HIGH-PERFORMANCE IMAGING SYSTEMS

HYPER-VISION SYSTEMS

Hyperspectral, multispectral
& high-speed infrared imaging

TELOPS

Telops is a leading supplier of high-performance scientific infrared cameras for the defence, academic, industrial, and environmental research industries. Telops also offers R&D services for optical systems technology development.

Since its beginning in 2000, Telops has distinguished itself with the quality of its technical personnel and its innovative approach to many technological challenges in the optics field. Today, the expertise of its scientists, engineers and technologists and the performances of its infrared cameras and hyperspectral imagers are internationally recognized.

INFRARED CAMERAS' KEY FEATURES

All our infrared cameras offer advanced features to address the most demanding research applications. They include:

- Blackbody-free permanent calibration
- Calibration up to 2500 °C (optional)
- Up to 16 GB of high-speed internal memory
- Automatic exposure control (AEC)
- Enhanced high-dynamic-range imaging (EHDRI)
- SDI, GPS, RS232 and thermistor ports
- Lock-In (optional)

HYPER-CAMS' KEY FEATURES

All our Hyper-Cam models are 2D staring imaging systems offering real-time calibration. They also offer the possibility of remote control to suit your application needs.

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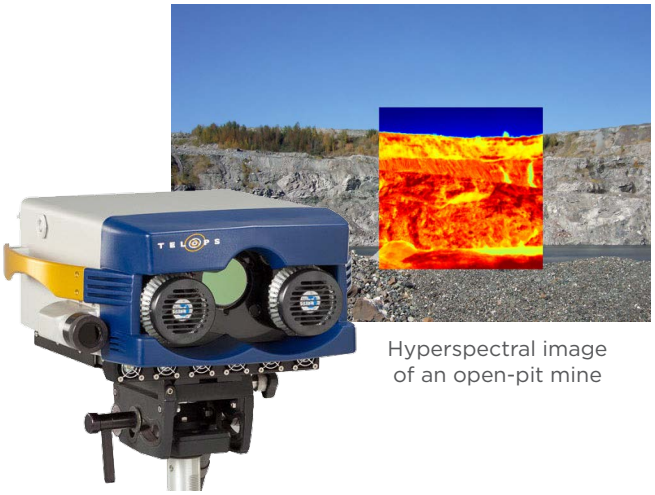


Hyperspectral image of an open-pit mine

HYPER-CAM

HYPERSPECTRAL CAMERAS

The Hyper-Cam is an advanced passive infrared hyperspectral imaging system that combines high spatial and spectral resolution. It provides real-time radiometrically calibrated data for gas and solid detection and identification.

Key benefits include:

- Best spectral resolution on the market
- Weatherproof enclosure ideal for field measurements
- Dual use: airborne and ground-based

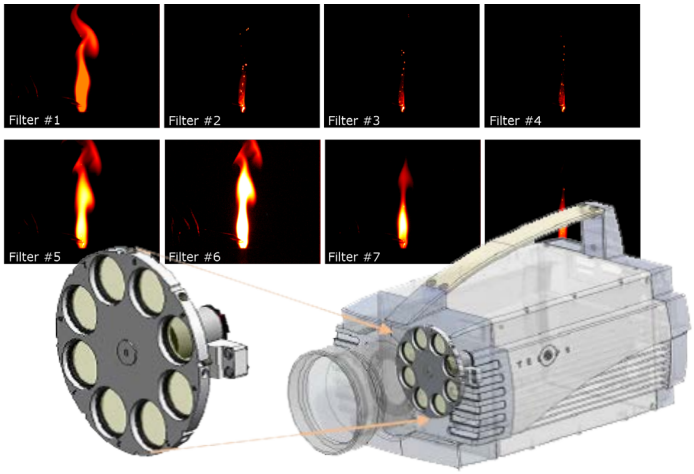
MS-IR

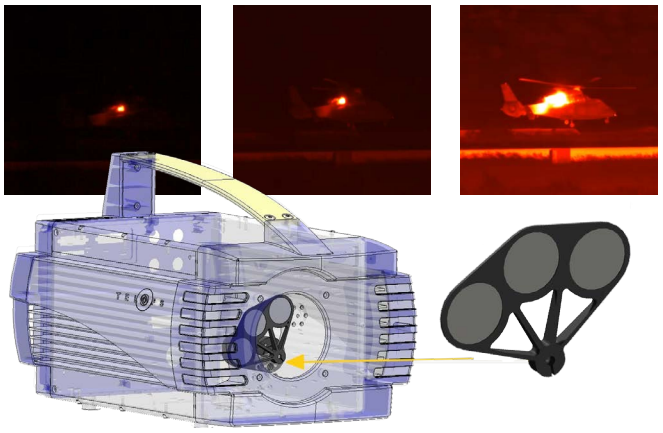
MULTISPECTRAL CAMERAS

The MS-IR infrared cameras are equipped with an 8-position fast-rotating filter wheel, which allows the scene signal to be split into different spectral bands. The filter wheel mechanism is designed to maximize the cameras' frame rate and can be used in either fixed or rotating mode. Rotating speed is adjustable up to 100 revolutions per second (800 frames per second).

