

HYPER-CAM

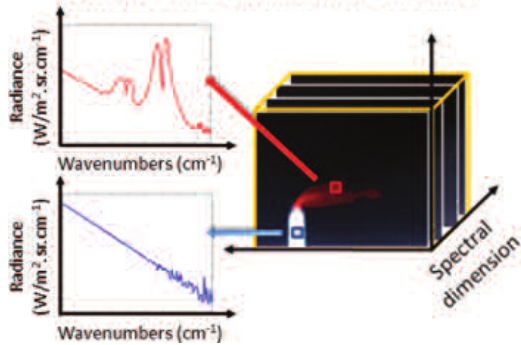
HYPER-VISION SYSTEMS

Detection and identification of substances and targets using a hyperspectral camera





A high resolution spectrum for each pixel



STANDOFF INFRARED HYPERSPECTRAL IMAGING SYSTEM

The Telops Hyper-Cam is an advanced standoff infrared hyperspectral imaging system. This remote sensing instrument combines high spatial, spectral and temporal resolution providing unmatched performance. It is a versatile tool for remote detection, identification and quantification, and is ideal for field measurements.

The unique spectral features of gases and solids are obtained upon modulation of the incoming infrared radiation from the scene by a Michelson interferometer. A high resolution spectrum is then recorded at each pixel of a focal plane array (FPA) detector.

By comparing a measured spectrum with reference spectral signatures of known gases and solids, the constituents of a target can be easily identified.

HYPER-CAM KEY BENEFITS

SPATIAL RESOLUTION AND IMAGING QUALITY

The Hyper-Cam provides an excellent image quality with the 320×256 pixels FPA detector. The $6.4 \times 5.1^\circ$ field of view (FOV) can be easily modified using different optics.

HIGH SPECTRAL RESOLUTION

The Hyper-Cam offers the best spectral resolution available. The spectral features of the targets can be well resolved providing good selectivity. It is user-selectable from 0.25 cm^{-1} to 150 cm^{-1} .

TEMPORAL RESOLUTION

Hyperspectral datacubes are recorded as a function of time allowing characterization of time-dependent events like gas cloud dispersion and combustion. Measurement time varies with acquisition parameters; this allows the fastest recording of dynamic events.

OUTSTANDING SENSITIVITY AND ACCURACY

Low noise equivalent spectral radiance (NESR) combined with automated high efficiency calibration sources ensure excellent accuracy at all times.

THE HYPER-CAM PRODUCT LINE COVERS THE ENTIRE SPECTRAL RANGE

HYPER-CAM LW

The Hyper-Cam Long-Wave (LW) is typically used for the characterization of gas clouds, minerals and materials at ambient temperature.

HYPER-CAM MW

The Hyper-Cam Mid-Wave (MW) is ideal for characterization of gas clouds, combustion, smokestacks and target signatures warmer than ambient temperature.

HYPER-CAM MWE

An extended spectral range can be reached with the Hyper-Cam Mid-Wave Extended (MWE) as it includes a part of the shortwave infrared spectral range. Typical applications include characterization of high-temperature events such as detonation and combustion.

FAST VERSION

The Hyper-Cam sensor data rate is remarkably fast, being only limited by the FPA readout time at a given spectral resolution. The Hyper-Cam MW and MWE are available in a «Fast» version that includes a high speed FPA.

A WHOLE RANGE OF APPLICATIONS



DEFENSE AND SECURITY

- Smoke candles
- Camouflage
- Signatures
- Energetic materials



INDUSTRIAL AND RESEARCH

- Jet engine combustion
- Toxic Industrial Chemicals (TICs)
- Atmospheric modelingToxic



ENVIRONMENT

- Flares and smokestacks
- Gas and aerosol clouds
- Landfills
- Greenhouse gases
- Urban heat islands



