Miros OSD™ - Oil Spill Detection System
The tool making your oil spill contingency more effective and reliable - day and night
Oil Spill Detection
by Radar and Thermal Imaging

Minimizing damage and cost from oil spills require systems and procedures to be present when the incident occurs. The Miros OSD™ System offers key functionality for oil spill detection for oil spill surveillance and oil recovery.

Miros offers a radar based OSD solution, which is thoroughly tested in oil-on-water exercises since 2004. Miros OSD™ has successfully guided response operations in real oil spill incidents, and has a rapidly growing customer base around the world.

The radar based system has fully automated detection, giving oil spill position, tracking and measurement of drift. Miros OSD™ can operate in nearly all visibility conditions on a 24 hour basis, and has become an essential tool for navigating the recovery vessel and boom efficiently towards the oil slick.

Using thermal (IR) imaging, identification of the thickest part of the oil slick becomes available. This contributes when estimating the magnitude of the spill and enables targeting the response effort to the part of the slick where the majority of oil is found.

Miros OSD™ Highlights

Radar based oil spill detection
- State-of-the-art automatic detection algorithms
- Range 2 – 7 km radius or more, depending on installation height and radar equipment
- Standard unmodified navigation X-band or optimized radar can be used

Thermal (IR) imaging option
- Inspection and verification of detected oil
- Relative oil thickness mapping
- Guiding of close range skimming operation

Radar based wave monitoring option
- Complete wave spectrum with wave height, period and direction

Proven product supporting your OSD operation – day and night
- Surveillance, detection and tracking of oil slick
- Size and position of oil slick
- Oil slick drift measurement with direction and speed based on wind and surface current data
- Identification of the thickest part of the oil slick
- Display of wave, wind and sea surface current data
- Storing of all acquired data during operation, screen dumps
- Data export to 3rd party systems

Courtesy Exxon Valdez Foundation
Oil recovery at Gulfaks, North Sea, Norway
Applying dispersants guided by Miros OSD™
Miros OSD™ supports your operation also at night
Operational Context

Remote sensing has become an integral part of oil spill contingency:
- Surveillance, giving early spill warning
- Verification and characterization, supporting your decision on how to respond
- Aid for navigation, for day and night operation and oil recovery efficiency

The Miros OSD™ system is used from offshore installations, vessels or shore based stations, either as a standalone system or as a part of a sensor network. Data available from Miros OSD™ is an essential contribution to the common operating picture. While satellite and airborne systems cover a larger area, the Miros OSD™ System provides continuous local surveillance. Recovery operations can be continued, even in darkness and when no aerial data are available.

Measurement Principles

For an X-band radar, low grazing angle backscattering from the sea surface is caused by the electromagnetic wave’s interaction with the wind generated sea surface capillary waves, a mechanism known as Bragg scattering.

Creation of such capillary waves is dependent on the surface tension of the sea water. If oil is present, the surface tension is reduced and the capillary waves will disappear. Hence, the backscattered electromagnetic energy from sea surface areas covered by oil is strongly reduced. In fact a very thin film of oil is enough to prevent the capillary waves from being created.

By analyzing the backscattered energy, presence of oil can be detected. Although thickness of oil cannot be measured using microwave radar, knowledge of how the oil drifts under given wind and surface current conditions indicates where the majority of oil can be found.

In the infrared spectrum, oil is emitting less energy than surrounding water of the same temperature. Using an IR sensor with sufficient resolution and sensitivity, this oil-water contrast can be used for monitoring the oil slick on the sea surface.

At the same time, oil absorbs energy in the visible spectrum better than water, causing a higher temperature where thick oil is covering the water. With the IR sensor, the thicker part of the oil slick can then be distinguished from the thinner, giving a relative thickness measurement.
Miros OSD™ – A Proven Product

The Miros OSD™ System is developed in cooperation with NOFO (Norwegian Clean Seas Association For Operating Companies). It has been thoroughly tested during the yearly Oil-On-Water field exercises conducted by NOFO in the North Sea since 2004. During these field tests many types of oil - crude oils, fuel oils and emulsions - have been released and detected by the OSD system. Experience from operational use is continuously fed back into Miros OSD™ product improvement to offer best possible functionality in an emergency situation.

After an oil spill from an offloading operation in the North Sea 2006, dispersants were applied using a NOFO vessel with the Miros OSD™ System on board. The operation was completed in darkness, relying totally on maneuvering using Miros OSD™. The data collected by the Miros OSD™ System were essential for the post-incident evaluation.

The Miros OSD™ System has become highly appreciated on oil recovery vessels and platforms operating in the North Sea, the Baltic Sea, the Atlantic, in the Mediterranean, the Black Sea, the Caspian Sea, the Arabian Gulf, South Africa, Brazil, Argentina, USA, Japan, China and on Taiwan.

Product Application

Oil spill Surveillance on Platforms, Rigs, FPSOs, Ports and Refineries:
- Automatic detection - alarm - verification
- Support correct response decision

Oil spill Recovery operations on Stand-by, Oil recovery and Coast Guard Vessels:
- Navigation aid for mechanical recovery or dispersant application
- Support efficient positioning of vessel, boom and skimmer

Easy Installation

The Miros OSD™ hardware system for a basic configuration consists of
- Marine X-band radar, either the ship’s existing navigation radar or alternatively a dedicated OSD radar with horizontal or vertical polarization
- Integrated Video Digitizer unit
- Type approved Maritime System Computer
- Gyro, GPS, Wind and AIS sensor interfaces
- Flat-screen monitor with night vision dimming functionality
- Dedicated IR camera with interface unit (optional)