

## Field Spectroradiometers for Remote Sensing



	SR-6500	RS-5400	RS-8800	PSR+	RS-3500
<b>Spectral Range</b>	350-2500nm	350-2500nm	350-2500nm	350-2500nm	350-2500nm
<b>Spectral Resolution</b>	1.5nm@700nm	2.7nm@700nm	2.8nm@700nm	2.8nm@700nm	2.8nm@700nm
	3.0nm@1500nm	5.5nm@1500nm	8nm@1500nm	8nm@1500nm	8nm@1500nm
<b>Si Photodiode Detector</b>	3.8nm@2100nm	5.8nm@2100nm	6nm@2100nm	6nm@2100nm	6nm@2100nm
	1024 element TE-cooled Si array (350-1000nm)	1024 element enhanced Si array (350-1000nm)	521 element Si array (3250-1000nm)	512 element Si array (350-1000nm)	512 element Si array (350-1000nm)
<b>InGaAs Photodiode Detectors (TE-cooled)</b>	512 element TE-cooled InGaAs array (1000-1600nm)	512 element TE-cooled InGaAs array (1000-1600nm)	256 element extended wavelength array (1000-1900nm)	256 element extended wavelength array (1000-1900nm)	256 element extended wavelength array (1000-1900nm)
	512 element TE-cooled extended InGaAs array (1600-2500nm)	512 element TE-cooled extended InGaAs array (1600-2500nm)	256 element extended wavelength array (1900-2500nm)	256 element extended wavelength array (1900-2500nm)	256 element extended wavelength array (1900-2500nm)
<b>Sensitivity Noise Equivalence Radiance (NER)</b>	0.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@400nm	0.3x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@700nm	0.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@400nm	0.5x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@400nm	0.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@400nm
	0.3x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@1500nm	0.1x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@1500nm	1.2x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@1500nm	0.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@1500nm	1.2x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@1500nm
	5.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@2100nm	2.5x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@2100nm	1.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@2100nm	1.0x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@2100nm	1.8x10 <sup>-9</sup> W/cm <sup>2</sup> /nm/sr@2100nm

**SR-6500**— ultra-high resolution field portable spectroradiometer for analyzing the finest spectral features. Use with our Miniprobe and ILM-660 for soil analysis and mineral identification; use our unique leaf clip for vegetation studies. Available with a range of fiber mount Field of View lenses.

**RS-5400**— high resolution field portable spectroradiometer for *in situ* measurements with high resolution and sensitivity. Use with our contact probe and Miniprobe or benchtop probe for soil analysis; use our unique leaf clip for vegetation studies. Available with a range of fiber mount Field of View lenses.

**RS-8800**—high resolution spectroradiometer controlled via iPhone, Android device or tablet. Used with *Sensagrip™* probe to provide real-time accurate measurements of scan angle, sun angle, distance from target and real-time target viewing so users of every experience level can scan at nadir for more accurate measurements.

**PSR+** — high resolution/high sensitivity field portable spectroradiometer with both direct attached lenses and fiber mount FOV options. Rugged and reliable construction for field use. Operate in standalone mode with built-in LCD display and memory to store up to 1000 scans. Highest sensitivity of our spectroradiometers.

**RS-3500**— high resolution budget-friendly field spectroradiometer for a range of remote sensing applications. Available with accessories as a remote sensing bundle.



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## Remote Sensing Spectroradiometers



Full range,  
field portable,  
spectroradiometers  
for remote sensing



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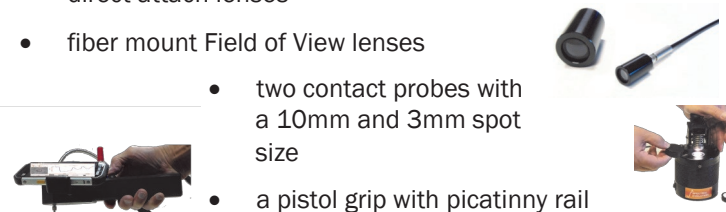
# Field Remote Sensing Systems to Match Your Application

SPECTRAL EVOLUTION's remote sensing field spectroradiometers provide a range of solutions for your remote sensing research challenges, including:

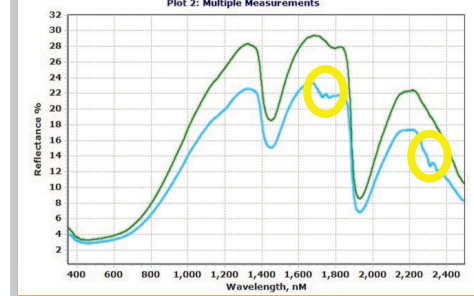
- Surface observation—confirming, disputing, or interpreting hyperspectral or multi-spectral data from satellites, flyovers and UAVS
- Environmental research, including snow and ice studies
- Agricultural analysis—crop health and yield, N/P/K measurement
- Forestry research, including canopy studies—Leaf Area Index analysis
- Glacial change and climate studies
- Calibration transfer and satellite sensor validation
- Water body studies, including algae blooms
- Plant species identification
- Vegetation health, including photosynthesis efficiency
- Irrigation assessment
- Soil analysis, including topsoil fertility and erosion risks
- Soil degradation, mapping, and monitoring
- Geological remote sensing, including mineral mapping, mineral identification, and geomorphology

Our field spectroradiometers are full range 350-2500nm rugged, reliable, high resolution/high sensitivity systems that are well-suited for remote sensing field or laboratory projects. They are available with a range of accessories including:

- direct attach lenses
- fiber mount Field of View lenses
  - two contact probes with a 10mm and 3mm spot size
  - a pistol grip with picatinny rail
  - *Sensaprobe™* grip that provides real-time accurate measurements of scan angle, sun angle, distance from target and real-time target viewing
- benchtop probe for soil analysis and powders
- rugged tablet for field use
- a unique leaf clip with built-in white reference and integrated light source
- RT sphere for reflection and transmittance measurements.



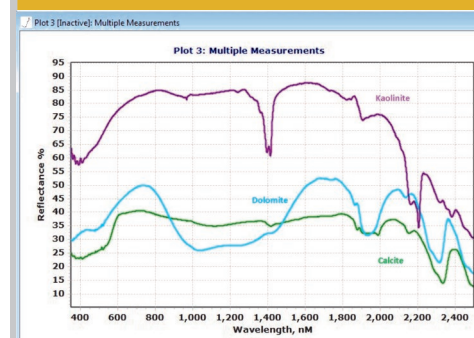
## Identifying soil hydrocarbons



with trace amounts of hydrocarbons with features around 1700nm and 2300nm (circled in yellow).

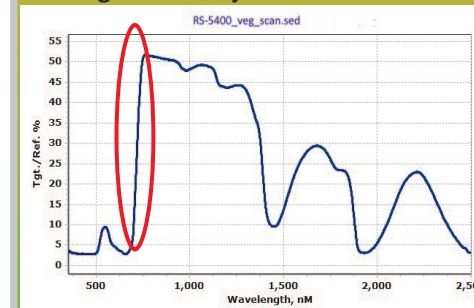
The full range RS-3500 bundle was used to measure soil samples to detect trace amounts of hydrocarbons in soil. The green scan represents a topsoil sample with prominent water absorption features at 1400nm and 1900nm. The light blue scan represents a sample of the same soil

## Mineral Identification



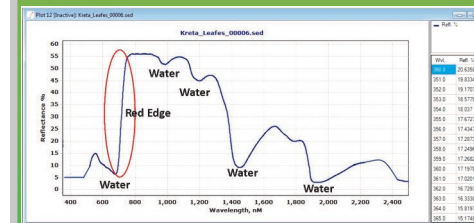
Our PSR+ can also be used for mineral identification in soil. In this scan the instrument has identified kaolinite, calcite and dolomite presence in the soil sample.

## Vegetation analysis



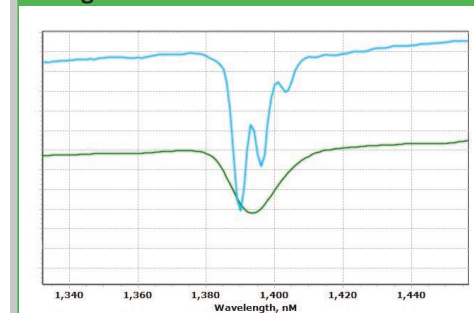
Scan taken with an RS-5400 using the leaf clip accessory. The red outline highlights the red edge portion of the spectra which can be used to investigate plant health.

## Measure water stress

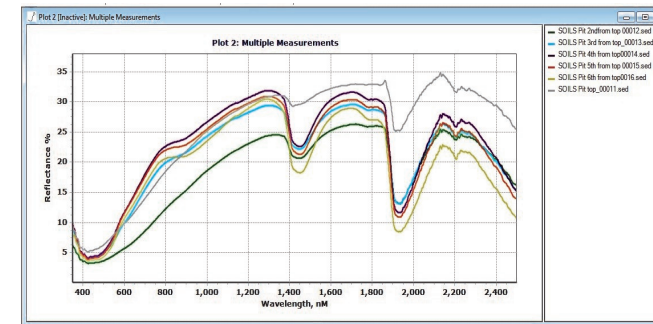


Scan taken with our leaf clip to measure water stress in vegetation.

