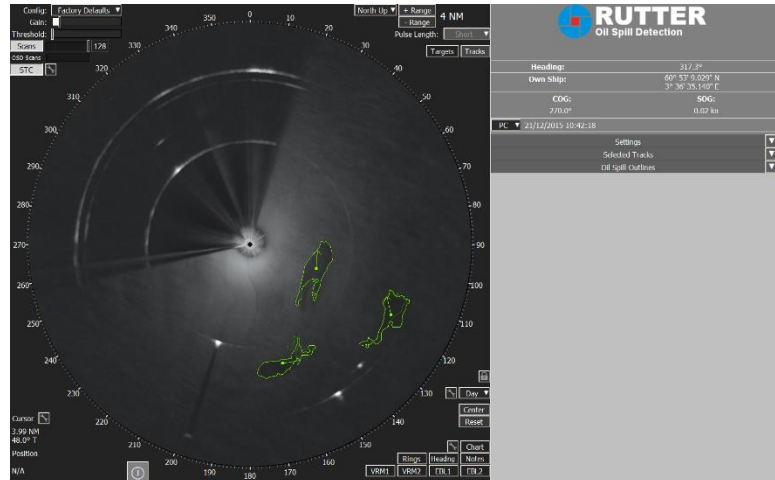


sigma S6 Oil Spill Detection

Rutter's *sigma* S6 Oil Spill Detection system combines proven capability in early detection of oil on water with tools that generate essential information for containment and cleanup, aiding to minimize environmental damage and cleanup costs due to oil spill events. The *sigma* S6 Oil Spill Detection system has been extensively tested and proven to be effective in independent trials conducted by the Norwegian Clean Seas Association for Operating Companies (NOFO) and is used world-wide. *sigma* S6 Oil Spill Detection systems are installed on fixed platforms, FPSO's, offshore workboats, patrol vessels and specialty clean-up vessels in many regions of the world, including Brazil, the North Sea, Gulf of Mexico, Eastern Canada, China and Russia.

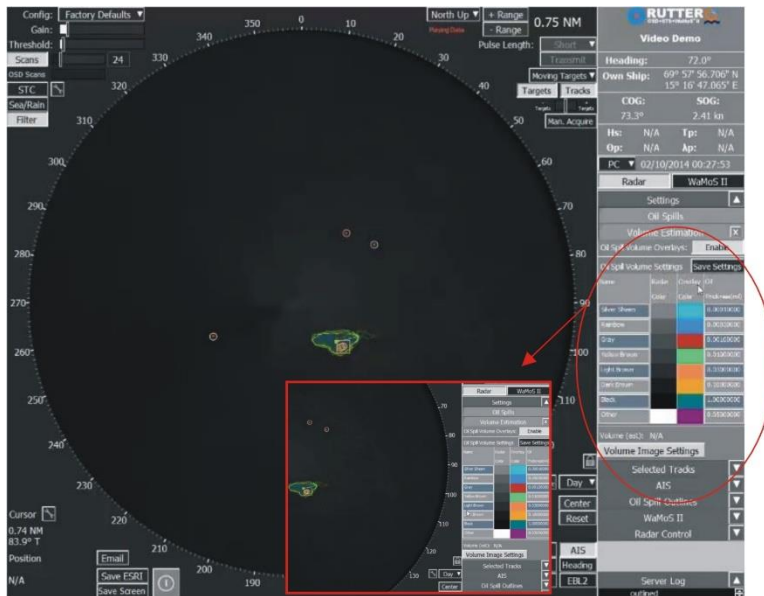
The *sigma* S6 Oil Spill Detection System has detected oil slicks as small as 5L, and can detect spills out to 4 nautical miles from the radar site across a broad range of sea states, weather conditions, at day or night. The *sigma* S6 Oil Spill Detection system automatically alarms when possible oil slicks are detected on the ocean's surface. With the confirmation of an oil spill, the system outlines the extent of the oil spill showing its deformation and drift over time, and provides calculated estimates for the oil spill's volume.



sigma S6 Oil Spill Detection System – Oil Detected

As thicker areas of a spill greater dampen the radar signal, detected areas with less radar return are inferred to be thicker, providing information for more efficient cleanup. Modeled after the AMSA Oil Spill Monitoring Handbook method, user entered thickness values are paired with the automatically calculated area information to provide an inferred oil volume. This information enables operators to determine if a growing spill area is related to increasing oil volume or dispersion.

The *sigma* S6 Oil Spill Detection System can be passively interfaced with existing commercially available marine radars, and is also available with the Rutter Radar 100S6 with either horizontally or vertically polarized radar antennas. Vertically polarized radar antennas enhance ocean surface detail, providing superior oil spill detection results. The system is fully motion compensated and operates equally well from both fixed platforms and vessels underway.



sigma S6 Oil Spill Detection System – Volume Estimate



sigma S6 Oil Spill Detection

The *sigma* S6 Oil Spill Detection System features full integration with select FLIR® IR cameras. Features include the ability to support multiple cameras, intelligent selection of a best camera for specific targets, and automatically direct the camera to oil spill targets as they are detected. These features support quick decision making in addressing potential spills, minimizing impact to the environment and operations. For other camera systems, the *sigma* S6 Oil Spill Detection System supports the NMEA Tracked Target Message (TTM) output to provide standardized targeting information.

The automatic detection, outlining and tracking of multiple, simultaneous oil spills is supported along with manual outlining. Different colors may be assigned to each oil spill area, and the outlines of manually outlined and automatically detected oil spills with target properties may be recorded and exported to disk or over email via ESRI formatted data files in support of oil spill response operations.

The *sigma* S6 Oil Spill Detection System offers a variety of outputs to both record and stream oil spill imaging, targets, outlines and drift vectors to external systems. A built-in Screen Recorder allows recording of the radar display which is useful for documenting an incident, scientific research or clean-up operations. Recordings are supported as a series of JPEG or PNG images, or as an AVI video. In addition, the *sigma* S6 Oil Spill Detection system comes standard with *sigma* S6 Connect, which makes data available through a web interface. Using open standards it allows easy integration into external systems such as Google Earth Pro and GIS systems using industry standard formats to access radar imaging (GeoTIFF, PNG, JPEG) and targets (GML, KML, DXF, ESRI).

***sigma* S6 Oil Spill Detection System**

- Marine certified (IEC 60945)
 - Rack Mountable/Desktop Radar Data Processor
 - 24" marine certified Rack Mountable/Desktop monitor (alternate sizes available)
 - Keyboard/Trackball Unit (Desktop style or Console Mount)
- Windows 7 operating system
- Automatic oil spill detection, outlining and tracking
- Fully motion compensated scan-to-scan integration of up to 128 radar sweeps, allowing the *sigma* S6 Oil Spill Detection System to identify small quantities of oil on the ocean's surface
- Advanced sea, rain, interference & clutter suppression
- AIS Class-A and Class-B target overlay
- Built-in interfaces for FLIR® camera systems and TTM output to other camera systems for enhanced target verification and identification
- Automatic Screen Recording in selectable time intervals for evidence documentation
- Remote client capability
- Computer-Based Training package
- *sigma* S6 Connect
- Coastline Masks