OIL SPILL RESPONSE SIMULATION

NTPRO 5000/PISCES II

WÄRTSILÄ

What is NTPRO 5000?

- 5th generation of the Navigational Simulation Platform for conventional STCW training, advanced operation specific training and R&D applications.
- Windows based network/client software package using COTS hardware infrastructure.
- Fully scalable solutions from online STCW training from the cloud up to full mission systems interconnected to other types of our and/or 3rd party simulators.
- The optimal simulation solution whether it is for generic or type specific ship's bridge operations.

STCW training

Operation specific training

Research & Development

NTPRO 5000

COMPLIANCE TO INTERNATIONAL STANDARDS AND REGULATIONS

- International Convention of Training,
  Certification and Watch keeping for Seafarers (STCW 2010 including the Manila Amendments).
- IMO model courses.
- International SOLAS Conventions.
- OPRC convention 1990.
- Close cooperation with ClassNK on training and simulator development.
- Approved with class notations: INTEGRATED SIMULATOR SYSTEM, NAUT-AW(SIM), DYNPOS-AUT(SIM), HSC, TUG, ICE, AHTS to the Class A Standard for Certification of Maritime Simulators No. DNVGL-ST-0033 April 2018.
- The Nautical Institute's and OSVDPA requirements for Dynamic Positioning Simulators.
- Regulations concerning 'special' training: fishing operations, VTS operator training, etc.

DNV·GL

IMO

STCW 2010

ClassNK

The Nautical Institute

TRAINING OBJECTIVE DEFINES THE SIMULATOR CONFIGURATION

COMPUTER-BASED TRAINING

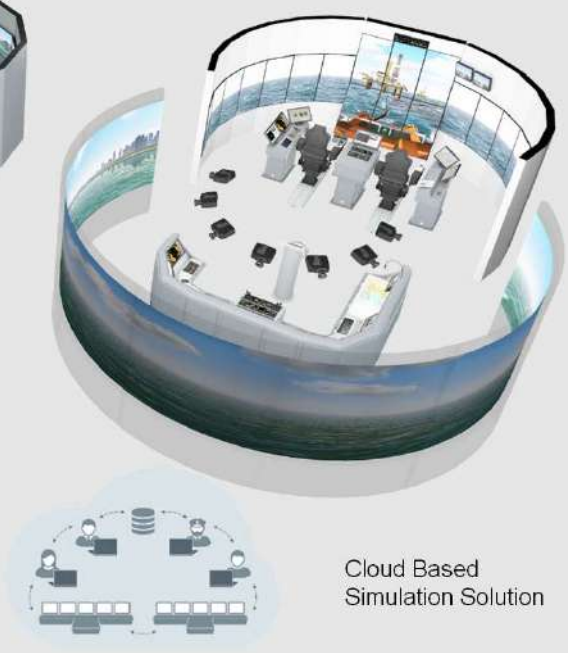
- Individual in-house or distance learning from the cloud
- Equipment familiarisation
- Self-examination and competence assessment
- Onboard training and assessment

NETWORKED CLASSES

- Interactive group exercises under instructor supervision

FULL MISSION SIMULATOR

- Final training, assessment and certification
- Bridge Resource Management
- Pilot training
- Task rehearsals



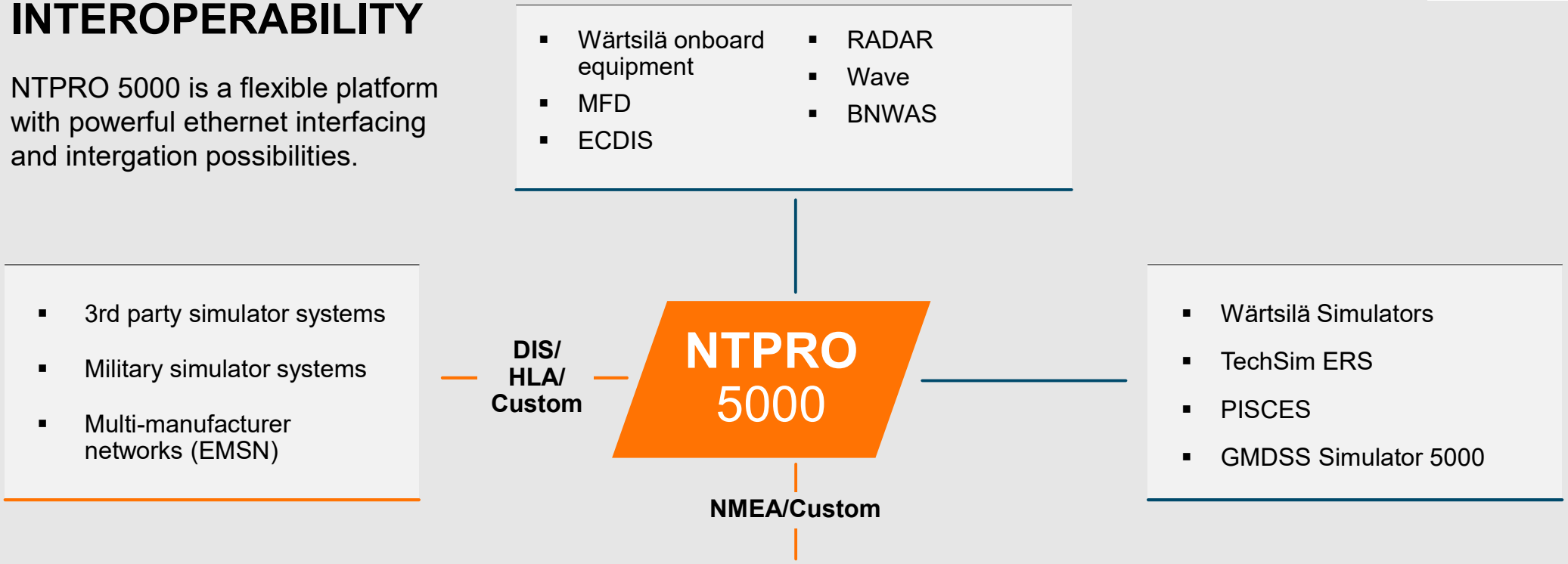
Cloud Based Simulation Solution

INTERCONNECTED SIMULATORS

- Crew resource management: **WHOLE SHIP** evolution training; Exercising communications between the bridge and engineering departments
- Operation resource management: interconnecting different types of Wärtsilä or 3rd party simulators to simulate a full operation, e.g. Oil Spill Response, Naval warfare, etc.

