

## Maritime surveillance

**Baffin island, Canada**  
The Northwest Passage was fully navigable for several weeks in 2007, for the first time since records began. COSMO-SkyMed © ASI processed and distributed by e-GEOS.

e-GEOS is a world leader in maritime monitoring services, participating in the major international programmes such as GMES (Global Monitoring for Environment and Security), MARISS (Maritime Security Services) and EMSA (European Maritime Safety Agency).

### Ship detection and tracking

Satellite borne SAR instruments data provide an efficient way of detecting ships in the open sea and measuring, through wake and Doppler displacement, their speed and direction. Repeated observation can contribute to a maritime surveillance system, complementing information on routes from coastal radars and shipboard Automatic Identification Systems (AIS). e-GEOS grants unique access to a variety of SAR satellites: COSMO-SkyMed constellation, RADARSAT-1 & -2, ENVISAT and ERS-2. Particularly COSMO-SkyMed constellation significantly improves the role of SAR in this application because of its high revisit frequency. High spatial resolution observing modes provide ship characterization / classification.

For each ship, the system provides:

- geographical location
- date and time of detection
- estimate of size
- estimated speed & direction, where wake is visible
- MMSI code of the ship, obtained by integrating Earth Observation data with AIS and/or Satellite-AIS and/or Long Range Identification & Tracking (LRIT) systems data

### Near Real Time (NRT) monitoring

e-GEOS, thanks to its own ground station based in Matera (Basilicata region, Italy), is able to cover the Mediterranean basin with NRT services and provide oil spill and ship detection reports integrated with AIS, Satellite AIS, VMS (Vessel Monitoring System), LRIT and any other available in-situ data.



## Maritime applications

### Strategic Surveillance

e-GEOS provides statistical traffic information derived from multi-temporal maritime picture analysis, and coastal areas monitoring, for critical route identification, patrol activity planning and decision support systems in case of crisis.

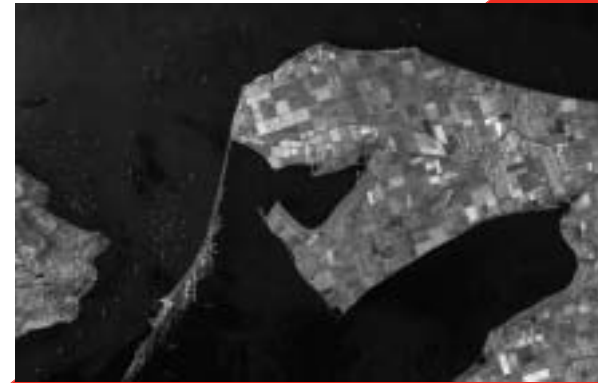
### Oil spill

Oil damps down capillary waves on the sea surface. The SAR sensors detect oil slicks as areas of lower back-scattered signal. Applications of oil slick detection encompass disasters (sinking tankers), illegal activities (tank washing) and oil exploration (natural seepage).

The COSMO-SkyMed constellation supports large scale monitoring for oil spills with its ScanSAR observing mode. The short revisit time supports an operational use of a SAR-based oil spill monitoring service making it easier to link an oil spill with a specific ship.

Available oil spill services and applications:

- routine and on-demand sea monitoring services
- statistical analysis
- support to environmental recovery measures following a spill
- integrated value-added products (automatic data integration chain)
- services provided on a continuous basis
- NRT performance (30 minutes from satellite pass)
- WebGIS delivery mode



### Strategic surveillance

Kerch strait, Ukraine  
COSMO-SkyMed image over the Kerch strait between Ukraine and Russia, November 2007.  
COSMO-SkyMed © ASI processed and distributed by e-GEOS



### Ice Monitoring

Antarctica  
COSMO-SkyMed image of an iceberg calving from a glacier in the Antarctic sea.  
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### Ship Detection

Ships detected by COSMO-SkyMed  
COSMO-SkyMed © ASI processed and distributed by e-GEOS

### Sea Ice

Sea ice information is required by a wide spectrum of users operating at high latitudes, including navigation (rivers, lakes and sea) and off-shore operations.

Satellite Earth Observation and in particular SAR instruments represent a reliable tool for ice monitoring, providing a synoptic view which complements the accurate but low coverage reports from ships and airborne sources.