25 October 2013

Report of an Operational Oil Spill Response Exercise between Finland and Estonia

Name of the exercise:	KOTKA 2013
Place of the exercise:	Outside Kotka, Finland
Date of the exercise:	August 26-28th 2013
Host state of the exercise:	Finland

1. Background and general information

An operative Oil Response Exercise 'KOTKA 2013' took place outside city of Kotka on 26-28 August. The exercise was be arranged under the *Agreement Between The Government Of The Republic Of Estonia And The Government Of The Republic Of Finland On Cooperation In Combatting Pollution In The Marine Environment* (1993). The exercise was hosted and arranged by Finland and implemented by the Finnish Environment Institute SYKE in cooperation with the Estonian Police and Border Guard Board.

SYKE informed on 6 June 2013 the Estonian oil spill response authorities, the Estonian Police and Border Guard about the exercise and invited to participate to it. The program and information about the scenario of the exercise was sent on 18 July 2013.

An Alarm Exercise was executed in combination with the Operational Exercise.

This is a 'lessons learned' report of the exercise. It is prepared by SYKE, to be presented and discussed at the following meetings of the competent oil spill response authorities both of the states.

The aim of these exercises was to test the available oil recovery techniques, alarm procedure, response capability, response time and to coordinate staff roles and co-operation between strike teams (including combating equipment) of the participating countries.

After arrival of the vessels on Monday, August 26th a briefing was held to the captains and observers on board Oil Recovery Vessel LOUHI in Kotka Central Harbour. A debriefing was held in the same place after the exercise 27 August.

2. Scenario and Briefing

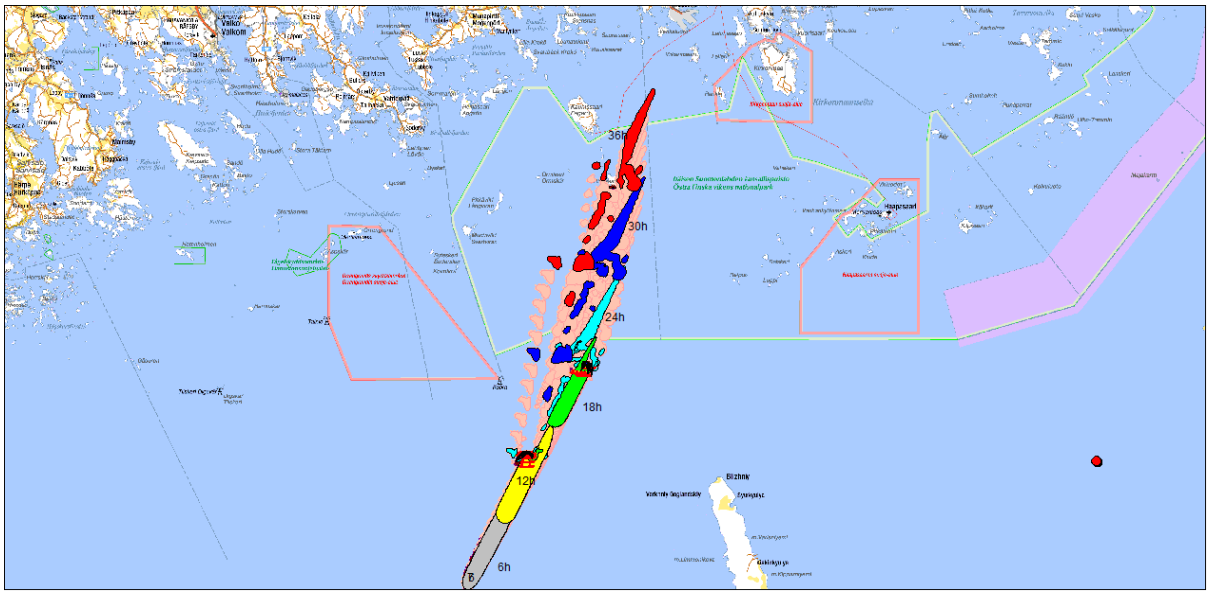
A very severe grounding of a Suezmax double hull oil tanker 'WW' with a cargo of 150 000 tonnes of crude oil had occurred on the 25th August 2013 at 21:00 in the place 60° 01' 36" N and 26° 36' 33"E. Location is about 20 kilometres west from Russian island Suursaari (Gogland) and about 50 kilometres from the Finnish city of Kotka.

