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# STUDY GUIDE

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Prevention of an Arms Race in Outer Space



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**Prevention of an arms race in outer space: further practical measures for the prevention of an arms race in outer space**

### **Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space**

#### **Note by the Secretary-General**

The Secretary-General has the honour to transmit herewith the report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space. The Group was established pursuant to General Assembly resolution [77/250](#).

\* A/79/150.



## Report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space

### Summary

By its resolution 77/250, the General Assembly requested the Secretary-General to establish a United Nations Group of Governmental Experts to consider and make recommendations on substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space. The Group adopted its report by consensus.

The present report reflects the discussions of the Group relating to general considerations of and key conceptual issues pertaining to substantial elements of such a legally binding instrument. This included discussions on: the evolving nature of outer space activities, threats and related capabilities; the evolution of United Nations efforts for the prevention of an arms race in outer space in all its aspects; the existing normative and legal framework; and approaches to further measures for the prevention of an arms race in outer space. The report also contains a non-exhaustive set of possible substantial elements that could be taken into account in further measures and appropriate international negotiations, including in a legally binding instrument on the prevention of an arms race in outer space.

The Group concluded that the present report could serve as a reference document for further measures and appropriate international negotiations on an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space and that the report could contribute to future work on the prevention of an arms race in outer space, such as in the forthcoming **open-ended working groups** established by the General Assembly. The Group agreed that efforts and approaches to elaborate measures on the prevention of an arms race in outer space, including on capabilities, activities and behaviours, should continue to take into account the evolving space activities and threats. It also identified areas where further work could be undertaken by States.

The Group recommended that the Secretary-General make the present report widely available, that Member States fully examine and consider it and that further consideration of various substantial elements and measures be pursued.

### 3 Definition

The Open-ended Working Group on the Prevention of an Arms Race in Outer Space (OEWG on PAROS) is a United Nations forum established to develop recommendations for preventing an arms race in outer space. It was created by UN General Assembly resolution 79/512, replacing two previous Working Groups focused on space threats and practical measures for PAROS. The OEWG's mandate is to submit recommendations on preventing an arms race in outer space in all its aspects, informed by existing relevant resolutions.

## Contents

	<i>Page</i>
Foreword by the Secretary-General .....	4
Letter of transmittal .....	5
I. Introduction .....	6
II. Organizational matters .....	6
III. General considerations and key conceptual issues pertaining to substantial elements of a legally binding instrument on the prevention of an arms race in outer space, including, <i>inter alia</i> , on the prevention of placement of weapons in outer space .....	7
A. Evolving nature of outer space activities, threats and related capabilities .....	8
B. Evolution of United Nations efforts for the prevention of an arms race in outer space in all its aspects .....	8
C. Existing normative and legal framework .....	9
D. Approaches to further measures for the prevention of an arms race in outer space .....	10
IV. Consideration of substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, <i>inter alia</i> , on the prevention of the placement of weapons in outer space .....	11
A. General considerations including definitions and verification .....	11
B. Substantial elements on the prevention of an arms race in outer space .....	13
V. Conclusions .....	20
VI. Recommendations .....	21
Annexes	
I. List of members of the Group of Governmental Experts .....	22
II. List of documents .....	25

## Foreword by the Secretary-General

Today's complex geopolitical context, rapid technological developments and the expanding use of outer space are increasing risks in this vital yet fragile domain.

A growing number of State and non-State actors operate in outer space, deploying ever more satellites. These systems provide essential services to all nations and are critical to achieving the Sustainable Development Goals. At the same time, any armed conflict originating in or extending to outer space could have catastrophic consequences for life on Earth. Every State, therefore, has an interest in pursuing a stable, secure, safe and sustainable outer space environment.

The present report provides a non-exhaustive set of potential elements for an international legally binding instrument on the prevention of an arms race in outer space, including measures to prevent the placement of weapons in outer space. These elements are aimed at informing future United Nations efforts and international negotiations on this critical issue. Such work could serve to further develop measures on capabilities, activities and behaviours, in view of evolving space activities and threats. In the report, the Group also identifies areas where additional research could be undertaken.

I recommend the present report to all Member States and to the public to encourage everyone to fully consider its insights for future deliberations on the prevention of an arms race in outer space.

## Letter of transmittal

23 August 2024 I have the honour to submit herewith the report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space, established pursuant to General Assembly resolution 77/250. The report was adopted by consensus on 16 August 2024.

The members of the Group included governmental experts nominated by the following Member States: Australia, Brazil, Canada, Chile, China, Cuba, Egypt, France, Germany, Hungary, India, Iran (Islamic Republic of), Israel, Japan, Morocco, Pakistan, Philippines, Republic of Korea, Russian Federation, Sweden, South Africa, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland and United States of America. The list of experts is contained in annex I to the report.

The report was prepared from November 2023 to August 2024, during which period the Group of Governmental Experts held two sessions in Geneva, from 20 November to 1 December 2023 and from 5 to 16 August 2024. As mandated by the General Assembly, the Chair of the Group convened a two-day open-ended intersessional informal consultative meeting, from 29 February to 1 March 2024 at United Nations Headquarters in New York, so that all Member States could engage in interactive discussions and share their views on the basis of a report on the work of the Group provided by the Chair in his own capacity. That meeting also included engagement with the broader outer space community, including representatives of civil society.

In accordance with resolution 77/250, the Group considered substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space, and made recommendations on the prevention of an arms race in outer space.

The Group recommended: that the Secretary-General make the present report available to all Member States, to the Conference on Disarmament, to any body or process established pursuant to a decision of the General Assembly and to the public; that Member States fully examine the report and consider its contents in any future deliberations or negotiations on the prevention of an arms race in outer space; and further consideration of substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space, and further consideration of measures on the prevention of an arms race in outer space, taking into account, as appropriate, processes initiated by Assembly resolutions 78/20 and 78/238.

On behalf of the members of the Group, I wish to express appreciation for the support of the officials of the Office for Disarmament Affairs who assisted the Group, Michael Spies, Ariana Smith and Eunsoo Choi, as well as for the contribution of Sarah Erickson of the United Nations Institute for Disarmament Research, who served as a consultant to the Group.

(Signed) Bassem Hassan  
 Chair of the Group of Governmental Experts on Further Practical  
 Measures for the Prevention of an Arms Race in Outer Space

### 3 Interesting Facts

During these sessions, the experts examined several key issues. They looked at the growing ability of states to use space for both peaceful and potentially military purposes, for example, satellites used for communications, navigation, and surveillance that could also be used in ways that might threaten security. The Group reviewed the current legal and policy framework, including the Outer Space Treaty and related UN resolutions, to see whether existing rules are strong enough to prevent an arms race in space. They also discussed possible elements of a new legally binding agreement, including how to define space weapons, how to verify compliance, and how countries could build trust and share information. Some proposals even raised the question of banning the placement of weapons in outer space altogether.

### 5 Interesting Facts

The Conference on Disarmament (CD) is the UN's primary multilateral disarmament negotiation forum, established in 1979 as a successor to earlier committees. With 65 members organized into regional groups, it operates by consensus and maintains a permanent agenda covering nuclear weapons, outer space, and conventional arms. The CD has successfully negotiated major treaties, including the NPT, Chemical Weapons Convention, and Comprehensive Test Ban Treaty, reporting annually to the UN General Assembly.

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In accordance with resolution 77/250, the Group considered substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space, and made recommendations on the prevention of an arms race in outer space.

The Group recommended that the Secretary-General make the present report available to all Member States, to the Conference on Disarmament, to any body or process established pursuant to a decision of the General Assembly and to the public; that Member States fully examine the report and consider its contents in any future deliberations or negotiations on the prevention of an arms race in outer space; and further consideration of substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space, and further consideration of measures on the prevention of an arms race in outer space, taking into account, as appropriate, processes initiated by Assembly [resolutions 78/20 and 78/238](#).

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(Signed) **Bassem Hassan**  
 Chair of the Group of Governmental Experts on Further Practical  
 Measures for the Prevention of an Arms Race in Outer Space

### 5 Interesting Facts

Resolution 78/20 set up an open-ended working group to discuss responsible behavior in outer space. This group was asked to consider both legally binding measures, such as possible treaties, and political commitments, such as voluntary guidelines or transparency measures. The idea is to allow progress even if agreement on a treaty proves difficult.

Resolution 78/238 created a second working group with a stronger mandate. Its job is to begin negotiations on a legally binding treaty to prevent an arms race in outer space. This effort builds on the 2023 Group of Governmental Experts' discussions and links to the long-running work of the Conference on Disarmament, which has debated the issue of preventing an arms race in outer space (PAROS) for decades but has not yet reached consensus on starting formal treaty talks.

## I. Introduction

1. In resolution 77/250, on further practical measures for the prevention of an arms race in outer space, the General Assembly requested the Secretary-General to establish a United Nations Group of Governmental Experts, with a membership of up to 25 Member States, chosen on the basis of fair and equitable geographical representation, to consider and make recommendations on substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, inter alia, on the prevention of the placement of weapons in outer space. The Assembly decided that the newly established Group of Governmental Experts would operate by consensus, without prejudice to national positions in future negotiations, and hold two 2-week sessions in Geneva, one in 2023 and the other in 2024, and requested the Secretary-General to transmit the report of the Group of Governmental Experts to the Assembly at its seventy-ninth session and to the Conference on Disarmament prior to its 2025 session.

## II. Organizational matters

2. In accordance with the terms of the resolution, the Secretary-General appointed a Group of Governmental Experts from the following Member States: Australia, Brazil, Canada, Chile, China, Cuba, Egypt, France, Germany, Hungary, India, Iran (Islamic Republic of), Israel, Japan, Morocco, Pakistan, Philippines, Republic of Korea, Russian Federation, South Africa, Sweden, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland and United States of America. In accordance with resolution 77/250 and, taking into account resolution 65/69,<sup>1</sup> the Secretary-General established the Group on the basis of fair and equitable geographical distribution and with a view to achieving the equitable and effective representation of women and men. A total of nine Member States nominated women to participate as experts in the work of the Group. The list of experts is contained in annex I to the present report.

3. The Group met in two sessions at the United Nations Office at Geneva, the first from 20 November to 1 December 2023 and the second from 5 to 16 August 2024. Prior to its first session, the Group benefited from an informal virtual preparatory meeting, which was convened on 10 October 2023 by the Office for Disarmament Affairs and the United Nations Institute for Disarmament Research (UNIDIR) in coordination with the Chair-designate of the Group. At its first session, the Group elected Bassem Hassan (Egypt) as its Chair.

4. Michael Spies, Ariana Smith and Eunsoo Choi of the Office for Disarmament Affairs served as the secretariat of the Group. Sarah Erickson of UNIDIR served as consultant to the Group.

5. In accordance with resolution 77/250, the Chair of the Group convened a two-day open-ended intersessional informal consultative meeting, from 29 February to 1 March 2024 at United Nations Headquarters in New York, so that all Member States could engage in interactive discussions and share their views on the basis of a report on the work of the Group provided by the Chair in his own capacity.<sup>1</sup> That meeting also included engagement with the broader outer space community, including representatives of civil society.