Key benefits include:

- Best combination of spatial and temporal resolution on the market
- Fast-rotating 8-position filter wheel
- Available in MWIR and LWIR models





HDR-IR

HIGH-DYNAMIC-RANGE CAMERAS

The HDR-IR cameras are ideal to measure scenes that include an extended temperature range. They are equipped with a fast-switching attenuation filter mechanism. With this mechanism, the cameras maximize the dynamic range during image acquisition by automatically selecting the best attenuation filter.

Key benefits include:

- Automatic attenuation filter transition in less than 50 ms
- Can measure highly contrasted scenes up to 2500 °C
- Available in MWIR and LWIR models

FAST-IR

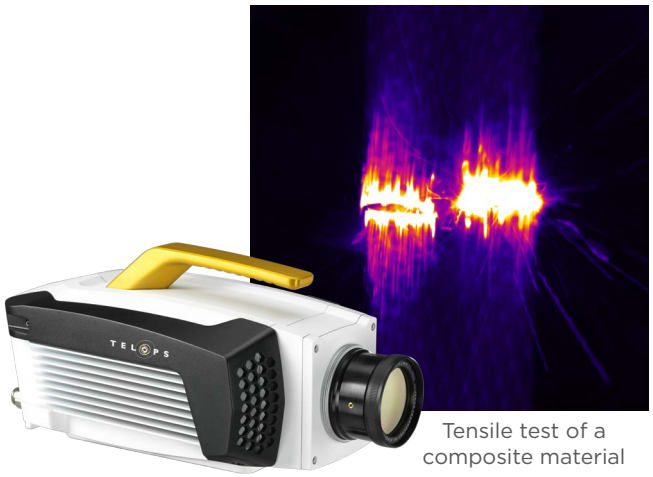
HIGH-SPEED CAMERAS

The FAST-IR infrared cameras offers high-speed thermal imaging with an impressive temporal resolution. They are therefore ideal to analyze dynamic events. These high-performance infrared cameras are also extremely sensitive, thus enabling the detection of challenging targets.

Key benefits include:

- Up to 2 000 fps at full frame and 90 000 fps in subwindow mode
- 4-position filter wheel
- Certified IP67 sealed enclosure, ideal for field measurements

Observation of fuel injection



Tensile test of a composite material

HD-IR

HIGH-DEFINITION CAMERAS

The HD-IR infrared cameras are high resolution scientific cameras that allow the analysis of events or targets with the utmost detail by producing sharp, crisp images. The cameras' high sensitivity make them the ideal tool for applications such as surveillance of vast areas and airborne mapping.

Key benefits include:

- Spatial resolution up to 1.3 megapixels
- 4-position filter wheel
- Certified IP67 sealed enclosure, ideal for field measurements

TS-IR

THERMAL SCIENTIFIC CAMERAS

The TS-IR infrared cameras are scientific cameras offering exceptional image accuracy and sensitivity. Their weatherproof enclosure has been designed to withstand the most demanding environments. A large selection of detectors are available in VGA and Mpx formats to cover the MWIR and LWIR.

Key benefits include:

- Certified IP67 sealed enclosure, ideal for field measurements
- 4-position filter wheel
- Available in many spectral bands and images formats

Airborne infrared imaging

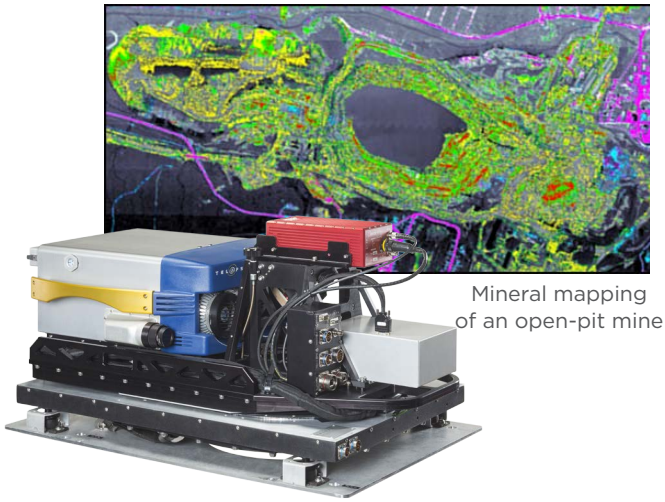
AIRBORNE PLATFORM

Generate georeferenced hyperspectral maps with the Hyper-Cam Airborne Platform.

The Airborne Platform is equipped with a stabilization system and an image motion compensation mirror, which allows you to use the Hyper-Cam from an airplane in order to map vast areas and obtain clear, high-quality spectral information.

