Space and Blue Economy

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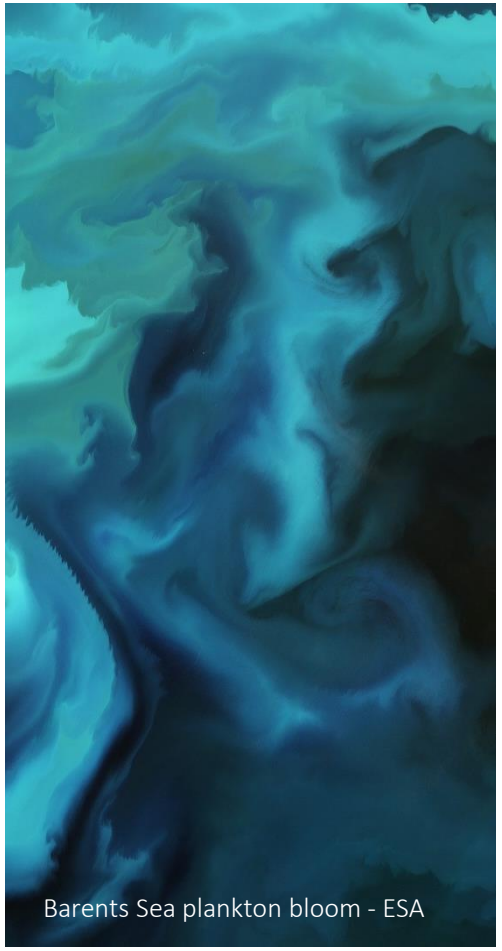
United Nations Office for Outer Space Affairs

UNITED NATIONS
Office for Outer Space Affairs

SDG 14: Life below water

"Conserve and sustainably use the oceans, seas and marine resources for sustainable development"

- Supports the conservation and protection of oceans and their resources;
- Considers the sustainable use of submarine resources and their respective habitats, as well as the increase of economic benefits to Small Island developing States and least developed countries from such use;
- Champions the promotion of scientific knowledge and the adoption of new technologies to deliver results towards the achievement of the global agendas.



Barents Sea plankton bloom - ESA

Marine Environment and the SDGs

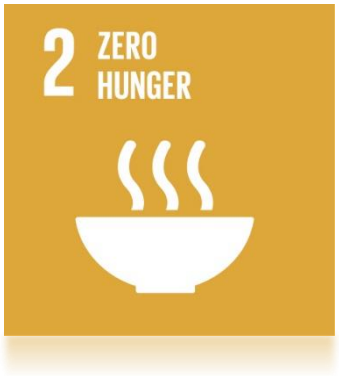
- The most relevant SDG to the marine environment is SDG 14: Life Below Water
- However, the marine environment is linked to a very wide range of SDGs, with most prominent:

SDG 1: No Poverty

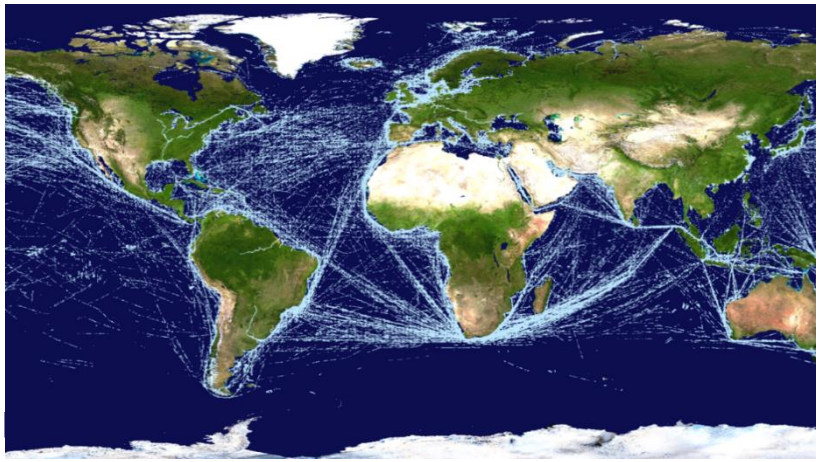
SDG 2: Zero Hunger

SDG 13: Climate Action

SDG 17: Partnerships for the Goals



Space technologies for marine monitoring



Global Navigation Satellite Systems (GNSS) are commonly used to monitor marine traffic and prevent accidents at sea, particularly ship collisions.

In case of an accident, the use of images generated by Earth Observation satellites can be critical in search and rescue operations and containing damages, especially pollution.

