

Satellite based oil spill and ship detection: From national towards pan-European multi-user services

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An increasing focus on environmental issues is registered in Europe, mainly as a result of oil and gas activities in areas of the world's riches fisheries, increasing ship traffic, and accidents with environmental impact. Satellite based Synthetic Aperture Radar (SAR) provide wide coverage of the Earth's surface independent of weather and light conditions and their potential for marine surveillance is evident. The SAR has therefore become one of the most important sensors for operational monitoring of the marine environment. Kongsberg Satellite Services (KSAT) in Tromsø, Norway has since 1994 provided operational satellite radar based marine oil spill and ship detection services.

European end users are served in near real time, i.e. less than one hour after satellite overpass. The satellite service is used in combination with other surveillance resources such as aircraft, radar/radio systems, models, and/or observations. To maintain an updated maritime picture for ship traffic monitoring, or in case of an illegal oil discharge, the satellite information is integrated with ship information from the Automatic Identification System (AIS). This joint and integrated information utilisation contributes to a more cost-effective utilisation of the other surveillance resources such as coastguard vessels and surveillance aircrafts. The technical capabilities have been documented and accepted, and the main challenge now is to obtain long-term sustainable services, independent of end-users annual budgets. A national application program, SatOcean, has been established in Norway under the responsibility of the Norwegian Space Centre. Norway has invested in the Canadian Radarsat program, and secured Norwegian public as well as commercial users access to data from the Canadian Radarsat-1 and 2 satellites. An important program strategy is multiple use of the data, i.e. the individual data sets are used for extraction of multiple information including oil spills, ships, oceanography etc. The national user needs for access to information and data have been documented, and is being used for implementation of an operational multi-user service program. Satellite tasking and knowledge on the capabilities and limitations is important in order to understand how multiple user needs could be best fulfilled. The national knowledge is now being utilised to establish operational sustainable pan-European marine surveillance services. Harmonisation and cooperation among of national, regional and international end-users represent additional challenges. Through information and cost sharing based on harmonised user requirements KSAT can provide more cost-effective services to both national and European users. KSAT has for two years been running an ESA Long Term Market development project. The objective is to develop transnational marine surveillance services and increase its market. KSAT has involved nations in adjacent areas in both the Baltic Sea and the North Sea, and a multi national oil spill monitoring service based on Envisat ASAR is currently conducted as a shared service for four key users in the North Sea. The multi user service will be extended with ship detection during the spring 2005. A joint Baltic oil service trial including shared aerial surveillance among the contributing nations is also planned for the spring 2005. The capabilities to provide operational, near real-time detection and early warning of possible oil spills and surface ship positions for local and regional environmental monitoring have been demonstrated. A user evaluation will be conducted and the ability to meet the operational requirements from the various user-groups will be presented. Initiatives to expand beyond Northern Europe have been taken through contributing to the planned ESA GMES marine projects.