SPECTRAL EVOLUTION

HYPERSPECTRAL SWIR SPECTRORADIOMETERS

The Standard for Accuracy & Reliability!

- Remote Sensing
- Soil Spectroscopy
- Precision Agriculture
- Vegetation Science
- Climate & Environment
- Ground Truthing
- Vicarious Calibration
- Mineral Analysis



www.spectralevolution.com

High-Resolution Field Portable UV-Vis-NIR Spectroradiometers For Remote Sensing

Spectral Evolution is the leading manufacturer of field-portable and laboratory UV-Vis-NIR spectroradiometers and spectrometers for remote sensing applications including geological remote sensing, ground-truthing, spectral remote sensing, environmental and climate research, crop and soil research, vegetative studies, forestry and canopy studies, radiometric calibration transfer, upwelling and downwelling measurement and more. Our UV-Vis-NIR spectroradiometers provide the best combination of high resolution and high sensitivity resulting in the most precise field portable instruments available on the market.

Spectral Evolution UV-Vis-NIR spectroradiometers provide:

- Fast, full-spectrum UV-Vis-NIR measurements – 350-2500nm with just one scan
- Superior reliability in the field with 100% diode array optics with no moving parts
- Wireless interface
- High-capacity Lithium-ion rechargeable batteries for field use
- Lightweight and rugged
- Rugged handheld tablet for field use running DARWin LT on Windows with digital camera, and GPS
- Field switchable optics for varying target sizes and measurement modes

All Spectral Evolution UV-Vis-NIR spectroradiometers include our exclusive DARWin SP Data Acquisition and Analysis software, full range spectroscopic analysis of samples. DARWin SP automatically saves data as ASCII files for use with 3rd party software without post-processing.