As a consequence of the grounding a total of 30 000 tonnes of crude oil escaped during 6 hours. There was south-western wind of 7-9 meters per second on the accident area. A huge, eight kilometres long and 1,5 kilometres wide oil slick was formed and started to drift towards Kotka. A 48 hours drifting prognosis was calculated with model "SPILLMOD".

Map of the drifting scenario. The map shows the calculated slick positions in 6 hour time steps. The red area in the map shows the slick position at the start of the exercise, green and blue areas indicate the slick drift during the exercise.

Fictively - not in reality - Finnish Environment Institute's duty officer alerted 12 Finnish oil recovery vessels, five of which arrived to the area during 26th of August. In addition, based on the bilateral agreement between Estonia and Finland, Finnish Environment Institute's duty officer requested assistance from Estonia. Also Regional Rescue Services were alerted in order to protect the shore from polluting. Surveillance aircraft was ordered to map the extent of the oil slick.

Fictively Finnish oil response units accomplished at sea oil containment and oil recovery operations with oil recovery vessels and boom laying vessels during 26th and early morning 27th of August. The fictive operation was simulated by "SPILLMOD".



Map of the fictive response scenario. The map shows the calculated slick positions in 6 hour time steps. There were simulated oil recovery of five vessels and oil containment of two booming of 2 kilometres long high sea booms. There were 5 500 tons recovered, 7100 tons evaporated, 1000 tons dispersed and still 15 800 tons drifting on the surface of water fictively when the actual exercise began.

In the briefing it was stated, that actual weather conditions at 9:00 LT 27th August (i.e. when vessels arrive to the exercise area) are a used during the operational exercise.

In Briefing Master of LOUHI was appointed to act as SOSC. NOSC of Estonian team was Master of KINDRAL KURVITS. SOSC ordered among other things communication channels, oil recovery areas for the response vessels defined by HELCOM grid and sailing order from the port to the exercise area. HELCOM grid was given as a transparent sheet for each vessel.

It was confirmed that a Finnish surveillance aircraft will fly in the area observing the spill extent. The aircraft will communicate the observations of the thickest parts of the slick to SOSC. SOSC will further communicate this information to the strike teams. Peat was used as the target substance for the aircraft crew. As an option the aircraft had the task to guide Strike Team(s) or individual vessel(s) to the areas of thicker oil. The aircraft will e-mail images to SOSC and vessels.

3. Participating Oil Recovery Vessels and Equipment

The exercise was participated by 6 Oil Response vessels from Finland and one vessel from Estonia.

Nation	Name of the vessel	LOA (m)	Main Oil Recovery system	Oil cargo tank capacity (m^3)	e-mail address
Finland	HYLJE	54	LORI INSIDE	800	hylje@syke.inet.fi
Finland	HALLI	60	LAMOR INSIDE	1400	halli@syke.inet.fi
Finland	SEILI	50	LAMOR INSIDE	200	seili.bridge@meritaito.fi
Finland	OILI 1	24	LORI INSIDE	60	oili1@meritaito.fi
Finland	LOUHI	71	LAMOR INSIDE	1200	mtalouhi@gmail.com
Finland	MERIKARHU	58	MOBIMAR INSIDE	40	merikarhu@raja.fi
Estonia	KINDRAL KURVITS	62	LAMOR INSIDE	100	

In addition Kymenlaakso Regional Rescue Services– the authority responsible for coastal oil spill response in Kotka area – participated with 5 bigger oil spill response boats (2 of them with oil recovery system) and 0,5 kilometers coastal boom. Additionally two transport boats of the Finnish Navy and one bigger oil recovery boat of the State owned company Meritaito LTD participated. The Rescue Service established a command post for their actions and sent a liaison officer to the lead vessel where SOSC was working.

A Finnish surveillance aircraft participated to the operation by flying two flights.