Some key specifications include:

- High sensitivity: Excellent signal-to-noise ratio (SNR) allows the detection of weak signals
- User-selectable spectral resolution up to 1 cm^{-1}
- Mapping and targeting acquisition modes



Mineral mapping of an open-pit mine

IR Camera Lenses

The Hyper-Cam's polarizer and telescopes

IR CAMERAS' LENS OPTIONS

Choose the right lens option for your specific needs.

Telops offers a variety of lens options depending on your camera configuration using either a flanged, threaded, or bayonet mount interface.

HYPER-CAM'S OPTIONS

Customize your Hyper-Cam one of our many accessories:

- Telescopes
- Motorized polarizer
- Long-range fiber optic data transfer
- Filter holder

USE THEM INSIDE OR OUTSIDE THE LAB

All of our cameras and hyperspectral imagers are designed for outdoor use and can follow you everywhere.

A large part of our cameras are IP67 certified, allowing you to take remote sensing to a whole new level.

Our Field Application Scientist recording a volcanic eruption with an Hyper-Cam

HYPERSPECTRAL CAMERAS	SPECTRAL RANGE (µm)	SPATIAL RESOLUTION (pixels)	MEASUREMENT RATE (Hz)	SPECTRAL RESOLUTION (CM^{-1})
HYPER-CAM MWE	1.5 - 5	320 × 256	0.7*	Up to 0.25
HYPER-CAM MWE FAST	1.5 - 5.4	320 × 256	2*	Up to 0.25
HYPER-CAM MW	3 - 5	320 × 256	1.8*	Up to 0.25
HYPER-CAM MW FAST	3 - 5	320 × 256	4.3*	Up to 0.25
HYPER-CAM Methane	7.4 - 8.3	320 × 256	3.6*	Up to 0.25
HYPER-CAM LW NB	7.7 - 9.3	320 × 256	3.6*	Up to 0.25
HYPER-CAM LW	7.7 - 11.8	320 × 256	3.6*	Up to 0.25

*at 16 cm^{-1}, 128 × 128, and 200 µs integration time

MULTISPECTRAL CAMERAS				FILTER POSITIONS
MS-IR MW MCT	3 - 4.9	640 × 512	115	8
MS-IR MW InSb	3 - 5	640 × 512	350	8
MS-IR MW FAST InSb	3 - 5.4	320 × 256	2 000 @ 320 × 240 90 000 @ 64 × 4	8
MS-IR MW HD InSb	3 - 5	1 280 × 1 024	105	8
MS-IR MW HD MCT	3.7 - 4.8	1 280 × 1 024	50	8
MS-IR VLW MCT	7.7 - 11.8	320 × 256	300	8

HIGH-DYNAMIC-RANGE CAMERAS				FILTER POSITIONS
HDR-IR MW MCT	3 - 4.9	640 × 512	115	3
HDR-IR MW FAST InSb	3 - 5.4	320 × 256	2 000 @ 320 × 240 90 000 @ 64 × 4	3
HDR-IR MW HD InSb	3 - 5	1 280 × 1 024	105	3
HDR-IR MW HD MCT	3.7 - 4.8	1 280 × 1 024	50	3
HDR-IR VLW MCT	7.7 - 11.8	320 × 256	300	3

HIGH-SPEED CAMERAS				FILTER POSITIONS
FAST-IR 2K	3 - 5.4	320 × 256	2 000 @ 320 × 240 90 000 @ 64 × 4	4
FAST-IR MCT	3 - 5	384 × 384	2 000 @ 256 × 256 10 000 @ 64 × 4	4

HIGH-DEFINITION CAMERAS				FILTER POSITIONS
HD-IR MW MCT	3.7 - 4.8	1 280 × 1 024	50	4
HD-IR MW MCT HS	3.7 - 4.9	1 280 × 720	85	4
HD-IR MW InSb	3 - 5	1 280 × 1 024	105	4

THERMAL SCIENTIFIC CAMERAS				FILTER POSITIONS
TS-IR MW MCT	3 - 5	640 × 512	150	4
TS-IR MW MCT HS	3 - 4.9	640 × 512	115 @ 640 × 512 100 000 @ 64 × 2	4
TS-IR MW InSb	3 - 5	640 × 512	350	4
TS-IR LW MCT	8 - 9.4	640 × 512	230	4
TS-IR LW MCT HS	7.7 - 9.3	640 × 512	115 @ 640 × 512 100 000 @ 64 × 2	4
TS-IR LW SLS	8 - 9.5	640 × 512	360	4
TS-IR VLW MCT	7.8 - 11.4	640 × 512	115	4
TS-IR VLW MCT 320	7.7 - 11.8	320 × 256	300	4
TS-IR VLW SLS	7.5 - 11.5	640 × 512	100	4
TS-IR VLW SLS 320	7.5 - 12	320 × 256	344	4

Specifications are subject to change without notice. Other configurations are available upon request.