6. The Group benefited from two rounds of virtual informal consultations convened by the Chair on 8 May 2024 and on 10 July 2024, at which it discussed

<sup>1</sup> Materials from that meeting are available on the website of the Office for Disarmament Affairs at <https://meetings.unoda.org/>.

## 2 Interesting Facts

Resolution 78/20 set up an open-ended working group to discuss responsible behavior in outer space. This group was asked to consider both legally binding measures, such as possible treaties, and political commitments, such as voluntary guidelines or transparency measures. The idea is to allow progress even if agreement on a treaty proves difficult.

Resolution 78/238 created a second working group with a stronger mandate. Its job is to begin negotiations on a legally binding treaty to prevent an arms race in outer space. This effort builds on the 2023 Group of Governmental Experts' discussions and links to the long-running work of the Conference on Disarmament, which has debated the issue of preventing an arms race in outer space (PAROS) for decades but has not yet reached consensus on starting formal treaty talks.

## 3 Interesting Facts

The United Nations Institute for Disarmament Research (UNIDIR) is an independent research body within the UN. It provides studies, practical ideas, and policy advice to support disarmament and arms control. UNIDIR also creates spaces for governments and experts to exchange views on security challenges. One of its focus areas is space security, where it works to reduce the risk of military competition in outer space through research and dialogue.



proposed elements for the report of the Group. The Group also benefited from a virtual informal workshop organized by UNIDIR and the Office for Disarmament Affairs on “The characterization and verification of weapons in space and other capabilities that can pose a threat to space systems”, held on 22 and 23 May 2024.

7. During its sessions in Geneva, the Group received briefings by Guilherme de Aguiar Patriota (Brazil), Chair of the 2018–2019 group of governmental experts on further practical measures for the prevention of an arms race in outer space, and by Omran Sharaf (United Arab Emirates), Chair of the Committee on the Peaceful Uses of Outer Space. The Group also benefited from presentations by representatives of UNIDIR and the United Nations Office for Disarmament Affairs, as well as from an independent expert from the Center for International Security, the Primakov National Research Institute of World Economy and International Relations, Russian Academy of Sciences. The Group also benefited from presentations, a total of 25 working papers and other inputs from its own members. In addition, the Group received written inputs from Member States, international organizations and non-governmental organizations.<sup>2</sup> The list of working papers submitted by the members of the Group, as well as other written inputs that it received are listed in annex II to the present report.

8. In accordance with resolution 77/250, the Group considered substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space (“substantial elements on the prevention of an arms race in outer space”) and made recommendations on the prevention of an arms race in outer space. At its 36th meeting, on 16 August 2024, the Group adopted its final report.

### III. General considerations and key conceptual issues pertaining to substantial elements of a legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of placement of weapons in outer space

9. The Group recalled previous efforts within the United Nations on outer space security, including the group of governmental experts established by General Assembly resolution 65/68, the group of governmental experts established by Assembly resolution 72/250, the Disarmament Commission, the open-ended working group established by Assembly resolution 76/231, the Conference on Disarmament and the First Committee. The Group sought to respect the mandates of relevant United Nations bodies and recognized the interrelationship between issues related to outer space security, safety and sustainability.

10. The Group considered that its report could serve as a reference document for further measures and appropriate international negotiations on an international legally binding instrument or instruments on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space (“legally binding instrument on the prevention of an arms race in outer space”), and could contribute to future work on the prevention of an arms race in outer space, such as at the forthcoming open-ended working groups established by General Assembly resolutions 78/20 and 78/238. The Group noted that experts did not seek a common view on all elements in the present report and that the considerations, conclusions and

<sup>2</sup> Working papers made publicly available by Group members and written inputs from non-members are available at <https://meetings.unoda.org/>.

recommendations in the report are not intended to prejudice any future negotiations or agreements and are without prejudice to national positions.

#### A. Evolving nature of outer space activities, threats and related capabilities

11. The Group noted that its work was taking place in a difficult geopolitical environment that creates greater mistrust and increases the risk of misperceptions and miscalculations, which has significant implications for international security.

12. The use of outer space has changed significantly over the past several decades. The space security environment is no longer solely tied to the dynamics of competition between two super Powers. An increasing number of State and Non-State actors operate in outer space with more and more satellites providing a growing range of benefits and essential services. Space services are increasingly being integrated into various aspects of essential services to all States and peoples, such as communications, energy, transportation, finance, emergency and humanitarian operations, as well as into defence and national security. Space science and technology and their applications, including satellite communications, Earth observation systems and satellite navigation technologies, provide indispensable tools for sustainable development. Therefore, every State has an interest in pursuing a stable, secure, safe and sustainable outer space environment, and the interests of all States should be taken into account in the elaboration of measures for the prevention of an arms race in outer space in all its aspects.

13. The Group noted that the elaboration of substantial elements on the prevention of an arms race in outer space should be based on a comprehensive understanding of threats in the context of outer space. The Group also noted that the perception of threats may differ among States.

14. The Group considered all vectors of threats relating to space systems and the broadest possible range of practical measures relevant for the prevention of an arms race in outer space in all its aspects. The increasing variety of threats to or involving space systems were considered along four vectors: Earth-to-space, space-to-Earth, space-to-space and Earth-to-Earth. These threats could involve kinetic and non-kinetic means, resulting in a gradient of reversible or irreversible effects.

#### B. Evolution of United Nations efforts for the prevention of an arms race in outer space in all its aspects

15. The Group discussed how developments relating to the evolving nature of outer space activities and space threats have influenced efforts to address the prevention of an arms race in outer space. The Group recalled that the goal of the prevention of an arms race in outer space was first agreed to in 1978 during the first special session of the General Assembly devoted to disarmament and that, in its final document, the Assembly stated that "further measures should be taken and appropriate international negotiations held in accordance with the spirit 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".<sup>3</sup>

16. The General Assembly adopted two resolutions in relation to the prevention of an arms race in outer space in 1981. Through resolution 36/99, the Assembly proposed "to take effective steps, by concluding an appropriate international treaty, to prevent

<sup>3</sup> Resolution 5-10/2, para. 80.

#### 11 Interesting Facts

Similar to the nuclear arms race, competition among countries to develop space-based and ground-based weapons could escalate tensions, leading to security dilemmas where defensive measures (such as ASAT) by one nation are perceived as threats by others, spurring further militarization.

#### 12 Did You Know That

In 2024, global government expenditure for space programs hit a record of approximately 135 billion U.S. dollars. The United States Government spent around 79.7 billion U.S. dollars on its space programs in that year, making it the country with the highest space expenditure in the world. The U.S. was followed by China, with government expenditure on space programs of over 19 billion U.S. dollars.

#### 13 Something to Think About

Countries with large military space programs often worry about hostile attacks on satellites, anti-satellite weapons, or interference with command systems. They see the potential for conflict as the biggest risk. In contrast, countries that mainly use space for civilian purposes (like communication, weather, or navigation) may see the main threats as being disruptions to services, not necessarily direct military attacks. Developing countries often worry more about being left out of access to space technology or suffering the fallout (like space debris) from conflicts between major powers.

Can you think of other differences in the perception of threats in the context of outer space?

The perception of different threats is why reaching global agreement on rules for outer space is so difficult.

recommendations in the report are not intended to prejudice any future negotiations or agreements and are without prejudice to national positions.

#### A. Evolving nature of outer space activities, threats and related capabilities

11. The Group noted that its work was taking place in a difficult geopolitical environment that creates greater mistrust and increases the risk of misperceptions and miscalculations, which has significant implications for international security.

12. The use of outer space has changed significantly over the past several decades. The space security environment is no longer solely tied to the dynamics of competition between two super Powers. An increasing number of State and non-State actors operate in outer space with more and more satellites providing a growing range of benefits and essential services. Space services are increasingly being integrated into various aspects of essential services to all States and peoples, such as communications, energy, transportation, finance, emergency and humanitarian operations, as well as into defence and national security. Space science and technology and their applications, including satellite communications, Earth observation systems and satellite navigation technologies, provide indispensable tools for sustainable development. Therefore, every State has an interest in pursuing a stable, secure, safe and sustainable outer space environment, and the interests of all States should be taken into account in the elaboration of measures for the prevention of an arms race in outer space in all its aspects.

13. The Group noted that the elaboration of substantial elements on the prevention of an arms race in outer space should be based on a comprehensive understanding of threats in the context of outer space. The Group also noted that the perception of threats may differ among States.

14. The Group considered all vectors of threats relating to space systems and the broadest possible range of practical measures relevant for the prevention of an arms race in outer space in all its aspects. The increasing variety of threats to or involving space systems were considered along four vectors: Earth-to-space, space-to-Earth, space-to-space and Earth-to-Earth. These threats could involve kinetic and non-kinetic means, resulting in a gradient of reversible or irreversible effects.

#### B. Evolution of United Nations efforts for the prevention of an arms race in outer space in all its aspects

15. The Group discussed how developments relating to the evolving nature of outer space activities and space threats have influenced efforts to address the prevention of an arms race in outer space. The Group recalled that the goal of the prevention of an arms race in outer space was first agreed to in 1978 during the first special session of the General Assembly devoted to disarmament and that, in its final document, the Assembly stated that "further measures should be taken and appropriate international negotiations held in accordance with the spirit 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".<sup>3</sup>

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<sup>3</sup> Resolution S-10/2, para. 80.

#### 14 Did You Know That

New technologies are creating new risks to space security. Satellites and space systems can be disrupted by cyberattacks that interfere with software, communications, or control from the ground. Directed energy weapons (DEWs), such as lasers or microwaves, could temporarily or permanently damage satellites. Small satellites can approach other satellites closely and may block sensors, jam communications, or even collide with or tamper with them. These technologies are developing faster than current laws and rules can handle, which increases the risk to satellites, critical space systems, and international cooperation. These emerging threats highlight the urgent need for updated rules and agreements.

#### 14 Definition

In the context of space disarmament, "kinetic" weapons refer to systems that physically destroy their targets through direct impact or explosions - such as anti-satellite (ASAT) missiles or weapons that can result in the creation of vast fields of debris from the destroyed satellite. Kinetic weapons are also a danger to other space objects because they can generate harmful space debris. In contrast, "non-kinetic" weapons disable or disrupt space assets without causing physical destruction. These include methods like cyber attacks, signal jamming, directed energy weapons (e.g., lasers), or electromagnetic pulses (EMPs) targeting satellites and other space-based systems.

the spread of the arms race to outer space", and through resolution 36/97 C, it proposed the consideration "as a matter of priority [of] the question of negotiating an effective and verifiable agreement to prohibit anti-satellite system". The Assembly subsequently adopted various resolutions relating to the prevention of an arms race in outer space, which have included, inter alia, decisions to establish groups of governmental experts and open-ended working groups, by its resolutions 45/55 B, 65/68, 72/250, 76/231, 77/250, 78/20 and 78/238.