INTEROPERABILITY

NTPRO 5000 is a flexible platform with powerful ethernet interfacing and intergation possibilities.



NTPRO 5000

PISCES II

- Resource management training for oil spill response organisations
- Oil spill investigations (backtracking)

NTPRO

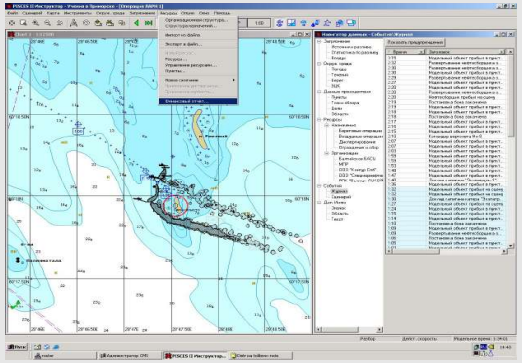
- Vessel and response equipment handling

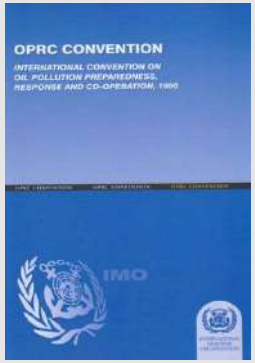
PISCES II – OIL SPILL RESOURCE MANAGEMENT

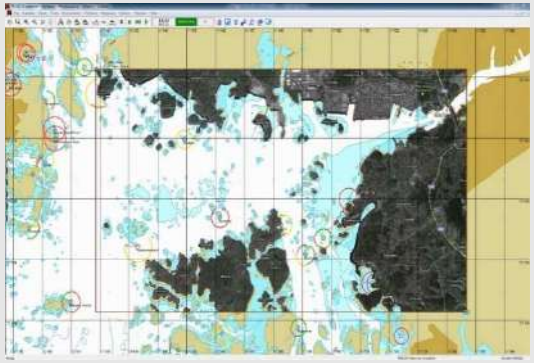
An incident response simulator designed for preparing and conducting resource management exercises.

Designed to evaluate the preparedness to respond effectively to oil spills, in accordance with the requirements of the **OPRC convention 1990**.

PISCES is developed specifically to support the **Preparedness for Response Exercise Program (PREP) administered by the U.S. Coast Guard** with the goal of providing an improved training environment for response managers.







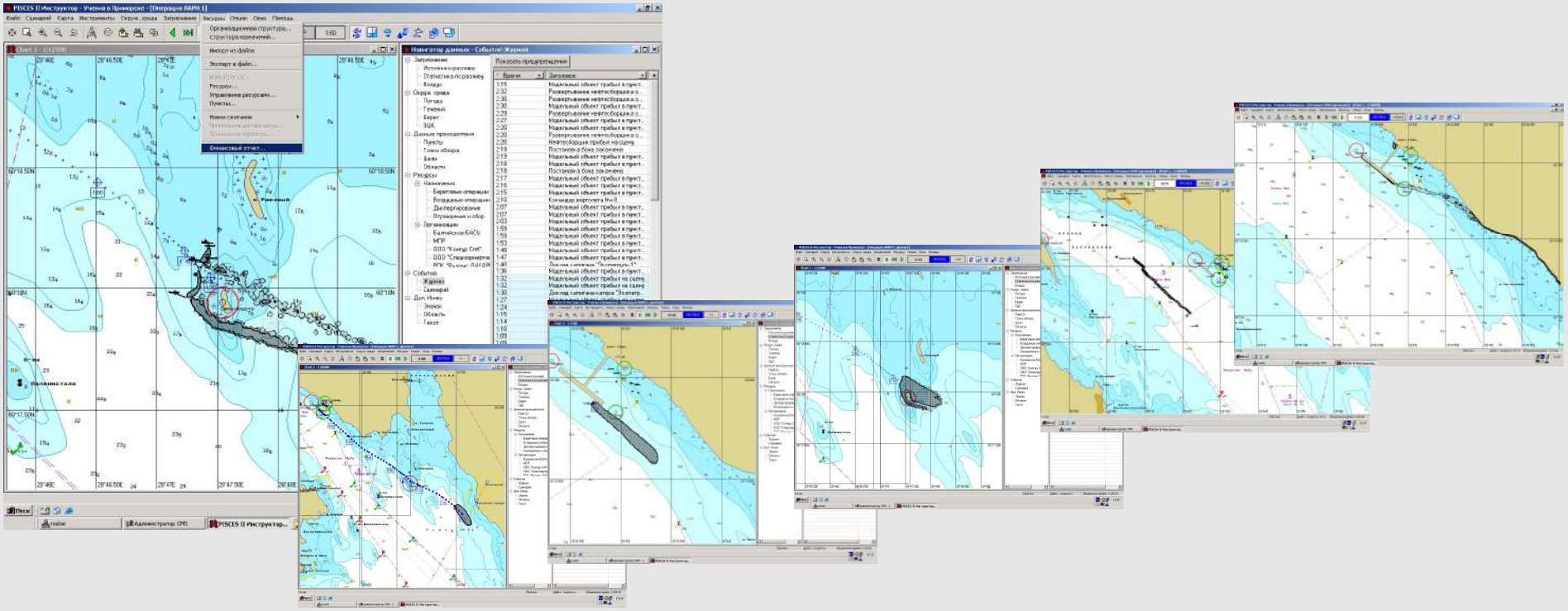
PISCES – TRAINING APPLICATIONS

- Coordination Centre's Operational Staff
- On-scene commander (level 2)
- Management level (level 3)
- Insurance and Investigation Officers
- Full operations resources management through joint exercise with navigational simulator

