	Bundle	Specifications	RS-3500/RS-5400
	RS-3500 Spectroradiometer	RS-5400 Spectroradiometer	Remote Sensing
Spectral Range	350-2500nm	350-2500nm	Rundlo Includou
Spectral Resolution	2.8nm @ 700nm 8nm @ 1500nm 6nm @ 2100nm	2.7nm @ 700nm 5.5nm @ 1500nm 5.8nm @ 2100nm	 RS-3500 and RS-5400 compact, portable spectroradiometers
Spectral Sampling Bandwidth	Data output in 1nm increments 2151 channels reported	Data output In 1nm increments 2151 channels reported	 Ergonomically designed pistol grip with industry-standard Picatinny rail for mounting accessories, for example, a laser sight AC universal power supply DARWin SP Data Acquisition software Pelican case Padded backpack 5x5 inch reflectance standard (99%) with aluminum case, cover and tripod mount 1.5 meter metal clad fiber optic with SMA-905 input connector
Si Detectors	512 element Si photodiode array (350–1000nm)	1024 element UV-enhanced Si photodiode array (350-1000nm)	
InGaAs Detectors (thermoelectrically cooled)	256 element extended wavelength photodiode array (1000–1900nm) 256 element extended wavelength photodiode array	512 element InGaAs photodiode array(1000-1900nm) 512 element extended InGaAs photodiode array	
FOV Options	(1900-2500nm) SMA-905 fiber end mount lenses: 1, 2, 3, 4, 5, 8 and 10° field of view, irradiance diffuser	(1900-2500nm) SMA-905 fiber end mount lenses: 1, 2, 3, 4, 5, 8 and 10° field of view, irradiance diffuser	
Noise Equivalence Radiance (1.2 meter fiber optic)	0.8x10 ⁻⁹ W/cm ² /nm/sr@700nm 1.2x10 ⁻⁹ W/cm ² /nm/sr@1400nm 1.8x10 ⁻⁹ W/cm ² /nm/sr@2100nm	0.5x10 ⁻⁹ W/cm ² /nm/sr@700nm 0.2x10 ⁻⁹ W/cm ² /nm/sr@1400nm 2.5x10 ⁻⁹ W/cm ² /nm/sr@2100nm	
Minimum Scan Speed	100 milliseconds	100 milliseconds	(includes thumbscrew
Wavelength Reproducibility	0.1nm	0.1nm	release mount)
Wavelength Accuracy	±0.5 bandwidth	±0.5 bandwidth	 NIST-traceable radi- ance calibration of 25
Communications interface	USB or Class I Bluetooth – laptop or PDA compatible	USB or Class I Bluetooth – laptop compatible	degree FOV fiber op- tic cable
Size	8.5 x 12 x 3.5 inches (21.6 x 30.5 x 8.9 cm)	12.4 x 8.7 x 4.4 inches (31.5 x 22.1 x 11.2 cm)	 Rechargeable battery and universal AC
Batteries	External Li-ion battery and universal power charger (2 of each included)	Batteries: Re chargeable Li-ion battery—7.4V 20Ah (148wh, 9059156-1C) - UN38.3 Passed	 charger Battery power cable Optional ALGIZ 8X bandhold tablet sup
Weight	8.94 lbs (4 kg)	12.64lbs (5.73kg)	ning Windows 10,



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and RS-5400 bundles



for remote sensing



Optional ALGIZ 8X handheld tablet running Windows 10, with a Bluetooth connection to DARWin LT and GPS—for RS-3500

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Field Remote Sensing Systems to Match Your Application

SPECTRAL EVOLUTION'S RS-3500 and RS-5400 spectroradiometer bundles are used in the field for a wide range of remote sensing applications, including :

- Ground truthing—confirming, disputing, or interpreting hyperspectral or multi-spectral data
- Environmental research
- Agricultural analysis
- Ecosystem change
- Forestry research, including canopy studies
- Glacial change and climate studies
- Atmospheric research
- Calibration transfer and satellite sensor validation
- Water body studies
- Plant species identification
- Urban development
- Crop health, including photosynthesis efficiency
- Irrigation assessment
- Soil analysis, including topsoil fertility and erosion risks
- Soil degradation, mapping, and monitoring
- Geological remote sensing, including surveying, mineral identification, and geomorphology

The RS-5400 provides high resolution/high sensitivity performance for remote sensing application with the following spectral resolution:

- 2.5nm @ 700nm
- 5.5nm @ 1500nm
- 5.8nm @ 2100nm



Our leaf clip bundle is specifically designed for leaf reflectance measurements. It features a single handed leaf clip with an integrated light source and data scan trigger. An integral swing-away reflectance panel provides easy reference measurements. Disposable peel-and-stick white reference standards are available.

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

RS-3500 and RS-5400 bundles include an ALGIZ 8X handheld tablet running Win-

dows 10 and connecting to DARWin SP and GPS using Bluetooth communications. Both the RS-3500 and RS-5400 bundles offer many different styles of contact probes and fiber holders such as a pistol grip with unique low reflectance and impact resistant thermoplastic handle, pushbutton trigger for data collection, and industry-

standard Picatinny rail for mounting accessories such as laser sights. A sample contact probe with built-in light source is also available.

Fixed mount FOV lenses are available in different sizes, including 1, 2, 3, 4, 5, 8, and 10 degrees.

We also offer a benchtop probe with sample holder and compactor for vegetation and soil measurements.

For reflection and transmittance measurements of leaves and needles, we offer a portable 4 inch RT sphere.





A Field Instruments to Fit Your Research

The RS-3500 and RS-5400 Spectroradiometer Bundles

Our RS-3500 and RS-5400 bundles feature the spectroradiometers with 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.

RS-3500 and RS-5400 Spectroradiometer Bundles Advantages

The RS-3500 and RS-5400 bundles 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—RS-3500 weighs only
 3.3kg/7.3lbs; the RS-5400 11bs/4.99kg—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
 ARVI (Atmospherically Resistant Vegetation Index)
- 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, a sunlight readable display, GPS, built-in camera and Bluetooth communication and running DARWin LT





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. The RS-3500 bundle and RS-5400 bundle 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 RS-3500 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.

 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, and produces single and multiple spectral plots

USGS Library & Vegetation Indices

Access to the USGS spectral library for vegetation and nineteen vegetation indices is provided by 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)
- 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)

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