17. The Conference on Disarmament first took up the matter of the prevention of an arms race in outer space in 1982 and first established an ad hoc committee on this item in 1985. In 2008, China and the Russian Federation introduced **the draft treaty** on the prevention of the placement of weapons in outer space and the threat or use of force against space objects and its revised version in 2014. From 1985 to 1994 and in 2009, 2018, 2022 and 2024, the Conference on Disarmament decided to establish a subsidiary body in order to advance the substantive work on the prevention of an arms race in outer space.

18. The Disarmament Commission, at its 2018, 2022 and 2023 sessions, considered the agenda item entitled "Preparation of recommendations to promote the practical implementation of **transparency and confidence-building measures** in outer space activities with the goal of preventing an arms race in outer space, in accordance with the recommendations set out in the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities" and adopted, by consensus, the recommendations contained in A/78/42.

19. The Group recalled the relevant reports of the Secretary-General relating to the prevention of an arms race in outer space.

## C. Existing normative and legal framework

20. The Group affirmed the applicability of international law to outer space, including the Charter of the United Nations and relevant outer space and arms control treaties to which States are party.

21. The Group considered the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ("Outer Space Treaty") and all its principles and obligations as a foundation of international space law and the key framework governing space activities. The Group affirmed the importance of the Treaty to the prevention of an arms race in outer space, especially its article IV. The Group underscored the need to seek strict compliance with and the universalization of the Outer Space Treaty.

22. The Group agreed that compliance with applicable existing international law is essential for building trust and for the prevention of an arms race in outer space.

23. There were diverging views among experts on discussing international humanitarian law in the context of outer space. Some experts affirmed that international humanitarian law applies to outer space and regulates the activities of all parties with their respective obligations in armed conflict, including State and non-State actors, in any environment, and that discussing and reaffirming it in no way legitimizes the use of force in violation of international law. Other experts affirmed that it is not appropriate to discuss international humanitarian law in the context of the prevention of arm race in outer space or the outer space domain and that any reaffirmation of the applicability of international humanitarian law to outer space legitimizes the use of force in outer space and an arms race in outer space.

24. The Group discussed the possible role of the principle and obligation on due regard as set forth in article IX of the Outer Space Treaty, in the prevention of an arms

## 17 Interesting Facts

The China-Russia Draft Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT) was first proposed in 2008 and updated in 2014. It aims to ban putting weapons in orbit and using or threatening force against satellites and other space objects.

However, the United States and its allies have criticized the draft. They point out that it does not cover ground-based anti-satellite (ASAT) weapons, has no system to check compliance, and uses unclear terms such as "weapons in space" and "use of force."

This disagreement reflects strategic differences. The United States has strong space-based capabilities, while China and Russia focus on ground-based ASAT systems. Each side wants to limit the areas where the other has an advantage.

## 18 Definition

Transparency and Confidence Building Mechanisms (TCBMs) are a set of voluntary, non-legally binding measures designed to increase openness, foster trust, and reduce the risk of misperception, miscalculation, and escalation among States regarding their outer space activities. The goal of TCBMs in PAROS is to create a more stable and predictable space environment, even in the absence of a comprehensive, legally binding arms control treaty.

the spread of the arms race to outer space", and through resolution 36/97 C, it proposed the consideration "as a matter of priority [of] the question of negotiating an effective and verifiable agreement to prohibit anti-satellite systems". The Assembly subsequently adopted various resolutions relating to the prevention of an arms race in outer space, which have included, inter alia, decisions to establish groups of governmental experts and open-ended working groups, by its resolutions 45/55 B, 65/68, 72/250, 76/231, 77/250, 78/20 and 78/238.

17. The Conference on Disarmament first took up the matter of the prevention of an arms race in outer space in 1982 and first established an ad hoc committee on this item in 1985. In 2008, China and the Russian Federation introduced the draft treaty on the prevention of the placement of weapons in outer space and the threat or use of force against space objects and its revised version in 2014. From 1985 to 1994 and in 2009, 2018, 2022 and 2024, the Conference on Disarmament decided to establish a subsidiary body in order to advance the substantive work on the prevention of an arms race in outer space.

18. The Disarmament Commission, at its 2018, 2022 and 2023 sessions, considered the agenda item entitled "Preparation of recommendations to promote the practical implementation of transparency and confidence-building measures in outer space activities with the goal of preventing an arms race in outer space, in accordance with the recommendations set out in the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities" and adopted, by consensus, the recommendations contained in A/78/42.

19. The Group recalled the relevant reports of the Secretary-General relating to the prevention of an arms race in outer space.

### C. Existing normative and legal framework

20. The Group affirmed the applicability of international law to outer space, including the Charter of the United Nations and relevant outer space and arms control treaties to which States are party.

21. The Group considered the **Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ("Outer Space Treaty")** and all its principles and obligations as a foundation of international space law and the key framework governing space activities. The Group affirmed the importance of the Treaty to the prevention of an arms race in outer space, especially its **article IV**. The Group underscored the need to seek strict compliance with and the universalization of the Outer Space Treaty.

22. The Group agreed that compliance with applicable existing international law is essential for building trust and for the prevention of an arms race in outer space.

23. There were diverging views among experts on discussing international humanitarian law in the context of outer space. Some experts affirmed that international humanitarian law applies to outer space and regulates the activities of all parties with their respective obligations in armed conflict, including State and non-State actors, in any environment, and that discussing and reaffirming it in no way legitimizes the use of force in violation of international law. Other experts affirmed that it is not appropriate to discuss international humanitarian law in the context of the prevention of an arms race in outer space or the outer space domain and that any reaffirmation of the applicability of international humanitarian law to outer space legitimizes the use of force in outer space and an arms race in outer space.

24. The Group discussed the possible role of the principle and obligation on due regard as set forth in article IX of the Outer Space Treaty, in the prevention of an arms

### 21 Interesting Facts

The Outer Space Treaty (OST) is a foundational piece of international law governing activities in space. It was adopted in 1967 and has been ratified by over 100 countries. Its core principles include:

- Non-appropriation: Outer space, including the Moon and other celestial bodies, cannot be claimed as sovereign territory by any nation.
- Peaceful purposes: Space should be used for the benefit and in the interests of all countries. The Moon and other celestial bodies are to be used exclusively for peaceful purposes.
- No weapons of mass destruction: The treaty explicitly prohibits placing nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies.
- Liability: Nations are internationally liable for damage caused by their space objects.

### 21 Interesting Facts

Article IV of the Outer Space Treaty prohibits States Parties from placing nuclear weapons or other weapons of mass destruction in Earth orbit, on celestial bodies, or anywhere else in outer space. It also bans the establishment of military bases, weapons testing, and military maneuvers on the Moon and other celestial bodies. However, it allows the use of military personnel and equipment for peaceful purposes, such as scientific research and exploration.

race in outer space. Application of **the principle of due regard**<sup>1</sup> could help States to avoid miscalculation and misinterpretation, avoid activities that could exacerbate tensions and undermine security and stability and foster engagement between States. The Group discussed the possibility that the application of the principle of due regard could be clarified, including through further discussions in the Committee on the Peaceful Uses of Outer Space and other relevant bodies, as appropriate, and could be taken into consideration when discussing further measures related to the prevention of an arms race in outer space, including in the negotiation of a legally binding instrument on the prevention of an arms race in outer space.

25. The Group affirmed that the existing normative and legal framework on outer space plays a significant role in preventing an arms race in outer space but does not guarantee the prevention of an arms race in outer space, and that there is a need to consolidate and reinforce that regime and enhance its effectiveness and that it is important to comply strictly with existing agreements, both bilateral and multilateral. The Group recalled the necessity of further measures with **appropriate and effective provisions for verification**<sup>2</sup> to prevent an arms race in outer space, including on the weaponization of outer space.<sup>4</sup>

#### D. Approaches to further measures for the prevention of an arms race in outer space

26. The Group discussed the possible interrelationships and distinctions between legally binding instruments and non-legally binding measures.

27. The Group recalled that negotiations for the conclusion of an international agreement or agreements to prevent an arms race in outer space remain a priority task of the Conference on Disarmament.<sup>5</sup> The Group further recalled that measures designed to strengthen transparency, confidence and security in the peaceful uses of outer space, as without prejudice to efforts towards the conclusion of an effective and verifiable multilateral agreement or agreements on the prevention of an arms race in outer space.<sup>6</sup>

28. The Group also recalled that the group of governmental experts established pursuant to General Assembly resolution 65/66 had endorsed efforts to pursue political commitments, for example declarations regarding the peaceful use of outer space, noting that such commitments could form the basis for the consideration of concepts and proposals for legally binding obligations.

29. The Group discussed but did not seek a common understanding on the concept of responsible behaviour in the context of outer space.

30. Some experts recalled that the prevention of an arms race in outer space requires various forms of measures, including legally binding measures and non-legally binding measures. Some experts expressed the view that both legally and non-legally binding measures can contribute to the goal of the prevention of an arms race in outer space in all its aspects and be pursued in a progressive, sustained and complementary manner. Some of those experts noted also that international non-legally binding measures can have a binding character for States participating in that measure and can obtain a legally binding status at the national level as an interpretation of existing legally binding instruments or when enshrined in national legislation and practice, without prejudice to the relevant constitutional or legal stipulations of States. Other experts were of the view that non-legally binding measures can complement and

<sup>1</sup> Resolution 78/19, para. 3.

<sup>2</sup> *Ibid.*, preambular para. 17.

<sup>3</sup> *Ibid.*, para. 3.

## 24 Definition

The principle of due regard, established in Article IX of the Outer Space Treaty, requires States to consider the rights and interests of other States when conducting space activities. Although not explicitly defined in the treaty, it obliges States to avoid actions that could harmfully interfere with others' peaceful use of outer space. This includes consulting with other States before and during activities that may cause such interference.

## 25 Something to Think About

What are the main obstacles to creating strong and effective verification measures for space arms control agreements? And how do the unique characteristics of the space environment and space objects (e.g., dual use technologies) make traditional methods of verification, such as inspections or monitoring, much harder to apply in space? And if a satellite is damaged, jammed, or interfered with, would it be difficult to determine who is responsible? If so, why would it be difficult?

race in outer space. Application of the principle of due regard could help States to avoid miscalculation and misinterpretation, avoid activities that could exacerbate tensions and undermine security and stability and foster engagement between States. The Group discussed the possibility that the application of the principle of due regard could be clarified, including through further discussions in the Committee on the Peaceful Uses of Outer Space and other relevant bodies, as appropriate, and could be taken into consideration when discussing further measures related to the prevention of an arms race in outer space, including in the negotiation of a legally binding instrument on the prevention of an arms race in outer space.

