



EE-587

Space sustainability, a multidisciplinary approach

Lecture 12 - Space and the SDGs

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Agenda for today

1. What are the SDGs?
2. Socio- Economic benefit of space activities
3. What about an 18th SDG?



► Welcome

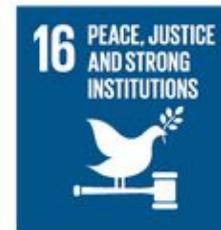
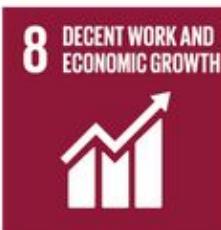
Learning outcomes

1. I know what are the SDGs and went through one study case on education
2. I know how to define the SDGs, how it is relevant for space
3. I know about the 18th SDGs proposal and have contributed to my version of it
4. I understand how I can use the framework for my space mission





SUSTAINABLE DEVELOPMENT GOALS



THE SUSTAINABLE DEVELOPMENT GOALS



What are the SDGs

- The Sustainable Development Goals (SDGs), also known as the Global Goals, are a shared agenda to end poverty, fight inequality and injustice, and protect the planet.
- The Millennium Development Goals (MDGs), adopted in 2000, aimed to address a range of social and economic issues including poverty, hunger, disease, gender inequality, and access to water and sanitation.
- The SDGs go much further than the MDGs to ensure that no one is left behind.

The 17SDGs

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote wellbeing for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

MAKING SENSE OF THE SDG S- THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

The 2030 Agenda for Sustainable Development, adopted unanimously by UN Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet . At its heart are the 17 SDGs, which are an urgent call for action by all countries developed and developing in a global partnership. They recognize that ending poverty and other deprivations must go hand in hand with strategies that improve health and education, reduce inequality, and spur economic growth all while tackling climate change and working to preserve our oceans and forests.

Can you explain the interrelationship among the SDGs which the following paragraph references?

For more information go to:
UN Department of Global Communications (DGC):
<https://www.un.org/sustainabledevelopment/>
UN Department of Economic and Social Affairs (DESA):
<https://sdgs.un.org/goals>

Read the Preamble of the 2030 Agenda for Sustainable Development

What does it cite as inspiration for the SDGs?

What do the SDGs seek to accomplish?

Preamble

- This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. All countries and all stakeholders, acting in collaborative partnership, will implement this plan. We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind. The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what these did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.
- The Goals and targets will stimulate action over the next fifteen years in areas of critical importance for humanity and the planet:

People

- We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

Planet

- We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

Prosperity

- We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

Peace

- We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

Partnership

- We are determined to mobilize the means required to implement this Agenda through a revitalised Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focussed in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people.
- The interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realised. If we realize our ambitions across the full extent of the Agenda, the lives of all will be profoundly improved and our world will be transformed for the better.
- Link to Preamble website and document: <https://sdgs.un.org/2030agenda>

Read the “ Our shared principles and commitments” section from the 2030 Agenda for Sustainable Development

Explain why the references in this text to human rights and the right to development are relevant to the SDGs.

Our shared principles and commitments

The new Agenda is guided by the purposes and principles of the Charter of the United Nations, including full respect for international law. It is grounded in the Universal Declaration of Human Rights, international human rights treaties, the Millennium Declaration and the 2005 World Summit Outcome. It is informed by other instruments such as the Declaration on the Right to Development.

“Our shared principles and commitments” section:
<https://sdgs.un.org/2030agenda>

CASE
STUDIES
ON
SDG 4

4 QUALITY
EDUCATION



SDG 4:

Ensure inclusive and equitable quality
education and promote lifelong learning
for all

SDG 4 Targets



Explore the UN websites below and specifically look at the targets for SDG 4

Have these targets been achieved in your school or community? If not, do you think that they can be achieved?

Think about countries where the targets of SDG 4 have not been met. What can the global community do to help these countries improve access to inclusive and equitable quality education?

How does SDG 4 relate to some of the other SDGs?

Have a discussion about these questions or other relevant related topics.

- UN Department of Global Communications (DGC): <https://www.un.org/sustainabledevelopment/>
- UN Department of Economic and Social Affairs (DESA): <https://sdgs.un.org/goals>
- UN Development Programme (UNDP): [https://www.undp.org/sustainable development-goals?gclid=EA1aIQobChMItOW56 SHgQMVwg6zAB3nKwyLEAAYAiAAEgJaG_D_BwE](https://www.undp.org/sustainable-development-goals?gclid=EA1aIQobChMItOW56 SHgQMVwg6zAB3nKwyLEAAYAiAAEgJaG_D_BwE)

Case Study 1



Please watch the following video and consider these questions:

Why does Malala's story resonate so powerfully on the global level?

How does Malala's message highlight the importance of education, especially for girls?



