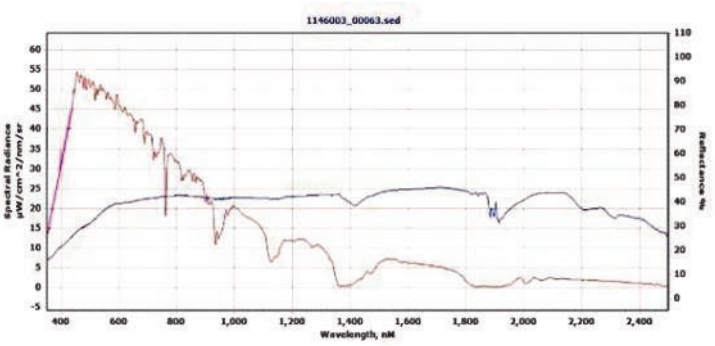
# SPECTRAL EVOLUTION

## Vicarious Calibration with a Field Spectroradiometer

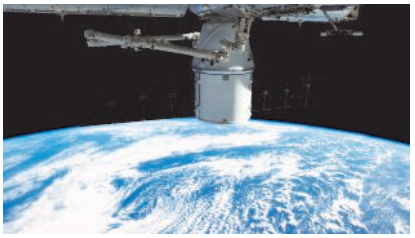
Vicarious radiometric calibration provides a means for monitoring the performance of on-board satellite sensors. Many applications, such as the effects of human activities on surface ecology, vegetation monitoring, climate studies and ocean research depend on the long-term stability of satellite radiometric calibrations of sensors to produce useful estimates of long-term variability. Satellite sensors are calibrated pre-launch in the laboratory using integrating spheres. The radiometric and spectral performance of sensors degrades over time post-launch due to the change in environment and sensor use and aging.




***Blue line is surface scan taken with a SPECTRAL EVOLUTION field spectrometer. The red line represents the solar radiance of the reflected light.***

Vicarious radiometric calibration uses *in situ* measurements over pseudo-invariant calibration sites at the time of satellite or airborne overpass. Calibration sites can be natural (desert, ocean) or man-made (target tarps of different reflectance values). The ideal site for vicarious radiometric calibration is a location where surface reflectance properties are constant and there is minimal atmospheric condition variation.

Vicarious radiometric calibration methods include reflectance-based, airborne radiance-based, and irradiance-based calibration methods. Reflectance-based and radiance-based approaches predict the at-sensor radiance using radiative transfer model calculations, using measured surface reflectance or radiance and atmospheric conditions. The irradiance-based approach measures atmospheric characteristics as well as diffuse-to-global irradiance.



***The radiometric and spectral performance of sensors can degrade over time post-launch.***

A NIST-traceable calibrated field spectroradiometer such as the SR-6500, RS-8800, RS-5400, PSR+ or RS-3500 can be used to measure the reflectance of the target site as the satellite passes overhead. With high resolution, high sensitivity and unmatched stability and reliability, these spectroradiometers can provide the measurements required to correlate to the energy measurements produced by the satellite sensors, thereby providing correction coefficients. Fast and easy operation allow you to take a large number of scans during the limited time of the satellite overpass. SPECTRAL EVOLUTION spectroradiometers provide:

- Fast, full-spectrum UV-VIS-NIR measurements – 350-2500 nm with just one scan
- Superior reliability in the field with 100% diode array optics with no moving parts
- Bluetooth interface – connection without cables
- Lithium-ion rechargeable batteries for field use
- Lightweight and rugged
- ALGIZ 8X rugged handheld tablet for field use running DARWin LT on Windows 10 with digital camera, and GPS
- Field switchable optics for varying target sizes and measurement modes
- DARWin SP Data Acquisition software that saves all files in ASCII format for use with other software applications

***Vicarious radiometric calibration can be done with a PSR+ spectroradiometer.***

26 Parkridge Road ◊ Suite 104
Haverhill, MA 01835 USA
Tel: 978 687-1833 ◊ Fax: 978 945-0372
Email: sales@spectralevolution.com
www.spectralevolution.com