Possible elements on items 6(a) and 6(b) in relation to the Open-ended working group on reducing space threats through norms, rules and principles of responsible behaviours

This paper, prepared under the sole responsibility of the Chair, reflects a non-exhaustive set of elements relevant to agenda items 6(a) and 6(b) drawn from the statements and working papers of States participating in the open-ended working group. This paper is without prejudice to the preparation and adoption of the report of the working group to be submitted to the General Assembly at its seventy-eighth session.

Existing international legal and other normative frameworks concerning threats arising from State behaviours with respect to outer space

1. The working group reaffirmed the applicability of international law, including the Charter of the United Nations and international humanitarian law, to activities in the exploration and use of outer space. The working group recalled that this principle was first recognized by the General Assembly in its resolution 1721 (XVI) of 20 December 1961 and reflected in article III of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the “Outer Space Treaty”). It was also noted that applicable international law included other relevant customary international law and international treaties, such as the law of State responsibility and international human rights law.

2. The working group emphasized the importance of the Outer Space Treaty as the foundation of space governance. The working group recalled the provisions of the Outer Space Treaty particularly relevant to its work, in particular:

(a) The freedom of exploration and use of outer space, including the moon and other celestial bodies (article I);

(b) The non-appropriation of outer space, including the moon and other celestial bodies (article II);

(c) The non-placement in orbit around the earth of any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, and the non-installation of such weapons on celestial bodies or their stationing in space in any manner (article IV);

(d) Assumption by States Parties of international responsibility for national activities in outer space, whether carried out by governmental agencies or by non-governmental entities, as well as the continued supervision of the activities of non-governmental entities in outer space (article VI);

(e) Assumption of liability for damage to other States Parties caused by objects launched into outer space (article VII);

(f) The principles of co-operation and mutual assistance, due regard for the interests of other States Parties, avoidance of harmful contamination and adverse changes in the environment of the earth and international consultations in the case of potential harmful interference (article IX).
3. The working group also reaffirmed the other principal United Nations treaties on Outer Space, including: The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space; The Convention on International Liability for Damage Caused by Space Objects; The Convention on International Liability for Damage Caused by Space Objects. The working group also noted other efforts to further develop principles contained within the Outer Space Treaty, including the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

4. In addition, the working group affirmed that certain international treaties in the field of disarmament and arms control are applicable to outer space. In particular, The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water banned tests of nuclear weapon test explosion, or any other nuclear explosion, in a number of areas including outer space. The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques prohibited the military or any hostile use of environmental modification techniques is also applicable to outer space.

5. The working group also affirmed the availability of judicial mechanisms for the peaceful settlement of disputes between States, notably the International Court of Justice.

6. The working group considered in particular the duty of due regard, which could be found in the Outer Space Treaty and related treaties. The working group considered the application of due regard in outer space should not deviate significantly from its application in the context of the high seas. In this connection, the working group considered that jurisprudence on the law of the sea has since clarified that the duty of due regard represents a balancing of rights and interests between and among States, and between States and the international community as a whole.

7. In the context of outer space, this balancing of rights and interests should involve two dimensions: first, between and among spacefaring nations; and, second, between a spacefaring nation and the wider international community. The working group considered that the duty of due regard does not constitute a blanket limit on State conduct, nor does it permit a State merely to note the rights of other States and still to act as it wishes in disregard of those rights. In most cases, the duty of due regard would necessitate consultations on the basis of good faith, and require that the avenues for such consultations are exhausted. Such consultations should encompass a conscious balancing of rights and interests, including extensive concern regarding the other party’s reaction; suggestions of compromise and willingness to offer assurances; and an understanding of other parties’ concerns in connection with any proposed activities.

8. The working group emphasized the desirability of improving the implementation of existing international law. The working group stressed in particular the importance of strengthening the existing legal framework applicable to outer space to deal with current and new threats and risks. In this connection, the working group noted that the prohibition contained within article IV of the Outer Space Treaty, on the non-placement in orbit around the earth of any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, and the non-installation of such weapons on celestial bodies or their stationing in space in any manner, does not address objects carrying other types of possible weapons nor objects that could be used as a weapon.
9. The working group affirmed that the prohibition on the threat or use force, as contained in Article 2(4) of the Charter of the United Nations, is applicable in outer space. The working group discussed issues in connection with the application of Article 51 of the Charter of the United Nations. The working group also discussed the question of what would constitute an armed attack in outer space, within the meaning of Article 51 of the Charter of the United Nations. The working group recalled the obligation of States, under article 2(3) of the Charter, to settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered.