4. Command, communication, tasks, situational picture, weather conditions and forecast of oil drifting and aerial surveillance

Vessels departed from port of Kotka at 8:00 am and started to work within the orders of SOSC when coming to the exercise area. There were following the Strike Team formations and tasks:

- LOUHI + KINDRAL KURVITS: sweeping oil recovery jointly on given area
- HALLI + 2 tugs: sweeping oil recovery on given area using a trawl of 400 meters high sea booms towed by 2 tugs and the build-in receovery system of HALLI)

- HYLJE + 2 tugs: to form a mobile containment booming of 1000 meters high sea boom to stop, to make narrower and to steer drifting oil. 2 tugs had task to tow the boom out from HYLJE and put it in ordered working position. HYLJE had task to deploy boom out and then start oil recovery
- MERIKARHU+ SEILI: sweeping oil recovery jointly on given area
- SEILI + OILI I: sweeping oil recovery jointly on given area

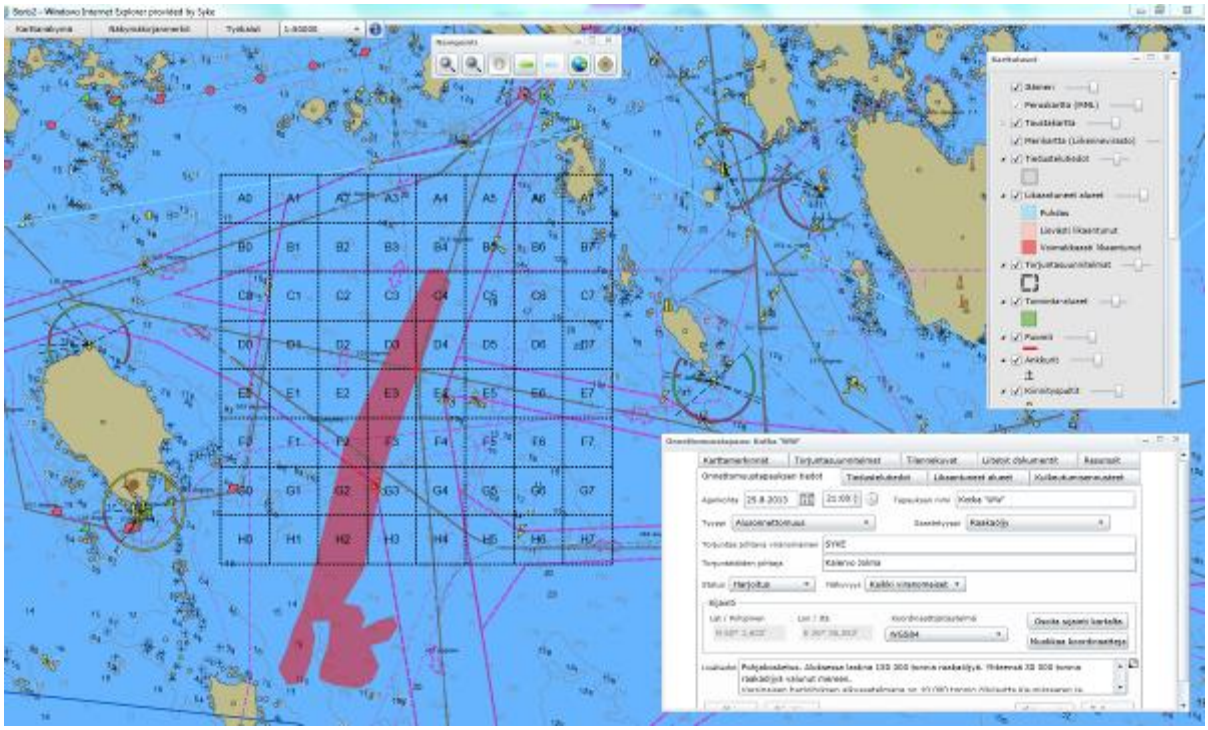
SOSC ordered the working areas according to the HELCOM grid that was used with a 1:50 000 sea chart. The given geographical central point was in the crossing of the 15,3 meters and 10,0 meters fairways between "Kaunissaari" island and the port of Kotka.

The Baltic Sea operative communication plan for joint combating operations was applied. As a main command channel was VHF 73. Standby channel was 16. Aircraft communicated with SOSC also on channel 73. LOUHI-KINDRAL KURVITS got channel 72, HALLI – tugs channel 77, HYLJE – OILI 1 channel 06 and MERIKARHU – SEILI channel 08 as working channels.

