités contre-spatiales cinétiques provoquant des destructions permanentes et irréversibles, exacerbent les risques quant à l'utilisation pacifique de l'espace extra-atmosphérique par la création de débris spatiaux. Dans ce contexte, le développement, les essais et l'utilisation potentielle de capacités antisatellites (ASAT) à ascension directe sont particulièrement préoccupants.

De même, les capacités contre-spatiales de nature non cinétique, y inclus les capacités optiques, électroniques et cybernétiques, peuvent menacer les biens spatiaux civils et militaires. Bien que ces capacités ne causent pas nécessairement des dommages physiques permanents, elles peuvent mettre temporairement hors service des biens spatiaux essentiels et affecter leur fiabilité. Un tel comportement peut susciter à son tour des mesures de représailles ou aboutir à rendre des biens spatiaux inopérables qui peuvent se transformer à leur tour en débris spatiaux, présentant un danger de sûreté supplémentaire. De plus, certains de ces capacités contre-spatiales sont plus abordables et leur utilisation plus difficile à détecter et à attribuer que des capacités contre-spatiales cinétiques.

Les opérations de rendez-vous et de proximité orbitale (RPOs) inamicales représentent une menace pour la sûreté et la sécurité des systèmes spatiaux. Le rapprochement délibéré à proximité de satellites étrangers sans coordination, sans

connaissance préalable ou sans consentement peut être interprété comme un acte hostile. Les RPOs peuvent être utilisés pour observer, désactiver ou menacer les satellites d'un autre pays. La menace de RPOs hostiles peut amener les pays à équiper les satellites de capacités défensives, ce qui soulèverait des questions concernant la militarisation de l'espace.

En outre, le placement d'armes dans l'espace extra-atmosphérique sous la forme d'armes espace-sol ou d'intercepteurs de missiles a également le potentiel d'augmenter le risque de transformer l'espace en un domaine de confrontation militaire et d'avoir un impact négatif sur la sécurité et la stabilité de l'espace. Les contre-mesures à ces menaces constitueraient des risques supplémentaires pour la sécurité et la stabilité de l'espace.

Enfin, les préoccupations liées aux menaces ou aux risques envers les systèmes spatiaux concernent non seulement le développement de capacités contre-spatiales mais aussi l'adoption de doctrines par certains États et alliances militaires considérant l'espace comme un domaine de confrontation militaire.

De nombreuses menaces et risques susmentionnés concernent à la fois des questions de sûreté et de sécurité, qui sont étroitement liées. Les débris peuvent être créés par des activités pacifiques, comme le lancement de satellites, ou de manière délibérée par un ASAT. Une fois créés, les débris spatiaux à longue durée de vie présentent un risque important pour la sûreté d'autres activités spatiales, y compris celles à des fins pacifiques. Les efforts visant à renforcer à la fois la sûreté et la sécurité de l'espace sont essentiels pour la durabilité des activités spatiales. Cependant, alors que les processus internationaux traitent des utilisations pacifiques de l'espace et abordent les risques et les dangers, les menaces croissantes pour la sécurité dans l'espace restent largement non adressées. Il est essentiel que ces défis en matière de sécurité soient abordés dans le cadre d'un processus ou d'un organe spécifique.

Les comportements responsables et irresponsables et leur impact potentiel sur la sécurité internationale

Un certain nombre de comportements peuvent contribuer favorablement à la sécurité internationale, tandis que d'autres comportements ont un impact négatif et déstabilisent la sécurité internationale dans l'espace. Compte tenu des difficultés inhérentes à la vérification des activités spatiales, et en particulier de la difficulté de vérifier l'intention qui sous-tend certaines actions, une approche fondée sur le comportement et axée sur les résultats semble être prometteuse. En se concentrant sur les comportements et leurs conséquences, on peut ainsi déterminer les résultats d'une action donnée indépendamment de son intention supposée ou réelle.

L'application complète des obligations existantes concernant l'espace extra-atmosphérique constitue le fondement du comportement responsable des États. Leur universalisation contribuerait favorablement à la sécurité internationale. De plus, un large éventail de mesures de transparence et de confiance (TCBM) peut renforcer la sécurité internationale et réduire le risque d'escalade. Ces mesures comprennent le partage d'informations, notamment sur les politiques et programmes militaires nationaux dans l'espace, les notifications préalables aux lancements de missiles et aux lancements spatiaux, aux manœuvres et opérations de proximité orbitale, ainsi que l'enregistrement des objets spatiaux dans un registre national ou auprès de l'ONU. Une autre mesure de prévention des conflits potentiellement utile pourrait être la mise en place d'un système de conscience situationnelle de l'espace (SSA) collaboratif et ouvert, qui non seulement permettrait d'assurer la transparence des activités spatiales, mais constituerait également une mesure de coopération essentielle. Un SSA multilatéral contribuerait également à relever les défis de la sûreté des activités spatiales.

