

Hyperspectral VNIR-1600 Hyperspectral Sensor

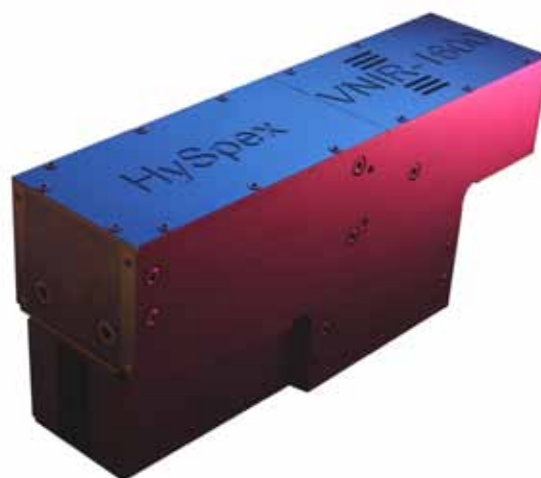


Hyperspectral Sensing and Imagery

Hyperspectral Imagery

Fugro owns and operates an airborne Hyperspectral sensor which can be used for the accurate detection and mapping of materials using a broad spectrum of reflectance across the visible and invisible near infrared wavelengths. Hyperspectral imagery provides information that is not possible to be collected efficiently by other means and is used in projects that require:

- Target detection
- Material identification and mapping
- Chemical and physical properties of surface



Hyperspectral VNIR-1600 HSI

The sensor is a Hyperspectral VNIR-1600, manufactured by Norsk Elektrik Optikk (NEO). This sensor operates in the visible and near infrared (VNIR) spectral range between 400 – 1000 nm. The spectral bands can be customized based upon application. Up to 160 bands can be configured using a spectral sample of 3.7 nm. Resolution of a pixel on the ground is dependent on the selected acquisition altitude; for example at flight altitude of 1500 m the pixel size is 1.0 m and at 2500 m altitude the pixel size is 1.9 m.

Data Acquisition

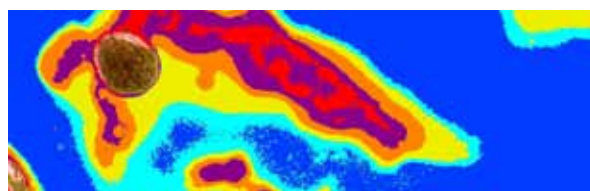
The Hyperspectral VNIR-1600 can be fitted to a wide range of aircraft and is able to operate independently or concurrently with other sensors such as Fugro's Airborne Lidar Bathymetry sensors. Careful operational planning is required for efficient hyperspectral data collection and needs to take into consideration a range of environmental conditions.

Data Processing

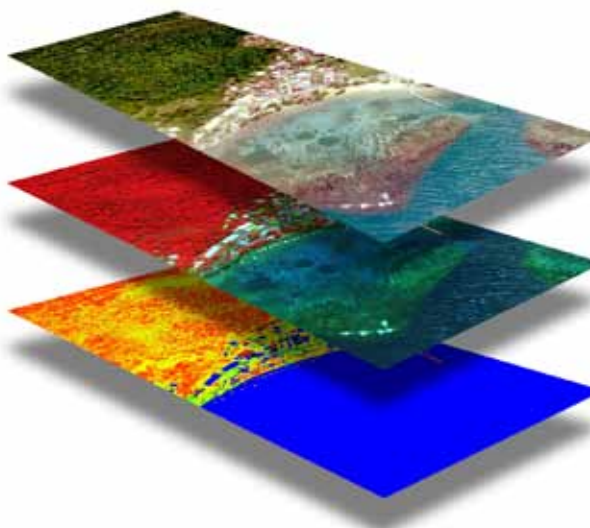
Hyperspectral data is georeferenced using attitude data that is collected concurrently using an ITrace inertial reference unit. The data is also atmospherically corrected using the Modtran model. After georeferencing and atmospheric corrections are applied, the output is either radiance or reflectance data.



A realistic true colour image from the sensor



Bathymetry index image generated from the sensor in shallow water



Hypex VNIR-1600 Hyperspectral Sensor



Applications

Applications for the Hypex VNIR-1600 Include but are not limited to:

- Habitat Mapping (marine, aquatic and terrestrial)
- Water Clarity Mapping
- Forestry Mapping
- Agricultural Mapping
- Urban planning/management

Technical Specifications

HYPESPEX VNIR 1600 Specifications

Imaging	Pushbroom
Detector	SSi CCD 1600 x 1200
Spectral resolution	3.7 nm
Spectral range	400-1000 nm
Spectral bands	160
Spatial pixels	1600
Max Frame Rate	135 fps
Dark frame acquisition	Automatic
Second order suppression	Built-in
Smile / keystone	Max frame rates are: <ul style="list-style-type: none">• 145fps with 2x binning (3.7 nm sampling)• 160 fps with 4x (7.4 nm) and 8x (14.8 nm) binning
FOV across track	17 ° with a field expander increasing the FOV to 34°
Object distance	~ 10 meters to ∞ with plane window (standard configurations) Dedicated close-up lenses are available for 0.3m, 1.0m and 3.0m working distance
Aperture	16mm in case of plane window, 10mm in case of 03.m close-up lens and 16mm in case of 1.0m and 3.0m close-up lense
Camera Interface	CameraLink
Detector	
Type	Si CCD with 7.4 μm square pixels
Exposure control	100 μs – 1 s
Dynamic range	62 dB
Digitization	12 bit



Note: Specifications subject to change without notice