During the exercise the participating units fed data in to the Finnish national oil response situational awareness system “BORIS”.

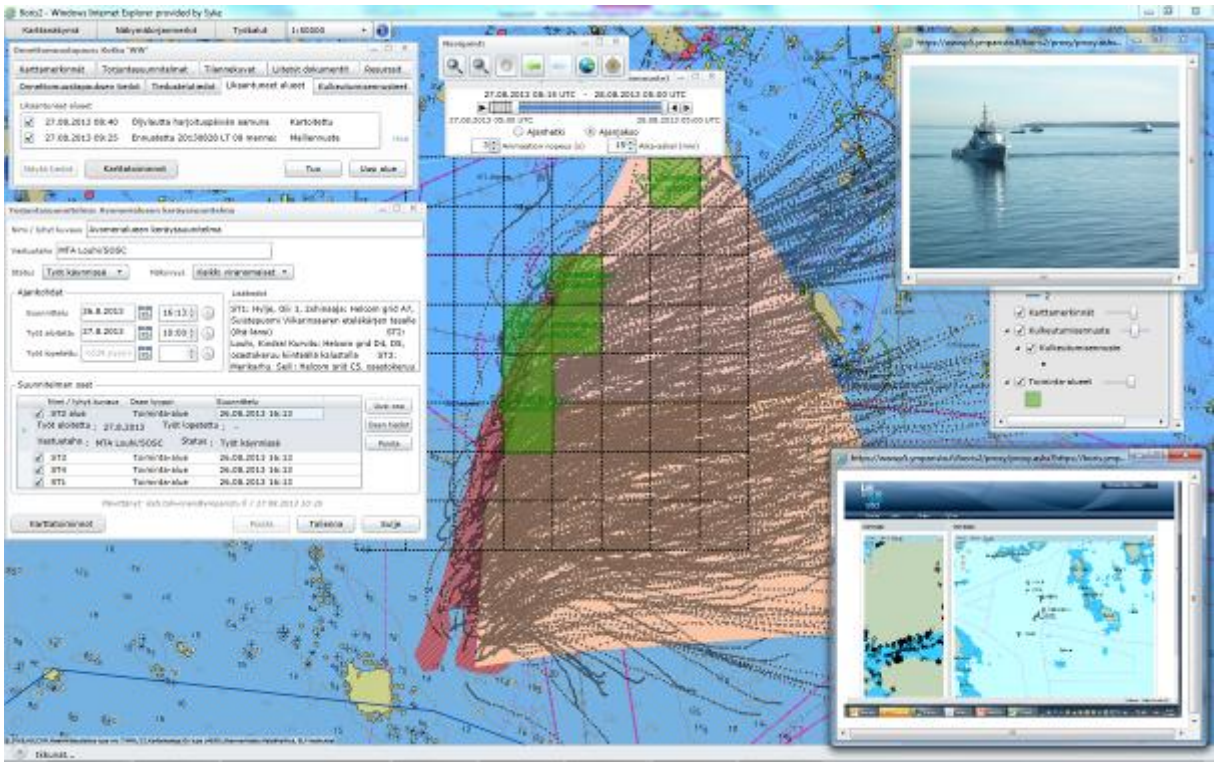
- SOSC and his situational awareness officer input response sectors.
- SOSC and his situational awareness officer input the recovery results once per hour as well as other relevant information.
- MRSC Helsinki input information on aerial surveillance results
- Kymenlaakso Rescue Services input information on their booms and recovery results.
- SYKE situational awareness officer compiled situation pictures showing the development of the situation, and assisted BORIS users when needed.