Un comportement responsable implique également de s'abstenir d'actions qui auraient une forte probabilité d'entraîner des perceptions erronées et, par conséquent, un risque d'escalade. Cela inclut, sans s'y limiter, de ne pas effectuer de rapprochements non consensuels ou des RPOs sans coordination, connaissance préalable ou consentement. De même, toutes les mesures possibles devraient être prises pour réduire la probabilité de création involontaire de débris spatiaux.

En outre, la Suisse considère qu'il est important que les doctrines spatiales militaires préservent le principe selon lequel l'exploration et l'utilisation de l'espace extra-atmosphérique doivent se faire à des fins pacifiques et pour le bénéfice et l'intérêt de tous les pays, conformément au Traité sur l'espace extra-atmosphérique. Les doctrines spatiales devraient également minimiser la possibilité d'un conflit armé dans l'espace extra-atmosphérique et inclure les principes du droit international humanitaire.

Il existe toute une série de comportements liés à l'espace qui pourraient être considérés comme créant une menace pour les autres systèmes spatiaux et la sécurité internationale. L'une des manifestations les plus évidentes d'un comportement irresponsable serait le placement d'armes dans l'espace. Il existe toute une série d'autres activités susceptibles de déstabiliser et d'avoir un impact négatif sur la sécurité internationale, y compris des actions non consensuelles et non transparentes comme les RPOs inamicales, ainsi que l'interférence cinétique ou non cinétique avec des objets spatiaux. En raison du risque à long terme que représentent les débris dans l'espace, toute activité susceptible d'entraîner la création de débris, dont le développement et l'essai de capacités antisatellites créant des débris, est particulièrement préoccupante et doit être considérée comme irresponsable.

Les systèmes basés dans l'espace étant de plus en plus essentiels pour l'activité humaine sur Terre, les comportements irresponsables susmentionnés ont des répercussions négatives sur la sécurité terrestre. Les menaces qui pèsent sur les systèmes spatiaux sont susceptibles de perturber les opérations civiles et militaires vitales et, par conséquent, d'accroître le risque d'escalade et de conflit. En outre, les menaces perçues en provenance et à destination des objets spatiaux se renforcent mutuellement et peuvent contribuer à une dynamique de course aux armements.

En raison de ce qui a été décrit comme un enchevêtrement (entanglement) croissant des infrastructures C4I spatiales nucléaires et non nucléaires, les menaces visant ces systèmes spatiaux pourraient créer une ambiguïté et conduire à une escalade nucléaire si elles étaient (mal)interprétées comme une attaque contre le système de commandement et de contrôle nucléaire.

Idées pour la poursuite de l'élaboration et de la mise en œuvre de normes, règles et principes de comportement responsable dans l'espace extra-atmosphérique

Il est essentiel de faire avancer l'adhésion au droit international existant ainsi que la mise en œuvre intégrale des normes et standards existants. Leur prise en compte et leur évaluation constituent le point de départ pour déterminer s'il est nécessaire d'établir de nouvelles règles ou normes.

Outre les obligations légales, les États devraient s'entendre sur ce qui constitue de comportements responsables en matière d'activités spatiales, par exemple en ce qui concerne le partage des informations, la notification et l'enregistrement des objets spatiaux. Étant donné les risques importants pour la sûreté et la sécurité liés à l'utilisation de capacités contre-spatiales cinétiques en particulier, une prohibition des armes antisatellites génératrices de débris pourrait constituer une priorité initiale.

Compte tenu du risque d'escalade involontaire d'actions mal comprises ou mal perçues comme une menace, des lignes de communication ouvertes entre les acteurs spatiaux constituent une mesure utile. Elles peuvent être utilisées pour notifier les

incidents et pour communiquer en temps utile. De même, le développement de capacités de conscience situationnelle de l'espace (SSA) collaboratif et ouvert contribue à accroître la transparence.

En outre, la Suisse encourage les États et les alliances militaires à adopter des doctrines spatiales retenant le principe selon lequel l'utilisation de l'espace extra-atmosphérique ne doit servir qu'à des fins pacifiques et à s'abstenir de le considérer comme un domaine de confrontation militaire.