- Main advantage of using simulator:
  - Resource management and optimisation
  - Decrease costs through efficient communication and proper equipment handling
  - Possibility to simulate specific scenarios (e.g. bad weather conditions) which is hardly achievable for training in real environment

OIL SPILL RESPONSE – PISCES – INTERACTIVE INFORMATION ENVIRONMENT

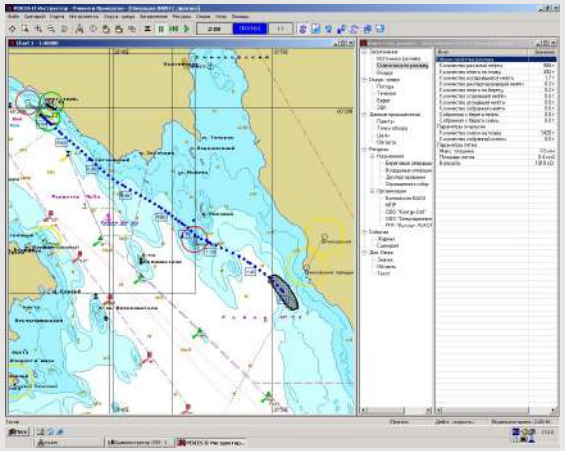
PISCES II provides the exercise participants with interactive information environment based on the mathematical modelling of an oil spill interacting with surroundings and combat facilities.

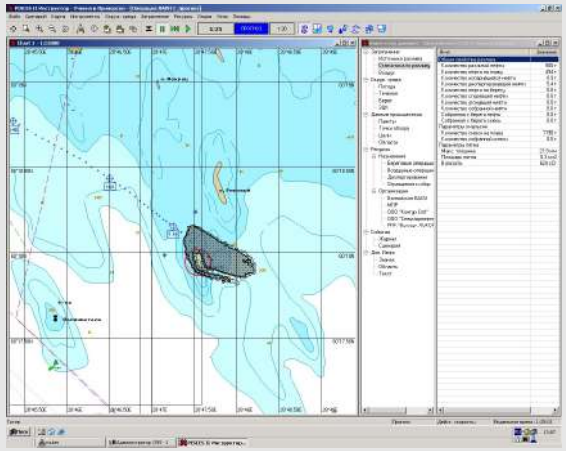


OIL SPILL RESPONSE – PISCES – OIL SPILL MODELLING

PISCES II spill model simulates processes in an oil spill on the water surface:

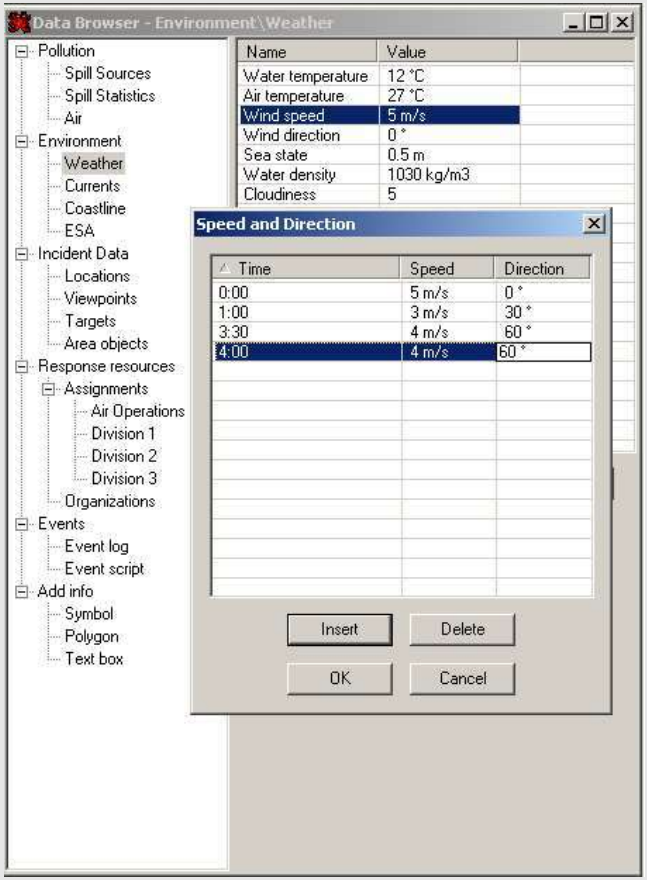
- transport by currents and wind
- spreading, evaporation, dispersion, emulsification, viscosity variation, burning
- interaction with booms, skimmers, and the coastline





OIL SPILL RESPONSE – PISCES – ENVIRONMENTAL DATA

- Weather conditions:
  - wind speed and direction
  - water and air temperature
  - wave height
  - water salinity
- External weather

