



**Clean Space Industrial Days**

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# **Space Sustainability in the 21<sup>st</sup> Century**

**JORGE DEL RIO VERA**

Scientific Affairs Officer Space - Applications Section

United Nations Office for Outer Space Affairs

United Nations Office at Vienna

[www.unoosa.org](http://www.unoosa.org)



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## Overview



UNOOSA's activities



Space for Sustainable development



Space Sustainability



UNISPACE+50 and Space2030



Conclusion and Q&A



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# United Nations Office of Outer Space Affairs

## Vision

Bringing the benefits of space to  
humankind

## Mission Statement

The core business of the Office is  
to promote **international  
cooperation** in the use of outer  
space to achieve development  
goals





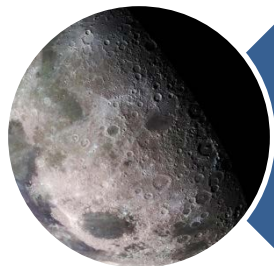
## Unique Roles of UNOOSA



**CAPACITY-BUILDER:** UNOOSA brings the benefits of space to humankind by building space capacity of non-space-faring countries.



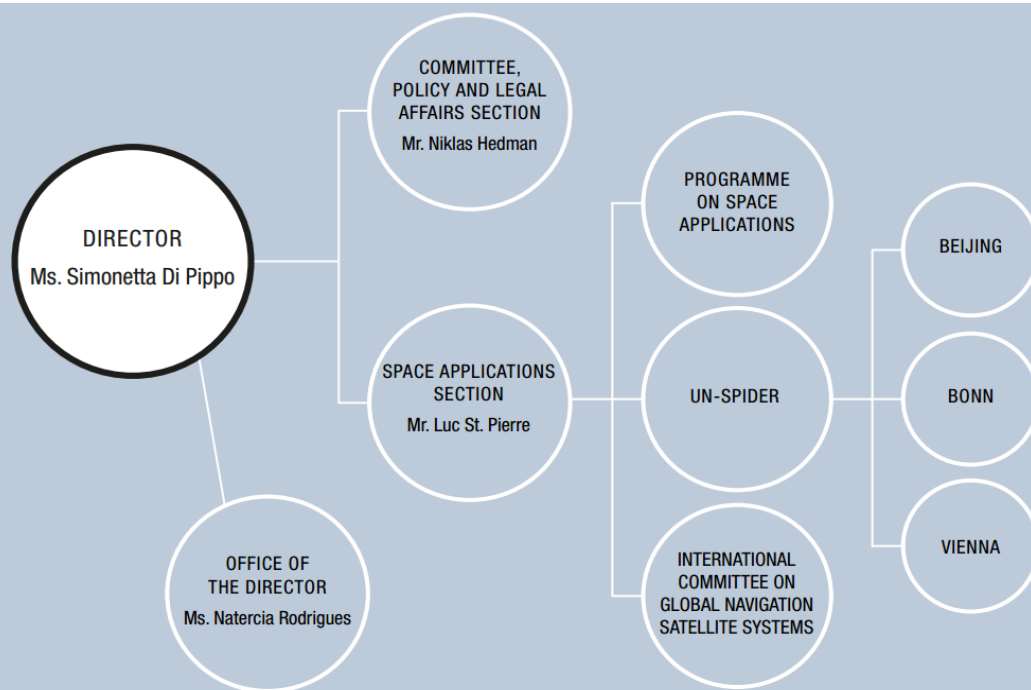
**GLOBAL FACILITATOR:** UNOOSA plays a leading and facilitating role in the promotion of the peaceful uses of outer space.



**GATEWAY TO SPACE:** UNOOSA is the main UN agency on space matters and facilitates the coordination of UN activities using space technology to improve lives around the world.



# Organizational Structure





# Committee on the Peaceful Uses of Outer Space



COPUOS 2016 in Vienna, Austria

- UNGA committee that reviews peaceful use of outer space, **encourages space research** programmes, and **studies legal issues** arising from exploration of space.
- COPUOS developed **5 treaties and 5 principles** of outer space.
- The Committee's membership has continued to expand. (87 States will be members of COPUOS by the end of 2017, though the Office serves all 193 Member States of the UN).
- Two subcommittees: Scientific and Technical, and Legal.



