



MEOS™ SAR Ship Detection

Value Added Product

The *MEOS SAR (Synthetic Aperture Radar) Ship Detection* is used for environmental and marine surveillance.

Ship Display

The ship detections are displayed using *MEOS View*. *SAR Ship Detection* is a product based on the semi-automatic ship detection algorithm developed by the Norwegian Research Defence Establishment (FFI).

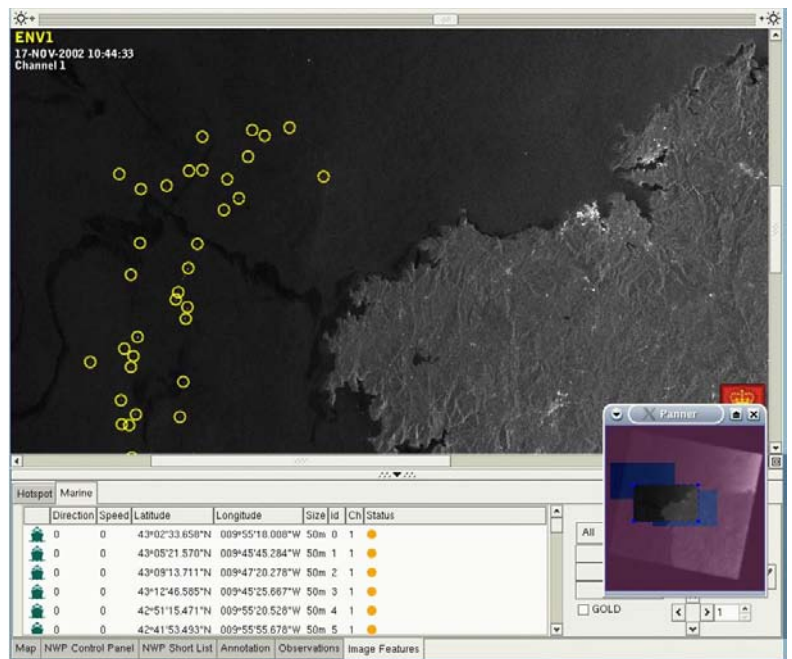
MEOS View is a visualisation tool specially designed to be used in an operational environment. The native input format is HDF5. *MEOSView* includes a thumbnail view of the product archive as well as a thumbnail view of preprocessed products and value added products if available.

Geographic information can be placed on images as overlays.



Key Features

- Operationally tested and in use in operational production
- Fast and effective automatic detection
- Ship detection product available in different file formats: HDF5, JPEG, TIFF, GEOTIFF, XML and ASCII
- *MEOS View* visualisation tool
- Validation and verification
- Generation of reports
- Combination with Numerical Weather Predictions model Vectors and wind estimated vectors combination of wind, oil, ship and overlaying graphics:
 - Coastlines and lakes
 - Borders
 - Rivers
 - Grid
 - Platforms
 - Pipelines
- Display automatically identification system information
- Display positions of other objects



SAR Ship Detection based on the FFI Algorithm

Ship target detectors are normally fast and effective, while the search for wakes may be time consuming. The strategy is to detect all possible ship targets, and then make a search around each ship candidate for possible wakes.

Detection of ship candidates is performed with an adaptiv filter which groups connected pixels if they are strong compared to the background. In order to cope with varying sea state conditions a ship-to-sea condition test is performed when a ship target is being detected.

SAR Ship Detection consists of:

Read SAR data

Subsets

Land mask

Using GSHHS files.

Detection of ship candidates

Assuming that land and islands have been successfully detected prior to the ship search.

Ship-to-sea condition test

Designed to be a first step in reducing the number of false alarms.

Distance to shore test

To avoid problems close to the shore.

Wake detection and analysis

If the ship wake is detectable in the SAR image.

Calculation of ship, size, direction and speed Ship report

Generated by MEOSView in Kongsberg Spacotec's ASCII format. It can also be generated in GOLD¹ ASCII format or other ASCII formats, as well as XML formats.

The native SAR Ship Detection format is HDF5.

The input SAR product is converted to HDF5, and the targets may be added using MEOSView.

SAR Ship Detection performed on the following SAR products:

- RADARSAT- 1/2² ScanSAR (Narrow and Wide) and SGF (SAR Geo-referenced Full-resolution) products
- ENVISAT ASAR (Advanced Synthetic Radar) Wide Swath mode Medium resolution (WSM)
 - (ASA_WSM_1P), Image Mode Precision (IMP)
 - (ASA_IMP_1P), Image Mode Medium resolution (IMM)
 - (ASA_IMM_1P), Alternating Polarisation mode Precision
 - (APP) (ASA_APP_1P) and Alternating Polarisation mode Medium resolution (APM) (ASA_APM_1P) products
- ERS-1/2 PRI products

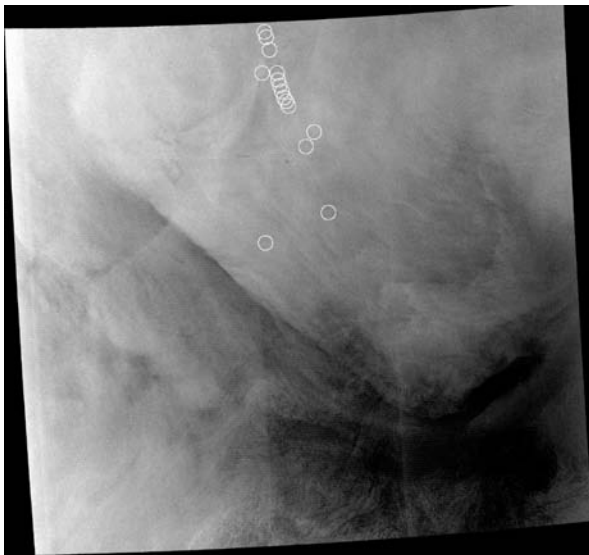
Performance

Within 5 minutes for ASA_WSM_1P or Scan SAR, less for other modes.

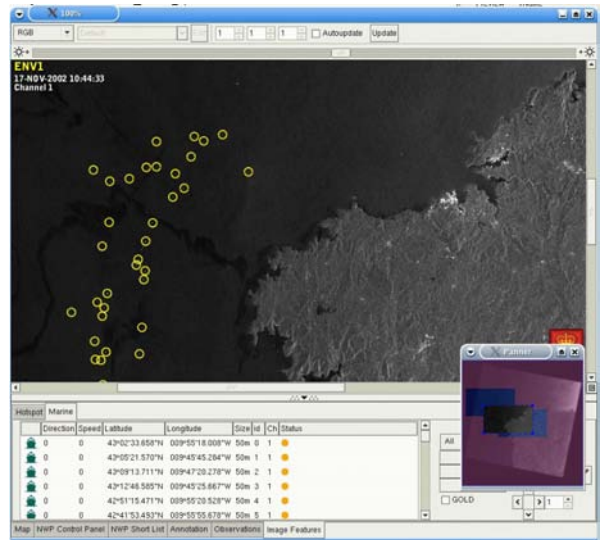
Detection Rate

Upwards of 85% to 95% depending on mode (RADARSAT-1 study).

Display Examples



SAR Ship Detection GEOTIFF Image



SAR Ship Detection display using MEOS View

Note:
MEOS is a registered trademark of Kongsberg Spacotec AS.
Specifications are subject to change without notice.

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