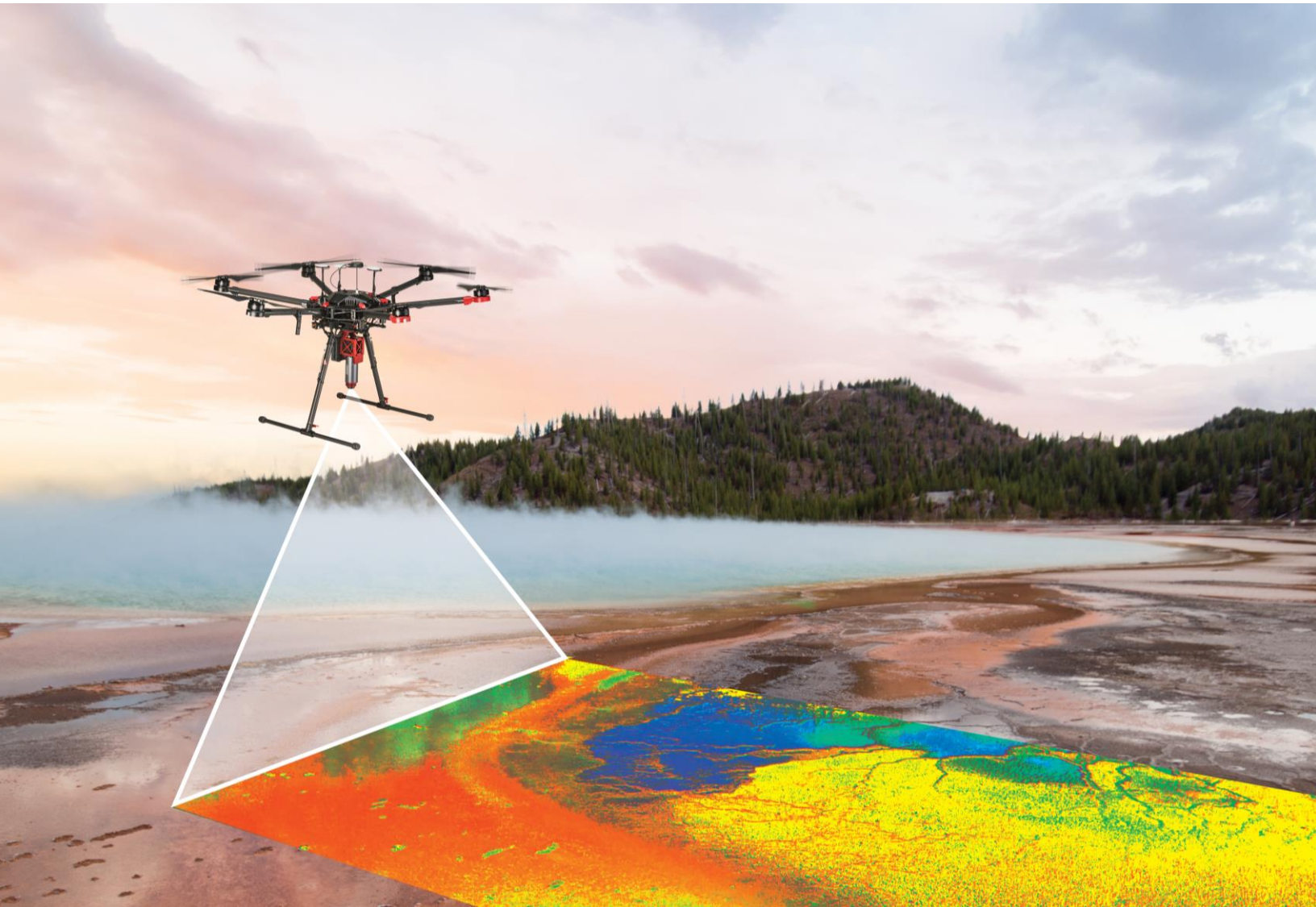


RESONON

Hyperspectral Imaging Solutions



Resonon Product Catalog

SEPTEMBER 2023

Resonon Product Catalog

SEPTEMBER 2023



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Hyperspectral Imaging Cameras

Pika L and Pika XC2

400 – 1000 nm
Visible + Near Infrared (VNIR)

See page 4.