# International Space Law

COPUOS is the forum for the development of international space law.

The Outer Space Treaty (fifty years old this year) provides the basic framework on international space law, including the following principles:

- The exploration and use of outer space shall be carried out for the **benefit and in the interests of all countries**;
- Outer space is **not subject to national appropriation** by claim of sovereignty;
- States shall not place nuclear weapons or other weapons of mass destruction in orbit;
- States shall be **responsible for national space activities** whether carried out by governmental or non-governmental entities.

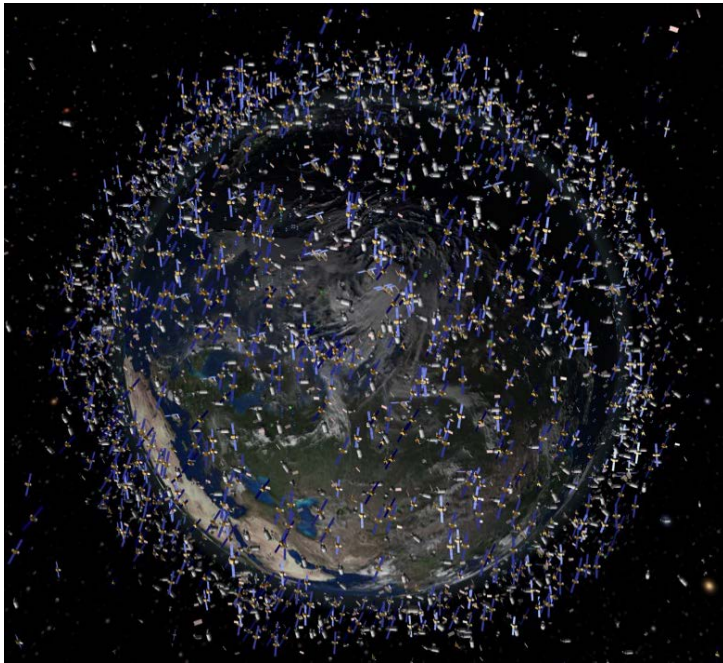


Astronauts aboard the Mir Space Station in 1995

UNOOSA supports COPUOS as it **negotiates international norms for outer space.**



# Register of Objects Launched into Outer Space



- Launching state parties agree to keep a **national register** of objects launched into outer space.
- UNOOSA **maintains a central register** of objects launched into outer space as the only treaty-based TCBM in outer space.
- UNOOSA assists state parties with the **identification of space objects**.
- UNOOSA **provides data** needed for the implementation and application of other treaties.





## International Committee on GNSS (ICG)



- **Encourages coordination** among GNSS providers.
- Promotes the introduction and utilization of **GNSS services in developing countries.**
- Assists GNSS users with their development plans and applications.
- Contributes to **sustainable development.**
- Ensures GNSS **interoperability and interconnectedness** among providers and users globally for enhanced services and applications.

The ICG promotes **voluntary cooperation** related to civil satellite-based positioning, navigation, timing, and value-added services.



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# UN Programme on Space Applications



- The Programme on Space Applications (PSA), since its creation in 1971, has made substantial progress in **furthering knowledge and experience of space applications** around the world.
- The Programme on Space Applications has **established regional centres** for space science and technology education in each region covered by the United Nations Economic Commissions: Africa, **Asia and the Pacific**, Europe, Latin America and the Caribbean, and Western Asia.



## UN-SPIDER

UNOOSA's **UN Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)** programme was created in 2006 to help communities, particularly in developing countries, to take full advantage of disaster-risk management from space-based technologies.

### **Advisory Missions:**

- **TAM:** Technical Advisory Mission
- **ISM:** Institutional Strengthening Mission
- **EM:** Expert Missions

**UN-SPIDER** has aided over 35 countries with the various advisory missions, and the **Asia-Pacific region is highly involved** in UN-SPIDER's capacity-building activities for sustainable development. From this region, countries such as Fiji, Myanmar, the Solomon Islands, Tonga and Vietnam have participated in UN-SPIDER programmes.