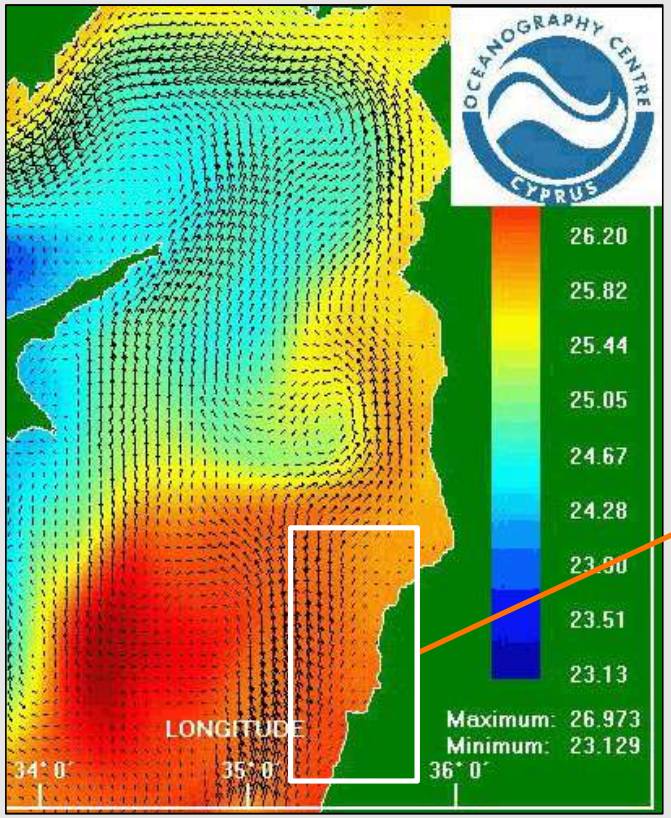


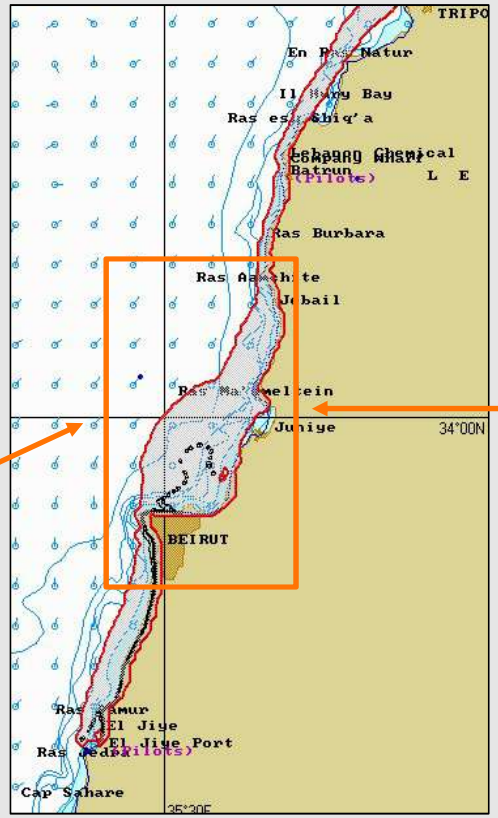
OIL SPILL RESPONSE – PISCES – ENVIRONMENTAL DATA

- Current fields inserted by instructor
- Import of current databases in XML-formats