Remote Sensing Series Technical Specifications

Model	NaturaSpec Ultra			NaturaSpec Plus			NaturaSpec 3500			PSR-1100f
										
Spectral Range	350-2500 nm			350-2500 nm			350-2500 nm			320-1100 nm
Spectral Resolution	1.5 nm @ 700 nm	3 nm @ 1500 nm	3.8 nm @ 2100 nm	2. 7nm @ 700 nm	5.5 nm @ 1500 nm	5.8 nm @ 2100 nm	3.5 nm @ 700 nm	7.8 nm @ 1500 nm	7.8 nm @ 2100 nm	3.0 nm @ 600 nm
Spectral Sampling Bandwidth (nm)	2048 Sampling channels | Data output in 1 nm increments			2048 Sampling channels | Data output in 1 nm increments			2048 Sampling channels | Data output in 1 nm increments			781 Sampling channels | Data output in 1 nm increments
Detectors	1024-element UV-enhanced Si Array 512-element TE-cooled InGaAs Array 512-element extended TE-cooled InGaAs Array			1024-element UV-enhanced Si Array 512-element TE-cooled InGaAs Array 512-element extended TE-cooled InGaAs Array			1024-element UV-enhanced Si Array 512-element TE-cooled InGaAs Array 512-element extended TE-cooled InGaAs Array			512-element Si Array
Calibration	Spectral and radiometric calibration for radiance/irradiance measurements using NIST traceable sources.									
Noise Equivalence Radiance W/cm²/nm/sr (1.5m fiber optic)	$0.4x10^{-9}$ @ 400 nm	$0.2x10^{-9}$ @ 1500 nm	$3.0x10^{-9}$ @ 2100 nm	$0.3x10^{-9}$ @ 400 nm	$0.1x10^{-9}$ @ 1500 nm	$2.5x10^{-9}$ @ 2100 nm	$0.3x10^{-9}$ @ 400 nm	$0.1x10^{-9}$ @ 1500 nm	$2.5x10^{-9}$ @ 2100 nm	$0.8x10^{-9}$ @ 700 nm
Software Included	DARWin™ Data Acquisition Data output in ASCII format for easy post processing. Compatible with: All post-processing software, EZ-ID™ software for instant identification & spectral library building and Eigenvector chemometrics modeling software.			DARWin™ Data Acquisition Data output in ASCII format for easy post processing. Compatible with: All post-processing software, EZ-ID™ software for instant identification & spectral library building and Eigenvector chemometrics modeling software.			DARWin™ Data Acquisition Data output in ASCII format for easy post processing. Compatible with: All post-processing software, EZ-ID™ software for instant identification & spectral library building and Eigenvector chemometrics modeling software.			DARWin™ Data Acquisition Data output in ASCII format for easy post processing. Compatible with: All post-processing software, EZ-ID™ software for instant identification & spectral library building and Eigenvector chemometrics modeling software.
Power (volts|watts)	AC/DC Switching Adapter Input: 100-240 VAC, 50/60 Hz Instrument DC Input: 12VDC 30W			AC/DC Switching Adapter Input: 100-240 VAC, 50/60 Hz Instrument DC Input: 12VDC 30W			AC/DC Switching Adapter Input: 100-240 VAC, 50/60 Hz Instrument DC Input: 12VDC 30W			AC/DC Switching Adapter Input: 100-240 VAC, 50/60 Hz Instrument DC Input: 7.5VDC 2.5W
Dimensions (millimeters | inches)	317 x 226 x 86 mm | 12.5 x 8.9 x 3.4 in			317 x 226 x 86 mm | 12.5 x 8.9 x 3.4 in			317 x 226 x 86 mm | 12.5 x 8.9 x 3.4 in			177.8 x 82.5 x 147.3 mm | 7 x 3.3 x 5.8 in
Weight (pounds | kilograms)	10.2lbs | 4.6kg			10.2lbs | 4.6kg			10.2lbs | 4.6kg			4lbs | 1.8kg
Interface	USB, Wireless Bluetooth™ Connection			USB, Wireless Bluetooth™ Connection			USB, Wireless Bluetooth™ Connection			USB, Wireless Bluetooth™ Connection
Minimum Scan Speed	100ms			100ms			100ms			100ms
Wavelength Reproducibility	0.1nm			0.1nm			0.1nm			0.1nm
Wavelength Accuracy (nm)	±0.5 Bandwidth			±0.5 Bandwidth			±0.5 Bandwidth			±0.5 Bandwidth
Data Optimization	Automatic Exposure, Detector Integration and Dark Current Correction									
Input and Accessories	Includes 1.5 m fiber optic (25° FOV), and Pistol Grip Fiber Holder Optional custom length and submersible fiber optic cables, fore optics, and accessories are available.			Includes 1.5 m fiber optic (25° FOV), and Pistol Grip Fiber Holder Optional custom length and submersible fiber optic cables, fore optics, and accessories are available.			Includes 1.5 m fiber optic (25° FOV), and Pistol Grip Fiber Holder Optional custom length and submersible fiber optic cables, fore optics, and accessories are available.			Includes 1.5 m fiber optic (25° FOV), and Pistol Grip Fiber Holder Optional custom length and submersible fiber optic cables, fore optics, and accessories are available.
Operational temperature range (°C)	-10°C to 40°C			-10°C to 40°C			-10°C to 40°C			-10°C to 40°C
Storage Temperature (°C)	-15°C to 70°C			-15°C to 70°C			-15°C to 70°C			-10°C to 70°C
Maximum Radiance	VNIR 2x Solar | SWIR 10x Solar			VNIR 2x Solar | SWIR 10x Solar			VNIR 2x Solar | SWIR 10x Solar			VNIR 2x Solar | SWIR 10x Solar
Stray Light	VNIR: 5,000:1 (0.02%) NIR: 10,000:1 (0.01%)			VNIR: 5,000:1 (0.02%) NIR: 10,000:1 (0.01%)			VNIR: 5,000:1 (0.02%) NIR: 10,000:1 (0.01%)			VNIR: 1,000:1 (0.01%)
Battery Run Time	Minimum 3 hours			Minimum 3 hours			Minimum 3 hours			Minimum 3 hours
Warranty	12-month manufacturer's warranty including expert customer support			12-month manufacturer's warranty including expert customer support			12-month manufacturer's warranty including expert customer support			12-month manufacturer's warranty including expert customer support
Computer	Windows®			Windows®			Windows®			Windows®

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Created with consideration for field research and built for the environment.



Academia:
Motivate your students. For your research, our Remote Sensing Series of instruments provides the best and most precise radiance and reflectance data. We have the most versatile and precise spectroradiometers in the world, which allow us to build predictive models from the spectral data.



Ground Truthing, Sensor Calibration & Imagery Analysis:
With different resolutions that match or exceed a range of hyperspectral sensors, our Remote Sensing Series spectroradiometers offer the fastest field measurements, making it perfect for sensor calibration, image analysis, and ground truthing.