## High resolution mineral Identification



Closeup of a talc scan showing the high resolution available with the SR-6500 (blue line) in comparison with a standard field spectrometer (green line). The SR-6500 delivers resolution of: 1.5nm @ 700nm, 3.0nm @ 1500nm, 3.8nm @ 2100nm



## Identifying Clays in Soil

SPECTRAL EVOLUTION spectroradiometers cover the UV/VIS/NIR spectra using three photodiode arrays with no moving parts. This makes them supremely reliable in the field. They can collect spectra in as little as 100 milliseconds. The exclusive DARWin SP Data Acquisition software included with each unit allows for full featured instrument control and data handling and is compatible with a wide range of 3rd party analytical software. DARWin allows the user to display single or multiple plot spectra. In the display on the left, the PSR+ was used to identify and classify different clay mixtures in soils in different test pits. The measurements were taken with a contact probe by scanning the pit sidewalls.

# Field Instruments to Fit Your Research

## Spectral Evolution Field Spectroradiometers

Our spectroradiometers feature NIST-traceable calibration for spectral radiance or irradiance measurements (depending on your optics choice) so you can get to work immediately. They are ideal for reflectance measurements in applications like vegetation studies, climate research, and soil analysis.

## Spectral Evolution Spectroradiometer Advantages

Our spectroradiometers deliver:

- Fast, full spectrum UV/VIS/NIR measurements (350-2500nm) with a single scan
- Autoshutter, autoexposure, and autodark correction before each new scan, with no optimization step, for one-touch operation
- Superior reliability—no moving optical parts to break down
- Lightweight and compact—small enough to carry on-board a plane and around a field or forest
- Rechargeable Li-ion batteries are included and provide up to 8 hours of field use
- Removable fiber optic cable—field swappable
- Best in class sensitivity/NER (low noise equivalent radiance)
- Bluetooth connectivity (Class I)
- Optional rugged ALGIZ 8X handheld tablet running Windows 10 with sunlight readable display, GPS, built-in camera and Bluetooth communication with the instrument and DARWin LT
- DARWin SP Data Acquisition software for one-touch scanning, automatically saves data as ASCII files for use with 3rd party software (no post-processing), displays reflectance/transmittance data (percentage) or absorbance (logarithmic) versus wavelength, produces single and multiple spectral plots, and works with chemometric software such as Unscrambler from Camo Analytics

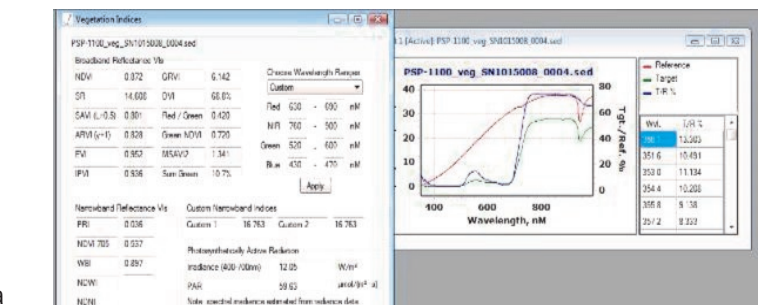


- Available with optional EZ-ID sample identification software and Custom Library Builder

## USGS Library & Vegetation Indices

Access to the USGS spectral library for vegetation and nineteen vegetation indices is provided by a pull-down menu in DARWin SP Data Acquisition software. Vegetation indices include:

- NDVI (Normalized Difference Vegetation Index)
- SR (Simple Ratio Vegetation Index)
- SAVI (Soil Adjusted Vegetation Index)



- ARVI (Atmospherically Resistant Vegetation Index)
- EVI (Enhanced Vegetation Index)
- IPVI (Infrared Percentage Vegetation Index)
- PRI (Photochemical Reflectance Index)
- WBI (Water Band Index)
- PAR (Photosynthetically Active Radiation)
- GRVI (Green Ratio Vegetation Index)

Our spectroradiometers are also available with our EZ-ID sample identification software and three mineral spectral libraries for matching to more than 1000 known minerals. EZ-ID also allows you to build your own library from known samples to match against target samples in the field for fast identification.