



United Nations
Office for Outer Space Affairs

HARNESSING SPACE FOR OCEANS

Photo credit: NASA

OVERVIEW

The ocean is our planet's life support system. It covers over 70% of the Earth's surface, absorbs nearly a third of human-caused carbon emissions, feeds three billion people, and produces half of the oxygen we breathe. Yet this vital resource faces mounting threats, from climate change and pollution to overfishing and the degradation of critical habitats.

Space-based technologies offer transformative solutions to address these challenges. Today, approximately 60% of the data used in oceanography and marine environmental monitoring comes from satellites. These tools enable us to track sea surface temperatures, monitor ocean currents, detect pollution and identify illegal fishing activity.

Despite the abundance of space-based data and technologies, many countries— particularly Small Island Developing States (SIDS) and Least Developed Countries (LDCs), whose very existence is threatened by rising sea levels, ocean heating and acidification— struggle to access, interpret, and apply space-derived insights. As a result, the full potential of these tools remains largely untapped where they are needed most.

In response to this gap, the United Nations Office for Outer Space Affairs (UNOOSA) has launched the **Space4Ocean Project**. This initiative is anchored by the **Space4Ocean Alliance**, a multilateral partnership that includes UNOOSA, the French space agency (CNES), the Norwegian Space Agency (NOSA), the Monaco Space Office, the Maldives Space Research Organization (MSRO), UNESCO and the European space agency (ESA). This represents a coordinated global effort to bridge the divide between the space and ocean communities, bringing together stakeholders from governments, UN entities, research institutions, civil society, and the private sector to deliver meaningful, measurable impact.

HOW SPACE ENABLES OCEAN SUSTAINABILITY

Space-based tools are uniquely suited to monitor large and remote ocean areas, delivering near real-time, high-resolution data that is critical for effective ocean monitoring. Satellites are also indispensable in understanding the ocean's role in climate regulation, as more than 80% of the indicators used by the Intergovernmental Panel on Climate Change (IPCC) rely on satellite observations. Applications include:

PREPARING & MITIGATING DISASTERS

- Providing early tsunami warnings
- Mapping oil spills
- Forecasting storms and hurricanes
- Mapping coastal erosion

MONITORING CLIMATE PARAMETERS

- Measuring sea level rise
- Measuring sea surface temperatures
- Tracking sea currents affecting weather patterns
- Monitoring ice cover

PRESERVING BIODIVERSITY

- Monitoring health of marine plant life
- Tracking migration of endangered species
- Preventing overfishing

SUPPORTING THE RULE OF LAW

- Detecting illegal marine pollution
- Tracking and identifying vessels
- Intercepting illegal, unreported and unregulated (IUU) fishing

UNOOSA's ROLE: THE SPACE4OCEAN PROJECT

As the only UN agency dedicated exclusively to space, and as the lead of 'UN-SPACE', the UN's inter-agency network on space, UNOOSA will assume a central coordination role, providing administrative leadership for the international secretariat of the Alliance. In doing so, the Office will serve as a global gateway and capacity builder, connecting Member States with the data, tools, and expertise they need and empowering them to harness space to address their national priorities.

UNOOSA continues to collect feedback from beneficiaries of space applications on the challenges they face, and this is what Member States and affected communities tell us:

- Stakeholders who need access to data the most are the least likely to have it
- Significant public and private investments have led to an abundance of relevant data
- Free data is of insufficient resolution to tackle challenges at a local scale
- Lack of awareness of data availability and potential applications contributes to insufficient take up
- Working applications are highly effective and need to be scaled & replicated.

UNOOSA is launching the **Space4Ocean Project** to respond to these challenges across four main areas:



1. POLICY INTEGRATION:

By collaborating with global initiatives like the UN Decade of Ocean Science for Sustainable Development (2021–2030) and providing technical recommendations for the development of Ocean Health Indicators, UNOOSA supports the integration by design of space-solutions insights into global ocean governance frameworks.



2. CAPACITY BUILDING:

Through its Space4Water and UN-SPIDER initiatives, the Office delivers tailored training programmes, workshops, and technical advisory missions to help countries, particularly SIDS and LDCs, build local capacity to use satellite data effectively.



3. TECHNICAL SUPPORT:

UNOOSA promotes open data principles, helps harmonise data standards, and fosters co-use of satellite and in-situ data. It also supports the use of space data and insights to design, refine, and scale solutions that directly respond to the challenges faced by developing countries.



4. AWARENESS RAISING:

Through global awareness campaigns and participation in high-level forums, UNOOSA ensures the visibility of space-based solutions in key multilateral processes, including UN Ocean Conferences (UNOCs) and Climate Conferences.

THE SPACE4OCEAN ALLIANCE: A MULTILATERAL PLATFORM FOR ACTION

The Space4Ocean Alliance fosters collaboration and innovation among space agencies, research institutions, private sector leaders, UN entities, and civil society organisations. The Alliance aims to bring space data to the communities that need it the most and promote the operational uptake of space solutions in ocean conservation by:

- Connecting stakeholders across the space, marine, and maritime domains;
- Addressing priority needs for improved ocean and coastal management;
- Promoting innovative space missions to close observation gaps;
- Facilitating access to satellite and in-situ data, models, and proven applications;
- Developing capacity-building initiatives to enhance data access and service uptake, particularly in SIDS and LDCs;
- Supporting the integration of local and global ocean indicators into decision-making.

Through these efforts, the Alliance directly supports the implementation of Sustainable Development Goal 14 (Life Below Water), as well as broader environmental and climate agendas.



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