The Pika L is small and lightweight, ideal for drone-based remote sensing.



The Pika XC2 is very high precision, used for cutting-edge research applications.

Pika IR and Pika IR+

(formerly Pika NIR-320 and 640)
900 – 1700 nm
Near Infrared (NIR)

See page 5.



The Pika IR and Pika IR+ are fast and affordable. They are ideal for ground-based research and for machine vision applications.

Pika IR-L and Pika IR-L+

925 – 1700 nm
Near Infrared (NIR)

See page 6.



The Pika IR-L and Pika IR-L+ are light-weight, compact imagers with very high spectral resolution. They are ideal for drone-based remote sensing applications.

Pika UV

(formerly Pika NUV2)
330 – 800 nm
Near Ultraviolet + Visible
(NUV + VIS)

See page 7.



The Pika UV is capable of sensing in the NUV spectral range, offering unique spectral information for applications in both research and industrial settings.

Pika L and Pika XC2

400 – 1000 nm
Visible + Near Infrared (VNIR)

Pika L



The Pika L is lightweight, compact, and cost-effective. It is ideal for drone-based remote sensing applications.

Pika XC2



The Pika XC2 has very high spatial and spectral resolutions. It is best used for laboratory and ground-based research requiring very high precision.

See page 9 for objective lens options.

| | Pika L | Pika XC2 |
|----------------------------|-------------------|-------------------|
| Spectral range | 400 – 1000 nm | 400 – 1000 nm |
| Spectral channels | 281 | 447 |
| Spectral bandwidth | 2.1 nm | 1.3 nm |
| Spectral resolution (FWHM) | 3.3 nm | 1.9 nm |
| Spatial channels | 900 | 1600 |
| Max frame rate | 249 fps | 165 fps |
| Interface | USB 3.0 | USB 3.0 |
| Weight, no lens | 0.6 kg | 2.4 kg |
| Dimensions | 100 x 125 x 53 mm | 101 x 275 x 74 mm |



Pika L Airborne Remote Sensing System (page 11)



Pika XC2 Benchtop System (page 14)

Pika IR and Pika IR+

(formerly Pika NIR-320 and NIR-640)
900 – 1700 nm
Near Infrared (NIR)

Pika IR



The Pika IR is a high-speed, cost-effective infrared imager, ideal for machine vision applications.

Pika IR+



The Pika IR+ has high spatial resolution and very high spectral resolution, providing excellent data quality.

See page 9 for objective lens options.

| | Pika IR | Pika IR+ |
|----------------------------|-------------------|-------------------|
| Spectral range | 900 – 1700 nm | 900 – 1700 nm |
| Spectral channels | 164 | 328 |
| Spectral bandwidth | 4.9 nm | 2.5 nm |
| Spectral resolution (FWHM) | 8.8 nm | 5.6 nm |
| Spatial channels | 320 | 640 |
| Max frame rate | 520 fps | 249 fps |
| Interface | GigE | GigE |
| Weight, no lens | 3.0 kg | 3.0 kg |
| Dimensions | 114 x 270 x 89 mm | 114 x 270 x 89 mm |



Pika IR/IR+ Airborne UAV System (page 11)

Pika IR-L and Pika IR-L+

925 – 1700 nm
Near Infrared (NIR)

Pika IR-L



The Pika IR-L is a high-speed, light-weight infrared imager, ideal for drone-based remote sensing applications.

Pika IR-L+



The Pika IR-L+ has high spatial resolution and very high spectral resolution, providing outstanding data quality.

