

SATELLITE QUALITY MONITOR

MODEL SQM-5002

BULLETIN SQM-1



SQM-5002 system shown with table option.

Overview

The Model SQM-5002 Satellite Quality Monitor is a computer-controlled, diffuse light source for field-calibrating narrow band filter radiometers and CCD imagers *in-situ*. A commercialization of the SeaWiFS Quality Monitor initially developed by NASA's Goddard Space Flight Center and NIST, the SQM-5002 supports field stability checks of ground-level filter radiometers to assist with verifying the performance of remote sensing platforms. While the lamp housing and components are nearly identical to the original NASA design, the control system and power supply were re-designed to enhance performance and are enclosed in a watertight steel NEMA-4X enclosure. The SQM-5002 is a complete system and provides three optical output intensity levels. It can be readily adapted to a wide variety of optical detectors both in the laboratory and in the field.

Principle of Operation

The SQM-5002 is a computer-controlled stabilized light source and can be run stand alone or monitored by a software application. An internal *thermally stabilized* current regulation circuit ensures precise current regulation to two independent lamp rings, providing low, medium or high power output. Shunt temperatures as well as the lamp housing temperatures are monitored during operation. When operated independently, these lamps result in three possible optical power levels. Two filter-detector channels and a third unfiltered detector are positioned within the lamp housing to permit direct optical monitoring of the lamp rings and the integrating cavity itself. These three detectors are *thermally stabilized* via a thermoelectrically-cooled mechanical housing to approximately 35°C, and their outputs are continuously monitored during system operation. An exit aperture provides spectrally and spatially uniform light flux to the device under test (DUT). Mechanical alignment fixtures are available for a variety of filter radiometers.

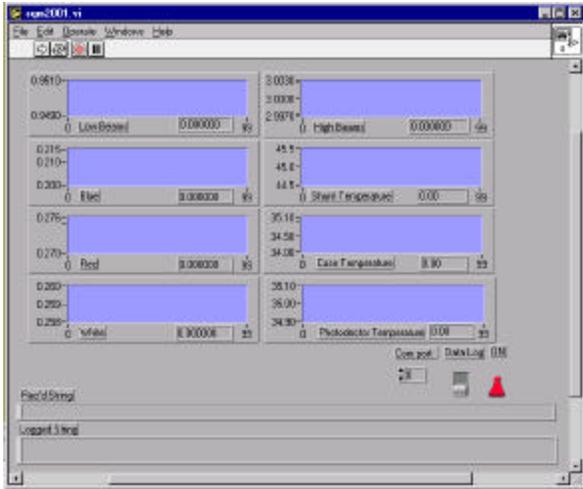
Features

- Portable, wide aperture highly diffuse optical source
- 16 low voltage lamps provide ultra-stable light
- Built-in temperature-regulated three-channel optical detector monitors output light quality
- GUI program provides user-friendly monitoring of system performance
- Operates from standard AC line voltages
- Rugged one-piece design for rapid set-up and operation in the field or in the lab
- Design performance was independently tested at NIST and field tested by NASA on several field campaigns (see references)

Applications

The SQM-5002 is a cost-effective field calibration source that is well suited to many applications:

- In-situ calibration of field radiometers, supporting ground-truthing of satellites
- ISO-9000 compliance/laboratory testing
- Environmental climate change research
- Government standards laboratories



SQM-5002 monitoring software GUI

Software Control

The system is operated and monitored via a GUI built with Lab-View™. It runs on either a Windows PC or Macintosh and can operate simultaneously with other software such as radiometer control applications. All system settings and performance logging is controlled by software, including lamp power, cooling fan and pre-heater. It provides continuous independent verification of optical output through 3 thermally-stabilized internal optical detectors.

Instrument Specifications

NASA Goddard personnel conducted optical performance tests on a production unit built under contract; for detailed specifications a comprehensive discussion on the system design can be found in these peer-reviewed papers:

- Johnson, B.C. et al. "Radiometric and Engineering Performance of the SeaWiFS Quality Monitor (SQM): A Portable Light Source for Field Radiometers." *Journal Of Oceanic and Atmospheric Technology*, pp.1008-1022, Vol 15 (1998).
- Hooker, S.B., Aiken, J. "Calibration Evaluation and Radiometric Testing of Field Radiometers with the SeaWiFS Quality Monitor (SQM)." *Journal Of Oceanic and Atmospheric Technology*, pp.995-1007, Vol 15 (1998).

Specifications

Output Power	3 levels: approx. 50w, 100w, 150w
Operating Temperature	-30°C to +34°C
Weight/Size	Lamp Housing: 100 lbs. (46 kg); dimensions: Power supply: 16" x 30" (41cm x 76cm); height is 28" (71cm)
Power Requirements	115/230 VAC 50/60Hz; Heater duty cycle varies with air temp; approx. 600W heater on; 50W with heater off
Software	LabView™ application; Windows 9x/NT, Mac

Sensor Mount

The device under test is mechanically interfaced to the lamp housing via an included kinematic mount. A universal optics table option is recommended to accommodate a wide variety of radiometers.

Reusable Flight Case

A reusable flight case option is recommended to protect your system.



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