25. The Group affirmed that the existing normative and legal framework on outer space plays a significant role in preventing an arms race in outer space but does not guarantee the prevention of an arms race in outer space, and that there is a need to consolidate and reinforce that regime and enhance its effectiveness and that it is important to comply strictly with existing agreements, both bilateral and multilateral. The Group recalled the necessity of further measures with appropriate and effective provisions for verification to prevent an arms race in outer space, including on the weaponization of outer space.<sup>4</sup>

#### D. Approaches to further measures for the prevention of an arms race in outer space

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27. The Group recalled that negotiations for the conclusion of an international agreement or agreements to prevent an arms race in outer space remain a priority task of the Conference on Disarmament.<sup>5</sup> The Group further recalled that measures designed to strengthen transparency, confidence and security in the peaceful uses of outer space, are without prejudice to efforts towards the conclusion of an effective and verifiable multilateral agreement or agreements on the prevention of an arms race in outer space.<sup>6</sup>

28. The Group also recalled that the group of governmental experts established pursuant to General Assembly resolution 65/68 had endorsed efforts to pursue political commitments, for example declarations regarding the peaceful use of outer space, noting that such commitments could form the basis for the consideration of concepts and proposals for legally binding obligations.

29. The Group discussed but did not seek a common understanding on the concept of responsible behaviour in the context of outer space.

30. Some experts recalled that the prevention of an arms race in outer space requires various forms of measures, including legally binding measures and non-legally binding measures. Some experts expressed the view that both legally and non-legally binding measures can contribute to the goal of the prevention of an arms race in outer space in all its aspects and be pursued in a progressive, sustained and complementary manner. Some of those experts noted also that international non-legally binding measures can have a binding character for States participating in that measure and can obtain a legally binding status at the national level as an interpretation of existing legally binding instruments or when enshrined in national legislation and practice, without prejudice to the relevant constitutional or legal stipulations of States. Other experts were of the view that non-legally binding measures can complement and

<sup>4</sup> Resolution 78/19, para. 3.

<sup>5</sup> Ibid., preambular para. 17.

<sup>6</sup> Ibid., para. 7.

#### 26 Interesting Facts

The UN does not directly make treaties legally binding. It facilitates the treaty-making process and adopts the final draft text via resolution, but the resolution adopting the text of a treaty does not automatically bind a country to its terms. The treaty only becomes legally binding after it has been independently ratified by a sufficient number of member states through their domestic legal processes. Member states must individually sign and ratify (or accede to) a treaty for its obligations to apply to them.

#### 30 Something to Think About

When we talk about non-legally binding measures in the PAROS context, what is the process by which "soft laws" that are not legally enforceable, can develop into binding obligations? How can the development of customary international law and the principle of good faith shape state behavior over time?

contribute to, but not substitute for, a legally binding instrument on the prevention of an arms race in outer space. Some of those experts considered also that non-legally binding measures should be aimed at increasing outer space safety, sustainability and security and, especially, at the prevention of an arms race in outer space and the conclusion of an international legally binding instrument on the prevention of an arms race in outer space.

31. The Group recalled that the group of governmental experts established pursuant to General Assembly resolution 65/68 endorsed efforts to pursue political commitments, for example, in the form of unilateral declarations, bilateral commitments or a multilateral code of conduct, to encourage responsible actions in, and the peaceful use of, outer space.

32. The Group considered that any possible measures would need to avoid adversely impacting the national security, technological, economic or development interests of States.

33. Without prejudice to the substance of existing proposals, a proposal was made for the States parties to the Outer Space Treaty to consider one or more additional optional protocols to the Treaty. It was noted that the Treaty lacks any provision for such a protocol and that not all States participate in the Treaty.

#### IV. Consideration of substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space

##### A. General considerations including definitions and verification

34. The Group agreed that the provisions of a legally binding instrument on the prevention of an arms race in outer space should be: practical, clear, scientifically and technically accurate, tailored to the specific objective of the measure under consideration and non-discriminatory; consistent with existing international law; and not adversely impact the national security, technological, economic or development interests of its States parties.

##### Definitions

35. The Group affirmed the importance of achieving a common understanding on key terms related to the prevention of an arms race in outer space in all its aspects, as this could impact the scope and implementation of any proposed measures. An international legally binding instrument on the prevention of an arms race in outer space would require definitions of terms. The definitions could be elaborated during negotiations drawing on previously agreed terms as appropriate. Explicit definitions might be required, especially in the absence of international common understanding on the underlying concepts. The Group also considered that definitions in existing multilateral legal instruments on outer space should be used to the extent feasible. The Group discussed possible terms on which definitions or understandings may be sought and considered that specific terms that require definition or understanding would depend on the objectives and measures of instruments.<sup>7</sup>

#### 34 Something to Think About

In what way could outer space disarmament initiatives affect the national security, technological, economic, or development interests of States, and how can such efforts be balanced with the need to promote international peace and prevent an arms race in space?

#### 35 Interesting Facts

Countries disagree on how to define key terms for preventing an arms race in outer space. These include what counts as a "weapon in outer space" (whether it only means weapons placed in orbit or also ground-based anti-satellite systems), what is meant by "peaceful purposes" (whether all military uses are banned or only aggressive ones), what actions qualify as a "threat or use of force" (from direct attacks to jamming and cyber interference), which "space objects" should be protected (all satellites or only certain ones), and what "responsible behavior" looks like (such as keeping safe distances or avoiding debris). These disagreements reflect deeper strategic differences about what activities should be restricted. What are these strategic differences and how do they feed into the disagreements over the way terms are defined? These disagreements reflect deeper strategic divides. For countries with advanced space systems, like the United States and its allies, satellites are central to military operations and economic life, and keeping rules narrow protects their ability to develop new technologies, non-destructive counterspace tools such as cyberwarfare, and even future missile defense systems. Russia and China, by contrast, push for broader bans on weapons in space, which would limit U.S. innovation in these areas while leaving their own ground-based anti-satellite programs untouched. In short, each side seeks rules that protect its strengths and constrain the other's.



36. The Group considered that any definitions included should ideally be the minimum number of terms required for such an instrument to function effectively. Any definitions should be practical, clear, scientifically and technically accurate and tailored to the specific objectives and provisions of the instrument. Definitions should provide clarity to the provisions of an instrument, facilitate compliance and be crafted to avoid legal uncertainty. The elaboration of definitions should also take into account multilingualism.

37. The Group discussed, in particular, whether States should attempt to elaborate a definition for infrastructure in the context of outer space as a first step towards its special protection. In this discussion, a concern was raised that establishing special protection for a certain category of space objects could imply that other categories of space objects could be legitimate or lawful targets or undermine legal certainty by introducing reinterpretation of international law.

#### Verification

38. The Group recalled that, in the final document of the first special session of the General Assembly devoted to disarmament, the Assembly emphasized that disarmament and arms limitation agreements should provide for adequate measures of verification satisfactory to all parties concerned in order to create the necessary confidence and ensure that they are being observed by all parties.<sup>8</sup> The Group recognized the necessity of including measures for verification as an integral part of substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, and that such measures should be considered at every stage of the negotiating process.

39. The Group considered that methods, procedures and techniques related to verification should be able to provide, in a timely, effective and efficient fashion, credible evidence of compliance or non-compliance with the provisions of a legally binding instrument on the prevention of an arms race in outer space. The Group noted that the development of verification measures should be without prejudice to the national security, sustainable development, technological, economic or development interests of its States parties.

40. The Group considered whether a layered or packaged approach towards verification could be pursued, depending on the nature of the measure. Experts presented various and different suggestions on what methods could form such an approach, including, *inter alia*, national technical means, monitoring systems, on-site pre- and post-launch inspections, routine inspections, ground and space-based sensors for space situational awareness, data exchanges and declarations, consultative and dispute settlement mechanisms as well as post facto observations of suspected

<sup>8</sup> The Group did not seek to agree on any specific definitions for the terms contained in the present report. Various experts suggested non-exhaustive lists of terms which partially overlapped on which definitions may be sought, including: behaviour of space objects; counterspace capabilities; critical infrastructure; convert; damage; denial; doctroy; disruption of normal functioning; dual-use; dual-purpose; harmful interference to outer space objects; lowering of effectiveness; military use of outer space; outer space object; partial orbit; operations in a professional manner; placement in outer space; rendezvous operations; proximity operations; safe separation; safe trajectory; space weapon; space safety risks; threat or use of force against outer space objects; threat or use of force by means of outer space objects; weapons in outer space.

<sup>9</sup> Resolution S-10/2, para. 31.

## 37 Something to Think About

When the Group talks about defining "infrastructure" in outer space, they mean deciding which kinds of satellites or space systems count as critical infrastructure that deserve special protection — for example, satellites that provide global communications, navigation (like GPS), or early-warning of missile launches. The idea is that harming these systems could have huge consequences for international security and civilian life.

But there's a problem: if you single out some satellites as specially protected, that could send the signal that all other satellites are fair game in a conflict. It could also muddy existing international law, which already says that force against another State's assets is restricted under the UN Charter. So the debate is: should you create a clear, narrow category of "infrastructure" for extra protection, or would that actually weaken the overall legal shield for all space objects? The definition matters because it decides which satellites get special protection — but choosing only some may risk undermining the protection of others.

How can states define and protect outer space "infrastructure" without undermining existing international law?

## 40 Definition

Space Situational Awareness (SSA) means knowing what is happening in space. It includes tracking satellites, space debris, and other objects in orbit as well as the ability to predict their future behavior in order to monitor risks like collisions or disruptions of satellites or space systems. SSA helps countries protect their space assets and avoid accidents.

violations. The Group considered that potential verification measures should be clearly tied to specific obligations.

41. The Group discussed the importance of space situational awareness as a means for characterizing or verifying the activities and behaviours of space objects. The Group noted documents and discussions in the Committee on the Peaceful Uses of Outer Space, including the guidelines for the long-term sustainability of outer space activities (A/74/20, annex II), in which the Committee calls, *inter alia*, for the sharing of information on space objects and orbital events, and proposals for a possible international mechanism under the auspices of the United Nations to facilitate the sharing of space situational awareness data, as well as the sharing of such data through national or regional initiatives. The Group noted that the sharing of space situational awareness data should be without prejudice to the national security, sustainable development, technological, economic or development interests of its States parties.

42. The Group recognized that further consideration would be required, *inter alia*, on the technical aspects of verification in relation to substantial elements on the prevention of an arms race in outer space, as verification of the characteristics of an object placed in outer space and verification of activities of space objects could involve challenges. The Group acknowledged that the elaboration of verification measures would take time and require engagement by technical, military and legal experts.

43. In particular, verification of dual-use systems may be challenging owing to their inherent characteristics and might involve monitoring their actual use rather than only assessing their characteristics, which may provide options for certain types of verification measures. Consideration could be given to characteristics and activities where there is greater risk. The Group acknowledged that this topic could benefit from further discussion, including on relevant space technology, taking into account current technological limitations and the benefits of further technological development.

44. With a view to addressing the relevant challenges related to defining weapons placed in outer space and verifying the characteristics of space systems, a possible option was presented for a possible framework intended to facilitate analysis of the relationship between threats, characteristics, definitions and verification of threats emanating from any vector. Other experts presented other possible options for how to determine characteristics of weapons placed in outer space. The Group acknowledged that these possible options also had various limitations and that this issue could benefit from further discussion.