10. The working group reaffirmed that international humanitarian law applies in all situations of international armed conflict and non-international armed conflict. Views were expressed on the applicability and application of IHL to outer space, notably in the light of the objective of international negotiations on the prevention of an arms race in outer space, which should be to prevent attacks from occurring in or from outer space. The working group did not consider in detail how international humanitarian law would constrain acts involving space systems undertaken by parties to armed conflict. Due to concerns that the objective of international negotiations on the prevention of an arms race in outer space should be to prevent attacks from occurring in or from outer space, the working group did not consider how international humanitarian law would constrain acts involving space systems undertaken by parties to armed conflict. Furthermore, the working group reaffirms that no discussion regarding the application or further elaboration of international humanitarian law can be construed as legitimizing or authorizing any act of aggression or any other use of force inconsistent with the Charter of the United Nations.

11. The working group considered the applicability relevance of aspects of elements drawn from the legal regimes governing other domains, notably aviation and the law of the sea as well as norms of responsible State behaviour in cyberspace.

12. The working group underscored the importance of transparency and confidence-building measures as a mechanism to reduce the risks of misperception, miscalculation and unintended escalation. The working group also recognized that such measures could also become an element of a legally binding instrument on the prevention of an arms race in outer space. The working group recalled the transparency and confidence building measures contained in the 2013 report of the group of governmental experts (A/68/189) and called for their implementation. The working group also recalled the criteria for transparency and confidence-building measures outlined by that report.

13. The working group reaffirmed that transparency and confidence-building measures for outer space activities should complement, but not substitute for, the verification measures in arms control agreements and regimes. Voluntary transparency and confidence-building measures could contribute to the consideration of concepts and proposals for legally binding arms control measures as well as verification protocols included in legally binding international instruments.

14. The working group considered a number of examples of existing transparency and confidence-building measures, derived from the 2013 report of the group of governmental experts as well as from various United Nations and other international instruments, mechanisms or arrangements. The working group stressed in particular the importance of effective and timely communication in order to build transparency and trust. The working group considered there was merit in the elaboration of further transparency and confidence building measures.
Current and future threats by States to space systems, and actions, activities and omissions that could be considered irresponsible

15. It was observed that the deteriorating international strategic security situation was leading to increasing strategic competition between space actors. The growing population density of space objects is increasing the likelihood of interference between satellites and is heightening the risk of misunderstanding and miscalculation. Similarly, the large and growing population of orbital debris increased the risk of collisions between space objects. In this regard, while the mitigation of debris has been addressed in the Committee on the Peaceful Uses of Outer Space and the Inter-Agency Space Debris Coordination Committee, there was no international framework to prevent the creation of debris caused by deliberate hostile acts or by the testing of antisatellite weapons.

16. It was also observed that a number of States already possess counter-space systems capable of damaging, degrading or destroying space systems. It was noted that security concerns resulting from such developments could drive other States to develop further systems to protect and defend those space systems. Many current and emerging threats fall below the threshold of the use of force and can include strategies, methods and acts which could negatively impact the space environment and international stability. This has given rise to serious concern regarding the threats to international peace and security posed by the possible weaponization of outer space and the transformation of outer space into a domain of active hostilities.

17. For the purpose of this report, the working group considered space systems as comprising three components: (a) the space segment, including satellites and launch vehicles; (b) the ground segment, including space monitoring systems and command and control, as well as data storage, processing and distribution; and (c) data links between the two, including uplinks and downlinks, as well as services provided to end users.

18. The working group considered the distinction between hazards and threats. Hazards involve harmful effects not caused by deliberate actions. These can include natural risks to space objects, including solar activity and radiation. They can also include risks of accidental collision with natural space objects, orbital debris, derelict objects or active space objects.

