

SPACE AND SUSTAINABILITY

Cases from Norway

Longyearbyen



Climate Change in the Arctic

In the Arctic, monitoring of sea ice is important for safety and commercial reasons, but it is also an important indicator of climate change. The Norwegian Meteorological Institute (Met.no) is daily delivering free ice charts predominantly based on satellite data and especially satellite radar data.

The presence, or absence, of snow cover, has a large impact in many areas including atmospheric processes and the Earth's surface energy balance. Met.no's and NVE's snow cover service is using

satellite monitoring of regional snow cover and is producing historical global snow cover products from satellite data.

Permafrost is important for our climate, containing large amounts of biomass stored as methane and carbon dioxide, making tundra soil a carbon sink. Norwegian institutes are developing a service based on satellite radar data from Copernicus, monitoring sinking ground and land heave. This service will be applied to monitoring permafrost with

a special focus on Svalbard. Methods are based on a highly successful service called InSAR Norway which has also been developed into the European service InSAR Europe, monitoring sinking ground and land heave all over Europe.

Glaciers are particularly sensitive to changes in climate and are one of the main contributors to recent sea level rise globally. The Norwegian Copernicus Glacier Service is using Sentinel satellite data to monitor glaciers in mainland Norway and Svalbard.

MARITIME MONITORING

A satellite is shown in orbit above the Earth's surface. The satellite is a rectangular box with various instruments and antennas. It is positioned on the right side of the frame, with the Earth's blue and white horizon visible below it. The background is the deep black of space. On the left side, the words 'MARITIME MONITORING' are written in a bold, white, sans-serif font. The word 'MARITIME' is on the top line, and 'MONITORING' is on the bottom line. A small orange horizontal bar is located under the 'M' of 'MONITORING'.



Photo: Norwegian Space Agency

Norway's large ocean areas are difficult to keep track of. The technological revolution that made micro satellites more affordable, has given Norwegian authorities new ways to monitor ship traffic, maritime resources, and environmental crime such as fishing crime and oil spills, as well as supporting search and rescue at sea. Norway is also supporting other governments in their supervision of their ocean areas.

Norway has been pioneering AIS satellites since 2010. Norway's fleet of micro satellites has all AIS detectors that pick up signals from the maritime collision avoidance system Automatic Identification System (AIS), mandatory for all vessels of 300 or more gross tonnage.

These signals communicate a vessel's identity, speed and bearing, and may be used for monitoring ship traffic. AIS signals alone may not give a complete view of maritime traffic. Technical errors, interference, signal manipulation and AIS transponders that have been switched off are possible problem areas.

The problem is mitigated by the payload of the Norwegian satellite NorSat-3. It is carrying a radar detector which is locating signals from civilian navigation radars. Thus, the Norwegian Coastal Administration will be able to verify the AIS information and detect ships that are not emitting AIS signals.

BLUE JUSTICE

In 2019 Norway launched the Blue Justice initiative to help developing countries to combat illegal fishing and other forms of fisheries crime.

This type of crime is robbing communities of their wealth and creates poverty and worker exploitation.

The overall goal of the initiative is to support the implementation of the international declaration against fisheries crime (Copenhagen Declaration) which currently has 60 member countries.

Norway's capacities are essential in the Blue Justice initiative. The Norwegian Government plans to use the country's micro satellites to track fishing in the waters of developing countries. In this way, these countries can disclose illegal fishing themselves. Norwegian space technology and high competence in digitalization processes will make the initiative even more effective.

An international Blue Justice vessel tracking center is already established in Vardø in Northern Norway. A digital platform for secure state-to-state cooperation against fishing crime is developed in Norway, owned by the Norwegian Coastal Administration, and administered by the UNDP.

“Since 2008 Norway has been at the forefront of getting global recognition that there is organized crime in the global fishing industry”

Bjørnar Selnes Skjæran, Minister of Fisheries and Ocean Policy



SAVING RAINFORESTS

Norway's International Climate and Forest Initiative (NICFI) is Norway's largest international effort to slow down climate change. The focus is on protecting the world's rainforests.

The loss of rainforests is a major contributor to the climate crisis. By absorbing large amounts of CO₂, rain forests help to slow down global warming. Tropical forests also have many other important functions, such as being a source of water and food, and they are essential for both humans and animals.

To know how to protect the forests, it's imperative to effectively monitor them. NICFI's Satellite Data Program is making sure that people all over the world get access to free high resolution images of the tropics.

In September 2020 NICFI signed a contract worth close to NOK 400

million with Kongsberg Satellite Services and their partners Airbus and Planet. Their mission is to make satellite images universally accessible. Since then the satellite program has registered more than 18 000 users from 158 different countries.



“Stopping the destruction of the world’s rainforests is the most effective climate action we can take to reach the 1.5 degree target”

Espen Barth Eide, Norwegian Minister
of Climate and Environment

ARCTIC ACCESS

Norway's geographical position in the North has made us a nation with a history of polar exploration and strategic and economic interests in the polar regions.

Norwegian companies and authorities have used our polar know-how to establish a firm footprint for the space sector in the polar areas. Norway has ground stations for receiving satellite data in two of the coldest and most inhospitable places on Earth, Svalbard and

Antarctica. It is the locations of the stations that make them so useful.

A ground station in the Arctic or Antarctica can receive data from the satellite every time it passes over the polar area. The combination of SvalSat (Svalbard) and TrollSat (Antarctica) makes it possible to contact polar-orbiting satellites every 50 minutes.

Today SvalSat in Svalbard is the largest ground station for polar orbiting satellites in the world. It is receiving data on behalf of many countries and is the main ground station for the European satellite programs Galileo and Copernicus. A fiber cable between Svalbard and the mainland makes sure the data travels fast to its destination.

Since 1962 science rockets have blasted off from Andøya on the coast of Northern Norway. Soon, Andøya Spaceport will offer one of the first European commercial launch pads for launching small satellites into orbit.

There has long been an unmet need for satellite-based broadband in the Arctic. Today's geostationary communication satellites have poor coverage in the High North. In 2024 Norway will have two new satellites bringing broadband to the Arctic.

The Arctic Satellite Broadband Mission (ASBM) will launch the satellites in a highly elliptical orbit offering continuous broadband at the 68th parallel north, which is roughly where the Arctic Circle runs.



The Norwegian Space Agency (NOSA) is a government agency under the Ministry of Trade, Industry and Fisheries. The Agency was established in 1987, when Norway became a member of the European Space Agency (ESA).

NOSA is responsible for organizing Norwegian space activities, particularly with respect to ESA and the EU, and for coordinating national space activities.



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