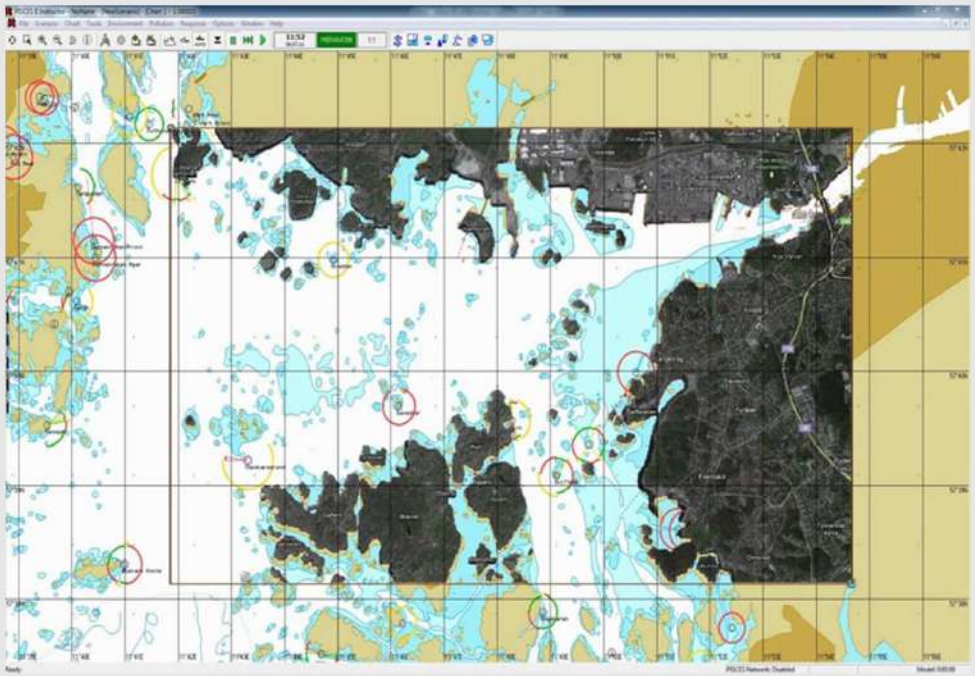
OIL SPILL RESPONSE – PISCES – TIMED MAPS OF CURRENTS

- External HD model data
- Import to PISCES
- Satellite image





OIL SPILL RESPONSE – PISCES – IMPORT OF GEOGRAPHICAL INFORMATION

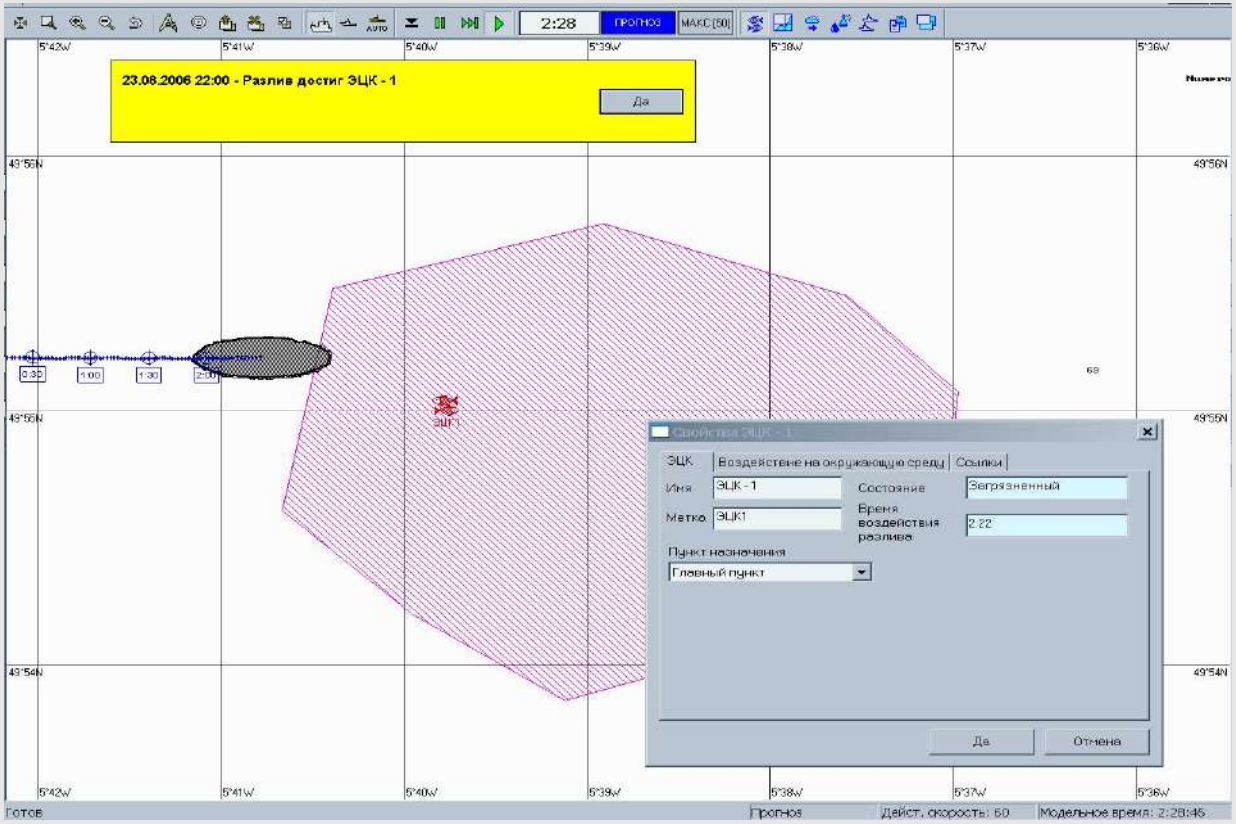


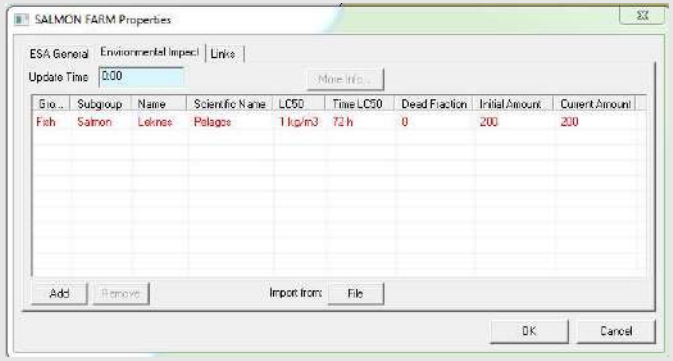
Provides trainees with additional information:

- Infrastructure
- Topographical information
- Imported raster images displayed as overlays

OIL SPILL RESPONSE – PISCES – ENVIRONMENTAL SENSITIVE AREAS – EAS

- The user can specify a list of dweller groups and its properties within defined polygons.



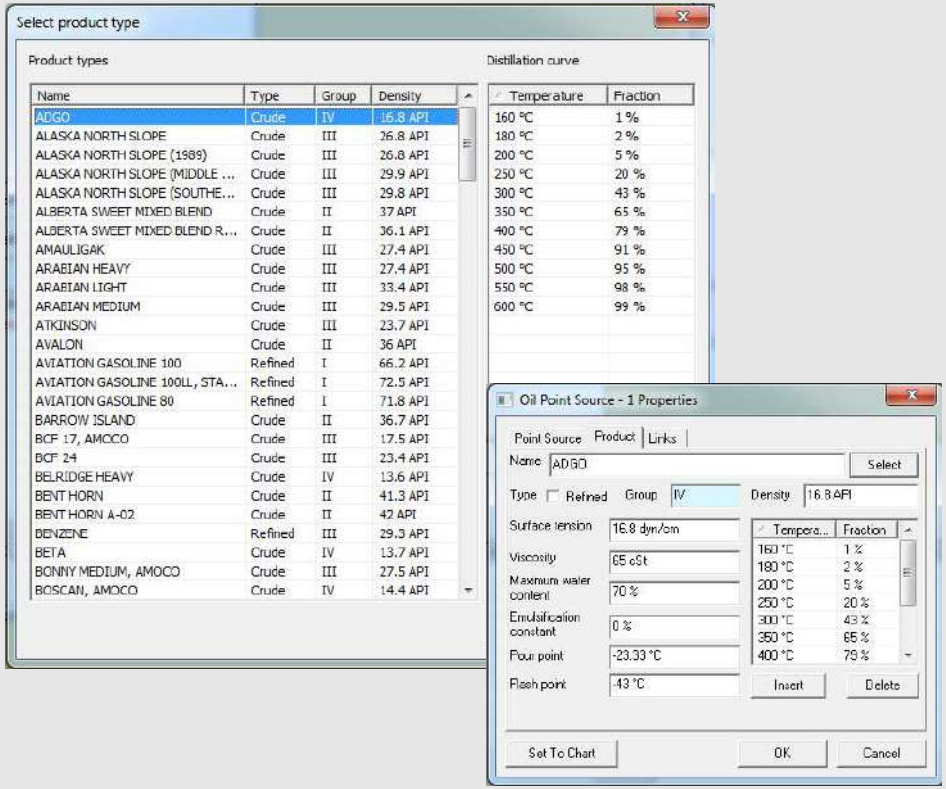


OIL SPILL RESPONSE – PISCES – POLLUTION

- Point source – one time spill at defined position.
- Area source – one time leak at defined polygon.
- Leak source – constant leak from one object, e.g. Vessel or Blow-out.