## B. Substantial elements on the prevention of an arms race in outer space

45. Consistent with its mandate, the Group considered the following non-exhaustive set of possible substantial elements that could be taken into account in further measures and appropriate international negotiations, including in a legally binding instrument on the prevention of an arms race in outer space. The Group did not seek a common view on, *inter alia*, all aspects of these proposed elements and concluded that further discussions are needed in order to further examine, develop and refine these and potentially other proposed elements, as well as to identify areas of convergence. The Group further discussed each of these possible substantial elements, the threats and the associated issues related to definitions and verification. The considerations in this section are not intended to prejudice any future negotiations or agreements and are without prejudice to national positions.

### 43 Definition

Dual-use space technology refers to space systems, satellites, or equipment that can be used for both civilian purposes (like communications, weather monitoring, or navigation) and military purposes (like surveillance, missile tracking, or counterspace operations). Because these technologies serve both peaceful and security-related roles, and can be operated by both civilian and military entities, it is harder to clearly define what is a weapon and set rules for what is allowed in space.

### Elements on principles and objectives

46. A possible element could reaffirm the relevance to the prevention of an arms race in outer space of principles and obligations contained in the Outer Space Treaty. They include, inter alia, that:

(a) The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all humankind;

(b) Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;

(c) States parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding;

(d) States parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner;

(e) The Moon and other celestial bodies shall be used by all States parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden;

(f) States parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State party to the Treaty;

(g) Each State party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State party from whose territory or facility an object is launched, is internationally liable for damage to another State party to the Treaty or to its natural or juridical persons by such object or its component parts on the earth, in airspace or in outer space, including the Moon and other celestial bodies;

(h) In the exploration and use of outer space, including the Moon and other celestial bodies, States parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States parties to the Treaty;

(i) If a State party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment.

### 46 Did You Know That

Over 110 countries have ratified the Outer Space Treaty, making it one of the most widely accepted international agreements governing space activities.

### 46f Something to Think About

Under the Outer Space Treaty, countries are responsible for all space activities conducted from their territory or by their citizens, whether carried out by government agencies or private companies. States must authorize and continuously supervise non-governmental entities to ensure their activities follow the Treaty's rules. This responsibility covers not only Earth orbit but also the Moon and other celestial bodies. It means that countries must create national laws and regulatory frameworks to oversee private space actors, manage liability for accidents, and ensure all space activities are safe and lawful. With the rise of private space companies like SpaceX and Blue Origin, how can regulatory frameworks strike a balance between ensuring that private companies follow the Outer Space Treaty while also fostering innovation and attracting private investment in the space sector?

47. A possible element could reaffirm that future measures on the prevention of an arms race in outer space should be consistent with provisions contained in the Charter of the United Nations, including, *inter alia*, those concerning:

- (a) The prohibition of the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations;
- (b) The settlement of international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered;
- (c) The inherent right of individual and collective self-defence if an armed attack occurs against a Member of the United Nations;
- (d) The precedence of the Charter of the United Nations, in the event of a conflict between the obligations of the Members of the United Nations under the Charter and their obligations under any other international agreement.

48. A possible element could reaffirm principles and objectives contained in existing arms limitation and disarmament agreements, including, *inter alia*:

- (a) The right to develop, access and use technology for peaceful purposes;
- (b) Implementation of instruments in a manner to avoid hampering the economic or technological development of States;
- (c) The need for adequate and effective verification;
- (d) **Non-discrimination;**
- (e) The objective of general and complete disarmament.

49. The Group recognized that further work is needed to determine the possible impact of threats to space systems on sustainable development. The Group noted that a possible element should have the objective of ensuring equal opportunities for women and men to enable their meaningful engagement in efforts to achieve the prevention of an arms race in outer space. Some experts expressed the view that any future instrument should avoid using gender-exclusive terms, aim at gender equality and be informed by diverse perspectives, and that further work is needed to determine the possible differentiated impacts of threats to space systems on vulnerable groups, including, but not limited to, women and girls.

#### Elements on obligations

50. The Group discussed the following elements and concluded that these elements on obligations required further discussions to identify areas of convergence.
51. The Group discussed whether possible elements in this section should be limited to addressing "intentional" acts, without seeking any common understanding on this issue.

#### Threat or use of force

52. The Group recalled that a possible element should include the obligations and principles enshrined in the Charter of the United Nations.
53. A possible element could include a provision on the threat or use of force against space objects, without prejudice to the provisions of the Charter of the United Nations and without expanding or detracting from their meaning.
54. A possible element could include a provision on the use of space objects as a means of a threat or use of force, including to destroy any targets on Earth or in outer

### 48d Something to Think About

What is the principle of "non-discrimination" in the context of PAROS? How can it be effectively implemented in outer space disarmament frameworks, given the substantial disparities between nations in their current space capabilities? How can we ensure that rules for space activities or arms limitations that apply to independent spacefaring nations, do not disproportionately limit the access of developing countries to space technology?

### 49 Did You Know That

Women and girls often face greater risks during disasters due to pre-existing disparities in information, mobility, and decision-making power, as noted by UN Women. The loss of space-based services like disaster monitoring and communication infrastructure would amplify these vulnerabilities.

47. A possible element could reaffirm that future measures on the prevention of an arms race in outer space should be consistent with provisions contained in the Charter of the United Nations, including, *inter alia*, those concerning:

(a) The prohibition of the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations;

(b) The settlement of international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered;

(c) The inherent right of individual and collective self-defence if an armed attack occurs against a Member of the United Nations;

(d) The precedence of the Charter of the United Nations, in the event of a conflict between the obligations of the Members of the United Nations under the Charter and their obligations under any other international agreement.

48. A possible element could reaffirm principles and objectives contained in existing arms limitation and disarmament agreements, including, *inter alia*:

(a) The right to develop, access and use technology for peaceful purposes;

(b) Implementation of instruments in a manner to avoid hampering the economic or technological development of States;

(c) The need for adequate and effective verification;

(d) Non-discrimination;

(e) The objective of general and complete disarmament.

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54. A possible element could include a provision on the use of space objects as a means of a threat or use of force, including to destroy any targets on Earth or in outer

### 53 Definition

The prohibition on the threat or use of force originates from Article 2(4) of the UN Charter, which states:

"All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the purposes of the United Nations."

This article establishes a general ban on aggressive acts between States, making both actual attacks and threats of attacks illegal under international law.

Specifically, "the threat or use of force" covers any action that could harm, destroy, or intimidate other countries or their assets, including:

- Kinetic attacks: physically striking satellites or other space objects.
- Electronic or cyber interference: disrupting satellites' operations or communications.
- Threats to act: statements, demonstrations, or maneuvers signaling an intention to harm or destroy space assets.

There are two recognized exceptions to this general prohibition:

- Self-defense under Article 51 if a country is attacked.
- Actions authorized by the UN Security Council to maintain or restore international peace and security.

space, without prejudice to the provisions of the Charter of the United Nations and without expanding or detracting from their meaning.

*Intentional acts / acts that damage or destroy space systems*

55.

A possible element could include specific prohibitions relating to acts that damage or destroy space systems, such as:

- (a) Intentional acts / acts against space objects under the jurisdiction or control of another State without its consent that could result in their destruction or damage;
- (b) Intentional acts / acts that damage or destroy terrestrial infrastructure used to control space objects, including command and control or space surveillance systems, by any means, including through malicious use of information and communications technologies;

*Acts that can disrupt or interfere with the safe operation or normal functioning of space objects*

56. A possible element of a legally binding instrument could include provisions obliging States to refrain from:

- (a) Intentional acts / acts that cause harmful interference with space objects under the jurisdiction or control of another State without its consent, especially with certain outer space activities that pose a particular risk of escalation, that disrupt peaceful space activities or that create space safety risks;
- (b) Intentional acts / acts that disrupt the normal functioning or alter the trajectory of space objects under the jurisdiction or control of another State without its consent, including physical connection to space objects under the jurisdiction and control of another State, without appropriate consultation and/or consent;
- (c) Intentional acts / acts that cause the destruction of space objects in a manner that creates space flight safety risks, including through the use of counterspace capabilities, such as **direct-ascent anti-satellite missiles**.

57. A possible element could also contain obligations relating to the safe conduct of operations with the objective of preventing misunderstandings, miscalculations and unintended escalations, such as, inter alia, requirements to ensure, to the greatest extent feasible and practicable, that space objects do not:

- (a) Operate in proximity to space objects under the jurisdiction and control of another State without the provision of appropriate notification of the operation;
- (b) Cause safety risks to spaceflight, including by not maintaining necessary safe separation from other space objects;

58. The Group discussed the challenges relating to **measures based on "proximity", "space safety risks" and "safe separation"** and verifying obligations related to these measures.

*Protection of space-based services to civilians*

59. A possible element could include provisions for the protection of space infrastructure which provides services to civilians, including provisions obliging States parties and non-State actors to avoid activities against such infrastructure that generate collateral impacts on civilian activity, especially over large areas. In this regard, some experts gave the following examples: disruption of air traffic, emergency services or global navigation satellite services. Some experts also indicated that such activities can include jamming or spoofing of signals.

## 56c Definition

Direct-ascent anti-satellite (DA-ASAT) missiles are ground-launched weapons that physically destroy satellites through collision, generating thousands of hazardous debris fragments in space. The first ASAT test to create a significant debris field was China's test on January 11, 2007, which destroyed an aging weather satellite and generated thousands of trackable pieces of space debris, raising international alarm and concerns about the long-term risks of space debris. To date, ASAT tests have created 6,851 pieces of trackable debris, of which more than 3,472 remain in orbit today, posing ongoing collision risks to satellites and crewed spacecraft.

## 58 Definition

This passage refers to the difficulty of monitoring and enforcing certain space safety or arms control measures. These measures rely on the physical positions and movements of space objects, which are often hard to observe and verify from the ground. Here's what the terms mean in this context:

- "Proximity" - How close two space objects (e.g., satellites or spacecraft) are to each other. Some rules might limit how near they can operate to prevent collisions or threatening maneuvers.
- "Space safety risks" - The potential dangers that space objects pose to one another, such as collisions, debris generation, or interference with operations.
- "Safe separation" - Maintaining a minimum distance or buffer between space objects to reduce the chance of accidents or misinterpretation of intent (for example, avoiding situations where a satellite might appear to be threatening another).

The challenge is that verifying compliance with these measures is difficult: you need accurate tracking data, transparency from all operators, and international cooperation to confirm that objects are keeping proper distances and not creating unsafe situations.

space, without prejudice to the provisions of the Charter of the United Nations and without expanding or detracting from their meaning.

*Intentional acts / acts that damage or destroy space systems*

55.