## UN-SPIDER: Myanmar in 2012



In 2008, Cyclone Nargis destroyed much agricultural land

- A 2008 cyclone destroyed much of coastal Myanmar, and the country is also susceptible to tropical storms, floods and earthquakes.
- In 2012, UN-SPIDER conducted two TAMs in Myanmar with organizations, including the University of South Wales, the National Disaster Reduction Centre of China and the US Geological Survey.



## UN-SPIDER: Myanmar in 2016

- In 2016, UN-SPIDER followed up with an ISM to increase the state's institutional disaster management. The impact:
  - Emergency Operation Centre (EOC) established with "Remote Sensing Unit"
  - Trained personnel in Remote Sensing and Geographic Information System are available at EOC
  - Disaster Management Training Centre conducts courses in remote sensing/GIS
  - NSDI and one map policy under consideration.



UN-SPIDER mission team in Myanmar



## The Importance of Space Today

- 60 years of the space era: the world has become dependent on **outer space activities** and the **amount of data and information** generated.
- Space today is a major societal and economic factor **valued at around USD320 billion**, with over 70 government space agencies, more than 1,400 satellites operated by over 60 countries, & an increasing number of private actors.

**Space is a “global commons”:**  
The advancements of space technology benefit all Member States of the UN in one way or another.





## Space Sustainability

- Approximately 1800 operational satellites in orbit today.
  - But only in this year ~340 satellites have been launched
  - Amount of operational satellites to be doubled in a few years
- Space as integral element of national critical infrastructures, banking, fleet management, smart power grids... rely on space infrastructure
- Space will become more and more important

**Use of Space to become Sustainable  
-> not compromising future use**





# Space Debris Mitigation Guidelines

- In its resolution 62/217 of **22 December 2007**, the General Assembly endorsed the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space
- **Guidelines are voluntary and Member States are invited to implement the guidelines through relevant national mechanisms**
- There are seven guidelines to be considered at design stage but to be implemented throughout all the phases of a space mission

[http://www.unoosa.org/pdf/publications/st\\_space\\_49E.pdf](http://www.unoosa.org/pdf/publications/st_space_49E.pdf)





## Long Term Sustainability Guidelines

- in 2010 the Scientific and Technical Subcommittee began considering as an agenda item the long-term sustainability of outer space
- In June 2016 the Committee agreed to a first set of guidelines for the long-term sustainability of outer space activities
- Work continues on a preambular text and a second set of guidelines, which will be brought together with the first set to form a full compendium of guidelines. The full compendium will then be referred to the General Assembly in 2018.



## Other efforts regarding Space Sustainability

- The Director of the Office is involved in the World Economic Forum - Global Future Council on The Future of Space Technologies
- There is also ongoing work on sustainability taking place in this forum



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# Transforming our world: 2030 Agenda for Sustainable Development





# Sustainable Development Goals (SDGs)



All countries and stakeholders are acting in **collaborative partnership** to **implement the 2030 Agenda for Sustainable Development.**



## Space and the SDGs

- **Cutting-edge technologies**, such as satellite technology and space applications, are indispensable as we strive to achieve our common goals under the **2030 Agenda for Sustainable Development**.
- **UNOOSA** is currently developing new, more holistic and tangible, approaches to capacity-building, in particular, to address the targets enshrined in the SDGs.
- There is no better example of UNOOSA's vision **'to bring the benefits of space to humankind'** by showing space's importance in the realization and implementation of the Sustainable Development Goals.





# Earth Applications of space technology

- Tracking air composition and quality, monitoring greenhouse gases
- Mapping public health emergencies and environmental influences
- Observing sea level, surface winds, sea ice and ocean colour
- Assessing extent of desertification, droughts and floods
- Monitoring water quality and of wastewater salinity
- Predicting crop yield, land cover and soil moisture
- Deploying tele-medicine in remote areas
- Enabling smart cities and transportation
- Disaster preparedness and mitigation
- Monitoring climate change
- And more!





