

Saturn Solutions

## MARINE MONITORING

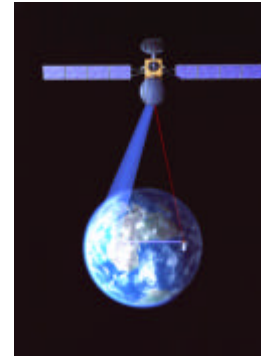


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## Optical Remote Sensing

### Background

Remote sensing is the collection of data about an object without coming into contact with it. The systems which undertake such work can be classified as active, passive, imaging or non-imaging.



Active systems illuminate the object of interest with their own radiation, whereas passive systems use naturally occurring radiation, either thermal or reflected solar. Imaging systems measure the intensity of the radiation reaching them as a function of position on the earth's surface producing a two-dimensional pictorial representation.



### The Advantages

The primary advantages of remote sensing are that large areas of interest can be investigated, at far higher speed than conventional studies would allow, and less accessible areas of the globe can be monitored.

### The Electromagnetic Spectra

The earth emits a continuous spectrum of electromagnetic radiation. Due to strong atmospheric absorption the majority of this is lost. Thermal infrared and microwave signals are the only ones left. Radiation can come from external sources as well, the naturally occurring one being the sun. The reflection of

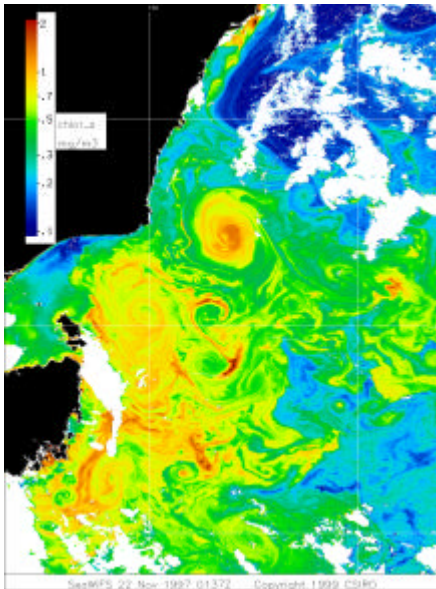


sunlight by the earth gives signals situated in the visible (400-800nm) and near-visible parts of the spectrum. The colour of the sea contains information on suspended particulate matter, both types and concentrations, productivity, plankton types, dissolved humic substance and many dissolved and suspended organic and inorganic pollutants. Water absorbs strongly in the red and least in the 400 - 500nm region,

which is why ocean waters appear blue. It is the blue part of the spectrum that is being reflected. This can be seen in the absorption spectra. The absorption spectrum of coastal waters, which would include particulates, dissolved substances and phytoplankton, show greater reflection in the yellow – green (500 – 600nm) part of the spectrum.

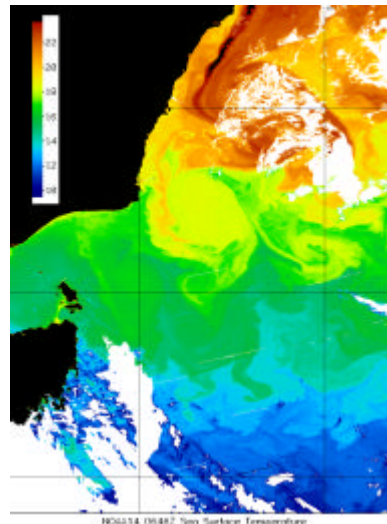
### Radiometers

A radiometer is a non-imaging sensor that is used to measure the intensity of the electromagnetic radiation in some waveband in any part of the electromagnetic spectrum, e.g. optical, infrared or microwave.



### Temperature Measurement of the Sea

The sea is heated by incident solar radiation. The amount of energy absorbed by the oceans depends on the position of the sun. When the sea surface is heated it causes a layering effect. Surface temperature studies yield information concerning the position of fronts and other oceanographic phenomena. The area where the temperature changes abruptly with depth is known as the thermocline. Thermoclines are also of interest in the study of biological parameters as they influence the habitats of phytoplankton. Changes in temperature, along with changes in salinity, define the different water masses that make up the world's oceans.



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