

## REMOTE SENSING OF OIL SPILLS

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### INTRODUCTION

Remote sensing has become an increasingly important part of oil spill countermeasures. Public expectations with respect to the environment are increasing, the minimum action for a spill is that the government or the spiller know the location and extent of the contamination. It is also being recognized by spill cleanup personnel that remote sensing can be used to increase spill cleanup efficiency. Furthermore, the advance in electronics has made the instrumentation much cheaper and capabilities which were only once dreamed of are now in reach.

The definition of remote sensing implies that a sensor, other than the eye, is used to detect the target of interest at a distance. The most common form of remote sensing as applied to oil spills is aerial remote sensing - that is using aircraft as a platform. Visual observation of oil spills is by definition, not remote sensing.

### OPTICAL TECHNIQUES

The most common means of remote sensing is the use of optical techniques, particularly cameras, both still and television. Aerial mapping is very common and many companies are equipped with aircraft and cameras to perform this function. Many cameras have been commercially available over the past 10 years. Table 1 lists a number of these.<sup>1,2</sup> (It is important to note that this table and all others in this paper include sensors that were available in the past, those that are currently available and in some cases, those under development.) The large format cameras listed in Table 1 are largely used for mapping purposes, however are occasionally used for oil spills. The front cover of the proceedings are a reproduction from a 9X9 inch format RC-10 camera. The image is of the EXXON VALDEZ spill during the early part of April, 1989.

Oil has an increased surface reflectance above that of water in the visible, but also shows some specific absorption tendencies to allow use of the visible spectrum as an oil detection means. The visible spectrum is from approximately 400 to 700 nm (blue to red). Oil has several manifestations throughout the spectrum. Heavy oil appears brown, showing up in the 600 to 700 nm region. Mousse shows up in the red-brown or closer to 700 nm. Sheen shows up silvery and reflects light over a wide spectral region up to the blue. There is no strong information in the visible region from 500 to 600 nm, so often