Headwall

Nano HP™

Compact VNIR Hyperspectral Imaging System for Remote-Sensing

FEATURES

- Perfect for environmental monitoring, mining, and precision agriculture applications

- Factory integrated & flight tested

- Best-in-class SWaP (Size, Weight, and Power)

- VNIR wavelength range (400 to 1,000 nm)

- Built-in GPS-IMU, solid-state storage

- Available LiDAR for high-resolution DEM (Digital Elevation Model) creation & 3D point clouds

Headwall

THE IDEAL SYSTEM FOR VNIR REMOTE-SENSING UAV MISSIONS

Headwall's original **Nano-Hyperspec**® took the remote-sensing community by storm, becoming the best-selling system of its kind. The next-generation **Nano™ HP** features improved spatial resolution, as well as a greater number of spectral bands in an exceptionally small, light, and power-efficient form factor.

The Nano HP can be purchased as a payload for integration onto compatible UAVs, and also as part of integrated "turnkey" systems that include the drone. These include the DJI Matrice 300 RTK[1], DJI Matrice 600 Pro, as well as the FreeFly Alta X that is made in the USA and supports NDAA-compliance.

Optional sensors and accessories such as LiDAR and thermal-imagers[2] can be incorporated into payloads suitable for your needs.

FEATURE	HEADWALL	COMPETITION
Turnkey Systems, Everything You Need	✅	⊗
Light Weight, Low Power Consumption	✅	⊗
Compact, Solid-State Data-Acquisition System	✅	⊗
CE-Certified VNIR Sensor	✅	⊗
Available LiDAR and Data-Fusion Options	✅	⊗
Factory-Made Holographic Gratings	✅	⊗
All-Reflective, Aberration-Corrected Design	✅	⊗

Portable & Robust

The Headwall Nano HP comes with a high-performance GPS/IMU and enables Light Detection and Ranging (LiDAR) to be added as an integral module, so that a Nano HP with LiDAR is actually lighter and smaller than a similarly equipped original Nano-Hyperspec!

Fixed- or gimbal-mount configurations are available, depending on the parameters of your payload. The platform-agnostic, browser-based **HSInsight™** interface makes setting up your Nano HP easy.
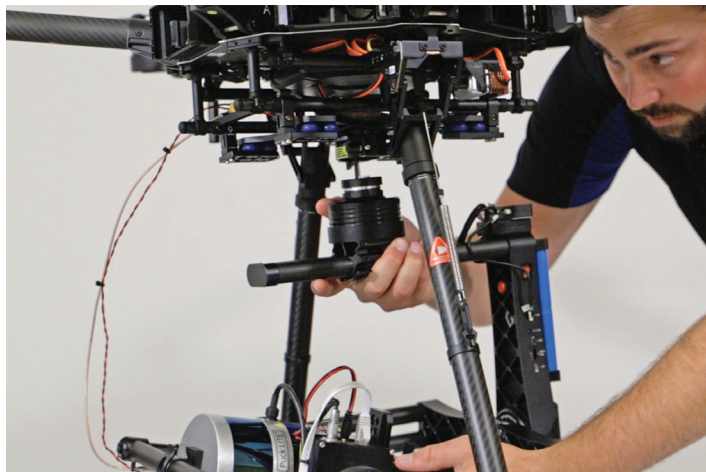

Figure 1. Headwall UAV systems utilize a quick-release mechanism between the drone and the payload that allows easy removal of the sensor suite for transportation or storage.
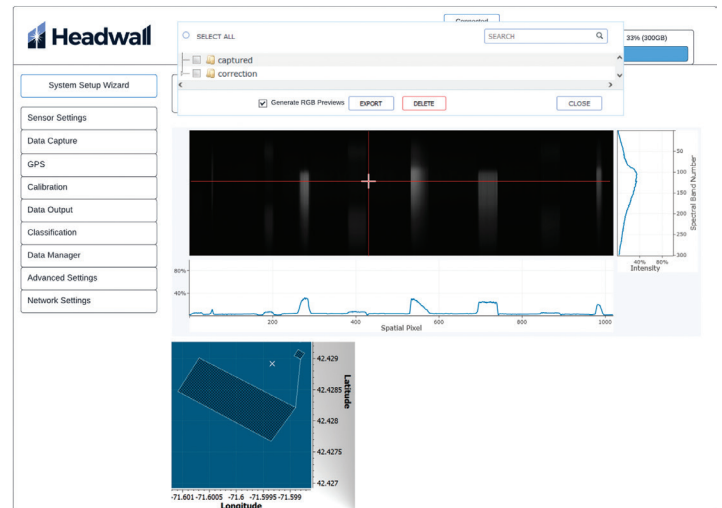