19. Threats were regarded as deliberate and non-consensual acts intended to, directly or indirectly, interfere with, deny, disrupt, degrade, damage or destroy space systems. It was considered that such threats could hamper the free and unhindered access and use of space, harm the safe operation of space systems and jeopardize the long-term sustainability of outer space, the provision of key space-based services to the public/civilian population and the use of relevant national-security spacebased services. Such threats against space systems can be divided into four categories, based upon its vector: Earth-to-space, space-to-space, Earth-to-Earth and space-to-Earth. These threats can have reversible or irreversible effects. Reversible effects are temporary and can include interference with radio-frequency signals or the dazzling of remote sensing systems. Irreversible effects involve damage to or the destruction of space systems.

20. The working group considered various types of counter-space capabilities with physical or kinetic effects that could pose a threat by States to space systems.

(a) Direct-ascent anti-satellite missiles could be launched from the ground, air or sea and make use of explosives, kinetic impact or other means to degrade or destroy a space object. The testing
or use of such capabilities are especially regarded as a threat due to their potential to produce large amounts of debris.

(b) Co-orbital anti-satellite capabilities can include satellites placed in Earth orbit capable or producing reversible or irreversible effects. They may carry anti-satellite missiles, other projectiles, robotic arms or chemical sprayers. They may also include satellites that deliberatively collide with other space objects or that come into close proximity with other space objects in order to interfere with it or disrupt its normal operations.

(c) Space-based missiles or anti-missile interceptors, designed to target objects on the ground, air or space or to target missiles launched from the Earth, were regarded as having potential to increase the risk of active hostilities in outer space.

(d) Nuclear 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 was 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, installed on celestial bodies or otherwise stationed in space for any type of attack.

21. The working group also considered various non-kinetic capabilities that could be used to affect the use of space assets as well and impair services of the targeted satellite or payload to the detriment for its users. The effects of such capabilities could be permanent or temporary and that their origin could be difficult to detect and attribute, increasing mistrust and the risk of misinterpretation.

(a) Directed-energy capabilities include lasers, high-powered microwaves, particle beams and electromagnetic pulse. They may produce reversible effects, including by temporarily blinding optical sensors, or irreversible effects by permanently degrading or damaging components such as sensors or solar panels.

(b) Radiofrequency capabilities can disrupt, deny, deceive, or degrade space services. Methods can include uplink jamming or spoofing, directed toward a target satellite but which can have widespread effects, or can including downlink jamming spoofing which is directed at users on the ground and may have more localized effects. It was noted that such systems are possessed by a number of States and non-state actors and have been used.

(c) Cyber capabilities can target satellite command and data distribution networks, resulting in data loss, widespread disruption, loss of operational control or the sending unauthorized commands to potentially take over operational control of a satellite. It was noted that such capabilities do not necessarily require significant resources, are difficult to attribute and may even be conducted by non-state actors.

22. The working group considered certain types of capabilities and operations that could be regarded as dual-use, with possible applications as co-orbital anti-satellite capabilities. It was noted that, due to the specific nature of the space environment, many non-state active satellites that perform...
simultaneously military and civilian functions could be regarded as dual-use and this makes it difficult to distinguish between threatening and benign capabilities and operations. A distinction was also made between dual-use and dual purpose space objects.

(a) On-orbit servicing involves the maintenance, repair, fuelling or construction of spacecraft in orbit. Active debris removal systems are intended to deorbit non-operational satellites. Both capabilities entail rendezvous and proximity operations and may employ robotic arms, harpoons, magnets, nets or other capture mechanisms. Such capabilities are intended for peaceful purposes. However they could also be used to manipulate, damage, degrade or destroy other space objects. Therefore, such capabilities and operations could increase the risk of misunderstanding or be perceived as hostile or threatening, especially when used or conducted in a non-transparent manner. To promote the [peaceful] pursuit of space activities and avoid the risk of misunderstanding such activities should be conducted with as much transparency as possible.

23. The working group considered various actions, activities or omissions that could be considered irresponsible. For the purpose of its work, the working group considered irresponsible behaviours to be actions, activities or omissions by States that pose a threat to space systems. It was emphasized that a focus on behaviour is not inequitable with traditional approaches to arms control and that the notion of irresponsible behaviour is inclusive of specific actions, activities or omissions involving counter-space capabilities, including the development, deployment and use of some capabilities.