## Space and the SDGs example:

### 2 ZERO HUNGER

- SDG 2 aims to **“end hunger, achieve food security and improved nutrition, and promote sustainable agriculture.”** Space-based applications can help achieve this goal through the planning and monitoring of agricultural production.
- For example, **precision agriculture** or site-specific farming, which uses GNSS and geographic information systems (GIS), allows farmers to accurately navigate specific locations in fields, collect soil samples, and monitor crop conditions. It is also used for farm planning, field mapping, tractor guidance, crop scouting, and yield mapping.
- **More space applications for sustainable agriculture** include: increased crop yields, mitigation of climate change, sustainable land use, drought effect mitigation, weather prediction, flood forecasting, fish stock monitoring, water management, and more.
- Space data is used to **increase the efficiency of sustainable agricultural** production and ultimately help end hunger.



## Space and the SDGs example:

### 3 GOOD HEALTH AND WELL-BEING

- SDG 3 aims to “**ensure healthy lives and promote well-being for all at all ages.**” UNOOSA promotes universal health coverage, especially in remote and rural areas, through satellite communications, meteorological and remote sensing technologies.
- For example, **telemedicine and tele-health** embrace telecommunication technologies to bring medical experts into virtual contact with patients or doctors in remote areas to avoid costly or potentially harmful relocation. Another example of space applications for SDG 3 is its role in **relief efforts for global disasters**. Search and rescue teams use GNSS, GIS and remote sensing technology to map disaster areas for rescue, aid operations, and assess damages.
- **More space applications for universal health coverage** include: population mapping, treatment of diseases, disease outbreak preparedness and response, tracking of vector-borne diseases, vaccination strategy, forecasting of extreme weather, monitoring air quality, controlling water quality, disaster preparedness and response, early warning of natural disasters, and more.





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# UNOOSA & the SDGs

Space Development  
Profile and Space  
Solutions Compendium

Space and Water Portal

Human Space  
Technology  
Initiative



And much more...

Space for Women

Space science and  
technology education

Partnerships

Access to Space





# UNOOSA & the SDGs: Profile and Compendium



## Space for Development Profile:

- The Space for Development Profile will consist of a set of generic indicators, which can be expanded on a country basis, taking into account the priorities of a country and tailored to each country's development strategy, in collaboration with the country.
- Monitoring and evaluation processes will lead to greater learning, adjustment and decision-making.

## Space Solutions Compendium:

- The Space Solutions Compendium will be a dedicated catalogue of solutions applicable at the national level that can be applied by the country in question.
- List of providers that could contribute to the improvement of a given indicator.
- Solutions could include guidelines, training courses or other forms of assistance, bringing value to the countries that apply them.



# UNOOSA & the SDGs: Global Partnership



- SPACE4SDGs to coordinate all the space efforts supporting the SDGs
- Building upon existing coordination mechanisms
- Including private sector

**Make the most out of Space to support a Sustainable Earth!**



## UNOOSA & the SDGs: Partnerships

**17** PARTNERSHIPS  
FOR THE GOALS



“Partnerships with the private sector will facilitate global engagement ...bringing together Governments, the private sector, civil society, and the United Nations system.”

UNOOSA intends to capitalize on technological and innovative skills of the private sector to benefit developing countries and to deliver the Access to Space initiative to address all 17 of the Sustainable Development Goals.



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# The Future of Global Space Cooperation:

# UNISPACE +50



## UNISPACE+50 in 2018

- **2018** marks the 50<sup>th</sup> anniversary of the first UN Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE), held in Vienna in 1968.
- **COPUOS** decided in June 2015 to use this milestone anniversary to renew and strengthen its mandate as a **unique platform for the interrelationship between major space faring nations and emerging space nations.**
- **UNISPACE+50** will articulate a **long-term vision for space:** from a domain of States towards a domain of a commonly shared human experience. This vision will be called **Space2030.**



1968 Conference on the Exploration and Peaceful Uses of  
Outer Space



## Space2030: A Joint Vision

- **UNISPACE+50** will consider the future course of global space cooperation for the benefit of humankind.
- It will be the best opportunity for joint work among Member States on **Space2030**, in order to address global space governance and the future of space.
- This is an opportunity for **new and creative ideas to strengthen global partnerships**, including in the areas of space exploration and innovation.
- **Space is a limited resource** that has to be protected through **one joint vision**, to be enshrined in Space2030.





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# Space Sustainability

Do private companies need legislation to take sustainability into consideration or can private companies be the drivers?



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+50 

THANK YOU



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