De plus, il est important de tenir compte du rôle croissant des acteurs non étatiques tels que les milieux académiques et industriels en ce qui concerne les activités spatiales. Par exemple, la coopération avec les acteurs spatiaux commerciaux peut être bénéfique pour développer des standards communs de comportement responsable dans l'espace.

La Suisse estime qu'il serait particulièrement utile de poursuivre les discussions sur cette question multidimensionnelle dans le cadre d'un organe mandaté par l'ONU, afin de parvenir à une compréhension commune de ce qui constitue un comportement responsable et de ce qui constitue un comportement irresponsable ou menaçant. Ces discussions devraient avoir pour but de parvenir à des résultats concrets, adoptés et mis en œuvre par tous les États membres de l'ONU. Un tel organe devrait être de nature inclusive, car la question de la sécurité et de la durabilité de l'espace concerne tous les États membres de l'ONU.

United Kingdom⁸

[Original: English]
[30 April 2021]

This national submission from the United Kingdom responds to the Note Verbale ODA/2021-00005/Outer Space, “Submission of the report of the Secretary-General on Resolution 75/36 on Reducing space threats through norms, rules and principles of responsible behaviours”. 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 organisations 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.

⁸ This is the summary provided by the United Kingdom. The 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

In order to address these challenges, the international community must consider them holistically. A space system is composed of three equally important segments – 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 like 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. Firstly, “hazards” that could harm a space system – these 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 organisations, such as the Inter-Agency Space Debris Coordination Committee (IADC) and the UN International Telecommunications Union, as well as industry bodies, such as CONFERS⁹ 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 threaten¹⁰ 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 cyber capabilities. 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 Outer Space Treaty of 1967, alongside other bodies of international law such as the UN Charter, 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 (known as the PPWT), mainly because it considers only threats in space (rather than e.g. Earth-based threat systems) and does 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 “weaponisation” of space. The UK 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 UK sought to make a constructive step forward to build trust and increase transparency in space.

That ambition was behind the UK’s UN General Assembly Resolution, “Reducing space threats through norms, rules and principles of responsible behaviours” at UNGA 75. The resolution “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

⁹ The Consortium for Execution of Rendezvous and Servicing Operations

¹⁰ The use of the term “threat” in this paper includes, but is not necessarily limited to, the threat of the use of force as referred to in article 2(4) of the UN Charter

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 UK 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 UK believes that seven types of activity would benefit from further, expert-level discussion: (i) destruction of, or threat to destroy, a satellite; (ii) direct ascent ASAT¹¹ use; (iii) non-kinetic threats, such as lasers; (iv) threats aimed at creating loss of imagery/sight of space assets; (v) interference with PNT¹² signals from satellites; (vi) reducing the ability of a ground operator to control a satellite; and (vii) Rendezvous Operations and Proximity Operations.

The UK does not wish to be prescriptive in setting out how we might address these types of activity. Nevertheless, this 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. ASAT 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 PNT 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 UN 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.

¹¹ Anti Satellite

¹² Position, Navigation and Timing

United States of America

[Original: English]

[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 like communications, weather prediction, navigation, ocean monitoring, and climate modeling. 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 (New START), have relied on space-based national technical means of verification to monitor compliance.

The December 2020 U.S. National Space Policy states that it is the policy of the United States that “[a]ll 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 “[l]ead 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 forge 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 man-made. Natural threats to satellites include solar activity, radiation, and natural orbital debris, whereas examples of man-made threats include satellite launch debris, radiofrequency interference, malicious cyber activity, and anti-satellite (ASAT) weapons such as directed energy systems, or direct-ascent missiles.

Some States are developing, operationalizing, and stockpiling a variety of ASAT 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: 1) ground-space; 2) space-space; 3) ground-ground; and 4) space-ground. Within these categories, the threats can be described as 1) reversible, which include temporary effects such as interference with radiofrequency signals or dazzling of remote sensing systems, or 2) irreversible, which include 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 on the 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-to-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 maneuver 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 cyber activity or physical strikes on ground systems such as command and control (C2) 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: Used to disrupt, deny, deceive, or degrade space services including satellite communications and positioning, navigation and timing (PNT) 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 toward 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 (DEW): Anti-satellite DEWs are designed to produce reversible or non-reversible effects against space systems by emitting highly focused radiofrequency or laser energy. Types of DEWs could include lasers, microwaves, and particle beams. Reversible effects include temporarily blinding optical sensors, which may deny the ability to locate, monitor, and track objects. Non-reversible effects include permanently damaging or destroying sensors or other satellite components.