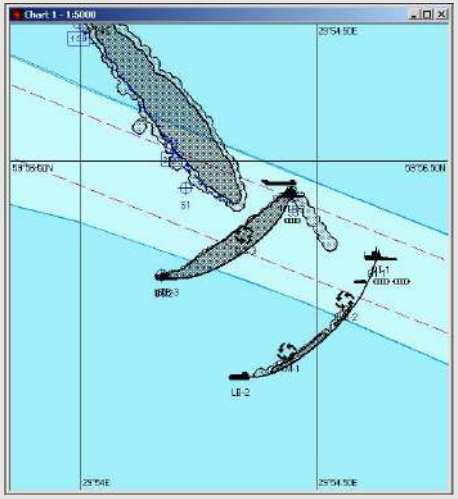
All spills will be affected by the defined environmental conditions.

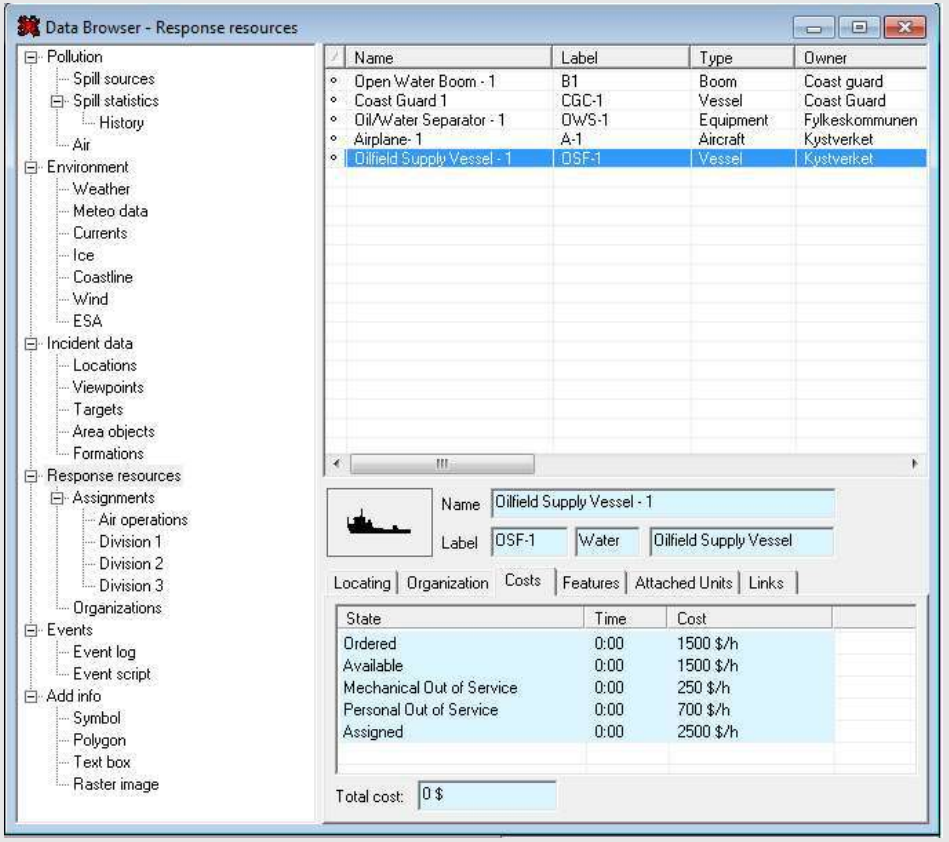
- Extensive Oil product database
- Instructor can edit/add spill products



OIL SPILL RESPONSE – PISCES – RESPONSE RESOURCES

- Platforms
  - Vessels
  - Helicopters
  - Airplanes
- Personnel
- Booms, skimmers, dispersants
- Resources can be edited by instructor





OIL SPILL RESPONSE – PISCES – CALCULATION OF COST FOR USED RESOURCES

Leknes incident- Crude Oil spill

Location	S Leknes	
Method	Joint operation	
	Time	**Date**
Start	06:14	27 Oct 2010
End	08:26	30 Oct 2010

Owner	Resource name	Amount	Cost
Kystverket	Vidar Viking	48	$ 22 000
Kystverket	UT-722	72	$ 16 000
Kystverket	Ocean Buster	60	$ 950
Kystverket	Ro-Boom 1	0	$ -
Kystverket	Ro-Boom 2	0	$ -
Kystverket	NOR1200L	60	$ 1 800
Kystverket	Airplane	72	$ 32 000
Kystvakten	KV Harstad	72	$ 9 500
DOF ASA	Skandi Mongstad	60	$ 35 000
Total			**$ 117 250**

- Cost of each mobilised resource is determined for the statuses:
  - Ordered
  - Available
  - Assigned
  - Out of service
- Comprehensive reports