Environmental Research:
Our Remote Sensing Series of instruments are an essential tool for environmental condition monitoring. They can evaluate a wide range of environmental resources to give comprehensive information about status and composition. They can also be used for remote sensing, air and water quality monitoring, vegetation and soil research, and other activities that show the health of an ecosystem.



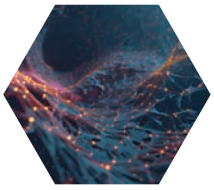
Precision Agriculture:
By monitoring environmental and plant physiological conditions, our Remote Sensing Series gives users the power to assess the chemical and physical characteristics of agricultural products, allowing them to identify and initiate targeted mitigation actions early in the growth cycle. This increases yields and lowers production risks.



Art Heritage:
To address issues of attribution, age dating, and conservation, our Remote Sensing Series of instruments are portable, ensuring that artwork remains in place during examination. It also examines significant works of art and historical documents nondestructively, allowing all materials to be measured safely without fear of damage.



Defense & Intelligence:
Target materials such as flora, camouflage netting, and terrain visible in remotely sensed overflight imagery can be recognized by using our Remote Sensing Spectroradiometers. Spectral Evolution's instrument wavelength range and resolution enables the creation of spectral libraries to identify materials, landscapes, soils, and floras which assist overflight missions int he search of structures and materials.



Material Composition & Quality Control:
Material composition can be measured with the help of predictive models made with our Remote Sensing Series spectroradiometers. Chemometric models and spectral libraries can be developed and used to automatically identify sample properties and composition for a wide variety of applications in material research, pharmaceutical, and food science.

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Essential Accessories

All of our spectrometers have SMA connectors to quickly and easily connect to a variety of accessories for nearly any application. Spectral Evolution accessories optimize collection of radiance, irradiance, reflectance, and transmittance measurements both in the field and in the lab.

Contact Probes



- Ergonomic design with external trigger for quick contact measurements
- Built-in 5-watt illumination for uniform signal across the full spectral range
- Available in 10mm or 3mm spot sizes for flexible targeting
- Scratch-resistant sapphire window

Pistol Grip



- Ergonomic handle with trigger holds fiber optic in place for precise standoff measurements
- Picatinny rail to mount optional scopes & laser sights for enhanced targeting accuracy
- Tripod mountable

Handheld Tablet



- Real-time, wireless instrument control
- Instantly view scans & match to vegetative, geological, and soil libraries in situ with DARWin and EZ-ID
- 7" capacitive touchscreen – sunlight readable display
- Built-in GPS and camera
- Windows based platform

Leaf Clip



- Comfortable handle with push-button external triggering allows for singlehanded operation
- Integrated 3mm spot size light source & reflectance standard
- Unique light source design minimizes heat to the sample to prevent damage.

R/T Sphere



- Measures absorbance, reflectance, and transmittance
- Small size and lightweight for use in the lab or field
- Use with included stand or mount on tripod
- Choose a High or Low intensity light setting to scan a variety of samples

Benchtop Probe



- Ideal for hands-free measurement of loose samples such as soil, crushed stone, or powders
- Optional compactor for consistent sample preparation
- SMA-905 fiber optic connection
- Built-in 5-watt tungsten-halogen bulb and durable sapphire window

Surface Probe



- Perfect for nondestructive sampling of sensitive or fragile samples on flat surfaces
- Eliminates thermal impact on samples by using consistent fiber-optic light paths
- Enables direct comparison between field and lab spectra
- Simplifies and standardizes sampling of flat materials

Diffusers & Lenses



- SMA fiber mount lenses available: 1°, 2°, 3°, 4°, 5°, 8°, and 10°
- Optional radiometric calibration of lenses

- Diffusers are ideal for irradiance measurements with inline and reflective diffuser options
- Inline Diffuser (cosine receptor) options available
- Reflective diffuser with fiber mount

UVF Probe



- Integrated 265 nm UV LED excites fluorescent materials for detailed spectral analysis.
- Precise 3 mm Spot Size
- Enables fluorescence emission collection with a full range high resolution spectroradiometer.