Oiled area from the according to the scenario at 08:40 was marked on BORIS as well as the HELCOM grid as in the following picture:

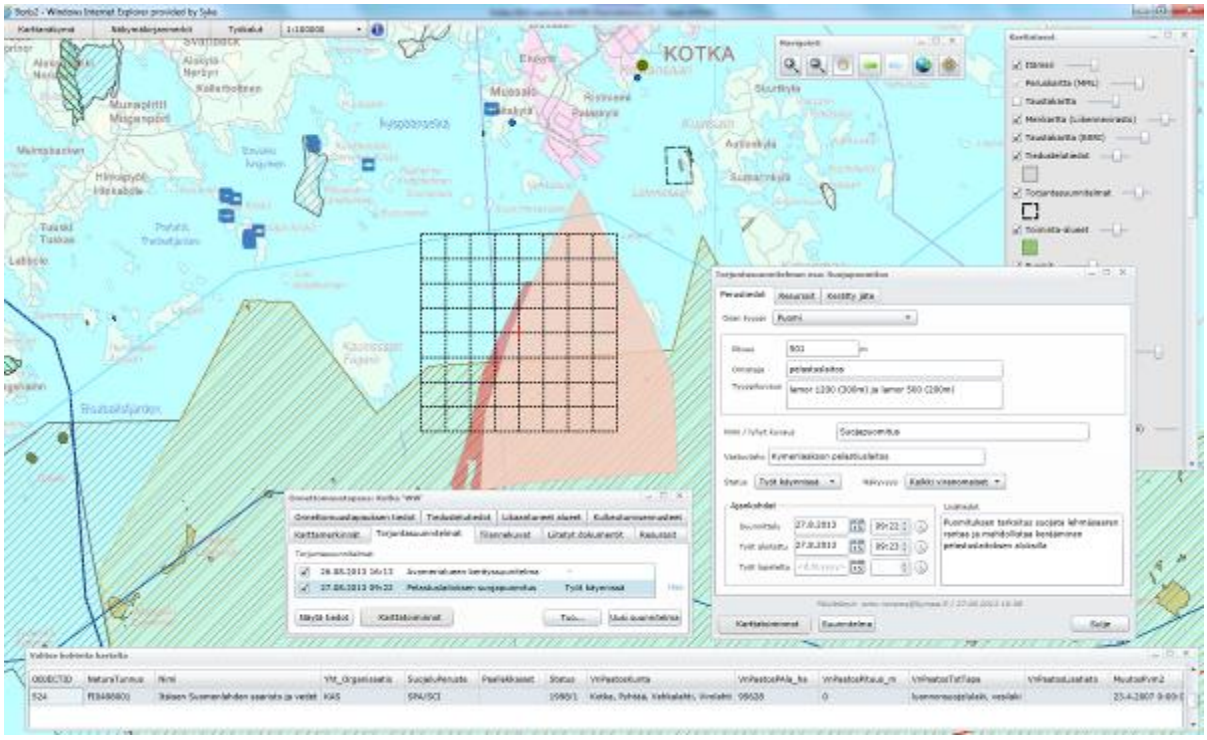


Squares on BORIS were the same as those in the HELCOM grid, but due to a mistake the numbering of squares started from 0 in BORIS (should have started from 1 as in the HELCOM grid). This error was corrected.

A local weather and oil drifting forecast was given by an on-duty officer of Finnish Meteorological Institute 9:25 am. There were weak south westerly wind 2-4 m/s oil drifting 0,5 kilometre per hour towards islands in east. The Forecast was inputted to BORIS and a capture from BORIS was looking like following:



About the same time there were in BORIS information available on action plans of the Kymenlaakso Rescue Services. They were intending to protect north shore of "Lehmäsaari" island and recover oil from sea by boats. That as well as areas to be protected (such as natural resources and recreational areas) were inputted to BORIS :