<https://www.youtube.com/watch?v=VxfV3dOTjlk&t=1s>

Case Study 2



Please watch the following video on a UNICEF initiative in Côte d'Ivoire through partnership with Conceptos Plasticos, a Colombian start up company.

Discuss the challenge of getting an education when there is no infrastructure/building for students and teachers to meet.

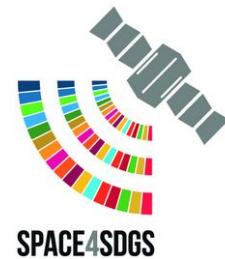
How does this video show the interrelation between SDGs?

This video highlights collaboration between various entities (the government of Côte d'Ivoire, UNICEF, and a private Colombian company). Why is such cooperation effective?



https://www.youtube.com/watch?v=wT_k9rCEiOI

SDGs and Space Technologies



The United Nation Office of Outer Space Affairs (UNOOSA) identifies how space can be used to support the 17 SDGs.

Moreover, the Center for the Study of Existential Risk (CSER) categorized the benefits and risks of space technologies according to:

- Earth for space economy- Earth based infrastructure and activities to observe or reach space
- Space for earth economy- Space based infrastructure and activities to improve life on Earth
- Space for space economy- Space based infrastructure and activities to advance a self-sustaining human presence in space

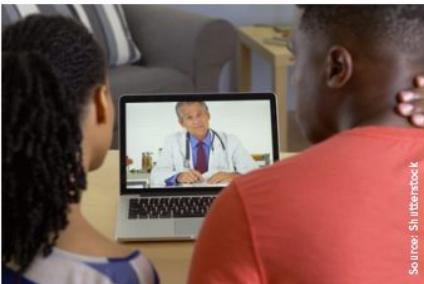
This mapping helps to understand, for each SDGs, the benefits and risks linked to space technologies and all the services and downstream applications that are the results of space activities.



Source: UNOOSA

16 PEACE JUSTICE AND STRONG INSTITUTIONS

SPACE LAW FOR NEW SPACE ACTORS Space Law and Policy Technical Advisory Missions, and helps Member States implement international treaties and commitments stemming from the Committee on the Peaceful Uses of Outer Space. In developing expertise on international space law, and engaging key decision-makers on the benefits of robust regulation, UNOOSA supports emerging space-faring nations gain the legal tools to underpin their national space activities, which builds trust and confidence for investors and fosters the sustainable use of outer space.



Source: Shutterstock

5 GENDER EQUALITY

SPACE AND GLOBAL HEALTH is the focus of the General Assembly 77/120, which encourages greater coordination and cooperation among all relevant actors in key space activities regarding global health that foster the exchange of ideas & data between the space and health sectors. UNOOSA works to strengthen capacity-building and networking in these areas across the globe.



17 PARTNERSHIPS FOR THE GOALS



PARTNERSHIPS with Member States are essential for UNOOSA's role as Secretariat of the Committee on the Peaceful Uses of Outer Space, which has negotiated global governance of outer space activities, and in our provision of unique opportunities to access the benefits of space policy, science, and technology. From deploying satellites from the International Space Station, to developing space law, as well as the use of earth observation to tackle climate change, UNOOSA's programme supports all Member States on their space-faring journey.



SPACE SOLUTIONS COMPENDIUM IS an online database of space solutions in support of the SDGs. The Compendium contributes to sharing good practices, establishing partnerships with industry, and empowering Member States to access and understand how space-based solutions can be used to achieve the sustainable development goals. Space agencies are welcome to submit solutions for the SCC.

United Nations Office for Outer Space Affairs & the SUSTAINABLE DEVELOPMENT GOALS

"The safe, peaceful, and sustainable use of outer space is vital for sustainable development here on Earth. By facilitating international cooperation in the Committee on the Peaceful Uses of Outer Space or as a member, UNOOSA provides unique opportunities to use space-based assets to implement the SDGs and improve the lives of their citizens."

Aarti Holla-Maini, UNOOSA Director

UNOOSA and space contribute to the SDGs through:

- 1 NO POVERTY** **promoting space data** for census mapping, aid provision, and sustainable utilisation of natural resources.
- 2 ZERO HUNGER** **improving food security & supporting** the use of remote sensing for agriculture, forestry, fishing, and irrigation.
- 3 GOOD HEALTH AND WELL-BEING** **harnessing space** for tele-medicine & education, -19 recovery, and improving quality of life.
- 4 QUALITY EDUCATION** **offering unique fellowships & opportunities to launch satellites** and conduct experiments in outer space.
- 5 GENDER EQUALITY** **empowering women in space** through UNOOSA's Space4Women mentorship programme.
- 6 CLEAN WATER AND SANITATION** **using space for sustainable management of water to address** diseases, pollution, drought, and water scarcity.
- 7 AFFORDABLE AND CLEAN ENERGY** **identifying optimal sites** for solar farms and the use of nuclear power in space.
- 8 DECENT WORK AND ECONOMIC GROWTH** **promoting socioeconomic prosperity** by establishing space-capable workforces and industries.
- 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE** **supporting trade, transport, and security** through global navigation satellite systems.
- 10 REDUCED INEQUALITIES** **space technologies** connect remote communities to services, education and work opportunities.
- 11 SUSTAINABLE CITIES AND COMMUNITIES** **promoting the use of space data and technologies** to sustain an 8 billion population.
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION** **promoting the safe & sustainable use of space**, and preserving the space environment for future generations.
- 13 CLIMATE ACTION** **coordinating international efforts for climate monitoring, adaptation, mitigation and resilience.**
- 14 LIFE BELOW WATER** **fostering awareness** in using space applications to protect marine life, & addressing coral bleaching & oil spills.
- 15 LIFE ON LAND** **monitoring** land-use, poaching, biodiversity, forest fire risk, smuggling routes, and protecting vulnerable species.
- 16 PEACE, JUSTICE AND STRONG INSTITUTIONS** **fostering robust regulation & national legislation** in line with international space law.
- 17 PARTNERSHIPS FOR THE GOALS** **establishing partnerships** with space agencies, UN entities, civil society, and industry for international cooperation.



UNITED NATIONS
Office for Outer Space Affairs

Available on





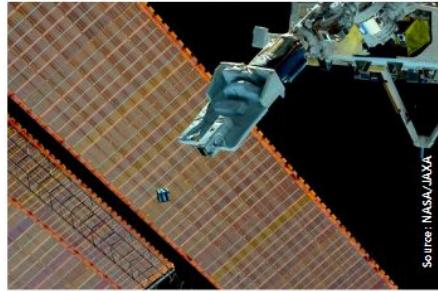
UN-SPIDER EMPOWERS countries to utilise Earth Observation, communications, and navigation satellites to build institutional resilience in all the phases of the disaster management cycle. Guidance is given on how to invoke International Emergency Response Mechanisms and strengthen national capacities in the use of space.



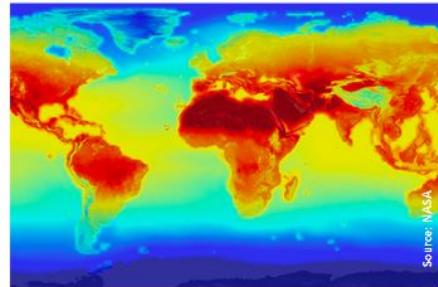
SPACE4WOMEN PROMOTES access to space as well as Science, Technology, Engineering, and Mathematics education and careers for women and girls around the world. Only 1 in 5 space industry workers are women and women make up only 11% of astronauts globally. To address this disparity, Space4Women brings together over 152 mentors to support their mentees in pursuing space as a career.



SPACE4WATER IS an inter-disciplinary, multi-stakeholder platform connecting experts in the use of space technology for water. UNOOSA maintains a web, multi-stakeholder platform connecting experts in the use of space tech for water. UNOOSA maintains an online hub, hosts meetings and an annual scientific conference series. Examples of space tech for water include monitoring surface water extent, groundwater resources, and drought monitoring based on satellite data.



ACCESS TO SPACE FOR ALL PROVIDES unique opportunities for Member States to access the benefits of space science, technology, and applications. UNOOSA's partnerships support hands-on opportunities on Earth and on-orbit, such as experiments in hypergravity and microgravity conditions; the development and deployment of small satellites; and educational programmes like fellowships. The knowledge and skills gained can help build a space-capable workforce and bring socioeconomic benefits.



SPACE4CLIMATE ACTION FULFILLS a niche role in facilitating international cooperation and the wider use of space-based technologies to implement climate change mitigation, adaptation, and resilience initiatives. UNOOSA delivers targeted capacity-building, hosts an online portal, and developed a strategic mapping exercise "International Efforts using Space for Climate Action", which supports policy-makers to develop multilateral strategies, partnerships, and research.



THE UN REGISTER OF OBJECTS LAUNCHED INTO OUTER SPACE is a key transparency mechanism, and as a treaty obligation, it helps Member States and industry understand the fundamental question of "Who owns what in space?". Member States registered 2050 functional space objects (probes, satellites, etc.) in 2022. UNOOSA maintains the Register on behalf of the Secretary-General.



Can you find other example of Space 4 SDGs?

"The safe, peaceful, and sustainable use of outer space is vital for sustainable development here on Earth. By facilitating international cooperation in the Committee on the Peaceful Use of Outer Space or as a member, UNOOSA provides unique opportunities to use space-based assets to implement the SDGs and improve the lives of their citizens."