A possible element could include specific prohibitions relating to acts that damage or destroy space systems, such as:

- (a) *Intentional acts / acts against space objects under the jurisdiction or control of another State without its consent that could result in their destruction or damage;*
- (b) *Intentional acts / acts that damage or destroy terrestrial infrastructure used to control space objects, including command and control or space surveillance systems, by any means, including through malicious use of information and communications technologies;*

*Acts that can disrupt or interfere with the safe operation or normal functioning of space objects*

56. A possible element of a legally binding instrument could include provisions obliging States to refrain from:

- (a) *Intentional acts / acts that cause harmful interference with space objects under the jurisdiction or control of another State without its consent, especially with certain outer space activities that pose a particular risk of escalation, that disrupt peaceful space activities or that create space safety risks;*
- (b) *Intentional acts / acts that disrupt the normal functioning or alter the trajectory of space objects under the jurisdiction or control of another State without its consent, including physical connection to space objects under the jurisdiction and control of another State, without appropriate consultation and/or consent;*
- (c) *Intentional acts / acts that cause the destruction of space objects in a manner that creates space flight safety risks, including through the use of counterspace capabilities, such as direct-ascent anti-satellite missiles.*

57. A possible element could also contain obligations relating to the safe conduct of operations with the objective of preventing misunderstandings, miscalculations and unintended escalations, such as, *inter alia*, requirements to ensure, to the greatest extent feasible and practicable, that space objects do not:

- (a) *Operate in proximity to space objects under the jurisdiction and control of another State without the provision of appropriate notification of the operation;*
- (b) *Cause safety risks to spaceflight, including by not maintaining necessary safe separation from other space objects;*

58. The Group discussed the challenges relating to measures based on "proximity", "space safety risks" and "safe separation" and verifying obligations related to these measures.

*Protection of space-based services to civilians*

59. A possible element could include provisions for the **protection of space infrastructure which provides services to civilians**, including provisions obliging States parties and non-State actors to avoid activities against such infrastructure that generate collateral impacts on civilian activity, especially over large areas. In this regard, some experts gave the following examples: disruption of air traffic, emergency services or global navigation satellite services. Some experts also indicated that such activities can include **jamming or spoofing of signals**.

## 59 Did You Know That

The militarization of space threatens these critical space-based services to civilians putting at risk both global cooperation and humanity's ability to benefit from the peaceful uses of space. In addition to the services mentioned in this paragraph, other civilian services that could be affected include:

- Telecommunications and internet services - disrupting mobile phone networks, internet access, or broadcasting.
- Weather forecasting and climate monitoring - interfering with satellites that provide early warnings for storms, floods, or wildfires.
- Financial services - affecting timing signals used for banking, stock trading, and payment systems.
- Maritime navigation - disrupting shipping routes that rely on GNSS or other satellite signals.
- Disaster response coordination - affecting satellite-based communications used in humanitarian relief.

Energy grids and infrastructure management - some power grids rely on satellite data for monitoring and coordination.

## 59 Definition

Jamming and spoofing are major threats to Global Navigation Satellite Systems (GNSS) like GPS, Galileo, GLONASS, and BeiDou. Jamming refers to unauthorized transmissions of signals at the same frequency as authorized services, often to evade tracking or for security or defence purposes. Spoofing involves fake signals mimicking authorized services, potentially misleading and endangering ships or aircraft.

#### Placement of weapons in outer space

60. A possible element could include obligations not to place weapons in outer space, including those designed to attack outer space systems or objects, or Earth-based targets. The Group discussed relevant challenges and possible options associated with defining a weapon in outer space and verifying such obligations.

*Research, development, testing, stockpiling and deployment of systems designed for the use in intentional acts / acts that damage or destroy space systems, as well as their elimination*

51. A possible element could include provisions:

- (a) Prohibiting research, development, testing, stockpiling and deployment of systems designed for acts that damage or destroy space systems, including destructive direct-ascent anti-satellite missiles, including counter-space testing activities that impair the safe operation of satellites, while taking into account the national security, technological, economic or development interests of States;
- (b) Prohibiting destructive testing of direct-ascent anti-satellite missiles;
- (c) Providing for the elimination of such systems that States already possess, provided that such systems are prohibited by the legally binding instrument on the prevention of an arms race in outer space.

*National space policies, doctrines and strategies and other measures that could reduce the risk of escalation, conflict and an arms race in outer space*

52. Taking into account the relevant agreed recommendations of the Committee on Peaceful Uses of Outer Space, the Group also discussed possible other measures that could to the greatest extent feasible and practicable reduce the risk of escalation, conflict and an arms race in outer space, including such as:

- (a) To operate in, from, to, and through space in a safe and sustainable manner;
- (b) To operate their space objects in a manner that maintains safe separation from other space objects and plan trajectories that avoid introducing spaceflight safety risks for other space objects;
- (c) To refrain from any tests, experiments or other intentional acts / acts that result in satellite break-ups or the intentional destruction of space objects;
- (d) To communicate and make notifications to enhance stability, safety and sustainability of outer space activities and to resolve concerns about international peace and security that arise from the conduct of outer space activities;
- (e) To provide appropriate notification of manoeuvres expected to impact space systems and services in order to reduce the risk of misunderstanding or misperception of their intentions;
- (f) To promote policies, strategies or doctrines related to outer space aimed at improving transparency, avoiding misunderstanding regarding States' goals and keeping outer space free from military confrontation;

*Assistance and encouragement in certain acts* 63. A possible element could include provisions that obligate States to refrain from assisting, encouraging or inducing any State, intergovernmental organization, entity, or anyone located on their territory or under their jurisdiction or control, in the conduct of any acts prohibited by the instrument.

## 60 Interesting Facts

If Member States were to agree that weapons should not be placed in outer space, verification of compliance with this rule would depend on how space weapons are defined. There are several key difficulties in getting Member States to agree on a definition of a space weapon:

1. Dual-use technologies - Many satellites and space systems can serve both civilian and military purposes. For example, a satellite used for Earth observation or communications could also be used for military intelligence or targeting. Countries disagree on whether these should count as weapons.
2. Ground-based vs. space-based systems - Some countries, like the U.S., focus on limiting space-based weapons but maintain ground-based anti-satellite (ASAT) systems. Others, like Russia and China, emphasize banning ground-based systems too. This creates disagreement over which systems fall under the definition.
3. Types of threats - There are different ways to interfere with space assets: kinetic attacks, jamming, cyberattacks, or directed energy. States disagree about which of these constitute a "weapon."
4. Strategic interests - Each country wants rules that protect its own strengths while limiting others. Advanced space powers may prefer a narrow definition to preserve freedom of action, while countries with more ground-based capabilities may push for a broader definition.
5. Verification challenges - Without a definition of a space weapon that all countries agree on, verification of compliance with rules on the use of these weapons would be impossible or at the very least would lead to disputes on how to interpret the rules.



#### Placement of weapons in outer space

60. A possible element could include obligations not to place weapons in outer space, including those designed to attack outer space systems or objects, or Earth-based targets. The Group discussed relevant challenges and possible options associated with defining a weapon in outer space and verifying such obligations.

*Research, development, testing, stockpiling and deployment of systems designed for the use in intentional acts / acts that damage or destroy space systems, as well as their elimination*

#### 51. A possible element could include provisions:

- (a) Prohibiting research, development, testing, stockpiling and deployment of systems designed for acts that damage or destroy space systems, including destructive direct-ascent anti-satellite missiles, including counterspace testing activities that impair the safe operation of satellites, while taking into account the national security, technological, economic or development interests of States;
- (b) Providing for the elimination of such systems that States already possess, provided that such systems are prohibited by the legally binding instrument on the prevention of an arms race in outer space.

*National space policies, doctrines and strategies and other measures that could reduce the risk of escalation, conflict and an arms race in outer space*

52. Taking into account the relevant agreed recommendations of the Committee on Peaceful Uses of Outer Space, the Group also discussed possible other measures that could to the greatest extent feasible and practicable reduce the risk of escalation, conflict and an arms race in outer space, including such as:

- (a) To operate in, from, to, and through space in a safe and sustainable manner;
- (b) To operate their space objects in a manner that maintains safe separation from other space objects and plan trajectories that avoid introducing spaceflight safety risks for other space objects;
- (c) To refrain from any tests, experiments or other intentional acts / acts that result in satellite break-ups or the intentional destruction of space objects;
- (d) To communicate and make notifications to enhance stability, safety and sustainability of outer space activities and to resolve concerns about international peace and security that arise from the conduct of outer space activities;
- (e) To provide appropriate notification of manoeuvres expected to impact space systems and services in order to reduce the risk of misunderstanding or misperception of their intentions;
- (f) To promote policies, strategies or doctrines related to outer space aimed at improving transparency, avoiding misunderstanding regarding States' goals and keeping outer space free from military confrontation;

*Assistance and encouragement in certain acts* 63. A possible element could include provisions that obligate States to refrain from assisting, encouraging or inducing any State, intergovernmental organization, entity, or anyone located on their territory or under their jurisdiction or control, in the conduct of any acts prohibited by the instrument.

## 60 Interesting Facts

In April 2024, the U.S. and Japan proposed a UN Security Council resolution (S/2024/302) to reaffirm the 1967 Outer Space Treaty's ban on weapons of mass destruction (WMDs) in space, prompted by intelligence that Russia was developing an anti-satellite weapon system involving a nuclear device. China and Russia countered with an amendment seeking to prohibit "all types of weapons" in outer space, not just WMDs. The China-Russia amendment failed with seven votes in favor, seven against, and one abstention (Switzerland), and Russia eventually vetoed the original U.S.-Japan resolution.

## 61b Did You Know That

In December 2022, the UN General Assembly adopted resolution 77/41 calling upon countries to commit not to conduct destructive direct-ascent anti-satellite missile tests. This followed U.S. Vice President Kamala Harris's April 2022 announcement of America's voluntary commitment to the ASAT test ban. As of October 2023, 37 countries have made similar commitments, including all European Union Member States.

#### Placement of weapons in outer space

60. A possible element could include obligations not to place weapons in outer space, including those designed to attack outer space systems or objects, or Earth-based targets. The Group discussed relevant challenges and possible options associated with defining a weapon in outer space and verifying such obligations.

*Research, development, testing, stockpiling and deployment of systems designed for the use in intentional acts / acts that damage or destroy space systems, as well as their elimination*

51. A possible element could include provisions:

(a) Prohibiting research, development, testing, stockpiling and deployment of systems designed for acts that damage or destroy space systems, including destructive direct-ascent anti-satellite missiles, including counter-space testing activities that impair the safe operation of satellites, while taking into account the national security, technological, economic or development interests of States;

(b) Prohibiting destructive testing of direct-ascent anti-satellite missiles;

(c) Providing for the elimination of such systems that States already possess, provided that such systems are prohibited by the legally binding instrument on the prevention of an arms race in outer space.

*National space policies, doctrines and strategies and other measures that could reduce the risk of escalation, conflict and an arms race in outer space*

52. Taking into account the relevant agreed recommendations of the Committee on Peaceful Uses of Outer Space, the Group also discussed possible other measures that could to the greatest extent feasible and practicable reduce the risk of escalation, conflict and an arms race in outer space, including such as:

(a) To operate in, from, to, and through space in a safe and sustainable manner;

(b) To operate their space objects in a manner that maintains safe separation from other space objects and plan trajectories that avoid introducing spaceflight safety risks for other space objects;

(c) To refrain from any tests, experiments or other intentional acts / acts that result in **satellite break-ups or the intentional destruction of space objects;**

(d) To communicate and make notifications to enhance stability, safety and sustainability of outer space activities and to resolve concerns about international peace and security that arise from the conduct of outer space activities;

(e) To provide appropriate notification of manoeuvres expected to impact space systems and services in order **to reduce the risk of misunderstanding or misperception of their intentions;**

(f) To promote policies, strategies or doctrines related to outer space aimed at improving transparency, avoiding misunderstanding regarding States' goals and keeping outer space free from military confrontation;

*Assistance and encouragement in certain acts* 63. A possible element could include provisions that obligate States to refrain from assisting, encouraging or inducing any State, intergovernmental organization, entity, or anyone located on their territory or under their jurisdiction or control, in the conduct of any acts prohibited by the instrument.

