

# Photometer

## Track the Path of a Moving Light Source

This invention is available for licensing out of NASA's space program to benefit U.S. industry. Sunphotometers are commonly used on the Earth's surface, as well as on aircraft, to determine the solar energy attenuated by aerosol particles in the atmosphere.

This invention, a photometer, tracks a path of a moving light source with little or no motion of the photometer components. The information provided by such an instrument is used to determine the spatial and temporal distribution of aerosols in the atmosphere, their distribution of sizes, and column densities of some gas phase constituents. Typically, this instrument tracks the sun or other major light sources to measure the direct solar attenuation and other relevant parameters. This innovation uses a combination of unique optics and a charged-coupled device (CCD) array to eliminate the moving parts and make the instrument much smaller, compact, and reliable. The system is virtually maintenance free. This innovation has the capability of making hyperspectral measurements.

### Technology Details

The system includes a non-moving, truncated paraboloid of revolution, having a paraboloid axis, a small entrance aperture, a larger exit aperture and a light-reflecting inner surface that receives and reflects light in a direction substantially parallel to the paraboloid axis. A system of wide field of view lenses can be substituted for this optical arrangement depending on the application. The system also includes a light processing filter to receive and process the redirected light, and to issue the processed, redirected light as processed light, and an array of light receiving elements, at least one of which receives and measures an associated intensity of a portion of the processed light. The system tracks a light source moving along a path and produces a corresponding curvilinear image of the light source path on the array of light receiving elements. Undesired light wavelengths from the light source may be removed by coating a selected surface with a coating that absorbs incident light in the undesired wavelength range.

### Commercial Applications

- Aircrafts
- Climate Monitoring
- Weather Stations
- Environmental Monitoring
- Photobiology Monitoring

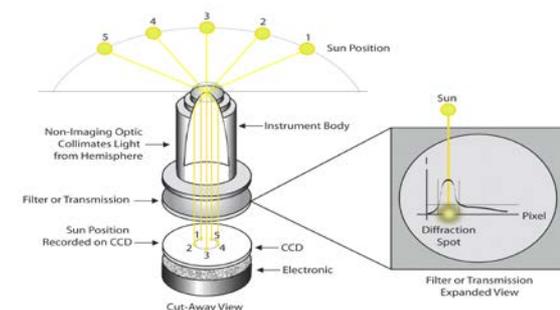


### Patent

This technology has been patented U.S. Patent Nos. 7,531,775. (Reference No. ARC-15443-1).

### Benefits

- Uses a combination of unique optics and a detector array to eliminate moving parts
- Instrument is smaller, compact, very reliable, and versatile
- Consumes little electrical power, other than what is required by light sensors and processing circuits



Schematic view of how photometer can track a moving light source, in this case the sun.