24. A behaviour would be irresponsible if it violates the Charter of the United Nations or other bodies of international law. Criteria for determining whether a behaviour was irresponsible could also include whether it violates the Charter of the United Nations or other bodies of international law, its consequences on safety, sustainability and security in outer space, its consequences on the civilian population and civilian objects, its impact on international peace and security, as well as whether it follows an understood pattern of action. It was noted that determining what actions, activities or omissions could be perceived as a threat by another State was useful as these actions, activities or omissions may not necessarily be unlawful. A view was also expressed that the working group should limit its consideration to actions, activities or omissions that should be regarded as unlawful. It was also noted that irresponsible behaviours affecting space systems could negatively impact a number of areas, including freedom of access to outer space, transportation safety, scientific research and development, climate change adaptation and mitigation, disaster risk prediction and management, emergency and rescue and other essential services as well as international peace, security and stability.

25. The working group considered various actions, activities or omissions in relation to outer space policies that could be considered irresponsible, including:

(a) Insufficient provision of information about the purpose and use of certain space objects, capabilities, technologies or activities, which can increase the risk of misperception;

(b) Failure to register space objects pursuant to the Registration Convention;

(c) Insufficient understanding of mutual threat perceptions, including in relation to the different extent to which States are dependent on space systems for their national security or economy;
(d) The absence of clear and internationally understood standards and norms of responsible behaviours in outer space, which could increase the risk of misperception and unintended escalation;

(e) The absence of channels of communication for regular coordination of spacecraft manoeuvres, which can make it difficult to address potential concerns regarding such manoeuvres or to deconflict operations in outer space;

(f) A lack of transparency on national space programmes, space security and defence policies, strategies and doctrines, which can feed mistrust and suspicion, thereby increasing risks of misperception and miscalculation;

(g) Publicly declaring outer space to be a warfighting domain or as an arena for military operations, or in pursuing military strategies, doctrines or policies aimed at achieving military superiority in outer space, which could promote an arms race in outer space and increase uncertainty regarding outer space security.

26. The working group considered various actions, activities or omissions in relation to outer space operations that could be considered irresponsible, including:

(a) Launching space vehicles without issuing pre-launch notifications, as well as without prior coordination with potentially affected countries, including those whose territories may be as potential drop zones of uncontrolled re-entering or launch debris that pose a potential risk of injury to people, damage or destruction to property;

(b) Conducting rendezvous and proximity operations, including close approaches, that involve the space objects of another State without prior notification, coordination and consent, or those performed after the affected State has requested consultation or cessation of the manoeuvre;

(c) Failure to conduct anti-collision manoeuvres when required and a failure to communicate with other States about potential collisions involving satellites.

(d) Placing weapons in outer space.

27. The working group considered various specific actions, activities or omissions in relation to counter-space capabilities that could be considered irresponsible, including:

(a) The development, acquisition, deployment, testing or use of counter-space capabilities that could hold at risk, interfere with, damage, or destroy space systems;

(b) The placement of satellites equipped with armaments in outer space;

(c) The placement of a co-orbital weapon or an electronic warfare satellite in the proximity of another national security satellite of another State;

(d) The development, testing or use of destructive direct-ascent anti-satellite missiles;

(e) Any other intentional and destructive act that could create large amounts of long-lived debris;
(f) Releasing objects such as sub-satellites or ejecting projectile-like fragments in the immediate vicinity of the satellite of another State without prior consultation and consent;

(g) Acts that interfere with the command and control of space systems or that impair or lead to the loss of the ability of an operator to control a satellite;

(h) Blinding the sensors of a satellite;

(i) Jamming or spoofing the signals of positioning, navigation and timing satellites or interfering with such systems via cyber or other means; or conducting or supporting any other activity designed or expected to disrupt, damage, destroy or disable space systems necessary for the provision of essential civilian services and for the protection and functioning of persons and objects specifically protected under international law;

(j) Any act that impairs, disrupts or targets military space systems, especially systems used for situational awareness, outer space monitoring, reconnaissance, navigation, communication, early warning, as well as for the conduct of military activities and operations.

Commented [CH10]: Rationale: suggested language is relevant to minimizing the risk of civilian harm due to irresponsible behaviors.