See page 10 for objective lens options.

| | Pika IR-L | Pika IR-L+ |
|----------------------------|------------------|-------------------|
| Spectral range | 925 – 1700 nm | 925 – 1700 nm |
| Spectral channels | 236 | 470 |
| Spectral bandwidth | 3.3 nm | 1.7 nm |
| Spectral resolution (FWHM) | 5.9 nm | 3.8 nm |
| Spatial channels | 320 | 640 |
| Max frame rate | 364 fps | 176 fps |
| Interface | GigE | GigE |
| Weight, no lens | 1.0 kg | 1.0 kg |
| Dimensions | 210 x 68 x 63 mm | 210 x 68 x 63 mm |



Pika IR-L/IR-L+
Airborne UAV System
(page 11)

Pika UV

(formerly Pika NUV2)

330 – 800 nm

Near Ultraviolet + Visible (NUV + VIS)

Pika UV



The Pika UV is a unique hyperspectral camera that measures ultraviolet light.

Many materials that appear similar to the human eye have distinct UV signals. Plant science, entomology and ornithology are a few of the research areas where UV light plays a significant role.



True-color image (LHS) and 360 nm image (RHS) showing “bullseye”

See page 10 for objective lens options.

| | Pika UV |
|----------------------------|-------------------|
| Spectral range | 330 – 800 nm |
| Spectral channels | 255 |
| Spectral bandwidth | 1.84 nm |
| Spectral resolution (FWHM) | 2.8 nm |
| Spatial channels | 1500 |
| Max frame rate | 142 fps |
| Interface | USB 3.0 |
| Weight, no lens | 2.2 kg |
| Dimensions | 107 x 230 x 85 mm |



Pika UV Benchtop System (page 14)

NOTE: Because halogen lights do not emit below 355 nm, an additional ultraviolet light is used to augment the standard halogen line light in the benchtop system.

Objective Lenses

Objective lenses determine the field of view for each hyperspectral camera.

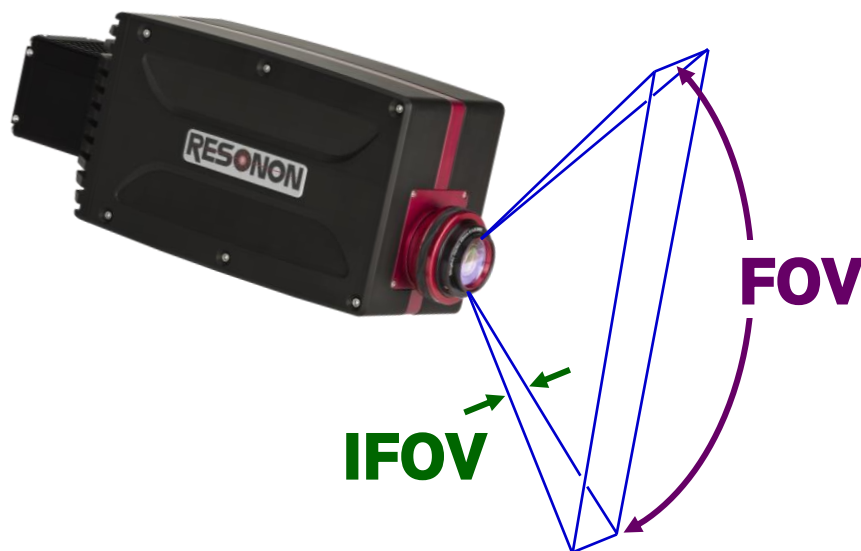


Field of View (FOV)

The Field of View defines the long dimension of the line imaged by the hyperspectral camera, reported in units of degrees. The user can change the FOV by changing the objective lens. See the tables below to identify the lens that provides the optimal FOV for each application.

Instantaneous Field of View (IFOV)

The Instantaneous Field of View defines the narrow dimension of the line imaged by the hyperspectral camera, reported in units of milli-radians.