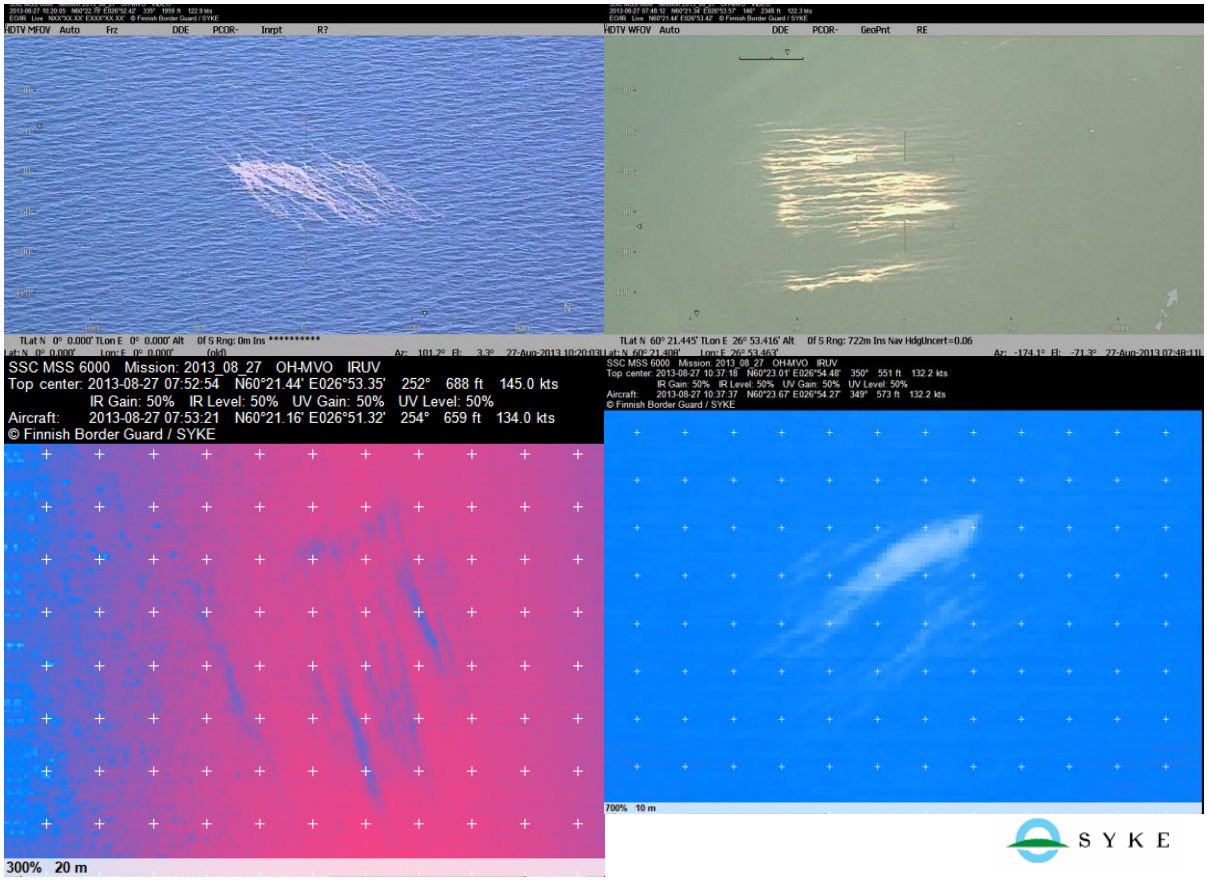


The Teams of vessels acted in their response areas in oil recovery during oil drifting towards islands in east. HYLJE was rigging 1000 meters high sea booms out with two tugs. Other two tugs were towing an oil trawl of 400 meters high sea booms with an opening at the end of it (at the start of the exercise the U-shape boom had no opening in it, but it was done by HALLI crew by emptying 4 air chambers of the boom. HALLI was following the trawl with its sweeping equipment deployed. See the following picture taken by the surveillance plane:

Deploying one kilometre high sea boom out from HYLJE took so much time that she had to start to take it back almost immediately after finishing the deployment. Due to this SOSC ordered OILI I to join the strike team of SEILI and MERIKARHU.

The boats of Kymenlaakso rescue services restricted spreading of oil with booms anchored to shoreline of the island "Lehmäsaari". See the following picture:

During two surveillance flights (10:30-11:30 and 13 – 14) aerial pictures on the scene were delivered by e-mail to vessels. SOSC communicated with the pilot of the plane by VHF. There was some peat spread from a boat in two different places and times. The plane spotted and pictured both slicks using its different devices.



A "peat slick" pictured by different devices of the surveillance plane

In order to remove recovered oil from vessels with small oil tank capacity there was a floating tank unit "Valas" (volume 200 cubic meters) that was towed by a boat. In the following picture that red tank is beside MERIKARHU.

The exercise was completed at 2 pm by the order of SOSC and vessels returned to the port of Kotka.

5. Debriefing

In the debriefing SOSC, NOSC of Estonian team and all other masters of vessels got the floor to say their experiences from the exercise.