Cyber Threats to Satellite C2: Satellite command and data distribution networks could expose space systems, ground infrastructure, users, and the links connecting these segments to cyber threats. Malicious cyber activities from ground-based sites directed at satellite C2 links could range from disrupting data, or sending unauthorized commands to potentially take 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 centers, power plants or space launch sites, could also threaten satellite services.

ASAT Missiles: ASAT missiles could be launched from on-orbit spacecraft or from systems on the ground, in the air, or at sea for the purpose of degrading or destroying targeted satellites. ASAT 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 nonreversible counterspace 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 (LTBT), 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 maneuvering 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 deorbit 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 on-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 below summarizes the various types and capabilities that could be used as anti-satellite weapons, the threat categories, and whether that capability could potentially provide beneficial, dual-use functions. It also looks at whether the capability could be considered to create effects that are considered reversible, non-reversible or both. This 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

Capabilities	Category	Dual-Use	Damage Type
Kinetic ASAT	Space-Space, Ground-Space	No	Non-Reversible
Robotic Arm ASAT	Space-Space	Yes	Both
Radiofrequency Interference	Space-Space, Ground-Space	Yes	Reversible
DEW Low Power ASAT	Space-Space, Ground-Space	Yes	Reversible
DEW High Power ASAT	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
C2 Interference	Ground-Space, Ground-Ground	Accidental/non-malign possible	Both
On Orbit Servicer	Space-Space	Yes	Both
Active Debris Removal	Space-Space	Yes	Both
Malicious Cyber Activity	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 -- make 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 behaviors, efforts, or measures that could be considered during further development and implementation of norms, rules, and principles of responsible behaviors

States must be committed to maintaining a peaceful and secure outer space environment. In that 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 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 (1975) provide the foundation of the space international legal framework for outer space.

Development and Implementation of Transparency and Confidence-building Measures (TCBMs): The international community has recognized the importance and usefulness of TCBMs, which can significantly contribute to the promotion of peace, security, and disarmament. According to the consensus report of the UN Group of

Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189), “States should implement TCBMs to the greatest extent practicable, consistent with their national interests and obligations.” TCBMs can be developed and implemented by States and intergovernmental organizations unilaterally, bilaterally, regionally, and multilaterally.

Enhancement/Improvement of Communication: Developing or improving communications between satellite operators, especially national security satellite operators, facilitates efficient and timely sharing of information, consultations and coordination related to potentially urgent matters. Exchanging appropriate information about on-orbit spacecraft operations 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 of, Conduct of, and Actions Relevant to, Space Operations: Further work is needed by States with respect to elaborating best practices and responsible behaviors 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 behavior, 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: How 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, due to the potential for collisions or other interference.
- Radiofrequency Interference: Interference with radiofrequency transmissions of satellites by space-related information and communication technologies (ICTs) 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 PNT 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 Radio Regulations of the ITU (1979), as amended. The ITU has also further considered how ITU Member States may contribute to these efforts with regard to space-based radiocommunication services through Plenipotentiary Resolution 186, “Strengthening the role of the ITU with regard to transparency and confidence building measures in outer space activities,” (Resolution 186 (Rev. Dubai, 2018)).
- 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 the reduction of tensions. Some of these capabilities, such as space-based national technical means, have underpinned the verification and credibility of 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 on-orbit objects, for example, a satellite's telemetry, tracking and control (TT&C) 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 ASAT weapons in the direction of, or 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 ASAT tests or other activities, would impact 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 Behaviors With Respect to Outer Space

Voluntary, non-legally binding norms, rules, and principles of responsible State behavior with respect 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 behavior with respect 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 behaviors 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 behavior with respect to outer space, such as the ability to adapt quickly to changing circumstances or technologies, 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. That does not mean that States should cease engaging on and discussing space security issues at the Conference on Disarmament or in other international fora. 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 toward developing more specific voluntary, non-legally binding "norms, rules and principles of responsible behavior" 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 below summarizes how the concepts discussed in this section can be applied to some of the areas for consideration in Section 2 of this submission, “Categories of behaviors, efforts, or measures that could be considered during further development and implementation of norms, rules, and principles of responsible behaviors.”

Table 2: Summary of concepts and areas for further consideration

Starting Point	Areas for Further Consideration
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 TCBMs, 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 behaviors that enhance communications, especially regarding national security satellite operators.
Communicate and make notifications	States could consider developing common definitions and understandings of operational terms and concepts.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors for the safe and professional operation of national security satellites, with due regard in order to avoid potential collisions or other harmful interference.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors that avoid using ICTs in a manner that impacts space operations.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors 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 behaviors that avoid purposeful interference with satellite command and control systems.
Maintain safe separation and safe trajectory	States could consider elaborating best practices or responsible behaviors that avoid simulating or testing

	ASAT 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 behaviors for ASAT 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 behavior” 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 behavior related to outer space.