Figure 2. Our new platform-agnostic HSInsight interface provides control over your Nano HP. Calibrate, adjust settings, and select data-capture parameters using a web browser.
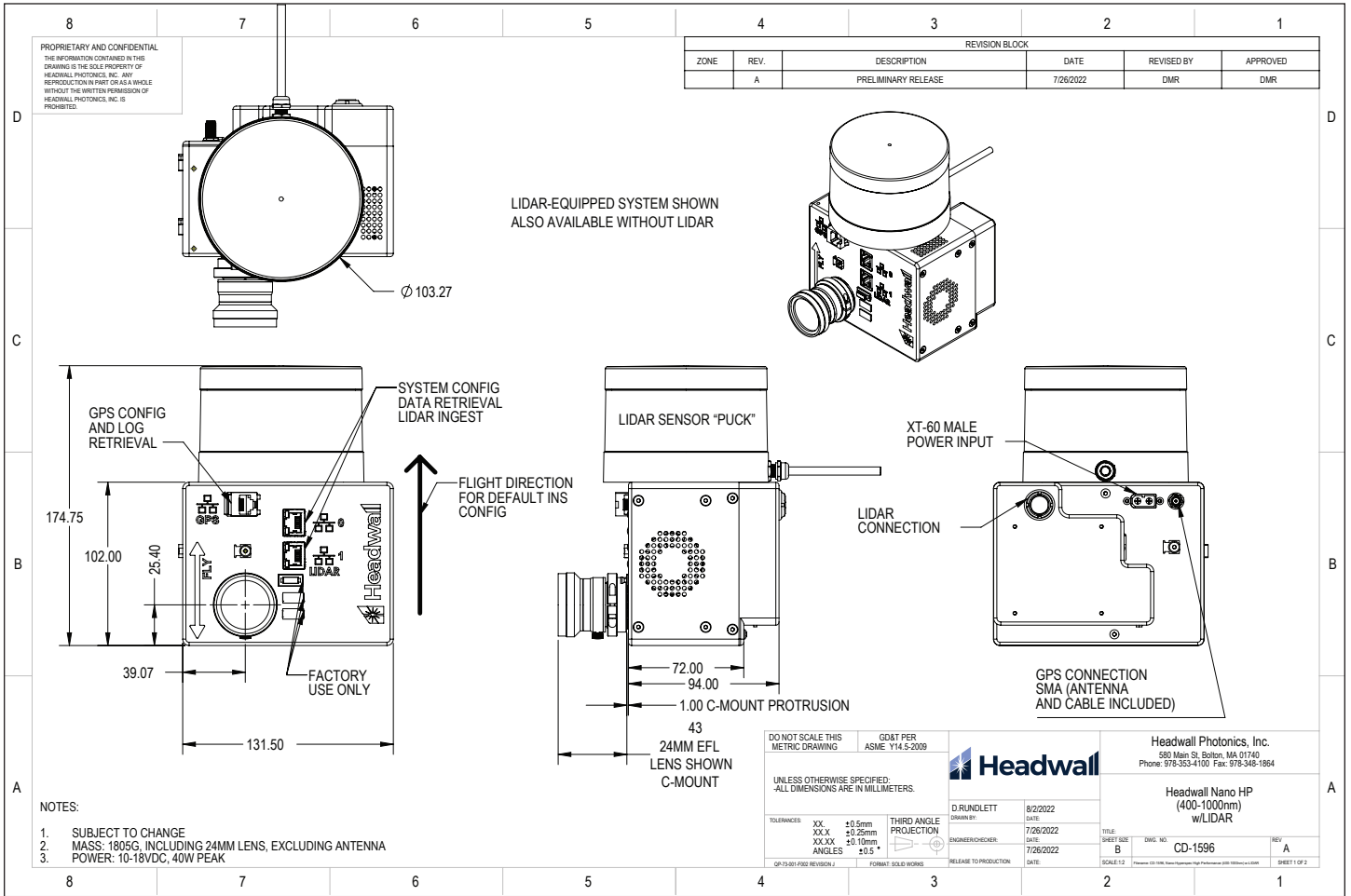
Figure 3. The Headwall Nano HP system equipped with LiDAR is shown here, much smaller and lighter than the previous-generation Nano-Hyperspec® when similarly configured. All user-accessible ports for power and data I/O are labeled, as is the direction of flight. Contact Headwall Customer Support for more complete dimensional drawings of this configuration or the configuration without LiDAR.
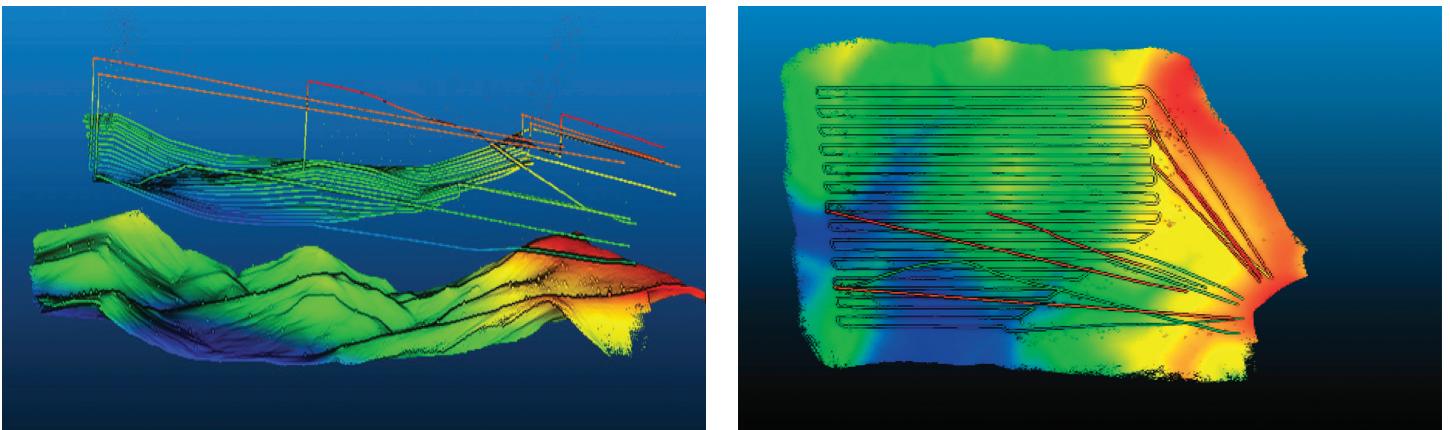

