

[http://www.eohandbook.com/eohb2012/sat\\_earth\\_obs\\_vis\\_ir.html](http://www.eohandbook.com/eohb2012/sat_earth_obs_vis_ir.html)

## Imaging Multi-Spectral Radiometers (vis/IR)

### Description

Visible/IR imaging multi-spectral radiometers are used to image the Earth's atmosphere and surface, providing accurate spectral information at spatial resolutions of order 100m up to several km, with a swath width generally in the range several hundred to a few thousand km.

In addition, these observations can be used to study critical components of the water cycle, such as cloud macro- and micro-physical properties, from which information on atmospheric dynamics and pollutants can be determined.

The information obtained from these instruments is often complemented by that from atmospheric sounders, since atmospheric effects such as absorption must be taken into account in deriving parameters such as surface temperatures.

Recent developments include improvements in spatial resolution (which, in some cases, is equivalent to those of high resolution imagers), spectral resolution, radiometric accuracy and multi-angle capability. Planned hyperspectral instruments that will be able to simultaneously acquire imagery in many tens of wavebands should significantly improve the quality of land cover and land use information derived from satellite imagery.

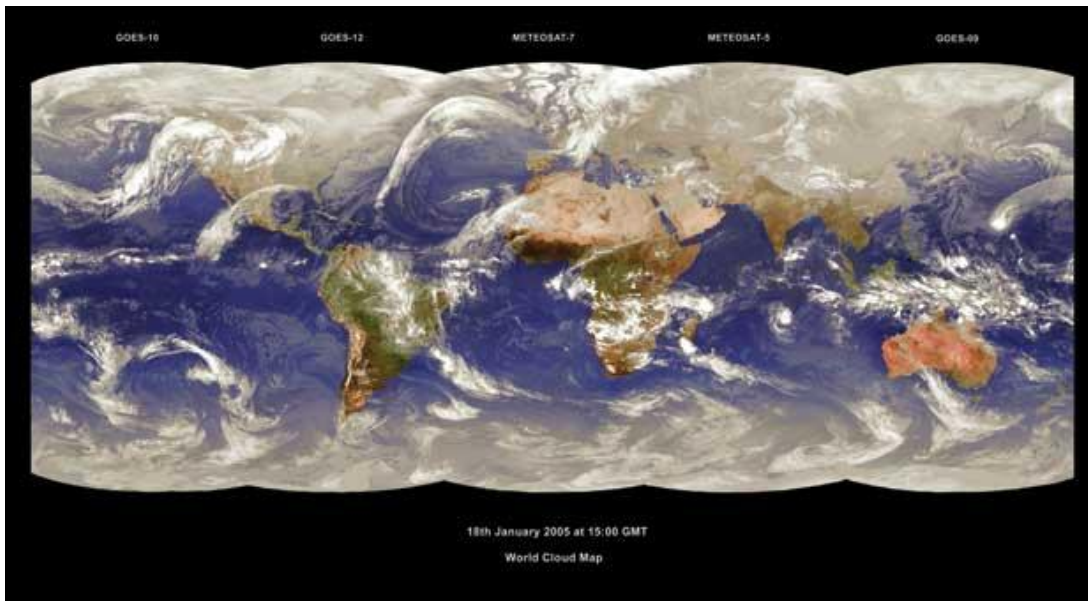
### Applications

Measurements from these multi-spectral radiometers operating in IR and visible bands may be used to infer a wide range of parameters, including sea and land surface temperatures, snow and sea ice cover, and Earth's surface albedo. These instruments may also make measurements of cloud cover and cloud top temperatures. Measurements of the motion vectors of clouds made by radiometers on geostationary satellites may be used in order to derive tropospheric wind estimates. Accurate information on atmospheric dynamics, derived from the instruments mounted on geostationary meteorological satellites like GMS, GOES or Meteosat, is essential for precise short- and medium-term weather forecasts provided by NWP centres in Japan, the U.S. and Europe.

Visible/IR radiometers are an important source of data on processes in the biosphere, providing information on global vegetation and its variations on sub-seasonal scales. This allows monitoring of natural, anthropogenic, and climate-induced effects on land ecosystems. Observations by AVHRR on NOAA and MetOp are traditionally used to provide classification and seasonal monitoring of global vegetation types, allowing estimation of primary production (the growth of vegetation that is the base of the food chain) and terrestrial carbon balances. Such information is of great value in supporting the identification of drought areas and provides early warning of food shortages.

## Current & planned instruments

AATSR	MI
ABI	MIRS
Advanced KMSS	MMRS
Advanced MI	MODIS
Advanced MSU-MR	MS (GISTDA)
ALISEO	MSI (EarthCARE)
AVHRR/3	MSS (Landsat)
AWFI	MSU-GS
AWiFS	MSU-MR
CCD camera	Multi-spectral thermal infrared imager (HyspIRI)
CHRIS	MUX
EPIC	MVIRI
ETM+	MVIRS
FCI	MVISR (10 channels)
HRMX	MX (RS-1A)-VNIR
HRMX-TIR	MxT
HRMX-VNIR	NigeriaSat Medium Resolution
HSC	NIRST
HSC	OLCI
HSI	OLI
HSTC	OLS
HYC	PAN (RS-1A)-MX
Hyperion	PCWMP
HySI (IMS-1)AATSR	RASAT VIS Multispectral
HYSI (RS-1A)-SWIR	RASAT VIS Panchromatic
HYSI (RS-1A)-VNIR	SEVIRI
HYSI-SWIR	SGLI
HYSI-VNIR	SLSTR
IIR	TANSO-CAI
Imager	TIR (Oceansat-3/3A)
Imager (INSAT)	TIRS
IMAGER/MTSAT-2	TM
IR Correlation Radiometer (GeoCape)	UV/Vis Near IR Wide Imaging Spectrometer (Geo-Cape)
IRS	VEGETATION
IVISSR (FY-2)	VHRR
JAMI/MTSAT-1R	VIIRS
KMSS	VIRR
LEISA AC	VIRS
MCSI	Visible imaging spectrometer (HyspIRI)
MERIS	VSC
MERSI	WFC
MERSI-2	WFI-2
METimage	WS LISS III



A geostationary satellite composite cloud map. Data from these satellites are an essential input to today's weather forecasting systems.



A 'Blue Marble' image of the Earth taken from the VIIRS instrument aboard Suomi NPP captured in early 2012

### Further Information

AVHRR: [edc2.usgs.gov/1KM/avhrr\\_sensor.php](http://edc2.usgs.gov/1KM/avhrr_sensor.php)

SEVIRI (Meteosat): [www.esa.int/msg/pag4.html](http://www.esa.int/msg/pag4.html)

IMAGER (GOES): [noaasis.noaa.gov/NOAASIS/ml/imager.html](http://noaasis.noaa.gov/NOAASIS/ml/imager.html)

MERIS: [earth.esa.int/web/guest/missions/esaoperational-eo-missions/envisat/instruments/meris](http://earth.esa.int/web/guest/missions/esaoperational-eo-missions/envisat/instruments/meris)

MODIS: [modis.gsfc.nasa.gov](http://modis.gsfc.nasa.gov)

RASAT: [www.uzay.tubitak.gov.tr/tubitakUzay/en/projects/spaceApplications.php](http://www.uzay.tubitak.gov.tr/tubitakUzay/en/projects/spaceApplications.php)

VEGETATION: [www.cnes.fr/web/CNES-en/1468-vegetation.php](http://www.cnes.fr/web/CNES-en/1468-vegetation.php)