Objective Lenses: Specifications

| | Notes | FOV (deg) | IFOV (mrads) |
|--------------------------|--|-----------|--------------|
| Pika L (page 4) | | | |
| 70 mm | | 4.3 | 0.17 |
| 50 mm | | 6.0 | 0.24 |
| 23 mm | standard on benchtop and outdoor systems | 13.1 | 0.52 |
| 17 mm | standard on airborne systems | 17.6 | 0.71 |
| 12 mm | | 24.8 | 1.00 |
| 8 mm | | 36.5 | 1.50 |
| 6 mm | | 47.4 | 2.00 |
| Pika XC2 (page 4) | | | |
| 70 mm | | 7.7 | 0.17 |
| 50 mm | | 10.7 | 0.24 |
| 23 mm | standard on benchtop and outdoor systems | 23.1 | 0.52 |
| 17 mm | standard on airborne systems | 30.8 | 0.71 |
| 12 mm | | 42.7 | 1.00 |
| 8 mm | | 60.8 | 1.50 |
| 6 mm | | 76.0 | 2.00 |
| Pika IR (page 5) | | | |
| 100 mm | | 5.5 | 0.30 |
| 75 mm | | 7.3 | 0.40 |
| 50 mm | | 11.0 | 0.60 |
| 25 mm | standard on all systems | 21.7 | 1.20 |
| 6.0 mm | | 77.3 | 5.00 |
| Pika IR+ (page 5) | | | |
| 100 mm | | 5.5 | 0.15 |
| 75 mm | | 7.3 | 0.20 |
| 50 mm | | 11.0 | 0.30 |
| 25 mm | standard on all systems | 21.7 | 0.60 |
| 6.0 mm | | 77.3 | 2.50 |

Objective Lenses: Specifications, continued

| | Notes | FOV (deg) | IFOV (mrads) |
|----------------------------|-------------------------|-----------|--------------|
| Pika IR-L (page 6) | | | |
| 100 mm | | 5.5 | 0.30 |
| 75 mm | | 7.3 | 0.40 |
| 50 mm | | 11.0 | 0.60 |
| 25 mm | standard on all systems | 21.7 | 1.20 |
| 6.0 mm | | 77.3 | 5.00 |
| Pika IR-L+ (page 6) | | | |
| 100 mm | | 5.5 | 0.15 |
| 75 mm | | 7.3 | 0.20 |
| 50 mm | | 11.0 | 0.30 |
| 25 mm | standard on all systems | 21.7 | 0.60 |
| 6.0 mm | | 77.3 | 2.50 |
| Pika UV (page 7) | | | |
| 60 mm | | 8.4 | 0.40 |
| 24 mm | standard on all systems | 20.5 | 1.00 |

Airborne Systems

Complete hyperspectral imaging systems for remote sensing.
Includes all hardware and software necessary for georegistered hyperspectral data.

Standard Kit Components:

- Data Acquisition Unit
- Ellipse N GPS/IMU
- Georectification Software
- Post-Processing & Analytical Software
- System Mount (UAV Standard)
- Radiometric Calibration & Calibration Target
- Protective Travel Case



Options (details on next page):

- M300/350 or Piloted Aircraft Mount Kit
- High-Precision Ellipse D dual antenna GPS/IMU
- Emlid RTK Base Station and Compatible Radio (for centimetric positioning and increased orientation accuracy)
- Downwelling Irradiance Sensors
- Training Services

| Complete System Weight (kg / lb) | |
|----------------------------------|-------------|
| Pika L | 1.83 / 4.03 |
| Pika XC2 | 3.84 / 8.47 |
| Pika IR/IR+ | 4.33 / 9.55 |
| Pika IR-L/IR-L+ | 2.23 / 4.91 |
| Pika UV | 3.60 / 7.93 |



