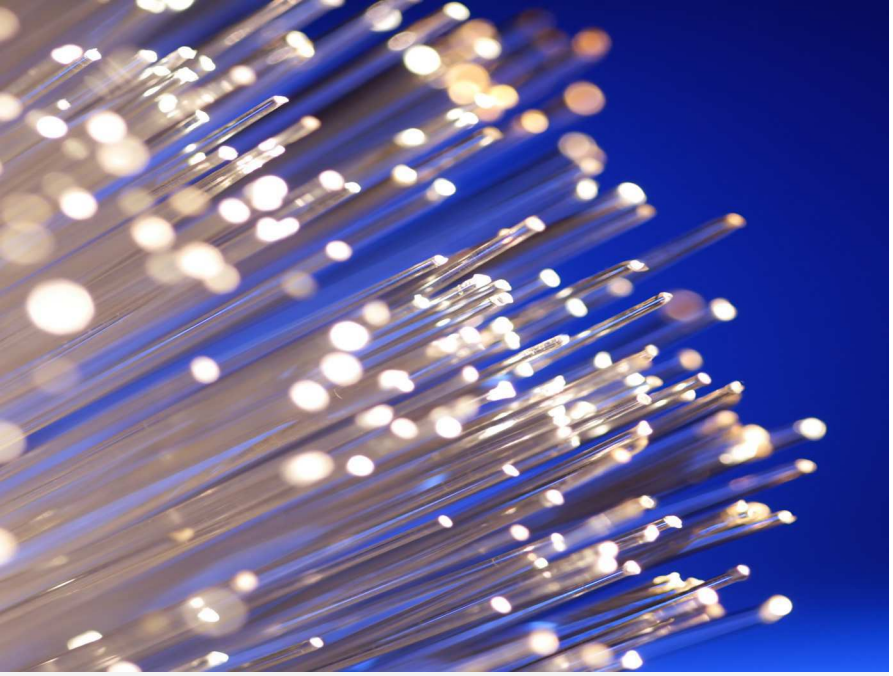


National Aeronautics and
Space Administration

technology solution

Optics

# Multiple Wavelength Light Collimator And Monitor

## Light Collimator and Monitor for a Spectroradiometer

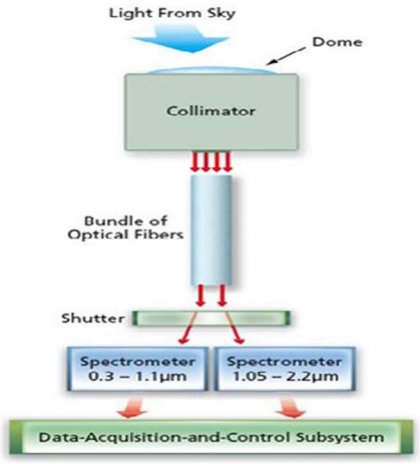
NASA has developed a novel light-intensity monitoring system for use in commercial applications. The system determines the useful spectrum of a light source including the contributions from the ultraviolet, visible, near, mid and far-infrared and compensates for contributions from dark current which is sensed when access to the light source is interrupted. This inventions simultaneously receives and processes light in three or more overlapping or isolated wavelength intervals and estimates dark current within each interval. It has a relatively small light acceptance angle (1-2 degrees) to discriminate against and prevent processing of light from a source outside a small acceptance region. It can compare light received in specified wavelength intervals with a dark current signal associated with each wavelength interval, for normalization purposes. The system is used in conjunction with two commercially available monolithic spectrometers: a silicon-based one for wavelengths from 0.3 to 1.1 um (micrometer) and a gallium arsenide-based one for wavelengths from 1.05 to 2.2 um (micrometer).

## BENEFITS

- Novel light intensity monitoring system
- Processes light in three or more overlapping or isolated wavelength intervals
- Estimates dark current within each interval
- Maximizes Interchangeability and data reproducibility

## THE TECHNOLOGY

When the shutter is open, light enters the monolithic spectrometer, electronic circuits in the spectrometers preprocess the outputs of photodetectors (one photodetector for each wavelength band), and the outputs of the spectrometer electronic circuits for the various wavelength ranges are sent to a data- acquisition-and-control subsystem that is part of the present system. When the shutter is closed, the same process takes place, for the purpose of collecting dark-current readings from the photodetector of each wavelength band. The data-acquisition-and-control subsystem digitizes the spectrometer outputs and further processes them to generate any or all of a variety of useful output data. Among other things, this subsystem subtracts shutter-closed (dark-current) readings from shutter-open readings to obtain corrected spectral-radiance readings. In addition to alternately opening and closing the shutter and taking dark-current readings during the closed time portions of successive cycles, the system can be made to sample dark currents during longer periods (e.g., a dark period of five minutes during each hour) to enable identification of anomalies in this system and/or in the spectrometers.




Spectroradiometer

## APPLICATIONS

The technology has several potential applications:

- Energy Sector
- LED testing systems
- Optics
- Earth Science
- Academic research
- Analytical instruments

## PUBLICATIONS

Patent No: 7,869,029

More Information

National Aeronautics and Space Administration

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