At Sea Response

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COUNTER POLLUTION AND SALVAGE STOCKPILES

Stockpiles of salvage, at sea recovery and shoreline response equipment at:

Dundee

Barnsley

Bristol

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Dispersant Locations

Lockheed Electra aerial spraying aircraft
Cessna 404/406 aerial spraying aircraft
Can be deployed at short notice by the MCA

Stornoway	**Lerwick**
Prestwick	**Inverness**
Halifax	**Belfast**
Milford Haven	**Coventry**
Southampton	**Ramsgate**
	Saltash

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At-sea oil spill response options

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At sea oil spill response options

- Monitor and Evaluate
- Contain and recover at sea
  - Booms and skimmers
- Use oil spill dispersants

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Monitor and Evaluate

- Use surveillance aircraft to monitor oil slick movement
- Aircraft are equipped with:
  - Cameras and video
  - SLAR (Side looking Airborne Radar) 20 km range either side of track
  - Infra-Red
  - Ultra-Violet

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Surveillance aircraft

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Monitor and Evaluate

- If oil is moving away from the shore there may be no need to respond
  - Small oil slicks are eventually broken up by the effects of wind and currents
- Informs other responses
- Aerial and satellite surveillance is used to identify oil slicks or illegal oil discharges from ships

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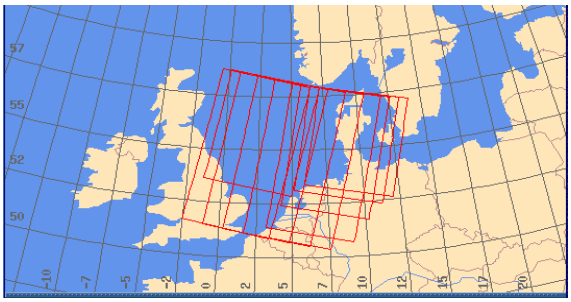
Satellite Surveillance - EMSA



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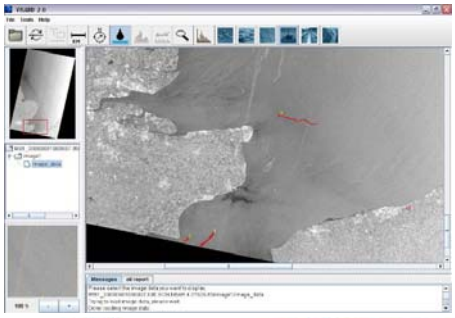
SATELLITE SURVEILLANCE



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Contain and recover at sea

- Dedicated recovery vessels
- Booms can be used to contain oil around source
- Booms can be towed by ships in various configurations to concentrate the spilled oil into smaller area
- Skimmers can then be used to collect the oil

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Weir Boom

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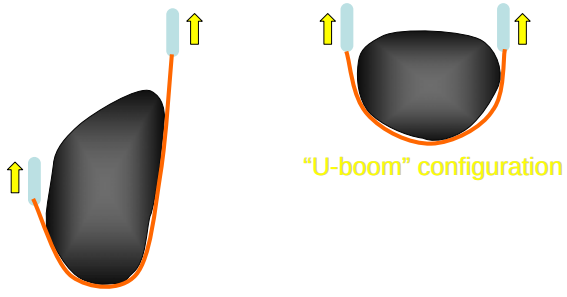
Various boom configurations



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Difficulties with booming at sea

- Getting to the site of the spill quickly
  - Ships are relatively slow
- Wave and weather constraints
  - Booming is not possible in rough seas
- Laws of hydrodynamics
  - Booms towed faster than approximately 0.7 knots will allow oil to pass under them
- Storing the recovered oil and water

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Oil Spill Dispersants

- What is the point of using dispersants?
- What are oil spill dispersants?
- What do they do?
- Who controls their use?

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The purpose of using dispersants

- Oil spill dispersants are used to rapidly disperse the spilled oil into the sea before it gets into shallow water or hits the shoreline where most damage occurs
- Dispersants have limits:
  - They will not 'work' in some cases,
  - They are not an appropriate oil spill response method in other cases

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Spray dispersants…..

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…. to try and avoid this

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Dispersant spraying

- Dispersants can be sprayed from ships and aircraft
- Spraying dispersant from aircraft is the MCA's preferred active oil spill response option
  - Aircraft can get to anywhere in the UKPCZ quickly
  - Large areas of spilled oil can be sprayed rapidly

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Cessna F406
1.5 tonnes dispersant

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Lockheed Electra
15 tonnes dispersant

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The Benefits

- The successful use of oil spill dispersants will transfer spilled oil from the surface of the sea into the water column as fine oil droplets.
- Almost, but not all, of the dispersed oil will be biodegraded by naturally occurring organisms
- Dispersant use can be more rapid, more effective and less costly than other options

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The Risks

- Marine organisms will be exposed to elevated concentrations of dispersed oil.
- The consequences depend on degree of exposure(dispersed oil concentration and exposure time) and species affected
- There must be room (water volume) and time for dilution of dispersed oil to low levels

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What are oil spill dispersants ?

- Mixtures of surfactants and solvents.
- Surfactants are the 'active ingredients'
- Solvents are used to allow the dispersant to be sprayed and help the surfactants into the oil.

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Surfactants

- Chemical molecules with two parts
  - One part is soluble in water
  - One part is soluble in oil
  - These two parts are connected

Water soluble Oil soluble

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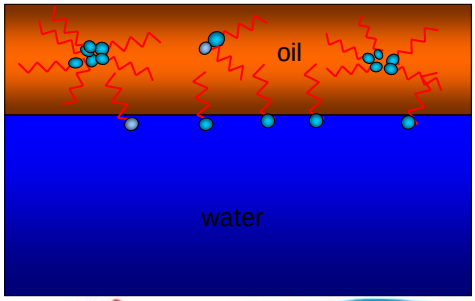
Surfactants soak in and orientate themselves



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Will dispersants work?

- Dispersant will disperse most crude oils for a period of time
  - The spilled oil "weathers" and becomes resistant to the action of dispersants
  - This is known as the "window of opportunity" for dispersant use and depends on oil type and prevailing conditions

Questions to be asked before dispersants are used

- Are dispersants allowed ?
  - The rules must be obeyed
- Will dispersants work ?
  - Oil type
  - For how long (window of opportunity) ?
  - Sea conditions ?
  - Dispersant available ?
- Will dispersing the oil be of benefit ?
  - What is being threatened by the oil ?
  - More sensitive to surface oil or to dispersed oil ?

Regulations about dispersants

- Dispersants cannot be sold or used in the UK unless they have first been tested for toxicity and effectiveness
- In Scotland, Marine Scotland act as the licensing authority
- Marine Management Organisation is licensing authority for England and acts on behalf of National Assembly for Wales.

Regulations about dispersant use

- It is illegal under FEPA 85 to put chemicals into the sea anywhere in the UK PCZ. Exemptions are made for the use of oil spill dispersants
- MMO / MS must give prior approval for every use of dispersant that occurs within 1 nautical mile of the 20 metre depth contour
- All dispersant use must be documented and reported to MMO / MS

Toxicity issues

- Modern dispersants are less toxic than the oil they are used to disperse
- Oil dispersed into the water column may cause toxic effects on some marine creatures
  - Risk is very small if water is more than a few metres deep and if there is good water exchange

Summary

- Monitor and evaluate
  - May be the only form of response, important element of other response strategies
- Containment and Recovery
  - Operational limitations of at sea recovery
- Dispersants
  - Dispersant spraying can be a very effective response depending on oil type / logistics