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## Protecting Earth's Future: Integrating a Cosmic Perspective and Community Actions Incorporating Planetary Defense into the “Beyond-SDGs”



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# Introduction

In the 21st century, humanity faces the pressing need to expand its disaster risk reduction strategies to include threats originating from beyond our planet. Among these, asteroid impacts, solar flares, and space debris pose significant risks to the sustainability of life on Earth.

While scientific and technological advancements have enhanced our ability to detect and mitigate such threats, establishing an effective planetary defense framework remains a critical challenge requiring unprecedented global cooperation.

At the same time, the Sustainable Development Goals (SDGs), adopted by all United Nations member states in 2015, have provided a powerful platform for collective action toward a resilient and sustainable future. However, the integration of planetary defense into global sustainability strategies is still at an early stage.

This poster explores the high compatibility between planetary defense initiatives and the objectives of the SDGs, evaluates recent progress in astronomy and space exploration, and outlines strategic approaches for advancing planetary defense through international collaboration.

As we approach the end of the SDG era and look toward the post-SDGs framework, planetary defense must be recognized not only as a scientific endeavor but also as a fundamental component of humanity's commitment to safeguarding our common future.



# 1. Study on Planetary Defense and Disaster Risk Reduction

## (1) Assessment of Risks of Spaceborne Disasters

It is only in recent history that humanity has shifted from accepting natural disasters as an unavoidable fate to recognizing them as challenges to be mitigated through science, technology, and collective effort. Among these, serious discussions and countermeasures regarding disasters originating from space have gained momentum primarily in the 21st century.

Through these examinations, it has become clear that asteroid impacts represent one of the foremost threats to the sustainability of Earth and humanity. At the same time, while it is anticipated that such threats could in principle be countered through concerted efforts on a global scale, achieving such unity in the current international community remains a significant challenge. Other major spaceborne disaster threats include solar flares and space debris.





# 1. Study on Planetary Defense and Disaster Risk Reduction

## (2) Development of a Global Framework for Disaster Risk Reduction

International efforts in disaster risk reduction began to show significant developments since 1990s. In 1999, the United Nations Office for Disaster Risk Reduction (UNDRR) was established. After the launch of the Sustainable Development Goals (SDGs) in 2015, the activities of the UNDRR became closely aligned with this new global program.

Among civil society organizations, the Global Network of Civil Society Organizations for Disaster Reduction (GNDR) was founded in 2007 and now operates in 130 countries.

In the field of space development, the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) has long addressed these issues. In 2013, a new organization was established to discuss the observation of and countermeasures against asteroids that pose a potential threat of collision with Earth.

As these activities have advanced, there has been a growing call for international cooperation in planetary defense. The key to this cooperation lies in strengthening partnerships within the framework of the SDGs.





## 2. Examination of the Relationship Between the SDGs and Planetary Defense

### (1) Analysis of High Compatibility with the Sustainable Development Goals (SDGs)

Planetary defense must be recognized as a critical pillar for achieving the Sustainable Development Goals (SDGs).

The SDGs are founded on the fundamental commitment to protect the dignity of humanity by ensuring the sustainability of life on Earth. Safeguarding the Earth itself is, therefore, a prerequisite for realizing every aspect of the SDGs.

At the time of the SDGs' adoption in 2015, planetary defense had not yet received sufficient international attention, and the risks of spaceborne disasters were not fully recognized by the global community.

However, thanks to the latest scientific knowledge gained through asteroid exploration missions in the 2020s, coupled with heightened awareness of the associated risks, it is now clear that planetary defense must be fully integrated into global sustainability strategies.

In 2024, the United Nations declared 2029 as the "International Year of Asteroid Awareness and Planetary Defense."

Strengthening planetary defense is not merely an additional measure—it is an essential action aligned with the core mission of the SDGs and equally crucial for the post-SDGs framework.

Advancing cooperation on planetary defense represents a decisive step toward securing a sustainable future for all humanity.





## 2. Examination of the Relationship Between the SDGs and Planetary Defense

### (2) Review of Initiatives in Astronomy and Space Exploration

The SDGs were adopted in 2015 with the unanimous approval of all United Nations member states. Each country developed its own action plan, and efforts to promote the SDGs advanced across industries, corporations, academic societies, and universities.

In the field of astronomy and space, the International Astronomical Union (IAU) designated "Astronomy and the SDGs" as the theme for its 100th anniversary.

In the field of space development, organizations such as NASA, ESA, and JAXA demonstrated their contributions to the SDGs.