Pika L Airborne
UAV System



Pika IR-L/IR-L+ Airborne
UAV System



Pika IR-L Piloted
Aircraft System

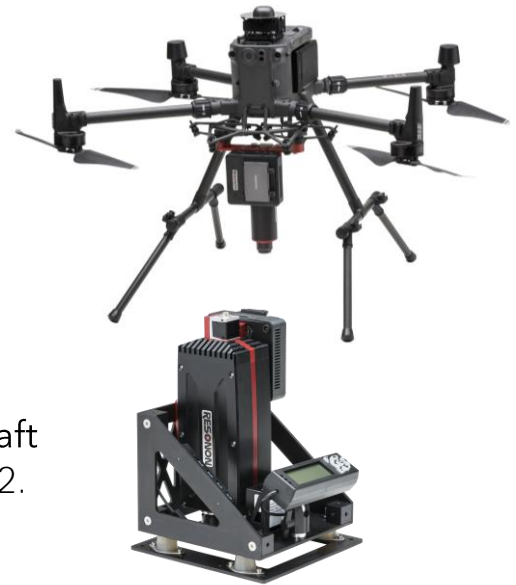
Airborne Systems: Options

Various options are available to tailor the airborne system for your needs.

M300/350 Integration

The Pika L and Pika IR-L airborne systems are compact and lightweight, making them ideal to use with the popular DJI Matrice 300 and 350. The M300/350 Integration kit includes:

- A mount to attach to the DJI Dual Gimbal Mount.
- A GNSS antenna mount and battery holder



Piloted Aircraft Integration Kit

Any of Resonon's imagers can be mounted to a piloted aircraft using our VIP (Vibration Isolation Pod), shown with a Pika XC2.

GPS/IMU

The High-Precision Ellipse 3D GPS/IMU is sold as an upgrade to the baseline Ellipse 3N. For details about choosing a GPS/IMU, please see [this guide](#).

RTK (Real-Time Kinematic positioning)

The Emlid RTK base station and radio are used to generate centimetric positioning and increased orientation accuracy, providing the highest quality airborne data.

Downwelling Irradiance Sensors

Several different downwelling irradiance sensors are available to fit the specific needs of any airborne imaging system.

Training

Training can be in-person or virtual. Pricing varies, please contact us for details.

Outdoor Systems

Complete hyperspectral system designed for outdoor measurements.
Includes all hardware and software to acquire and analyze hyperspectral data.

The imager is mounted to a rotation stage on a tripod that rotates to scan the scene.

Standard Kit Components:

- Rotational Scanning Stage & Tripod
- Ruggedized Data Acquisition Laptop & Spectronon Software
- Radiometric Calibration
- Calibration Target
- Power Supply
- Protective Travel Case

The kit may be purchased without the computer, but with the Spectronon software license provided.



Benchtop System: Reflectance Configuration

Complete hyperspectral system designed for laboratory measurements. Includes all hardware and software to acquire and analyze hyperspectral data.

The linear translation stage holds the sample and translates across the field of view.

Standard Kit Components:

