

## Oil Spill Detection Systems Help Minimise Negative Consequences

a report by

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The oil industry and authorities responsible for the environment are continuously in search of improved methods for the earliest possible detection of oil spills to limit the extent of pollution and increase the efficiency of cleaning up. An instrument that is in position to automatically detect and give an alarm upon occurrence of an oil spill and that, in addition, is capable of defining the spread of oil spill will help to ensure that the necessary actions are being taken to reduce the environmental consequences of oil spills. It is important to keep in mind that the oil spill detection system will allow for the availability of information day and night, regardless of visibility. Thus, clean-up operations may take place with full efficiency 24 hours per day.

Oil spills represent a large cost, economically and environmentally. Therefore, detecting an oil spill as soon as possible is important in order to minimise the negative consequences.

Many high-risk oil spill sites already have a marine X-band radar, which facilitates the availability of radar sea-clutter images. It would be valuable to be able to extract information about oil spills from these images. Results from previous trials with airborne radars indicate that X-band radars are well suited to oil spill detection. Using X-band radar makes it possible to see oil spills in the dark, enabling skimming operations to function on a 24-hour basis.

An oil spill detection system on an oil production platform or a floating production storage and offloading (FPSO) vessel should be completely automatic, due to the limited resources in most operational situations. Ideally, the system should also be capable of giving realtime results, without any need for post-processing. An oil spill detection system on a vessel for clean-up operations should also have the capability of providing wave and current information.

The Norwegian company Miros has developed an oil spill detection system based on capturing and processing digitised radar images from standard X-band navigation radars. It features a bridge display for monitoring wave parameters in realtime, such as

actual wave height, period and direction. The oil spill detection system can be used on:

- skimmer vessels and other vessels participating in oil clean-up operations;
- coastguard and other patrol vessels for oil spill monitoring;
- oil rigs, FPSO vessels and tankers for oil spill monitoring; and
- oil terminals for oil spill monitoring in the terminal area.

The oil spill detection system is based on the Miros Wavex system and on the fact that areas covered by oil will reflect less microwave power due to dampening of sea surface capillary waves. Wavex is a tool for sea state evaluation and for applications such as passage planning and reduction of hull and cargo damage, as the crew can see when to reduce speed or alter the ship's course when sailing in bad weather. For high-speed craft, the system provides information on operational parameters, such as significant wave height.

The oil spill detection system provides an automatic alert if an oil spill is present. A user-friendly graphical user interface (GUI) shows the oil spill, its area, velocity and other information valuable for an oil recovery operation.

It was previously known that an oil spill causes the radar cross-section of the sea surface to decrease due to the dampening of sea surface capillary waves. This dampening also results in less microwave power being reflected. Areas containing oil will be shown as dark areas in radar sea surface images. This fact, among others, is used to develop algorithms for automatic oil detection.

Digitised radar images are acquired using technology already existing in the Miros Wavex system, a directional surface wave and current monitoring system that uses the information in the marine X-band radar images. A radar interface module is easily connected to most available standard X-band radar models. ■

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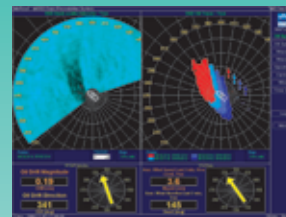
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## MET OCEAN, OIL SPILL DETECTION AND WAVE MONITORING SYSTEMS

Miros AS is a Norwegian high-tech company that integrates advanced systems and provides remote sensing equipment for the offshore industry. The products include meteorological, oceanographic and performance monitoring.



### MET OCEAN SYSTEMS

Miros AS is an experienced supplier of Met Ocean systems and is capable of supplying and integrating any required sensor into its systems. All systems are modular and provided with software and displays as suited for individual operator requirements. Miros systems provide real time and historic data to support:

- Helicopter traffic control.
- Marine operations (Offshore loading, Subsea operations, Diving operations, Supply vessels onloading and offloading).
- Rescue operations.
- Crane vessel operations.
- Synoptic reporting.

### OIL SPILL DETECTION SYSTEMS

The Miros oil spill detection system (OSD) utilizes advanced image processing algorithms for earliest possible detection of oil spills. Hence, the extent of the pollution may be limited and the efficiency of clean-up operations increased to reduce the environmental consequences of oil spills. OSD has the ability to detect oil spills in complete darkness enabling 24-hour skimmer operations. Used on:

- Skimmer vessels and other vessels participating in oil spill clean-up operations.
- Coast Guard vessels and other patrol vessels for oil spill monitoring.
- Oil rigs, FPSOs and tankers for oil spill monitoring.
- Oil terminals for oil spill monitoring in the terminal area.