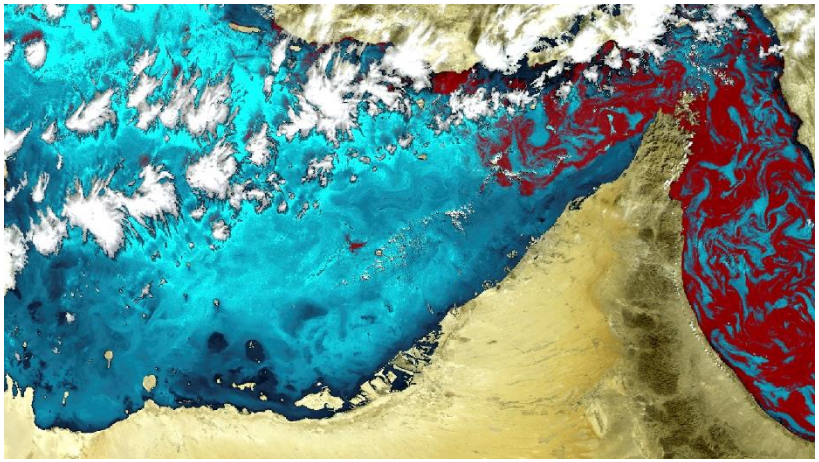
Marine Traffic. Photo @LuxSpace S.a.r.l. retrieved from the ESA photo repository

Earth Observation satellite data are often used to monitor changes in the marine environment.

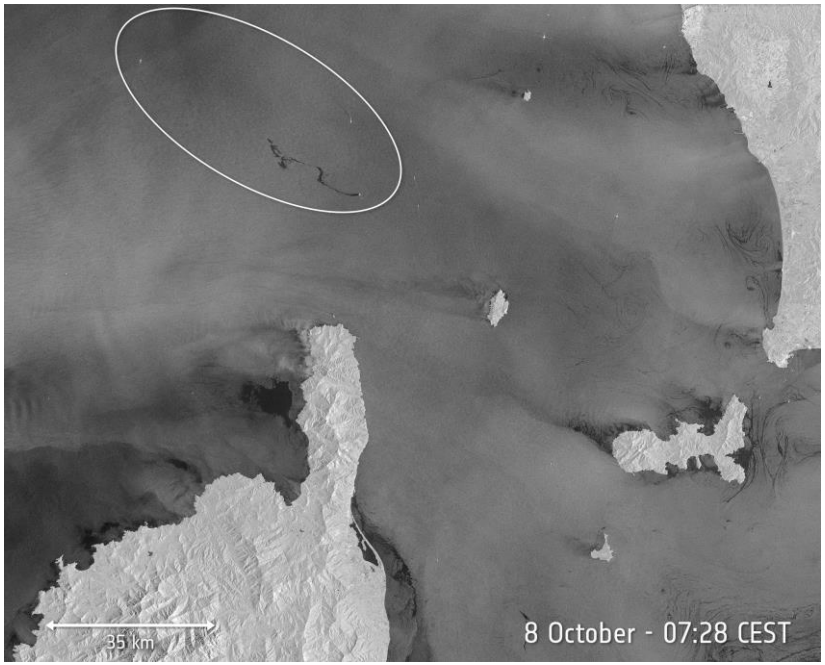
One such change that is easily detectable through EO is algal blooms, commonly known as red tides.

Identification of harmful algal blooms can assist communities in protecting local coastal ecosystems.

Red tide at UAE. Photo @ C-wams project, Planetek Hellas/ESA retrieved from the ESA photo repository



EO for monitoring of oil spills



Oil spill spread. Photo retrieved from the ESA photo repository; it contains modified Copernicus Sentinel data (2018), processed by ESA, CC BY-SA 3.0 IGO

