CIMEL ELECTRONIQUE 318A SPECTRAL RADIOMETER
NASA Stennis Space Center

Latitude: N30.36801
Longitude: W89.61667

The CIMEL Electronique 318A spectral radiometer manufactured in Paris, France is a solar powered weather hardy robotically pointed sun and sky spectral radiometer. This instrument has approximately a 1.2 degree full angle field of view and two detectors for measurement of direct sun, aureole and sky radiance. The 33 cm collimators were designed for 10-5 straylight rejection for measurements of the aureole 3 degrees from the sun. The robot mounted sensor head is parked pointed nadir when idle to prevent contamination of the optical windows from rain and foreign particles. The sun/aureole collimator is protected by a quartz window allowing observation with a UV enhanced silicon detector with sufficient signal-to-noise for spectral observations between 300 and 1020 nm. The sky collimator has the same field of view but an order of magnitude larger aperture-lens system allows better dynamic range for the sky radiances. The components of the sensor head are sealed from moisture and desiccated to prevent damage to the electrical components and interference filters. Eight ion assisted deposition interference filters are located in a filter wheel, which is rotated by a direct drive stepping motor. A thermister measures the temperature of the detector allowing compensation for any temperature dependence in the silicon detector.

NASA Stennis Space Center Cimel 318A Sun Photometer. The Vitel GOES DCP transmitter antenna is visible just below the edge of the table. The antenna points toward an azimuth angle of 152° with an elevation angle of 45°.

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Solar Radiometry Table on Roof of Building 1103. On top of the table are the Cimel 318A Sun Photometer, the MFR-7 Multifilter Rotating Shadowband Radiometer, and the TSI-440A Total Sky Imager. On the shelf below (from left to right) are the Cimel electronics box/Vitel transmitter environmental enclosure, AC/DC power supply enclosure, and YESDAS datalogger. The separate facility enclosure to the left houses 120VAC power outlets, TCI/IP network connections (via fiber optic lines), analog telephone jacks, and a wireless data transceiver.

The sensor head is pointed by stepping azimuth and zenith motors with a precision of 0.05 degrees. A microprocessor computes the position of the sun based on time, latitude and longitude which directs the sensor head to within approximately one degree of the sun, after which a four quadrant detector tracks the sun precisely prior to a programmed measurement sequence. After the routine measurement is completed the instrument returns to the "park" position awaiting the next measurement sequence. A "wet sensor" exposed to precipitation will cancel any measurement sequence in progress. Data are downloaded under program control to a GOES satellite Data Collection Platform (DCP) transmitter (Vitel VX1004).

The instruments have a 12Volt marine battery for uninterrupted power.

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Cimel electronics box (white) and Vitel GOES DCP transmitter (black) inside environmental enclosure.

This instrument is part of the Aerosol Robotic Network (AERONET) run by NASA Goddard Space Flight Center (see the "AERONET information" folder). AERONET is a global network of over a hundred similar instruments that transmit data to GSFC for processing using peer-reviewed algorithms. The AERONET office calibrates all instruments in the network annually.

Data are transmitted from the memory of the sun photometer to the AERONET office using the Data Collection System (DCS) in GOES-East. The DCS is a governmental system operated for the purpose of transmitting low volume environmental data from remote sites for various institutions and government agencies. Stennis Space Center (SSC) operates AERONET instrument #165 with a GOES user ID of 1314212A and transmission time window of 16 to 18 minutes past each hour. The system passes up to 30 kbytes per day in 24 individual transmissions. During each transmission, a packet of data and status information are time stamped by the radiometer, then transmitted to the central receiving station at Wallops Island, Virginia.

SSC personnel monitor the Cimel's performance and data quality by checking the AERONET web site once per day and reviewing a daily e-mail message automatically generated by the AERONET data processing program. The AERONET office publishes Level 1.0 (raw) and Level 1.5 (cloud screened) data on their web site, along with daily plots of atmospheric water vapor content and spectral aerosol optical depths (http://aeronet.gsfc.nasa.gov:8080/).

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