

GÉANT and EMSA – Protecting Europe's seas from pollution

Transmitting satellite data in real-time to detect and monitor maritime oil spills

Cutting marine pollution, such as oil spills, is central to safeguarding the environment. However the sheer size of European seas, stretching south from the Arctic to the Canary Islands in the Atlantic and east to the Black Sea combined with the number of vessels travelling through them makes detecting and collecting evidence on polluters similar to finding a needle in a haystack.

To help meet this need for faster and more detailed monitoring the European Maritime Safety Agency (EMSA) developed the CleanSeaNet service. This combines satellite data with powerful Geographic Information Systems (GIS) to provide a real-time service for monitoring oil pollution and collecting evidence of potential polluting vessels. These results can then be used by authorities in the relevant country to take action to clean up spills and prosecute offenders. CleanSeaNet was created through an EU directive as part of ongoing efforts to decrease maritime pollution.

Speed is of the essence

Oil spills change very rapidly depending on wind and tidal conditions, so it is vital that satellite data is transmitted as quickly as possible from downlink stations across Europe to EMSA's headquarters in Portugal for processing. CleanSeaNet aims to provide alerts to relevant member states within 30 minutes, enabling them to react quickly and to reduce the environmental impact.

Given the enormous range of satellite images, which cover up to 250,000 km² and can reach sizes of over 1 Gb, it is difficult to send these files economically through commercial networks in near real-time. CleanSeaNet therefore uses the high speed pan-European GÉANT network and National Research and Education Networks (NRENs) to deliver this vital data within strict time limits.



The Challenge

Reduce maritime pollution by providing fast detection of oil spills through real-time analysis of satellite images.

The Solution

CleanSeaNet uses the research networks of GÉANT and its NREN partners to deliver high resolution satellite images from downlink stations across Europe.

Key Benefits

Today CleanSeaNet is able to identify potential pollution and provide alerts to maritime authorities in near real-time, allowing them to act efficiently with the necessary response actions.



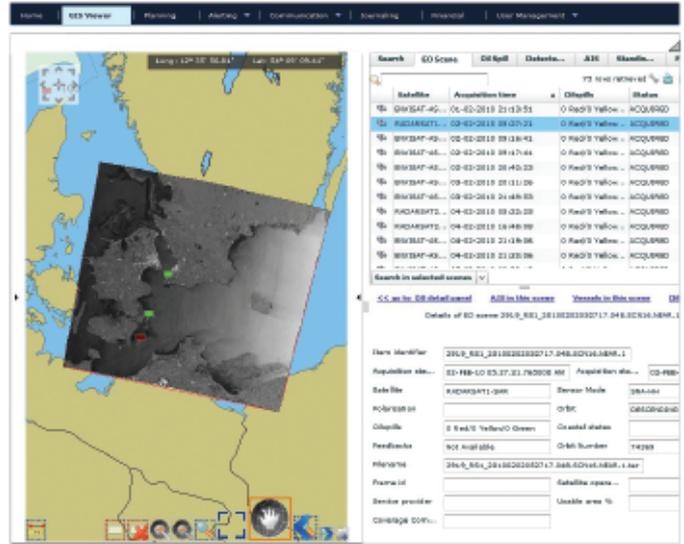
Speed is of the essence when it comes to reducing the effects of oil spills in European waters which is why CleanSeaNet has been created, enabling EMSA to provide fast warnings of potential pollution to coastal states. Given the need to transmit huge files in extremely tight timeframes CleanSeaNet uses the high speed and high bandwidth provided by GÉANT and Europe's national research networks. They support our CleanSeaNet service, helping to protect European seas from pollution.

Olaf Trieschmann, Senior Project Officer, CleanSeaNet

CleanSeaNet is built on advanced technology. Low orbit polar orbiting synthetic aperture radar satellites downlink over 2,000 images per year to stations in Norway, Italy, Portugal and France. It is then processed and sent via local NRENs (UNINETT in Norway, GARR in Italy and RENATER in France) across GÉANT via FCCN in Portugal to EMSA HQ in Lisbon – within a 10-minute time frame. This satellite data is then combined with CleanSeaNet's web-based GIS system and alert reports are generated which are delivered to relevant European member state authorities. Maritime authorities can then access more information through the CleanSeaNet website and take action accordingly. This includes launching clean-up initiatives and using the evidence in the prosecution process.

In order to maximise effectiveness CleanSeaNet works with multiple satellites, each of which uses different downlink stations located across Europe dependent on their orbit. The pan-European footprint of GÉANT and its NREN partners plays an important role in transmitting satellite data, wherever the downlink station is, across Europe to EMSA HQ in Lisbon.

Since CleanSeaNet went live in 2007 the number of oil spills detected on the images taken in European waters has decreased by half. While this is due to a range of factors including better ship design and greater environmental awareness, CleanSeaNet has proved to be a strong deterrent tool in safeguarding the European maritime environment.



We are grateful to GÉANT, national research networks and the EU for allowing us to use these high speed networks – while CleanSeaNet is not a research project, they recognise the essential work that it carries out across Europe to safeguard the maritime environment. Since its introduction in 2007 the number of oil spills detected on the images taken in European waters has decreased by half, demonstrating the kind of impact that technology and networking can have on the lives of all European citizens.

Olaf Trieschmann, Senior Project Officer, CleanSeaNet

connect • communicate • collaborate

The world is criss-crossed with high-capacity data communications networks, connecting and serving research and academic institutions across the globe. The most advanced of these is GÉANT, serving Europe.

Separate from the public Internet for reasons of security and performance, many of these networks are designed, deployed and run by the networking organisation DANTE and make an enormous practical contribution to research in a wide variety of areas – saving lives, protecting the environment and establishing real-time collaboration between scientists all over the world.

GÉANT and its NREN partners provide CleanSeaNet with the fast and reliable connections needed to monitor and report on maritime oil spills. Time is of the essence, with large satellite images needing to be transmitted across Europe, analysed and alerts issued within a 30 minute window. Without access to the pan-European footprint of GÉANT and the NRENs it would be much more difficult to meet this tight timescale, setting back efforts to reduce maritime pollution.



For more information:

GÉANT: www.geant.net
CleanSeaNet: <http://cleanseanet.emsa.europa.eu>
GARR: www.garr.it

RENATER: www.renater.fr
FCCN: www.fccn.pt
UNINETT: www.uninett.no