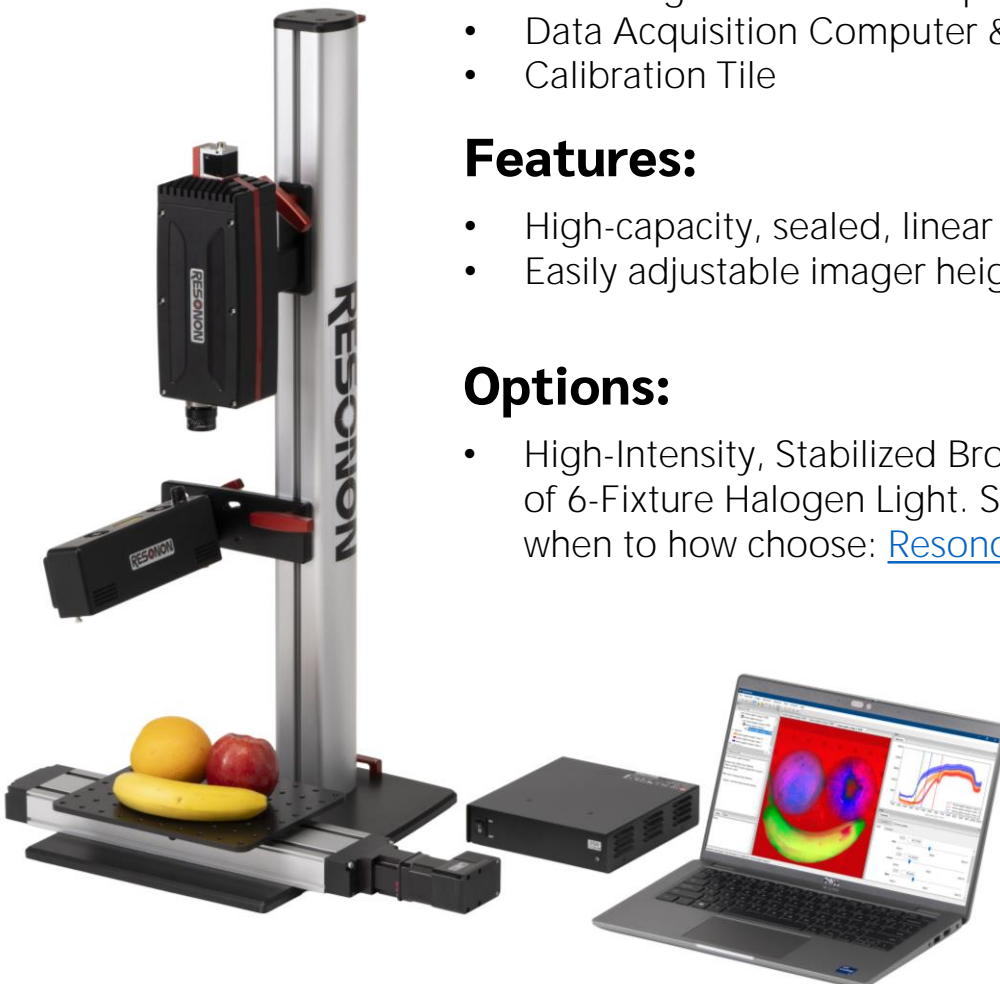
- Linear Translation Stage
- 6-Fixture Halogen Light Assembly
- Mounting Tower and Baseplate
- Data Acquisition Computer & Spectronon Software
- Calibration Tile

Features:

- High-capacity, sealed, linear scanning stage
- Easily adjustable imager height, light height, and light angle

Options:

- High-Intensity, Stabilized Broadband Line Light in place of 6-Fixture Halogen Light. See here for guidance on when to how choose: [Resonon Illumination Options](#)



The kit may be purchased without the computer, but with the Spectronon software license provided.

Custom stage and lighting configurations are available.

Contact us for details.

Benchtop System: Reflectance-Transmission Configuration

Complete hyperspectral system designed for laboratory measurements.
Includes all hardware and software to acquire and analyze hyperspectral data.

Clear stage with option for both above (reflectance) and below (transmission) lighting.

System Components:

- Linear Translation Stage with Clear Tray
- High-Intensity, Stabilized Line Light Assembly
- Backlight Housing
- Mounting Tower and Baseplate
- Data Acquisition Computer & Spectronon Software
- Calibration Tile

Features:

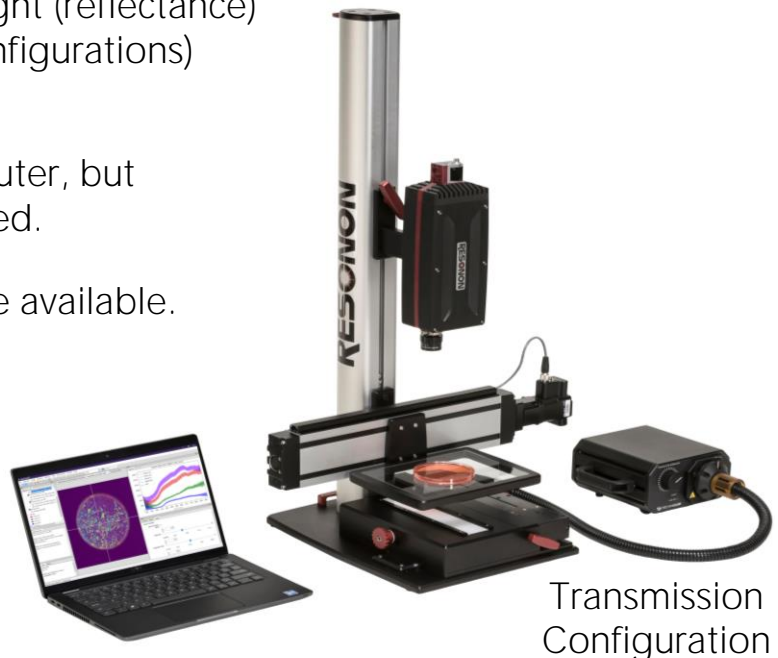
- High-capacity, sealed, linear scanning stage
- Line light quickly moves between transmission and reflectance configurations
- High-intensity stabilized line light
- Easily adjustable angle / height for the light (reflectance)
- Easily adjustable imager height (both configurations)

The kit may be purchased without the computer, but with the Spectronon software license provided.

Custom stage and lighting configurations are available.
Contact us for details.



Reflectance Configuration



Transmission Configuration

Benchtop System: Transmission Benchtop Add-On Kit

Kit includes all hardware and instructions required to convert an existing Reflectance Configuration System into a Reflectance-Transmission Configuration System.

Kit Components:

- Clear Tray
- Line Light Housing Assembly for Transmission Configuration
- Mounting Brackets, Hardware and Instructions

NOTE: This kit is only compatible with new-style benchtop systems, identified by the smooth aluminum column. Old-style benchtop systems had the 80/20 column.



Benchtop System:

Stabilized Halogen Line Light Add-On Kit

Kit includes all hardware and instructions required to convert an existing 6-Fixture Halogen Light Reflectance System into a Line Light Reflectance System.

Kit Components:

- Halogen Line Light Assembly
- Power Supply and Cables
- Mounting Bracket, Hardware and Instructions



Stabilized Halogen 6-Fixture Light Add-On Kit

Kit includes all hardware and instructions required to convert an existing Line Light Reflectance System into a 6-Fixture Halogen Light Reflectance System.

Kit Components:

- 6-Fixture Halogen Light Assembly
- Power Supply and Cables
- Mounting Bracket, Hardware and Instructions



NOTE: Both of these kits are only compatible with new-style benchtop systems, identified by the smooth aluminum column. Old-style benchtop systems had the 80/20 column.

Benchtop System: Large Sample Reflectance Configuration

Complete hyperspectral system designed for large stationary samples. Includes all hardware and software to acquire and analyze hyperspectral data.

The imager and lighting are mounted to a long-travel stage that is mounted to a tower(s). Both vertical and horizontal orientations are available.

Standard Kit Components:

- 890 mm Long-Travel Linear Translation Stage
- 6-Fixture High-Intensity Stabilized Broadband Lighting Assembly
- Mounting Towers and Baseplates
- Data Acquisition Computer & Spectronon Software
- Radiometric Calibration
- Calibration Standard



The kit may be purchased without the computer, but with the Spectronon software license provided.



Horizontal Orientation:
Pointing Forward

Horizontal Orientation:
Pointing Down



Vertical
Orientation

Benchtop System: Benchtop Enclosure (The “Black Box”)

The “Black Box”, created to easily eliminate unwanted ambient light without turning off the room lights, is an add-on accessory.