In Japan, the Astronomical Society of Japan held a forum on the theme of "Astronomy and the SDGs" in 2020.

In March 2022, JAXA formulated its basic policy on the SDGs, demonstrating its commitment to protecting humanity from the ultimate natural disaster through planetary defense.



**JAXA's HP demonstrates its contribution to the SDGs through planetary defense as follows**  
Contributing to the sustainable development of space exploration by improving technologies related to space probes. Contributing to collision avoidance against the ultimate natural disaster of celestial bodies impacting Earth by developing impact prevention technologies and analyzing the physical properties of incoming celestial objects.



## 2. Examination of the Relationship Between the SDGs and Planetary Defense

### (3) Evaluation of Contributions from the Planetary Defense Conference (PDC)

The PDC is an international meeting of experts on celestial impacts with Earth, which began in 2009. Since its inception, scientific analysis has advanced significantly, particularly thanks to the successful arrival of space probes from Japan, the United States, and Europe at asteroids in the 2010s and 2020s. In recent years, discussions have expanded beyond purely scientific analysis to include broader societal issues such as disaster prevention, environmental protection, legal systems and human rights, public participation, and international cooperation, leading to the accumulation of valuable research findings. A major future challenge is to clearly demonstrate the relationship between these achievements and each field of the SDGs, and, through this effort, to pave the way for including space-related issues in the post-SDGs framework.



<b>Session 9</b>	<b>The Decision to Act: Political, Legal, Social, and Economic Aspects</b>
	Planetary Defense Governance: From Ad-hoc Decision Making to Multilateral Security Regime
	Collective Action Problems in Planetary Defense
	Legal Framework of The United Nations Security Council's Role in Decision and Implementation of Planetary Defense Action
	Proposing a Holistic Approach to an appropriate Legal Framework for Planetary Defense



### 3. Strategies for Space-Borne Disasters in Collaboration with the SDGs

#### (1) Formulation of Policies and Measures to Protect Earth and Humanity

In 2025, the world has entered the second quarter of the 21st century. We have made progress in uncovering and recognizing imminent crises.

Yet the harsh truth is this: despite the power of today's science, technology, and international cooperation, many critical goals remain unachieved. Among these shortcomings, global planetary defense policies against spaceborne disasters remains unsatisfactory.

As the 2030 SDG deadline approaches, we must now leverage newly acquired knowledge and technology not only to achieve the SDGs but also to envision and construct a new program that extends beyond them. Within any new framework, the establishment of policies and systems for planetary defense must be made a top priority.





### 3. Strategies for Space-Borne Disasters in Collaboration with the SDGs (2) Promotion of Collaboration with the Disaster Prevention Community

One of the keys to advancing future disaster measures is to collaborate broadly with citizen communities engaged in disaster prevention and environmental protection activities. Through such collaboration, the issue of planetary defense can move beyond the limited circles of governments and researchers and reach the broader public.

If the public understands the vital mission of overcoming major planetary and human crises, it will be possible to gain broad and powerful support. It is worth recalling that Nicolaus Copernicus, who made groundbreaking advances in astronomy during the 15th century, is also revered as a leader who rose to protect his community during times of crisis.





### 3. Strategies for Space-Borne Disasters in Collaboration with the SDGs

(3) Challenges for the “Post-SDGs” and the UN's International Asteroid Year

The year 2025 marks the beginning of a critically important period for the future of Earth and humanity.

Discussions on the post-SDGs framework are expected to solidify by the United Nations SDGs Summit in 2027, making thorough preparation essential.

Additionally, it is our grave responsibility to ensure the success of the "International Year of Asteroid Awareness and Planetary Defense," which the United Nations has designated for 2029.

That year, the asteroid Apophis is expected to make an extremely close approach to Earth. Furthermore, it is noteworthy that South Africa, as the chair of the G20 this year, has emphasized through the S20—the summit of science academies—that the responsibilities of scientists and technologists must be further strengthened.





# Conclusion

Planetary defense is no longer a distant or theoretical concern—it is an urgent and integral part of securing a sustainable future for Earth and humanity. As we approach the close of the SDG era, it is vital that planetary defense be firmly embedded in global sustainability strategies, both within and beyond 2030.

Building strong international cooperation, deepening collaboration with civil society, and promoting public understanding will be key to achieving this goal. It is the social responsibility of our generation to ensure that the Earth, our shared home, is safeguarded against catastrophic spaceborne threats.

Now is the decision time to act—decisively and collectively—to protect the future of all life on this planet.

Thank you for your kind attention.