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- 15 LIFE ON LAND** monitoring land-use, poaching, biodiversity, forest fire risk, smuggling routes, and protecting vulnerable species.
- 16 PEACE, JUSTICE AND STRONG INSTITUTIONS** fostering robust regulation & national legislation in line with international space law.
- 17 PARTNERSHIPS FOR THE GOALS** establishing partnerships with space agencies, UN entities, civil society, and industry for international cooperation.



For your project

Identify which SDGs your project is addressing? Also looking at the target indicators.

<https://sdgs.un.org/goals>

What are the improvement you think could be done based on what you've learned from the SDGs and the examples?

What about an 18th SDG?

Take 5 min with your neighbor to think about an 18th SDG focused on space

What are the different propositions?

SDG 18 – SPACE FOR ALL

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AN INDEPENDENT PERSPECTIVE ON SPACE

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THE FUTURE
TOGETHER

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ABOUT

Space exploration and research has given humanity many advantages in terms of technology and understanding about ourselves and our origin. These benefits will only increase in the future, not only in those domains but can also help economic

<https://sdgsspace.wordpress.com/>

Space 18th SDG

... updating the U.N. 2030 Agenda for Sustainable Development

Home Events 18th SDG Facts Press Releases



Welcome to the Space 18th SDG proposal!

<https://space18thsdq.space/>

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History, concepts and challenges of proposing an 18th UN Sustainable Development Goal related to Space

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ABSTRACT

The UN launched in 2015 17 Sustainable Development Goals as part of their 2030 agenda which covered almost every aspect of human civilization on Earth. Outer Space, however, was omitted from the considerations. There hence have already been a couple of suggestions of an 18th SDG related to Space. The paper will discuss the history and motivations of these suggestions, compare the conceptual frameworks provided, and attempt at modifying the structure of the SDGs and such a potential SDG in particular, as well as the challenges that come with this concept. Comparisons are made to the UN Space 2030 agenda.

1. The 2030 Agenda

The 17 Sustainable Development Goals (SDGs) have been formulated by the United Nations to direct developments on Earth towards the future [1]. They cover almost every aspect of modern civilization and range from poverty and "Zero Hunger" to "Quality Education" and "Reduced Inequalities" and "Decent Work and Economic Growth" to "Sustainable Cities and Communities". Many environmental goals are included, covering areas from "Affordable and Clean Energy" to "Climate Action," "Life Below Water" and "Life on Land," "Peace, Justice and Strong Institutions" and "Partnerships for the Goals" conclude the objective. The SDGs "recognize that ending poverty and other deprivations requires hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests." [2]

GOAL 1: No Poverty
GOAL 2: Zero Hunger
GOAL 3: Good Health and Well-being
GOAL 4: Quality Education
GOAL 5: Gender Equality
GOAL 6: Clean Water and Sanitation
GOAL 7: Affordable and Clean Energy
GOAL 8: Decent Work and Economic Growth
GOAL 9: Industry, Innovation and Infrastructure

GOAL 10: Reduced Inequality
GOAL 11: Sustainable Cities and Communities
GOAL 12: Responsible Consumption and Production
GOAL 13: Climate Action
GOAL 14: Life Below Water
GOAL 15: Life on Land
GOAL 16: Peace, Justice and Strong Institutions
GOAL 17: Partnerships for the Goals

The SDGs are structured into 169 quantifiable targets with 248 indicators. Some of these indicators are repeated several times, so the total number of unique indicators is only 231 [3]. This demonstrates that "the SDGs function as a network. There are interlinkages between targets across different goals." [4] The 2030 Agenda lists eradication of poverty as the first and foremost aim [5], which can also be understood when looking at how the SDGs came into existence.

2. The path towards the 2030 Agenda

The SDGs are part of the 2030 Agenda, "a shared blueprint for peace and prosperity for people and the planet, now and into the future," as the official working puts it [5]. The agenda has its origins in the 1992 Rio de Janeiro Earth Summit, where "more than 170 countries adopted Agenda 21, a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment." [6] More recently, in the year 2000, the UN member states

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- ESA space environment statistics <https://sdup.esoc.esa.int/dicosweb/statistics/>
- [ITU Space Sustainability Portal](#)
- Secure World Foundation [Handbook for New Actors in Space](#)
- [UNOOSA's Awareness-raising and capacity-building project](#) on LTS Guidelines
- [European Space Agency's Space Debris Charter](#) and technical booklet
- **Info about space missions:** <https://www.eoportal.org>
- [Space4SDGs: How space can be used in support of the 2030 Agenda for Sustainable Development](#)
- <https://www.yorku.ca/unsdgs/toolkit/teaching-the-17-un-sdgs/discipline-specific-material-for-the-sdgs/engineering-un-sdgs/>
-