



Configuration

The system consists of a spectroradiometer with two input and two output ports. The system features simultaneous data acquisition from the two output ports (configured with a MCT and an InSb detector).

One input port is used to fix a reference cancellation source. The other input port is designed to receive an input telescope and a viewing device. The MR170 is equipped with liquid nitrogen cooled detectors.

The spectroradiometer includes:

- Complete Fourier Transform Interferometer, with two detectors
- Electronic controls built into the FTIR module
- External power supply module
- Acquisition and data processing radiometric software
- Input collimator
- FTIR Internal temperature control system
- FTIR base with handles and fixation points for tripods
- Room temperature cancellation reference source
- Aluminum transport case

Data acquisition and radiometric software

Communication link to PC

100 Mb Ethernet communication with shielded CAT 5 cable

Recording time (continuous mode)

Up to 30 minutes (equivalent to 5 GB)

Transfer to hard disk

Data saved in real time to hard disk

Data time stamping

On-board, at ZPD from embedded processor

FTSW500 radiometric software (features)

- Control of the instrument (configuration, status, commands, etc.)
- Real time data acquisition on both channels (MCT and InSb det.)
- Functionalities to perform instrument diagnostics
- Data analysis and post processing
- Built-in radiometric calibration function (Radiance, Irradiance and Apparent Intensity)
- Built-in data export function to GRAMS spectroscopy software
- Library of java functions compatible with MATLAB and IDL for further for further data processing
- Windows XP compatible

Options

Telescopes

- Wide-angle telescope (maximum field of view = 75 mrad) focusing range: 2 m to infinity
- Medium-angle telescope (maximum field of view = 28 mrad) focusing range: 10 m to infinity
- Narrow-angle telescope (maximum field of view = 4.9 mrad) focusing range: 30 m to infinity

Viewing devices

- Ocular
- CCD camera with controller and monitor

Others

- Tripod
- Computer
- (AERI) Atmospheric Emitted Radiance Interferometer Configuration.

Spectrometric characteristics

Spectral technique

Fourier Transform Interferometer

Spectral range

667 - 5,000 cm^{-1} (2-15 μm) capability

Optional extension to 10,000 cm^{-1} (1 μm) available

Spectral resolution

6 computer selectable unapodized resolutions (1, 2, 4, 8, 16, and 32 cm^{-1}) at all wavelengths

Spectral stability

Better than 0.01 cm^{-1}

Scan speed

5 cm/s, fixed

Scan rate

Resolution	Scan/Sec.
1 cm^{-1}	2
2 cm^{-1}	5
4 cm^{-1}	9
8 cm^{-1}	16
16 cm^{-1}	30
32 cm^{-1}	50

FOV of interferometer

45 mrad (without input collimator or telescope)

Maximum optical throughput

$8.1 \times 10^{-3} \text{ cm}^2 \text{ sr}$

Detectors

InSb: 1,800-5,000 cm^{-1} (2-5.5 μm)

Optional extension to 10,000 cm^{-1} (1 μm) available

MCT: 667-2,500 cm^{-1} (4-15 μm)

Optional PV MCT available 740-2500 cm^{-1}

Detector cooling

Liquid nitrogen

Noise equivalent spectral radiance

(at 16 cm^{-1} resolution, 1 s. observation time, calibration and measurement near ambient temperature, measured at peak response)

MCT: NESR (RMS) < $2.5 \times 10^{-9} \text{ W}/(\text{cm}^2 \cdot \text{sr} \cdot \text{cm}^{-1})$

InSb: NESR (RMS) < $2.5 \times 10^{-10} \text{ W}/(\text{cm}^2 \cdot \text{sr} \cdot \text{cm}^{-1})$

Dynamic range InSb detector

1-64 gain and 16-bit ADC

Dynamic range MCT detector

1-256 gain and 16-bit ADC

Gain control

Computer controlled (manual and automatic mode) in steps of 1, 2, 4, 8, 16, 32, 64 (128, 256 MCT only)

FOV selection

Manually-controlled field stop

Physical and electrical characteristics

Weight

Sensor head: 35 kg

Power supply module: 3.5 kg

Dimensions (L x W x H)

Spectroradiometer: 390 mm x 375 mm x 460 mm

Input collimator: 190 mm x 102 mm x 115 mm

Power supply module: 390 mm x 255 mm x 110 mm

Modulation frequency

3.3 kHz to 25 kHz

Temperature operation range

0°C to 45°C operating, -30°C to 55°C survival

Humidity

< 90% relative humidity non condensing

Operational random vibration

Acceleration spectral density 0.015 g^2/Hz from 5 to 40 Hz. Monotonic slope down to 0.00015 g^2/Hz at 500 Hz. (Along typical mounting direction) Acceleration magnitude 1 g RMS along typical mounting direction (0.63 g RMS for the other 2 directions)

Reference to MIL-STD 810 F method 514.5

Shock

Optical head 6 g during 10 ms

Acceleration amplitude 6 g (half sine)

Shock duration 10 ms

Number of shocks 15 (5 each direction)

Reference to MIL-STD 810 method 516.5



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