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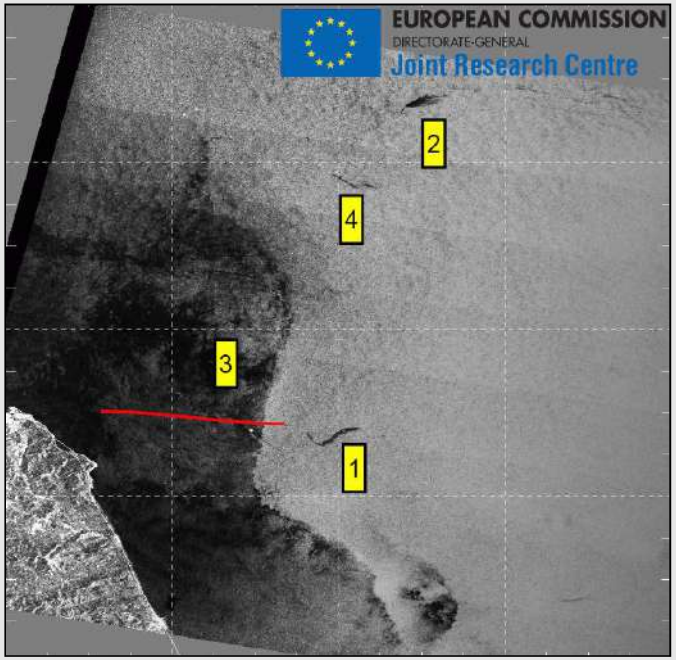
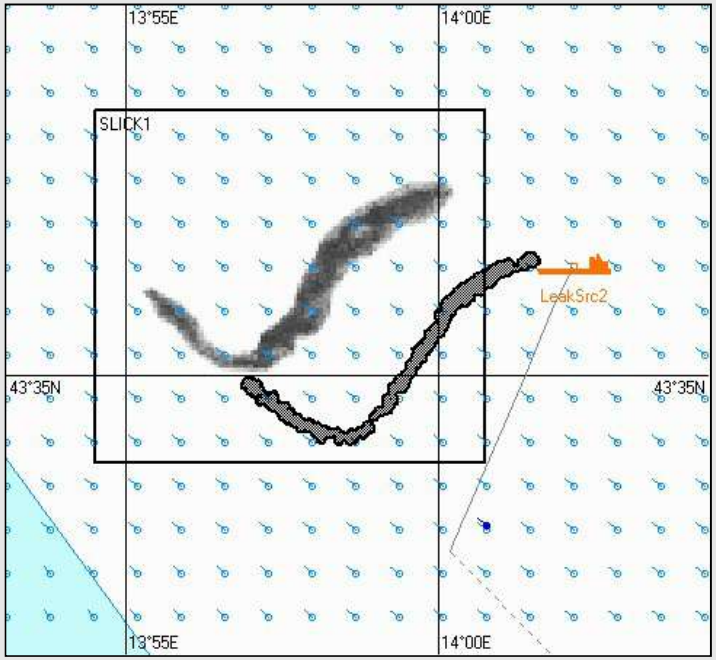
OIL SPILL RESPONSE – PISCES – INVESTIGATION OF ILLICIT POLLUTION SOURCE

- Combination of Satellite Imagery, AIS history Data and Backtracking model allows to point out potential source of oil spill vessel.
- Successful application in the Adriatic sea (several cases).

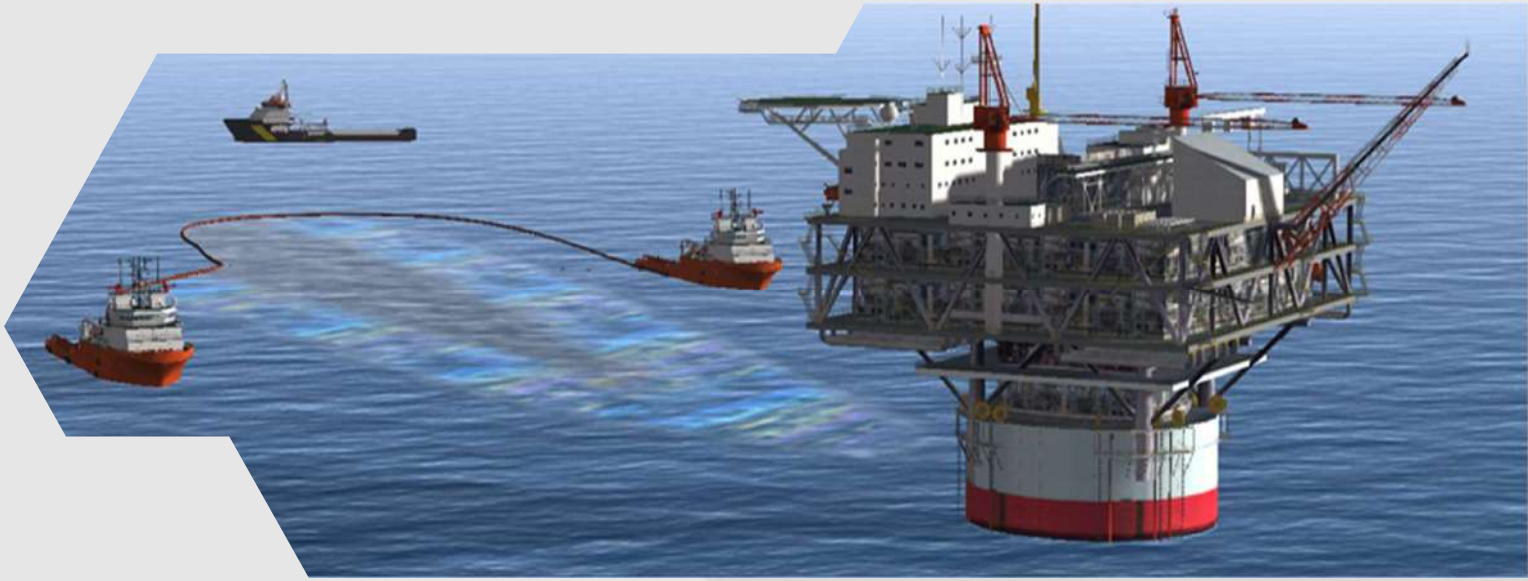




OIL SPILL RESPONSE – NTPRO OIL SPILL FUNCTIONALITY

Train bridge and deck crew joint actions, responding to surface oil spills. The following skills could be trained within the simulator application courses:

- Manoeuvering, fleet formation and communication
- Controlling deck winches, lines, oil booms, skimmers, busters, and oil barges
- Contaminated water/oil spill and recovery



