

KSAT satellite based vessel detection service

- Covering large areas effectively
- Operating independently of light and weather conditions
- Rapid response
- Multiple satellites, both SAR and optical



Kongsberg Satellite Services



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Maritime Monitoring KSAT – Vessel detection service

Kongsberg Satellite Services (KSAT) is a world leading provider of satellite ground station services and value-adding services derived from satellite data. KSAT has supplied sophisticated monitoring services to coastguards, pollution-control authorities and countries in Europe for over a decade. With its unique geographical location with headquarters in Tromsø, in the North of Norway, and satellite ground stations in Svalbard (SvalSat) and Antarctica (TrollSat), KSAT is the only company in the world that can supply access to satellites from both the Arctic and the Antarctic, and this ability to access the satellite from both polar regions results in rapid access to the data, from anywhere in the world.

KSAT is owned 50 % by Norwegian Space Centre and 50 % by Kongsberg Gruppen.

For more information: www.ksat.no



SPACE is filled with possibilities. Satellites 400-800 km above ground constantly circle the globe with advanced equipment, providing detailed information from the earth surface. The satellites that circle around the poles are called polar-orbiting satellites and Kongsberg Satellite Services (KSAT), with its unique geographical location close to both poles is capable of acquiring information from around the globe, in a very short time.

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WORLD CLASS - through people, technology and dedication



Coordinated surveillance, satellite and aircraft observation:

An integrated system combining all available surveillance data represents the optimal and most cost efficient solution for environmental monitoring and situational awareness. Satellite imagery provides an overview that allows the authorities to identify areas that should be more closely observed. This optimises the use of surveillance aircraft and coastguard vessels, producing a more effective surveillance and a optimised use of available surveillance resources.



Vessel detection

- Increasing demand for maritime awareness

Satellite imagery has become an important source of information in state-of-the-art maritime surveillance and monitoring systems. A demand for the best possible vessel monitoring solutions is driven by:

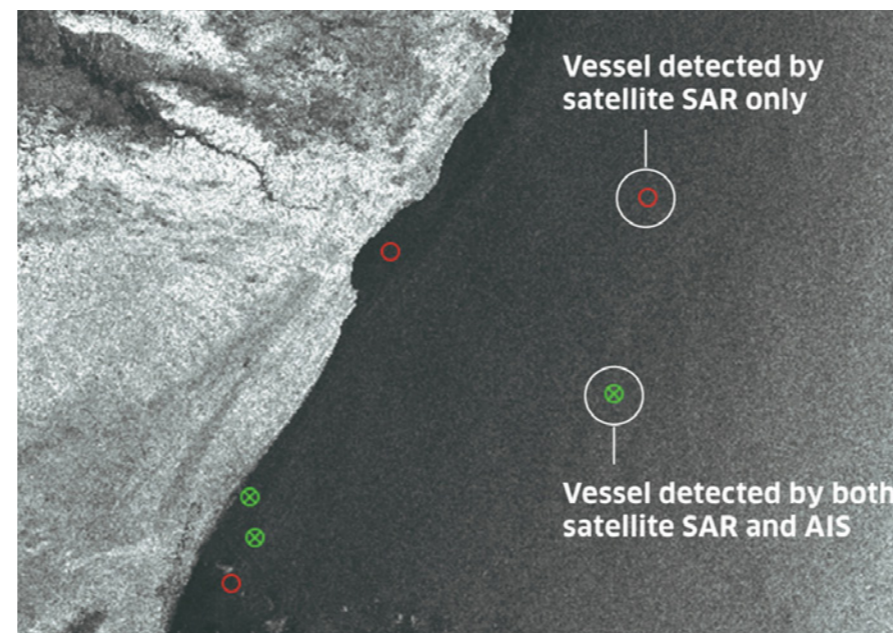
- Illegal activities such as piracy, human trafficking, smuggling and terrorism
- Illegal fishing activities
- Increasing ship traffic, transportation of hazardous materials, passengers and goods

Satellites images make it possible to cover large areas, thus making it possible to obtain cost-effective targeting of other surveillance means like coastguard vessels and aircraft.

KSAT offers a multi-mission operational service providing vessel positions from both electro-optical and radar satellites, combined with vessel tracking reports.

The objective of the service is to provide positions of non-reporting vessels to the end-user, less than 30 to 60 minutes from satellite acquisition.

The KSAT vessel detection service provides a snapshot of vessel activity in a certain area. Vessels are detected in satellite imagery and for each vessel, information about geographical location (latitude/longitude), estimated vessel length and heading are provided. Combining the satellite based information with other available vessel tracking systems (VTS, AIS, LRIT, VMS, etc), the **non-reporting vessels** can be highlighted.



■ Example of vessels detected with RADARSAT-2 outside the coast of Somalia and correlated with AIS data. Green circles indicate positions of vessel reported with Satellite AIS. Red circles indicate positions of non-reporting vessel, only detected in the satellite image (RADARSAT-2 SCANSAR Narrow Mode © MacDONALD, DETTWILER AND ASSOCIATES LTD., 2009 – All Rights Reserved)

An automatic algorithm detects vessels in the satellite images. A final quality assessment is done by experienced image analysts/operational engineers. The analysts make use of additional information on fixed installations, oceanographic maps, local wind speed and wave heights.

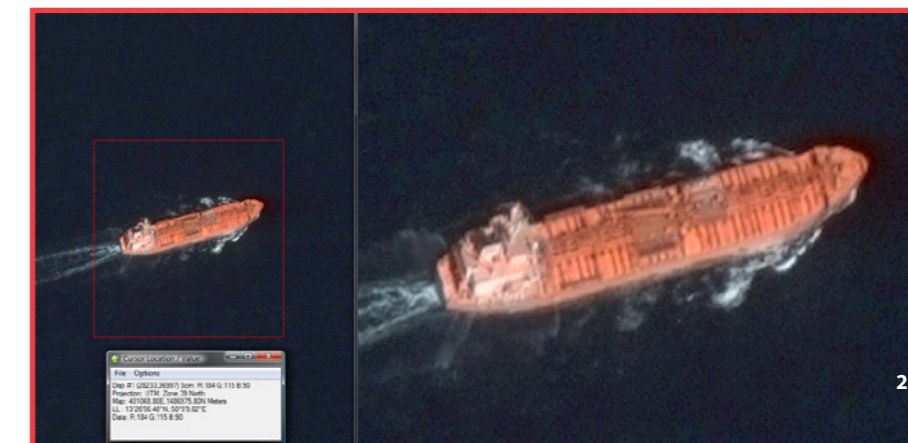
Synthetic Aperture Radar (SAR)

SAR is an advanced satellite sensor that sends microwaves towards the earth's surface and receives the signals reflected from the surface underneath, called backscatter. These radar satellites are able to observe features and objects on the surface both at night time, and through cloudy and foggy conditions.



Electro-optical satellites

Satellites equipped with electro-optical sensors will provide high-resolution and accurate imagery all over the world. By using multi-spectral sensors it is also possible to extract information not visible for the human eye. The high resolution images from optical satellites makes it possible to identify the vessels detected with low resolution images from radar satellites.



■ 1. RADARSAT-2 UltraFine Mode: swath width 20 km, resolution 3 m (©MacDONALD, DETTWILER AND ASSOCIATES LTD., 2009 – All Rights Reserved)

■ 2. and 3. QuickBird, swath width 16,5 km, resolution 60 cm. © COPYRIGHT 2010 DigitalGlobe