Proximal Probe



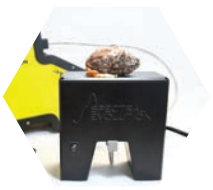
- Rapid Field Sampling - boom-mounted design with GPS tracking.
- Creates a controlled sampling environment with uniform illumination and controlled geometry.
- Versatile Compatibility - field and lab use with all Spectral Evolution instruments.

ILM-550



- Supplies uniform illumination over the spectral range of 350-2500 nm
- Includes options for diffuse or spot illumination configurations.
- Optional 50- watt or 75 watt tungsten halogen bulbs ensuring optimal illumination.
- Mount on lab benches, optical tables, or tripod for repeatable data collection

ILM-660



- Our highest-intensity light source
- Includes two 20-watt tungsten-halogen bulbs for maximum illumination
- Ideal for dark samples like solid rock or loose mineral/soil
- For NaturaSpec Ultra Only

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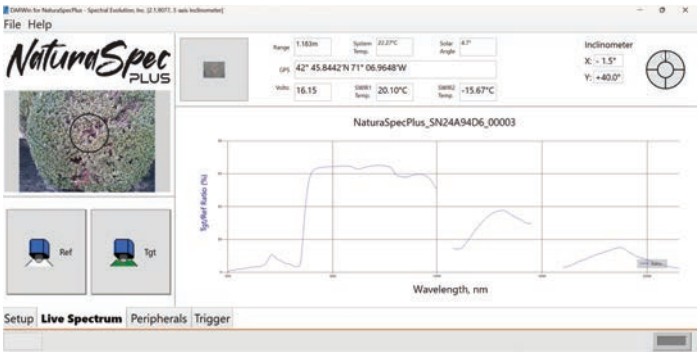
Sensaprobe with Built-In Camera

The Sensaprobe delivers measurement intelligence unavailable with conventional field accessories.



Its integrated systems provide:

Built-In Camera

- Live video targeting
- Automatic image capture
- Visual verification of field-of-view

Laser Rangefinder

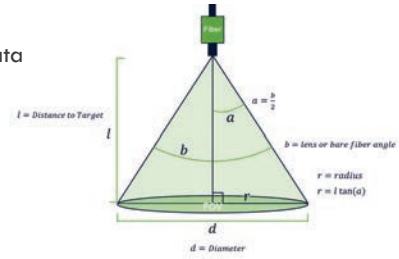
- Live distance measurement
- Accurate field-of-view calculations
- Improved scan repeatability

Integrated Inclinometer

- Records probe orientation
- Automatically tags scans with tilt-angle data

GPS Positioning

- Records exact measurement location
- Supports repeatable field campaigns
- Records solar angle



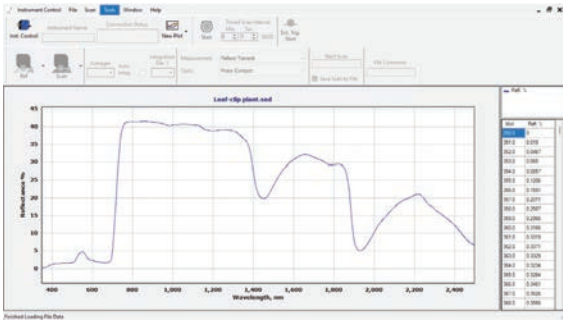


DARWin™ Aquisition Software

Every Spectral Evolution spectroradiometer includes the exclusive DARWin software – a full-featured, menu-driven program for easy data acquisition and analysis of multiple UV-VIS-NIR spectra.

DARWin comes equipped with features specifically for field measurements:

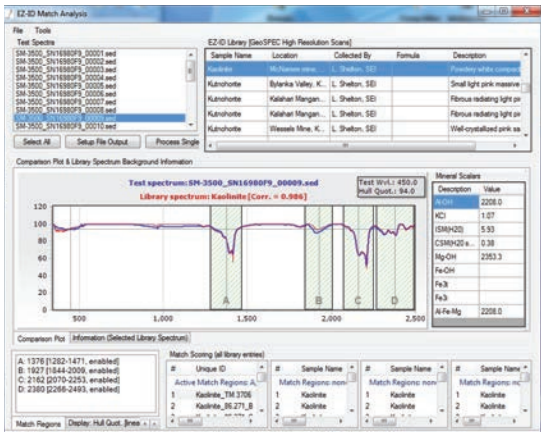
- Intuitive, easy-to-use menus for fast, efficient operation.
- Adjustable integration time, scan averaging, and fore optics selection.
- Automatic spectral collection at user-defined intervals.
- Flexible scan triggering through software or connected accessories.
- Multiple data display formats, including reflectance, transmittance, absorbance, and radiance/irradiance.
- Built-in calculation of broadband, narrowband, and user-defined vegetation indices.
- Windows-compatible software with ASCII file export, instrument status monitoring, and DARWin LT support for rugged field tablets.