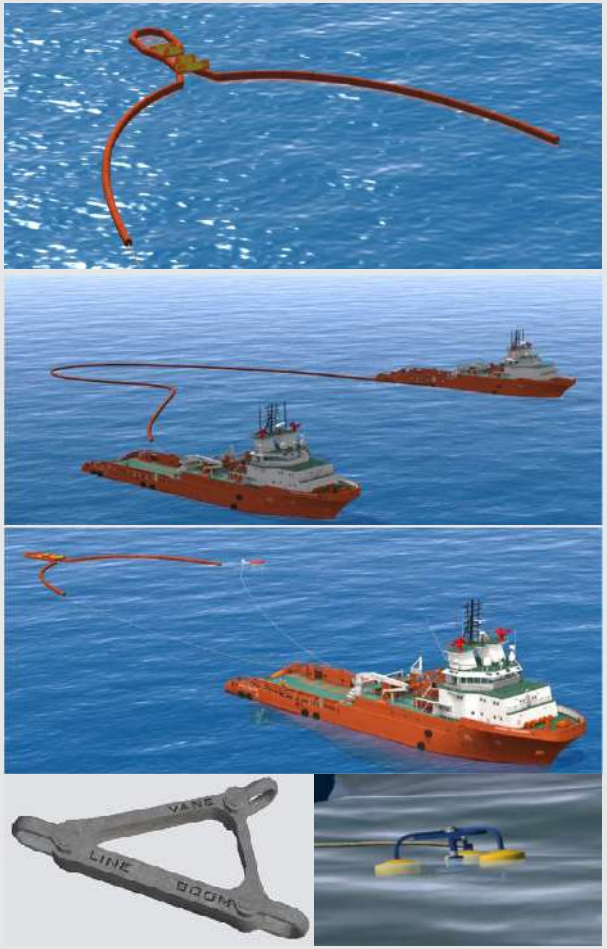
OIL SPILL RESPONSE – OWN AND TARGET SHIPS

- Oil Skimmer Boat 1 (Fish boat)
  - Three winches (Port/Stbd bow and stern)
  - Three visual skins (red/blue/green)
- Other vessels available upon request

- OSV 3 (AHTS)
  - Full winch configuration
  - Capstans

OIL SPILL RESPONSE – OWN AND TARGET SHIPS

- NOFI Busters
  - Ocean, Current and Harbour Busters
- Booms
  - 600 mm, 900 m and 1200 mm
- Boom vanes with bridle for single vessel operations
- Oil skimmer
  - Capacity and clogging set by instructor
  - Indicates collected amount of spill
- Poor handling of booms and busters will lead to inefficient oil recovery.
- Modelling of response equipment is based on manufacturer data taking speed and sea state limits in account.



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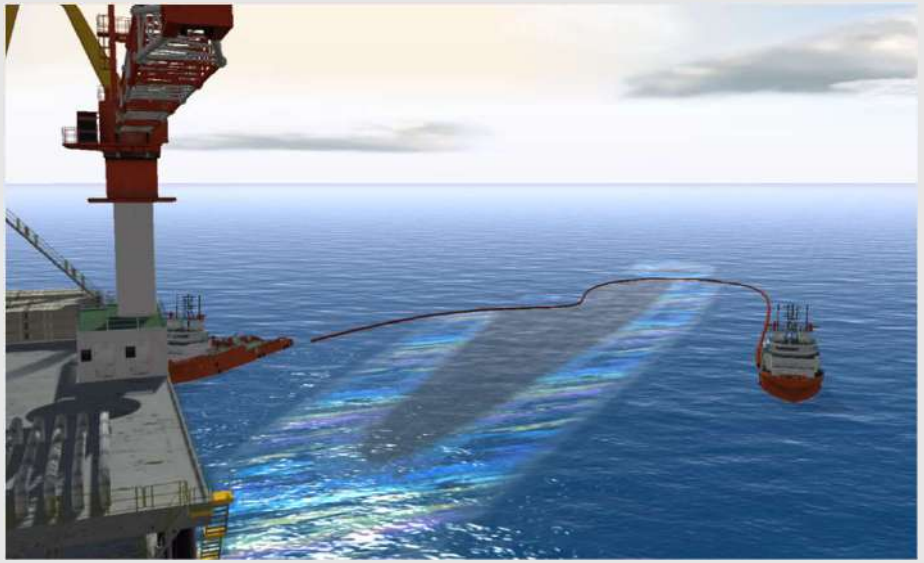
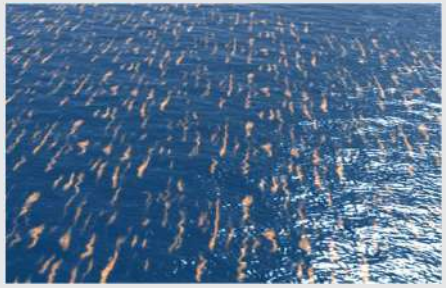
OIL SPILL RESPONSE – OWN AND TARGET SHIPS

Two types of oil spill

- Oil slick
  - Physically calculated flow
  - Interacts with booms, busters, skimmers, barges, structures and vessels
- Target oils slick
  - Visual presentation for scene creation
  - Does not interact with objects
  - Different visual presentation modes



Windrow



Sheen

Streamers

Metallic

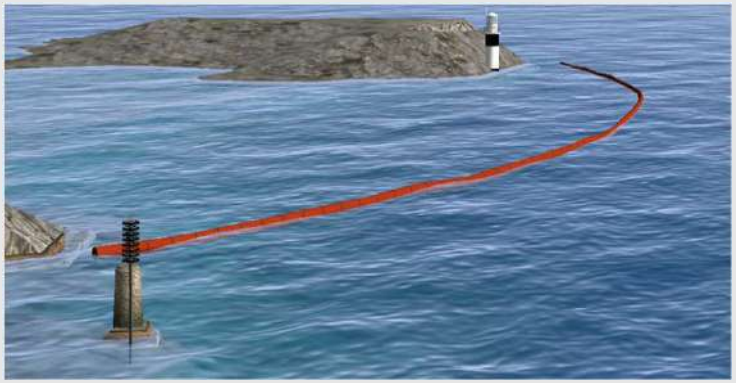
OIL SPILL RESPONSE – OTHER OPERATIONS

Anchored boom

- Deploy boom at any position, e.g. along the coastline.

Floating garbage

- Deflates boom – collected oil will transpire if towing proceeds



Dynamic bollard object can be placed anywhere in the scene:

- Shore to shore operations
- Vessel to shore operations

THANK YOU

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