## 62c Interesting Facts

Acts that result in satellite breakups or the destruction of space objects can lead to a catastrophic event in space. In 1978, NASA scientist Donald Kessler described what is now known as the Kessler Syndrome - a theoretical scenario where space debris that collides with satellites or other debris, can break into more fragments and trigger a chain reaction of further collisions. Low Earth Orbit satellites are seen as being the most vulnerable satellites to the damaging effects of a cascading chain reaction due to the high density of satellites in this region of outer space. If this were to occur, LEO could be rendered unusable for satellites, threatening essential space-based services like communication, navigation, and Earth observation.

A chain reaction of collisions creating more debris can, in theory, occur in other high-risk orbital areas as well, such as Geosynchronous Orbit (GSO).

## 62e Something to Think About

The risk of misunderstanding or misperception in outer space is closely tied to transparency and concerns about national security and proprietary technologies.

On one hand, greater transparency can build trust and reduce the chance that other countries see an action as hostile when it is not. For example, a satellite moving close to another might be seen as preparing for interference, even if it is only testing sensors. Clear communication and data-sharing could avoid such misinterpretations.

On the other hand, countries are often reluctant to be fully transparent. They worry that revealing too much about their space systems might expose military vulnerabilities or give away commercial secrets. How can states balance the need for transparency in space maneuvers with concerns over national security or the protection of proprietary technologies?

#### National implementation

64. A possible element could include provisions requiring States, in accordance with their constitutional procedures, to take necessary measures to ensure compliance with the provisions of the instrument, including by any entities under their jurisdiction or control.

#### Elements on transparency and confidence-building measures

65. The Group recalled the consensus that exists within the United Nations on the importance of transparency and confidence-building measures as a means of reinforcing the objective of preventing an arms race in outer space and need for States to review, as appropriate, implement and report, to the greatest extent practicable, the proposed transparency and confidence-building measures contained in the 2013 report of the Group of Governmental Experts on transparency and confidence-building measures in outer space activities (A/68/189).

56. Transparency and confidence-building measures can, as appropriate, be an integral element of a legally binding instrument on the prevention of an arms race in outer space. Such measures can be designed to facilitate, *inter alia*, the resolution of disputes related to the implementation of an instrument. They could also be aimed at enhancing space security and sustainability. The Group also noted that, when applicable, transparency and confidence-building measures can be designed to apply to both State and non-State actors.

57. The Group recalled that transparency and confidence-building measures for outer space activities could also complement and contribute to, but not substitute for, an international legally binding instrument on the prevention of an arms race in outer space, as stated in the 2023 report of the Disarmament Commission.<sup>9</sup>

58. The Group recalled that voluntary transparency and confidence-building measures, considered as complementary measures, could contribute to the consideration of concepts and proposals for legally binding measures for the prevention of an arms race in outer space, as well as verification protocols included in legally binding international instruments.<sup>10</sup>

59. In this connection, the Group discussed possible elements on transparency and confidence-building measures, including from the 2013 report of the group of governmental experts and recalled in the 2023 report of the Disarmament Commission, that could contribute to the consideration of substantial elements on the prevention of an arms race in outer space, giving due consideration to national security considerations:

- (a) Exchanges of information on the principles and goals of a State's outer space policy;<sup>11</sup>
- (b) Exchanges of information on major **military outer space expenditure** and other national security space activities;
- (c) Exchanges of information on orbital parameters of outer space objects and potential orbital conjunctions;

<sup>9</sup> A/78/42, para. 12.

<sup>10</sup> *Ibid.*, para. 12.

<sup>11</sup> In this context, some experts expressed the view that the United Nations Institute for Disarmament Research (UNIDIR) Space Security Portal is a useful tool to improve the transparency of States' and other organizations' policies related to space security. Other experts expressed the view that the Space Security Portal is an initiative under the sole responsibility of UNIDIR.

#### 69b Interesting Facts

The UN Standardized Instrument for Reporting Military Expenditures- later renamed UN Report on Military Expenditures (Milex), was established in 1981 as a platform for States to share information regarding their annual military expenditure. Military outer space expenditures are included in this report because it adopts the definition of military expenditure used by the Stockholm International Peace Research Institute (SIPRI) which explicitly states that all spending on military space activities is part of military expenditure. The Report aims to increase transparency, build confidence and, ultimately, facilitate a reduction of military spending.

- (d) Exchanges of information on forecast natural hazards in outer space;
- (e) Notification of planned spacecraft launches;
- (f) Notifications on scheduled manoeuvres that may result in risk to the flight safety of other space objects;
- (g) Notifications and monitoring of uncontrolled high-risk re-entry events;
- (h) Notifications in the case of emergency situations;
- (i) Notifications of intentional orbital break-ups;
- (j) **Voluntary familiarization visits;**
- (k) Expert visits, including visits to space launch sites, invitation of international observers to launch sites, flight command and control centres and other operations facilities of outer space infrastructure;
- (l) Demonstrations of rocket and space technologies.

70. The Group discussed possible further elaboration of transparency and confidence-building measures, including whether and how to provide routine communication and notifications of military activities in space; establish emergency channels to facilitate the resolution of crises; and establish points of contact to facilitate communication and reduce misunderstandings.

#### Elements on consultative mechanisms and settlement of disputes

71. The Group discussed how possible elements of a legally binding instrument could address consultative mechanisms or the resolution of disputes. States could also expand current existing consultative procedures or mechanisms and, in the case where existing procedures or mechanisms may not be considered sufficient to address concerns related to outer space to establish them on a bilateral basis.

#### Elements on international cooperation

72. Possible elements on international cooperation, taking into account the particular needs of developing countries, could include:

- (a) A reaffirmation that outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies;
  - (b) An undertaking for States to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful exploration and use of outer space on a mutually acceptable basis<sup>12</sup> and in conformity with international obligations;
  - (c) A provision for States with significant space technologies to consider international cooperation on a mutually acceptable basis, such as providing assistance and training and transferring technology, data and material to requesting States for the equitable and mutual benefit of, and taking into account the legitimate rights and interest of, all parties concerned.
73. In addition, any possible measures included in a legally binding instrument on the prevention of an arms race in outer space should provide for implementation in a manner that avoids hampering economic development and the advancement of

<sup>12</sup> A/88/189, para. 62.

### 69i Interesting Facts

Apart from notifications, there are several collaborative efforts the international community could pursue to mitigate the risk of space debris.

They could agree on rules for how satellites should be handled at the end of their missions, set common standards to limit the creation of debris, and support new technologies like systems that can remove debris or satellites that can safely take themselves apart. These steps would make space use safer and more sustainable for everyone.

### 69j Definition

Voluntary Familiarization Visits are when one nation willingly invites another's military or diplomatic representatives to observe its capabilities, activities, or facilities. These visits aim to foster mutual understanding, dispel concerns, and reduce the risk of miscalculation, thereby enhancing trust and regional stability. They are not mandated by treaties but are proactive confidence-building measures.

- (d) Exchanges of information on forecast natural hazards in outer space;
- (e) Notification of planned spacecraft launches;
- (f) Notifications on scheduled manoeuvres that may result in risk to the flight safety of other space objects;
- (g) Notifications and monitoring of uncontrolled high-risk re-entry events;
- (h) Notifications in the case of emergency situations;
- (i) Notifications of intentional orbital break-ups;
- (j) Voluntary familiarization visits;
- (k) Expert visits, including visits to space launch sites, invitation of international observers to launch sites, flight command and control centres and other operations facilities of outer space infrastructure;
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  - (b) An undertaking for States to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful exploration and use of outer space on a mutually acceptable basis<sup>12</sup> and in conformity with international obligations;
  - (c) A provision for States with significant space technologies to consider international cooperation on a mutually acceptable basis, such as providing assistance and training and **transferring technology**, data and material to requesting States for the equitable and mutual benefit of, and taking into account the legitimate rights and interest of, all parties concerned.
73. In addition, any possible measures included in a legally binding instrument on the prevention of an arms race in outer space should provide for implementation in a manner that avoids hampering economic development and the advancement of

<sup>12</sup> A/68/189, para. 62.

## 72 Something to Think About

How can the international community ensure that space governance frameworks are not dominated by a few powerful actors, but instead provide equitable participation and safeguards for developing countries?

## 72c Did You Know That

NASA's Technology Transfer Program is a successful initiative which ensures that innovations from space exploration are applied to benefit life on Earth. Mandated by law, it manages NASA's portfolio of patents, software, and technical expertise, making them accessible through licensing, partnerships, and open-source platforms. The program fosters "spinoffs" - commercial solutions that leverage NASA technologies to advance healthcare, transportation, and environmental sustainability.

technology for peaceful purposes, while protecting sensitive information for national security or commercial proprietary reasons.

#### Elements on other aspects

74. The Group briefly noted possible elements on institutional arrangements, including on the potential need for a dedicated secretariat or an implementation support unit as well as a review process of its implementation, with the understanding that institutional arrangements would depend on the objective and scope of a specific legally binding instrument on the prevention of an arms race in outer space. A legally binding instrument could provide for review of its implementation process through review conferences, regular meetings of States parties and the establishment of a specialized international institutional body.

75. The Group also briefly noted possible requirements for the entry into force of a legally binding instrument. The Group discussed the necessity of participation by major space-faring nations, which would be essential for the effectiveness of such an instrument, bearing in mind the experience of instruments with specific criteria for their entry into force.

### V. Conclusions

76. Given the depth of its exchanges, the work of the Group enabled a better understanding of the issues relating to the prevention of an arms race in outer space as well as consideration of substantial elements on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space and possible aspects of relevant negotiations. Over the course of its work, the Group gained a fuller appreciation of the range of issues and identified areas which could be considered in future negotiations. Without prejudice to national positions, the members of the Group are confident that the present report can serve as a valuable reference for States and as a useful resource for addressing the prevention of an arms race in outer space.

77. Taking into account Sections III and IV, the Group concluded that the present report could serve as a reference document for further measures and appropriate international negotiations on an international legally binding instrument on the prevention of an arms race in outer space, including, *inter alia*, on the prevention of the placement of weapons in outer space. The Group also concluded that the report could contribute to future work on the prevention of an arms race in outer space, such as at the forthcoming open-ended working groups established by General Assembly resolutions 78/20 and 78/238, taking into account previous work carried out pursuant to Assembly resolutions 72/250 and 76/231.