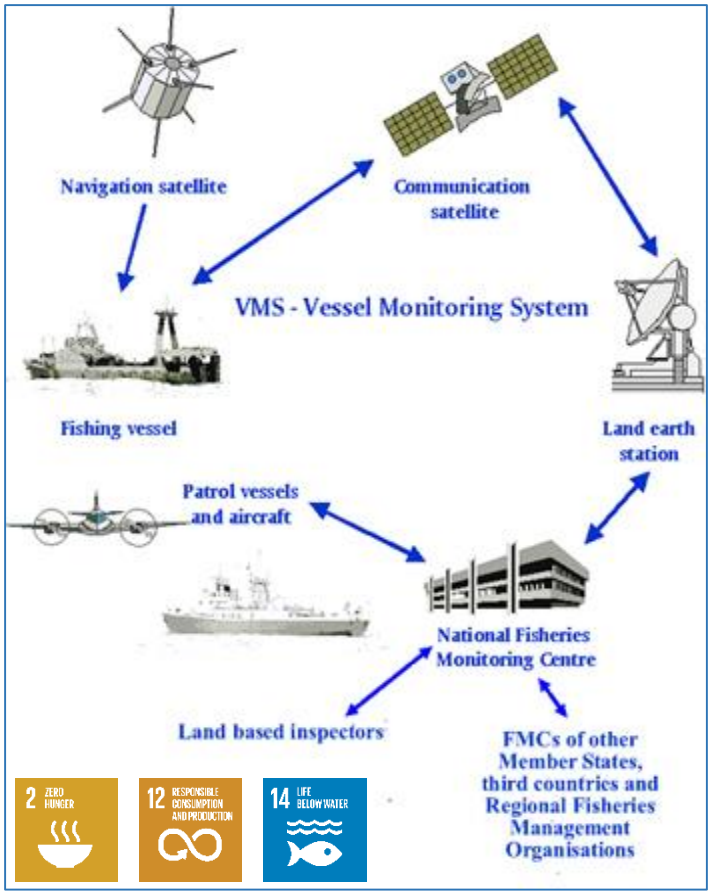
Earth Observation data, particularly radar data, can be used to create maps to monitor the spread of oil spills and to provide data in near-real time to authorities involved in clean-up efforts.

One such example is the explosion of the **Deepwater Horizon** rig in April 2010, which threatened the spawning grounds of the Atlantic bluefin tuna.

Radar data from European and international satellites were transformed into weekly maps showing the location, shape and size of the spill.

By overlaying the oil spill extent maps and the 'spawning habitat index', it was possible to see where and how often the oil spill overlapped with spawning grounds. Fortunately, the spawning hotspot in the west was apparently unaffected by the pollution, as observed from satellite images.

Satellite data for illegal fisheries monitoring



Global Navigation Satellite Systems technology is commonly used in monitoring commercial fishing vessels. The vessel monitoring system (VMS) employed universally within the European Union keeps track of vessels longer than 15m.

The vessels are required to emit a signal in regular intervals for authorities to track their operating locations.

If GNSS is coupled also with Earth Observation data (images), it is also possible for authorities to acquire instant proof of illegal activity during the non-emitting intervals and increase enforcement levels.

Vessel Monitoring System graph @ ec.europa.eu

Satellite data for marine biodiversity monitoring

Satellite data has long been utilised for monitoring of endangered species populations, including cetaceans.

GNSS trackers are commonly used to track marine migration routes and allow for monitoring of registered pods.

Earth Observation images also allow for monitoring of populations, including their nesting and feeding areas.

Monitoring population distribution however still remains a challenge.

Citizen science, coupled with online social platforms with geotagging, can prove the solution to data acquisition, as it allows for real-time reporting of sightings.

Dolphin. Photo retrieved from the NASA photo repository

United Nations Office for Outer Space Affairs


COPUOS 2017, Vienna, Austria

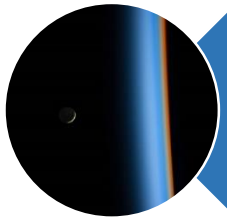
VISION

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.

Actions that countries can take to contribute to the promotion of space-based technologies within the context of the SDGs

- Awareness raising about the use of space technologies for environmental monitoring
- Integration of space technologies in monitoring and enforcement of regulation
- Provision of access to citizen science platforms
- Development of international partnerships for integrated adoption of space technologies

The importance of synergies

- The combination of the two (Copernicus and EGNSS) will allow both the **monitoring** and the **achievement** of some of the targets that are associated with the Goals:
  - **Monitoring** – enhancing the quality of data collected to help monitor the status of SDGs implementation;
  - **Achievement**, which envisages direct support from *EGNSS* and *Copernicus* in achieving specific SDGs.