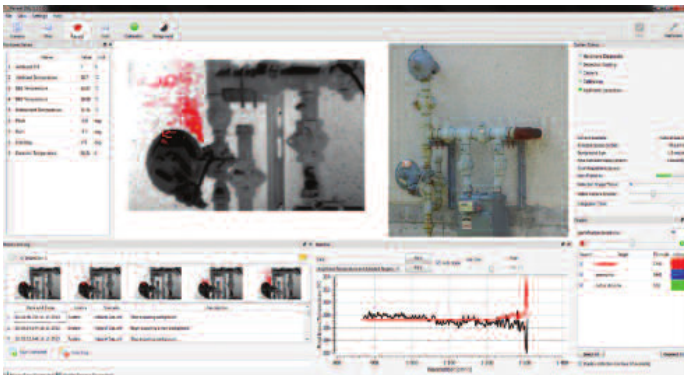
NATURAL RESOURCES

- Natural gas
- Geology and mining
- Airborne surveys
- Oil sands

POWERFUL SOFTWARE TO SUIT YOUR APPLICATIONS

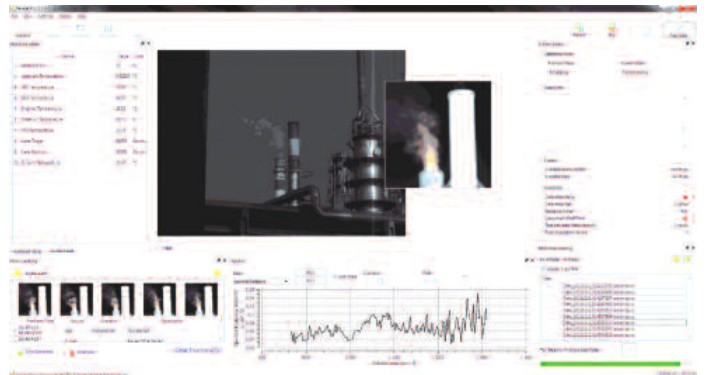
REVEAL D&I

Real-time detection and identification software for experiments involving gas releases and leaks. Detection algorithms allow the chemical imaging of multiple gases simultaneously on an interactive interface.



REVEAL SUITE

Reveal is a powerful research software for data acquisition with a maximum flexibility for advanced users. Reveal Calibrate performs radiometric calibration while Reveal Viewer allows efficient browsing of hyperspectral datacubes.



All hyperspectral data is readily compatible with Matlab and ENVI software.

PARAMETER	UNIT	HYPER-CAM LW	HYPER-CAM MW	HYPER-CAM MWE	HYPER-CAM NB	COMMENTS
Spectral Range (typical)	m	7.7 – 11.8	3 – 5	1.5 – 5.4	7.7 – 9.3	Other bands and extended range available
Spectral Resolution	cm ⁻¹	Up to 0.25*			0.25 – 64	Computer-selectable *Not applicable to all configurations
FPA Format	pixels	320 × 256				Computer-selectable windowing
Field of View (FOV)	deg	6.4 × 5.1			25.2° × 20.3°	Telescopes available to change FOV
Typical NESR	nW/cm ² sr cm ⁻¹	20	4	7	20	For a single scan at 16 cm ⁻¹ resolution, at peak wavelength
Radiometric Accuracy	K	< 1.0	< 2.0	< 2.0	> 1.0	Using calibration module at peak wavelength
Acquisition Software		Reveal Suite Reveal D&I			Reveal Suite	Sensor and data management suite Real-time gas detection
Data Transfer		Camera Link				Long range fiber optic available
Power Consumption	W	180				Depends on operating conditions
Weight	kg	31				Includes the calibration module
Operating Temperature	°C	-20 to 40				Extended temperature range available

These specifications are for illustrative purposes only. The exact specifications depend on each configuration.



AIRBORNE

The airborne platform used with the Hyper-Cam enables the production of hyperspectral maps of the ground surveyed from an airplane. The airborne module includes a stabilization platform, a Global Positioning System/Inertial Navigation System (GPS/INS), an image motion compensation mirror, a navigation module as well as all the necessary airborne operation software. Hyperspectral mapping applications:

- Target detection and identification
- Environmental monitoring
- Surveillance
- Agriculture and vegetation surveys
- Geology, mining and oil & gas exploration



ACCESSORIES AND OPTIONS

- Telescopes
 - 0.25x: FOV of 24 × 20°
 - 3.5x: FOV of 1.8 × 1.5°
- Global Positioning System (GPS) and compass
- Motorized polarizer
- Motorized pan and tilt platform
- Long range fiber optic data transfer
- Filter holder
- Customized spectral range detector