DARWin interface showing a vegetation scan

EZ-ID™ Spectral Matching Software

- Add-on module to DARWin
- Build your own custom spectral libraries
- Instantly compare acquired data to reference libraries for instant identification and classification
- Available with USGS Spectral Library and optional SPECMin™ and GeoSPEC™ high-resolution libraries providing an additional 2310 scans for fast identification of over 794 minerals.



EZ-ID module

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The Pinnacle of Field Spectroscopy!

Bringing lab quality data to field measurements.

Every instrument and accessory built and sold by Spectral Evolution is subject to rigorous quality testing. Each component is meticulously designed, assembled, and calibrated at our facility in Haverhill, MA to ensure the maximum performance and reliability.

Service & Customer Support

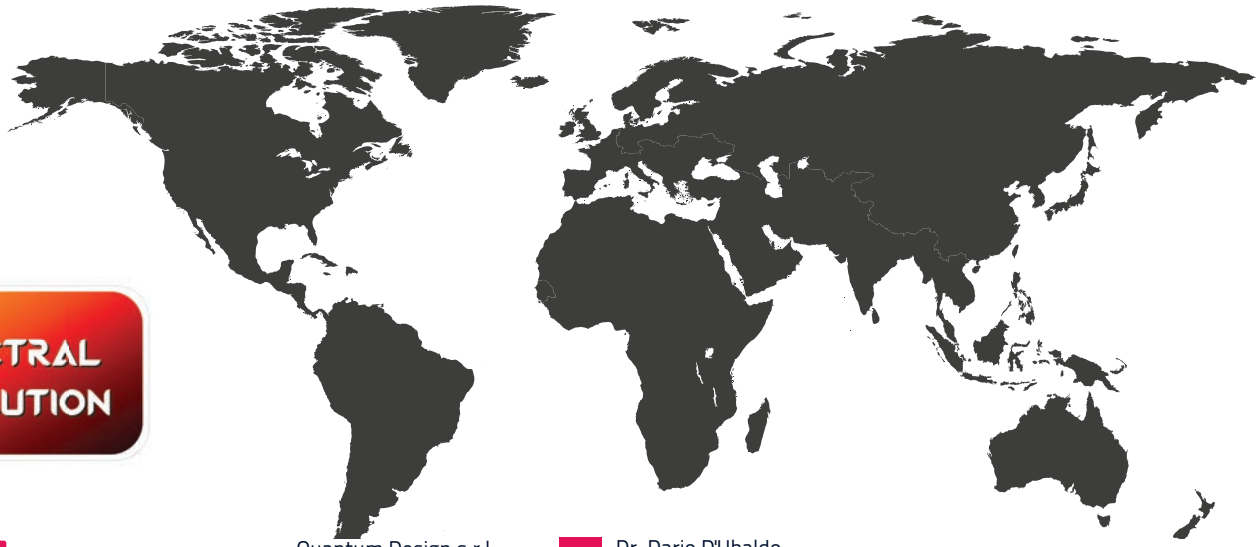
Our commitment to customers extends well beyond the purchase of an instrument. Spectral Evolution provides technical assistance, preventive maintenance, factory repairs, and spectral and radiometric calibration services to help ensure long-term accuracy and reliable performance. Our experienced support team is dedicated to keeping your instruments operating at their best.

Application Expertise

Our team of scientists, engineers, geologists, and application specialists brings extensive knowledge to every measurement challenge. From selecting the right instrument to optimizing its performance, we provide expert guidance and application-specific training. With both in-person and virtual training available, we help customers achieve dependable results in the field and laboratory.

Global Distributor Network

Spectral Evolution serves customers worldwide through an extensive network of knowledgeable distributors and representatives. With partners across the Americas, Europe, Africa, Asia, and Oceania, we connect customers with regional product expertise and personalized assistance, backed by our headquarters in Haverhill, Massachusetts, USA.



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