OPTIMIZED OPERATIONAL AIRBORNE OIL SPILL REMOTE SENSING: THE QUANTITATIVE APPROACH CURRENT STATUS OF SENSOR AND MISSION SYSTEM TECHNOLOGY

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Abstract

Operational airborne oil spill monitoring has become a global concern during the last three decades. Currently there is a multitude of specialized airborne remote sensing systems all over the world, which are operated for this purpose, especially for the deterrence of potential polluters and the support of oil spill clean-up activities. In the 1970s and 1980s, the main effort has been directed towards developing sensors with enhanced spill monitoring capabilities that explains the existing large number of well-established oil spill remote sensors. Recently, more and more attention has been paid to the automated processing of remotely sensed multi-spectral oil spill data acquired by airborne sensor platforms. In this paper, we focus on advanced data processing and present ways of improving the usability of airborne multi-sensor oil spill monitoring systems with regard to on-board and ground-based data analysis as well as distribution of remotely sensed oil spill data. In this context we (1) give an overview of currently existing oil spill remote sensing technology like infrared/ultraviolet line scanners, microwave radiometers, laser fluorosensors, and radar systems, (2) present the Multispectral Environmental Data Unit for Surveillance Applications (MEDUSA) for network-based real-time data acquisition, (3) describe a MEDUSA software module which is the Oil Spill Scene Analysis System (OASSAS) for analysis and fusion of multi-sensor data and (4) present the distribution of oil spill data and related data products using web-based geographical information systems. Especially the automated generation of thematic maps of the oil spill scene along with their web-based distribution is becoming more important in distributed marine crisis management.