SOSC: Beginning was a little slow, but that did not really matter. In a real situations the start is likely happening gradually when vessels arrive, which should be applied also in exercises (and has been done in some of them). Also a "surprise" exercise could be tested and a longer duration of the at sea recovery operation. The operation went smoothly and it was straight forward to give new tasks to strike teams. The strike teams informed to SOSC the recovery result once per hour.

BORIS was generally functioning all time even connections were sometime poor. When compared to its testing in BALEX DELTA 2012 the system was now entirely a new one. All vessels expect KINDRAL KURVITS had internet connection that is needed to access BORIS. Due to no access to Internet KINDRAL KURVITS did not get the BORIS situation pictures that SYKE produced and e-mailed to participants

LOUHI found that for them it was extremely easy to carry out the given tasks since they were the lead vessel from where SOSC was running the recovery fleet operations. LOUHI told that it was the first time that they were in the same strike team with KINDRAL KURVITS and there was very good cooperation.

Captain of KINDRAL KURVITS told that they would have liked to have a STS as one of their exercise tasks. In the beginning they had minor problem with an air pipeline, but that was solved quickly. They told that this was KINDRAL KURVITS' first sail to abroad and all went well and cooperation was good. They wished they would have had internet access in order to receive BORIS information as well as information from surveillance aircraft.

Captain of HALLI said that they would have wanted "a target ship" in the area. Risk preventing measures like surrounding the casualty with booming, cargo off loading, lightering and removal of oil

from broken tanks could be exercised. Internet connection was not functioning at open sea that well. HALLI´s arrival directly from sea to the exercise illustrated a real like start. Tugs towing trawling boom were new in the game, but succeeded well although the boom the tugs were towing had no opening at the bottom of the U-shape, but this was fixed with HALLI's workboat from which HALLI crew members emptied four boom sections. They experienced the orders of SOSC were good.

MERIKARHU tested the towable tank "VALAS" which the crew felt would enhance usability of MERIKARHU in real cases since her tank capacity is only 40m3. One HELCOM grid cell as operating area for three vessels is too small. In all they said it was the most smoothly going exercise they have experienced so far. The equipment worked well and they got new tasks during the course of the exercise.

For SEILI SOSC`s orders and the tasks given by him were clear and reasonable.

When OILI I got its tanks full there was sometime confusion about further measures.

Because of technical problems of the boat that was towing the "VALAS" tank, the VALAS was not available from noon onwards.

From the point of Regional rescue services their action area near "Lehmäsaari" was remote from the location where the open seafleet was exercising. According to drifting forecast oil would had not been Lehmäsaari during the time of the exercise but later. Rescue services were actively inputting information to BORIS.