UNOOSA and the European GNSS Agency **(ST/SPACE/71):**

European Global Navigation Satellite Systems and Copernicus: Supporting the Sustainable Development Goals

http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace71_0_html/st_space_71E.pdf

EGNSS and Copernicus supporting SDG 14

Targets	EGNSS	Copernicus	Synergies
14.1	◑●	●●	●●
14.2	●●	●●	●●
14.3	◑◑	◑◑	◑◑
14.4	●●	●●	●●
14.5	●●	●●	●●
14.7	◑◑	◑●	◑●
14.c	◑◑	●●	◑●

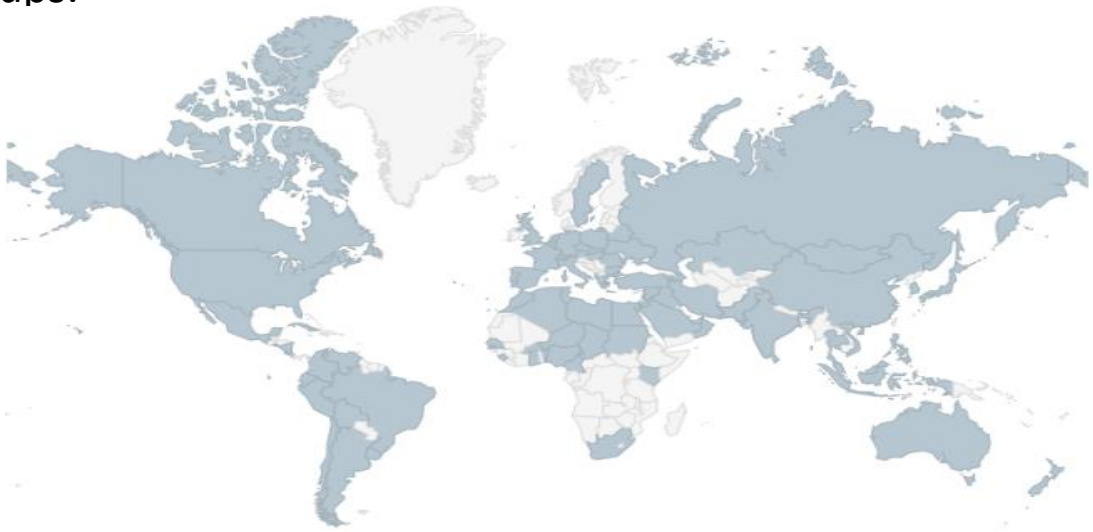
Level of contribution in monitoring/achieving part of a target/indicator

◑◑ Limited contribution ●● Significant contribution

United Nations publication: ST/SPACE/71

Committee on the Peaceful Uses of Outer Space

UNOOSA supports **the Committee on the Peaceful Uses of Outer Space (COPUOS**), its Scientific and Technical Subcommittee, Legal Subcommittee, and related working groups.



COPUOS was established by the General Assembly in 1959 with 24 members. Since then, the Committee's membership has continued to expand (currently 92 members), though the Office serves all 193 Member States of the UN).

STSC and LSC

The **Legal Subcommittee (LSC)** discuss **legal matters** related to the exploration and use of outer space. Topics include the status and application of the **five United Nations treaties on outer space**, the definition and delimitation of outer space, national space legislation, legal mechanisms relating to **space debris mitigation**, and **international mechanisms for cooperation** in the peaceful exploration and use of outer space

The **Scientific and Technical Subcommittee (STSC)** discuss matters related to the scientific and technical aspects of space activities. Topics for discussion include **space weather**, **near-Earth objects**, the use of **space technology for socioeconomic development**, or for **disaster management support**, **global navigation satellite systems**, and the **long-term sustainability** of outer space activities.

International Committee on GNSS (ICG)

- UNOOSA serves as the executive secretariat of ICG
- The ICG promotes **voluntary cooperation** related to civil satellite-based positioning, navigation, timing, and value added services
- 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 the **sustainable development** of the world

- Assure GNSS **interoperability and compatibility** among providers and users globally for enhanced services and applications

ICG: Programme on GNSS applications

- **United Nations Regional Workshops/training courses on the use and applications of GNSS**
  - Building the capacity of developing countries in using GNSS technology for sustainable development
- **Reference frames and timing (WGD)**
  - To benefit operational geodesists or surveyors involved in positioning and measurement and potentially dealing with sea level changes. It is open to government, private sector, academic or graduate students in surveying or a related discipline (IAG, FIG, IGS)
- **Space Weather and GNSS (WGC)**
  - Promotes the use of GNSS for scientific applications and space weather in developing countries
  - Increased number of students and young scientists studying and using GNSS, including increasing participation by women, and many opportunities for research (improved imaging of the ionosphere over the equatorial region, ionospheric effects on augmentation systems…)

ICG Information Portal

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