CleanSeaNet: The integrated European satellite based oil spill and vessel detection service of EMSA

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The discharge of oil from ships, oil platforms and other sources causes significant damage to the coasts and to the marine environment in general. The monitoring of European waters is particularly challenging as the European Union (EU) is an inundated peninsula with an extensive external coastline and several significant semi-enclosed seas. Due to the large sea areas involved and to the transboundary behaviour of deliberate, illegal oil discharges the European Marine Safety Agency (EMSA) was tasked to develop an operational satellite monitoring system: CleanSeaNet. Any oil pollution from ship observed by satellite can constitute a MARPOL violation. CleanSeaNet has been designed to support the national response activities in terms of greater consistency, efficiency and effectiveness. CleanSeaNet is recognised as a fully operational maritime GMES service.

CleanSeaNet consists of two elements, the service providing possible oil spill identification and vessel detection information on European scale with associated alerts to the national users and the underlying processing chain of satellite Synthetic Aperture Radar (SAR) images. Satellite data is provided by the European Space Agency's ENVISAT, Canada's RADARSAT satellites and in future the GMES SENTINEL-1 satellite. Images from other satellites e.g. TerraSAR, Cosmo Skymed and optical sensors are analysed in special situations.

According to the coverage requirements of the European Coastal States EMSA plans and tasks the satellite images, which are accordingly acquired, downloaded, processed and analysed in near real time by a network of receiving stations located in Norway, France, Italy and the Azores. For oil spill detection purposes and polluter identification the SAR images are enriched with supporting meteorological, oceanographic and ancillary information to identify possible pollutions and to determine the likelihood of the presence of oil on the sea surface. The processed and analysed information together with all related information is then distributed to the national authorities in the affected European Coastal States in nominally less than 30 min. A dedicated CleanSeaNet web portal has been created for easy access to the service, which comprises of a GIS web browser, a planning interface, and is integrating EMSA vessel traffic information, forecasting and backtracking models, oceanographic and marine data, ready to become a platform for maritime surveillance applications.

Currently 24 EU coastal states have joined the service, and approximately 2300 SAR scenes are delivered annually, with a successful delivery rate of more than 90%. Over 3000 potential oil spill can be identified in these images, and linked to the EMSA vessel traffic information (AIS, LRIT and in future sat-AIS) and backtracking models to assign potential polluter to the spills to support national prosecution activities and to significantly increase deterrence effects.

Following the Deepwater Horizon incident on 20th April 2010 in the Gulf of Mexico concern has been raised over the offshore installations also operating in and around European Waters. As a first step of mitigation of platform malfunctions CleanSeaNet could support national administrations in terms of detecting and monitoring of illicit or accidental oil pollutions from these off shore installations. The large geographical coverage of CleanSeaNet allows the identification of oil spills over large areas of sea. This is particularly relevant as oil in the water column could appear at the sea surface some distance from a platform. Approximately 50% of the images needed could be provided as synergy from the CleanSeaNet oil spill monitoring service.

The presentation will show the technical setup of the service, will give details of the analysis and will provide results of the service after four years in operation.