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After successfully testing the sensor in 19 controlled spills carried out from Gunnar Seidenfaden, OSIS has completed the offshore tests. The system is now tested and verified to such an extent that its ability to identify and quantify an oil spill on the water surface is unquestionable.

◈ **By:** Casper Kvitzau

Fully functional system demonstrated in final tests on Gunnar Seidenfaden

Together with the Danish Navy and their response vessel Gunnar Seidenfaden, OSIS successfully carried out the final offshore tests of the new generation oil spill sensors.

4.000 litres of oil was discharged into the sea and subsequently identified and quantified using the proprietary OSIS Oil Spill Detection module. The ability of the sensor system to both identify and quantify an oil spill on the water surface is now unquestionable.

This mission was the 5th and final test sequence in the comprehensive offshore test programme completed with the Danish Navy in the period 2005-2007. The offshore test missions involved a total of 19 controlled spills using rape seed oil and margarine.

The final and 5th mission was carried out during September 2007 and verified that the system has been further improved from the former tests on mission 4 in week 27 (explained in the earlier newsletter). The tests in week 27 revealed some inconsistencies in the ability to geographically position the oil spill correctly in the presentation software. The problem was identified as a GPS error and the corrections implemented before the final tests, which proved very successful.

The results from the final tests verified that the OSIS sensor system mounted on a response vessel is a fully functional tool for oil spill identification and quantification during cleanup operations. The pictures and illustrations below serves to substantiate the conditions under which the tests were carried out.

Margarine and rape seed oil alongside the vessel

SensorPack mounted in the front mast with oil in front of the vessel

During the test mission both margarine and rape seed oil were used. By using two different viscosities, oil slicks including both thicker and thinner layers could be generated for testing the system ability to track a large surface area as well as to quantify the oil slick.

The slicks were discharged in two sequences as illustrated I the picture above. First, the thick margarine (light yellow) was discharged, followed immediately by the thinner rape seed oil (dark yellow). This generated a large oil slick with a well defined core as clearly seen in the picture below.

Thick and thin layers on the water

**Captain and crew watching the oil**

Rescue Buoy and oil on the water

Varying weather conditions

In line with previous tests, all measurements were logged and stored. The data will serve to continuously improve system performance and software algorithms. A large variety of sensor data are required to prepare the software algorithms for the variations in weather conditions.

Onsite Viewer with thickness indication from 0.1mm to 1.5mm
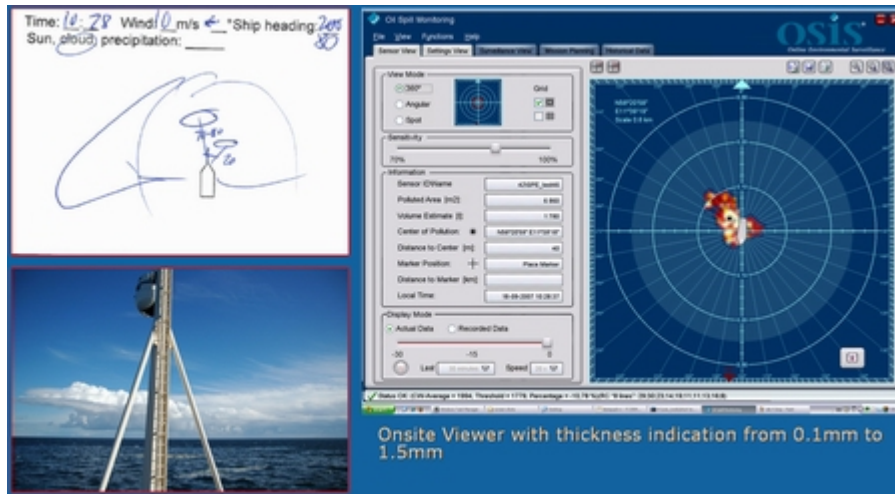
Mission Planning including camera pictures, hand drawings and screen dumps 18-09-07_10:28

To secure compliance between actual spill location and sensor system identification, a comprehensive mission planning procedure was applied. During each oil spill, the spill vas visually mapped out and compared with the corresponding sensor registration every 5 minutes during the missions. All spills were logged both by camera pictures, hand drawings and screen dumps from the Onsite Data Viewer. For every screen dump from the Onsite Data Viewer a "real life" picture was taken of the spill. This enables the test crew to verify that the area presented as oil in the Data Viewer is in fact an accurate representation of the oil slick on the water surface.

The results from the test program, including the five planned and executed missions with the Danish Navy and their response vessel Gunnar Seidenfaden can be summarized as:

- Short range system performance was verified up to 1km
- Oil spill surface area identification was 100 percent successful
- Oil spill layer thickness identified from 0.1mm to 1.5mm
- Oil spill volume estimated with 11-50 percent deviation depending on weather conditions

The crew onboard the vessel representing potential end users of the system, expressed their great enthusiasm about the performance. The system functionality and user interface, together with its ability to both identify and quantify the spills was the key factors.

Captain working with the OSIS Onsite Data Viewer

If any further information is needed, please do not hesitate to contact OSIS on mail@osis.biz