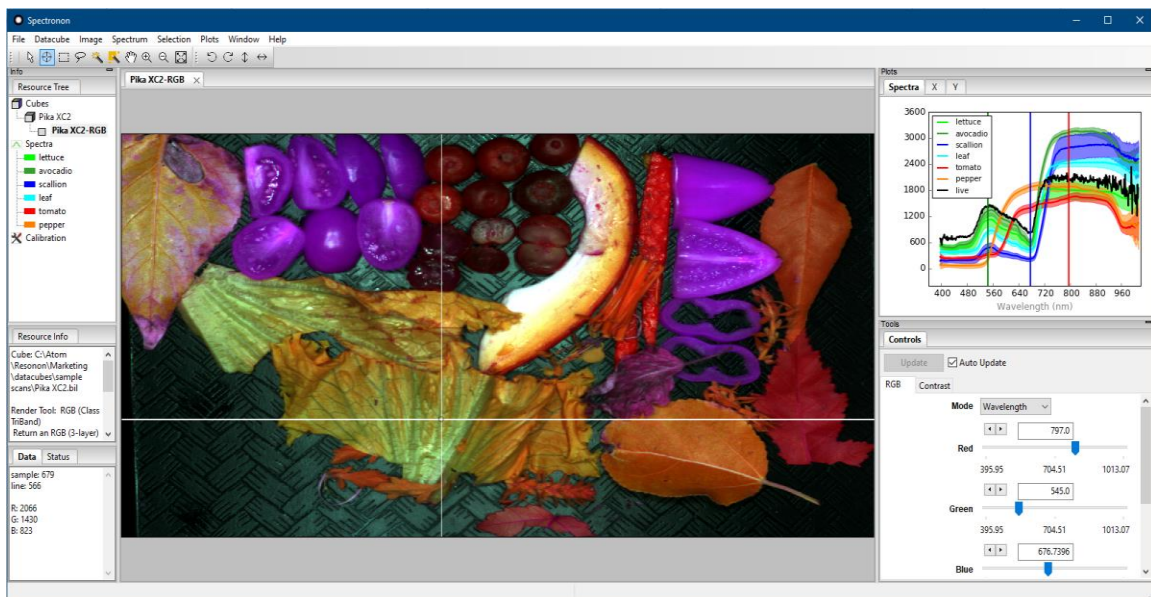


The “Black Box” benchtop enclosure

Features:

- The simplest means to control light incident on your sample
- Fits any standard Resonon Benchtop System
- Comes fully assembled; just pull from the box, place overtop your benchtop system, and begin obtaining data.

Software



Spectronon™ Hyperspectral Analysis Software

Spectronon software is used to control Resonon's benchtop and outdoor hyperspectral imaging systems. Spectronon features many data processing, analysis, and visualization tools for hyperspectral datacubes and enables user-written plugins.

Spectronon comes standard with the Benchtop, Outdoor, and Airborne Systems.

A free version of Spectronon (without controls for hyperspectral cameras and systems) is available at the [downloads page](#) on our website. Sample data is also available.

Spectronon runs on Windows 10 or 11 operating systems.

Software Development Kit (SDK)

Resonon provides for free a programming guidance document for integrating Resonon hyperspectral cameras using readily available SDKs in a number of different software languages and operating systems.

Support

Resonon strives to make products that are easy-to-use and very reliable. In the event that an issue arises with one of our products, Resonon Customer Support will work with you to solve any issues.

Please email support@resonon.com with a description of the issue and Resonon Customer Support will quickly reach out to assist you.

Recalibration

As with most precision instruments, Resonon recommends a wavelength and radiometric recalibration yearly, or after any rough handling or exposure to extreme temperatures. This ensures the best performance from your hyperspectral imaging system.

Warranty

All equipment comes with a 2-year warranty. An additional year of warranty can be purchased for 5% of the total price.

Official Terms and Conditions for Sale can be found [here](#).
Details of our Warranty and Repairs policies can be found [here](#).

Repairs

If repairs are required, please contact us. We will quickly issue an RMA number and provide shipping guidance.

If the system is under warranty, we will repair and return it. If the system is out of warranty, there is a \$500 evaluation fee charged in addition the customer paying for shipping. If the repair costs fall within \$500, then no additional charges will apply. If the repair costs more than \$500, the overage will be invoiced to the customer when the product is returned.