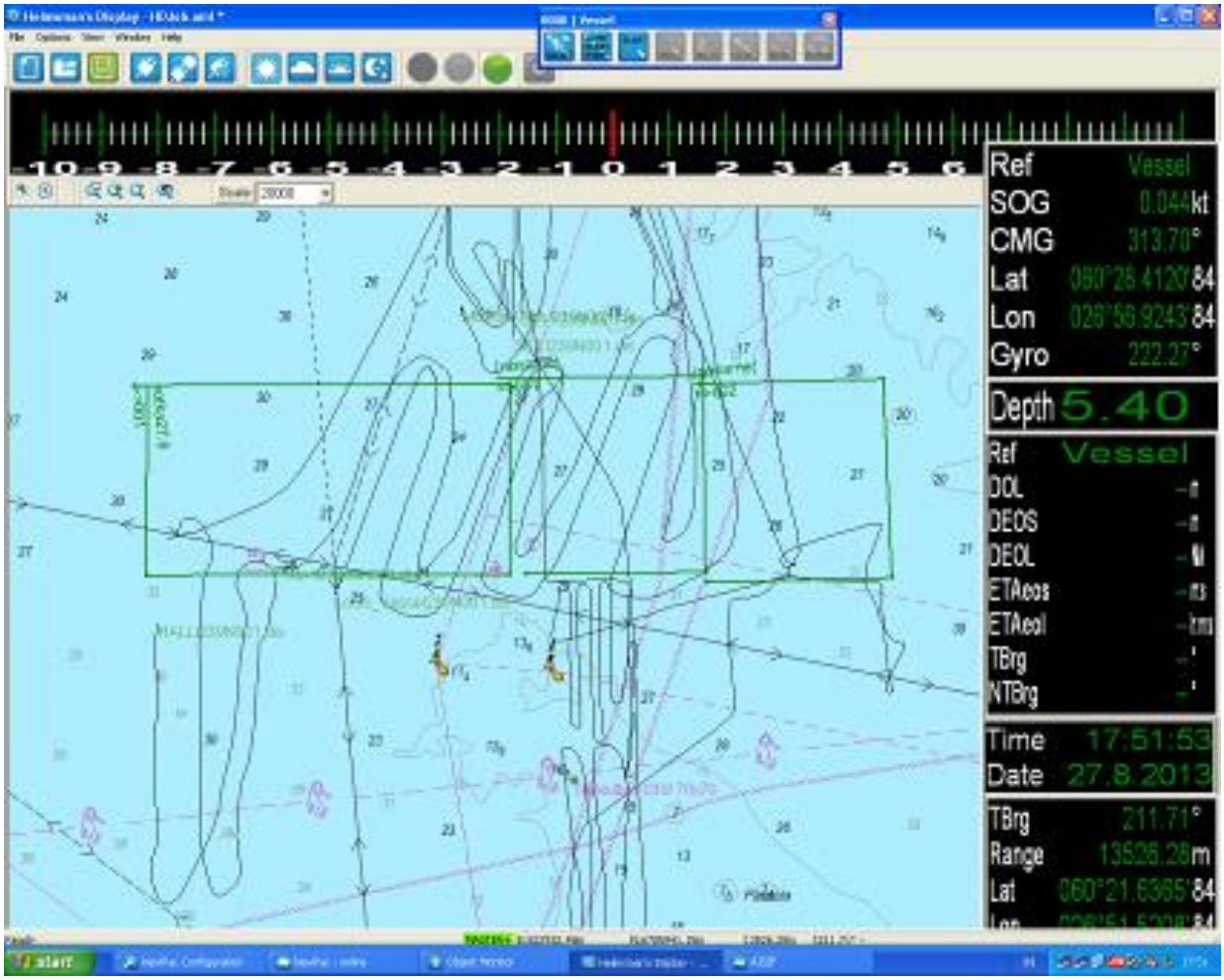
Recovery vessel HYLJE was bound all time with deploying one kilometre long high sea boom. That was because of last minute cancellation of an ordinary vessel that was planned to be used as boom layer. However it high-lighted, how time consuming high sea boom laying from vessels is.

In real situation recovery vessels shall not be used for boom laying even though many recovery vessels are suitable for boom laying and protective booming is urgently needed. Recovery vessels' ability to recover oil shall be utilized entirely for that purpose and other non-specialized vessels shall be used for booming. High sea booms are irreplaceable in stoping, containing, slowing or steering oil slicks, thus much effort should be put to develop the mobilization of high sea booms. One way is deploying booms from shore to sea and to tow them by tugs to the area - like it was in this exercise for the booms used for the oil trawl.

Altogether few hundreds of tonnes of oil would have been recovered according to reports that the vessels gave to SOSC during the exercise. However the reported recovery results very small when compared to the amount of oil in the scenario. More theoretically a calculation was made about the possible recovery result:

Vessels	sweeping width [m]	leangh of sweeprout e[km]	area sweeped [km2]	tank capacity [m3]	layer thichness [mm]	recovered amount (theoretical) [m3]
Louhi	42	18	0,756	1200	0,5	378
Kindral Kurvits	30	18	0,54	100	0,5	270
Seili	30	18	0,54	196	0,5	270
Oili 1	21	18	0,378	80	0,5	189
Merikarhu	32	18	0,576	40	0,5	288
Halli+hinaajat	170	18	3,06	1400	0,5	1530
total			5,85	3016		2925

Recovery vessels' movements during the operation were tracked by oil recovery software on board LOUHI. As seen in the picture below the sweeps of the vessels covered the intended areas very well:



Communication went smoothly and in a professional manner. Tasks given by SOSC were clear and tasks were accomplished well. Some technical defects were found but generally all went well and especially trawling of oil with booms proved again to be a good way to raise efficiency of oil recovery.