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

II. Reply received from the European Union

[Original: English]

[3 May 2021]

The EU and its Member States welcome the adoption of UNGA 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 EU and its Member States consider the adoption of the Resolution as a first step in a pragmatic and cooperative process, involving all UN 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 EU and its Member States entirely support this process as they entirely support the resolution.

The EU and its Member States are historically engaged to concretely improve 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 EU and its Member States regard outer space as a global commons, to be used for the benefit of all. The EU and its Member States stress the importance of conducting space activities in accordance with international law, including the UN Charter. The 1967 Outer Space Treaty and other applicable international law as well as guiding principles developed in the UN framework constitute the cornerstone of the global governance of outer space. The EU 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, distinguishing between innocuous behaviours and potentially threatening ones.

The EU and its Member States highlight the importance of the mutually reinforcing role of transparency and confidence-building measures, 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 for the functioning of today's societies and the global economy and trade, as well as for progress on crucial global issues such as combatting climate change and achieving the UN Sustainable Development Goals. The digital economy, the fourth industrial revolution, agriculture, transport (across the transport modes – land/water/air), fishing, energy, finance, urban development, telecommunication, environmental monitoring, and the broad security chain from civil protection to security and defence are amongst the space-reliant sectors. These sectors and others are vulnerable should space assets be at risk. The economy, the security, the daily life of contemporary societies are vulnerable, both in space-faring nations and, more broadly, in all countries increasingly using modern technologies.

Space assets are vulnerable in this increasingly contested space environment. In addition to the Member States capabilities, the EU owns two civil space constellations: 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 EU.

Against this background, the EU and its Member States underline the need to better tackle the increasing risk and threats that arise from these developments, and result in challenges to our security.

It is thus 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 EU and its Member States believe that an approach based on behaviours, supported by relevant monitoring capabilities, is the most pragmatic way forward to improve space security today, as it will help to 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 UNGA Resolution 75/36 might help creating 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 (ASAT) tests. Be them ground-based or co-orbital, their effects are the destruction of the targeted satellite as well as the collateral generation of space debris, potentially long lived debris. Increased debris levels risk a cascading process that could render orbits unusable for human activities for the generations to come and jeopardise access to space. The more objects in orbit, the higher the risks for 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 ASAT activities, the conduction of such tests per se may lead States to perceive their space assets to be held at risk, and as such it could be irresponsible or threatening as it increases the risk of miscalculation and unintended escalation. These activities are dangerous and highly destabilising. They may lead to deteriorating the confidence between space actors, to

increase the perception of threats, and could lead to an escalation of violence due to their potential catastrophic consequences.

The EU and its Member States urge all States to refrain from the irresponsible behavior of destructing space objects that generate space debris, especially multiple long-lived debris.

Non-kinetic threats (such as cyberattacks, jamming and other electromagnetic interferences 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, those activities may be considered by the EU as constituting irresponsible behaviour when they jeopardise the security of people and goods, whether on Earth or in space.

Technologies allowing in-orbit rendez-vous operations and proximity/docking operations can be used for activities such as active debris removal or on-orbit servicing. Rendez-vous 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 operation of other satellite or to 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 EU and its Member States consider that conducting or knowingly supporting rendez-vous operations affecting another State without the consent of that State constitutes irresponsible behaviour. Agreeing norms, rules or principles of responsible behaviour regarding these operations, and especially rendez-vous operations, is thus 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 EU and its Member States welcome the progress achieved in COPUOS with the adoption of the Long Term Sustainability Guidelines 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 EU 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 long-lived debris, norms on rendez-vous operations and norms on proximity orbital operations.

The EU and its Member States emphasise that any future legally binding framework in 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 EU and its Member States also emphasise 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 EU and its Member States believe that publishing and sharing information about space doctrines, policies and strategies is responsible and would help creating confidence between actors. Sharing information on space launch vehicle programs, including pre-launch notifications, is already established practice under the Hague Code of Conduct (HCoC). The EU and its Member States encourage all States to subscribe to the HCoC. In addition, the EU 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 EU and its Member States consider it important to jointly pursue and intensify efforts to address challenges in outer space, with the involvement of all UN Member States. The EU and its Member States therefore continue to be fully committed to engage constructively in discussions on this initiative.