78. Taking into account the content of sections III and IV, the Group agreed that efforts and approaches to elaborate measures on the prevention of an arms race in outer space, including on capabilities, activities and behaviours, should continue to take into account the evolving space activities and threats. Measures that can contribute to the prevention of an arms race in outer space in all its aspects could relate to, *inter alia*, the threat or use of force against outer space objects, prohibiting the placement of weapons in outer space, preventing the possibility of the extension of armed conflict into outer space, as well as measures and efforts to reduce the risk of tensions arising from misperceptions and miscalculations.

79. The Group identified areas where further work could be undertaken by States, including, but not limited to:

- (a) Further developing definitions for a legally binding instrument on the prevention of an arms race in outer space in all its aspects;

(b) Further developing common understanding on threats in the context of outer space;

Further consideration of effective arms control, limitation or prohibition measures that would contribute to the prevention of an arms race in outer space and their scope;

(d) Further study of the issue of verification;

(e) Continuing discussions on proposals on other aspects, including institutional arrangements;

(f) Further consideration of possible measures to strengthen international cooperation on the peaceful uses of outer space in the context of the prevention of an arms race in outer space;

(g) Further elaboration of understandings on the principles of space law, such as peaceful purposes, due regard, continuing supervision and authorization and the duty to consult in the Outer Space Treaty, including on how these principles could contribute to the goal of the prevention of an arms race in outer space in all its aspects;

(h) Further consideration to ensuring equal opportunities for women and men to enable their meaningful engagement in efforts to achieve the prevention of an arms race in outer space in all its aspects;

(i) Further encouragement and facilitation of engagement by civil society and commercial actors in efforts to achieve the prevention of an arms race in outer space in all its aspects;

(j) Further implementation or elaboration of transparency and confidence-building measures without prejudice to the conclusion of a legally binding instrument on the prevention of an arms race in outer space.

## VI. Recommendations

80. The Group recommends that the Secretary-General should make the present report available to all Member States, to the Conference on Disarmament, to any body or process established pursuant to a decision of the General Assembly and to the public.

81. The Group recommends that Member States fully examine the present report and consider its contents in any future deliberations or negotiations on the prevention of an arms race in outer space.

82. The Group recommends further consideration of substantial elements of an international legally-binding instrument on the prevention of an arms race in outer space, including, inter alia, on the prevention of the placement of weapons in outer space, and further consideration of measures on the prevention of an arms race in outer space, taking into account, as appropriate, processes initiated by General Assembly resolutions 78/20 and 78/238.

### 79d Something to Think About

While verification of space weapons demands cutting-edge technology and technical expertise, arms control negotiations happen in inherently political settings. How can multilateral political dialogue contribute to advancing technical solutions, such as those required for verification of treaty compliance?

### 79h Did You Know That

Women remain significantly underrepresented in the space sector, particularly in leadership roles. According to the landmark study on gender equality in the space sector conducted by UNOOSA, women make up only 30% of the workforce in public space sector organizations worldwide. This representation drops significantly at higher levels of leadership - women hold just 24% of managerial roles, 21% of executive positions, and only 19% of board seats.

## Annex I

**List of members of the Group of Governmental Experts****Australia**

Ruth Hill

Deputy Permanent Representative to the Conference on Disarmament

Department of Foreign Affairs and Trade

**Brazil**

Cláudio Leopoldino

Counsellor, Head of the Disarmament and Sensitive Technologies Division

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Ashlyn Milligan

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**Chile**

Felipe Cousiño

Ambassador, Director of International and Human Security

Ministry of Foreign Affairs

**China**

Liang Guotao

Director, Arms Control Department

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**Cuba**

Ivonne Sánchez Quintero

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**Germany**

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**Hungary**

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Challenges, Department of Security Policy and Non-Proliferation

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**Iran (Islamic Republic of)**

Nassereddin Heidari (first session)  
Ambassador and Permanent Representative to the Kingdom of Thailand and  
Permanent Representative to the United Nations Economic and Social Commission  
for Asia and the Pacific and other United Nations agencies in Bangkok

Shahrokh Shakerian (second session)

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**Israel**

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Ministry of Foreign Affairs

**Japan**

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**Morocco**

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**Pakistan**

Rizwan Siddique  
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**Philippines**

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**Republic of Korea**

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**Sweden**

Lenavon Sydow  
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**South Africa**

Zaheer Laher (first session)  
Chief Director, United Nations Political, Peace and Security  
Department of International Relations and Cooperation

Shuaib Mahomed (second session)  
Acting Deputy Director, Nuclear Disarmament and Non-Proliferation, Department  
of International Relations and Cooperation

**United Arab Emirates**

Abdulla Ahmad Alshehhi  
Head of Strategic Research  
United Arab Emirates Space Agency

Fatima AlShamsi (second session)

Deputy Head of Space Policy and Regulations Department  
United Arab Emirates Space Agency

**United Kingdom of Great Britain and Northern Ireland**

Clive Hughes  
Head, Space Security and Advanced Threats  
Foreign, Commonwealth and Development Office

**United States of America**

Eric Desautels  
Director, Office of Emerging Security Challenges, Bureau of Arms Control,  
Deterrence and Stability  
United States Department of State

## Annex II

### List of documents

Document No.	Title
GE-PAROS/2023/WP.1	Working paper submitted by Felipe Cousseño Working paper
GE-PAROS/2023/WP.2	submitted by Yurika Ishii Current trends and developments in
GE-PAROS/2023/WP.3	outer space security,
	including vectors of threats, submitted by UNIDIR
GE-PAROS/2023/WP.4	Gender-based considerations for a legally binding instrument on
	the prevention of an arms race in outer space (PAROS),
	submitted by Ashlyn Milligan
GE-PAROS/2023/WP.5	Possible substantive elements for a legally binding international
	instrument on the prevention of an arms race in outer space, in
	particular, on the prevention of the placement of weapons in
	outer space, submitted by Konstantin Vorontsov
GE-PAROS/2023/WP.6	Working paper for the agenda item on: Review of existing
	international law relevant to prevention of an arms race in outer
	space, including, inter alia, on the prevention of placement of
	weapons in outer space, submitted by Noelle Riza Castillo
GE-PAROS/2023/WP.7	Review of the analyses submitted to the Conference on
	Disarmament of the 2014 Russian – PRC draft “treaty on the
	prevention of the placement of weapons in outer space, the threat
	or use of force against outer space objects” (PPWT), submitted
	by Eric Desautels Proposals of the United States of America
GE-PAROS/2023/WP.8	regarding responsible
	State behaviour for outer space activities, submitted by Eric
	Desautels
GE-PAROS/2023/WP.9	Working paper submitted by Eric Desautels
GE-PAROS/2023/WP.10	Working paper submitted by Eric Desautels Working paper
GE-PAROS/2023/WP.11	submitted by Eric Desautels Security threats, counter-space
GE-PAROS/2023/WP.12	capabilities and irresponsible
	behaviours, submitted by Noelle Castillo and Florian Seitz
GE-PAROS/2023/WP.13	Working paper submitted by Nassereddin Heidari
GE-PAROS/2023/WP.14	Principles of international law relevant to the discussions of the
	Group of Governmental Experts submitted by Ashlyn Milligan
GE-PAROS/2023/WP.15	Verification of legally binding measures for the prevention of an
	arms race in outer space (PAROS), submitted by Szilvia Balzs,
	Noelle Riza D. Castillo, Felipe Cousseño, Ruth Hill, Clive
	Hughes, Ashlyn Milligan, Eun-jin Park, Lena von Sydow, Pierre-
	Alain Voltz, Yurika Ishii
GE-PAROS/2023/WP.16	Response to comments on the working paper on the principle of
	Due Regard, submitted by Noelle Castillo

## 7

### Interesting Facts

The U.S. and Russia-China disagreed sharply over the 2014 draft treaty on preventing weapons in outer space. The U.S. argued the treaty had serious flaws: it never defined clearly what counts as a “space weapon” given that many technologies can be used for both civilian and military purposes; it lacked any system to verify compliance; and it left loopholes by allowing states to keep researching, developing, and stockpiling space weapons as long as they weren’t deployed in orbit. It also ignored ground-based anti-satellite weapons and repeated rules that were already part of existing space law. Finally, the U.S. pointed out that Russia and China themselves were continuing counterspace activities, which undercut trust in their proposal.

Document No.	Title
GE-PAROS/2023/WP.17	Preventing an arms race in outer space, submitted by Clive Hughes
GE-PAROS/2023/WP.18	The positive contribution of public space security doctrines, strategies and policies to prevention of an arms race in outer space, submitted by Florian Seitz, Szilvia Balázs, Lena von Sydow and Pierre-Alain Voltz
GE-PAROS/2023/WP.19	Working paper submitted by Lena von Sydow
GE-PAROS/2023/WP.20	A proposed framework for categorizing weapons placed in outer space, working paper submitted by Bassem Hassan
GE-PAROS/2023/WP.21	In all its aspects: further developing PAROS as a modern concept for addressing space security threats, submitted by Ruth Hill, Clive Hughes, Yurika Ishii, Ashlyn Milligan, Eun-jin Park, Florian Seitz, Pierre-Alain Voltz
GE-PAROS/2023/WP.22	Proposal of considering optional additional protocol(s) to the Outer Space Treaty, submitted by Felipe Cousiño
GE-PAROS/2023/WP.23	Principles and criteria related to adequate and effective verification, submitted by Eric Desautels
GE-PAROS/2023/CRP.1	Draft agenda
GE-PAROS/2023/CRP.1	Indicative timetable
GE-PAROS/2023/CRP.2	Working paper submitted by Liang Guotao
GE-PAROS/2024/WP.1	Proposed draft structure for the report, submitted by Szilvia Balázs, Clive Hughes, Florian Seitz, Pierre-Alain Voltz and Lena Von Sydow
GE-PAROS/2024/WP.2	Working paper submitted by Konstantin Voronstov, Possible substantive elements of a final report of the United Nations Group of Governmental Experts on the Prevention of an Arms Race in Outer Space
GE-PAROS/2024/WP.3	Working paper submitted by the Kingdom of the Netherlands
GE-PAROS/2024/WP.4	Supporting a complementary approach to considering possible legally binding instruments to address the threat of conflict in outer space, working paper submitted by New Zealand
GE-PAROS/2024/WP.5	Working paper submitted by the United Kingdom on the prevention of an arms race in outer space
GE-PAROS/2024/WP.6	Incorporating transparency and confidence-building measures (TCBMs) into legal approaches to the prevention of an arms race in outer space (PAROS), submitted by Project Ploughshares
GE-PAROS/2024/WP.7	Potential pathways for concrete improvement of space security, submitted on behalf of the European Union and its member States
GE-PAROS/2024/WP.8	Working paper submitted by UNIDIR: Verification for Outer Space Security
GE-PAROS/2024/WP.9	

<i>Document No.</i>	<i>Title</i>
GE-PAROS/2024/CRP.1	Report by the Chair of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space
GE-PAROS/2024/CRP.2	Indicative timetable (week one)
GE-PAROS/2024/CRP.3	Revised proposed elements for the Report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space (reissued for technical reasons)
GE-PAROS/2024/CRP.3/Rev.1	Draft report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space
GE-PAROS/2024/CRP.3/Rev.2	Revised draft report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space
GE-PAROS/2024/CRP.4	Report of the Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space