Figure 4. The images above are 3D point clouds generated from an optional LiDAR sensor that was part of the payload during a hyperspectral UAV mission to Cuprite, Nevada by a team from Headwall and the University of Arizona. LiDAR allows high-resolution digital elevation models (DEMs) to be created to enable more precise flight operations as well as more accurate orthorectification of the hyperspectral imaging data.

Headwall UAV systems are programmed to follow terrain at a constant altitude above ground level. The hyperspectral data that is captured from the air is post-processed and orthorectified so that a consistent nadir view of the mission area is achieved.

You can see on the left that the aircraft enters and departs the capture area along straight lines. While inside the 'capture polygon' designated as part of the flight plan, the hyperspectral sensor is activated and a "lawnmower" pattern is flown as shown in the image on the right.

COMPLETE SYSTEMS FOR HYPERSPECTRAL REMOTE-SENSING UAV MISSIONS

Because you may travel to locations that give additional meaning to the word "remote" in remote sensing, Headwall turnkey systems feature UAVs that fold and disassemble to more easily transportable sizes that can be quickly deployed in the field.

Rechargeable batteries supply power to all systems, and additional batteries as well as chargers are available to extend your missions.

Training sessions, both in person and online, are given by experts who are not only makers but users of our systems, and have successfully completed missions at a variety of locations around the world.

Some UAVs such as the FreeFly Alta X can be folded into a more compact shape for transport to and from your mission location.

[1] RTK (Real-Time Kinematic) feature not currently utilized for positioning. See Headwall White Paper, "RTK vs. PPK Explained" for more information.

[2] Subject to availability by the manufacturer

[3] Higher frame rates attainable with certain configurations.

[4] High-Performance GPS-IMU utilizes Post-Processing Kinematics (PPK) for increased measurement accuracy

SPECIFICATIONS	
Wavelength Range	400 – 1,000 nm
Spectral Bands	342
Spatial Pixels	1020
Camera Technology	CMOS
Pixel Pitch	5.86 µm
Aperture	f/2.5
Dispersion/Pixel	1.76 nm
Entrance Slit Width	20 µ
Spectral FWHM	6 nm
Frame Rate (Sustained)[3]	300 Hz
ADC Bit Depth	12-bits
Spectrograph Design	Aberration-Corrected
Digital Interface	GigE
GPS/IMU	Internally Mounted High-Performance with PPK[4]
Data Storage on Payload	480 GB Solid-State
Weight (without / with LiDAR)	1.05 kg (2.32 lbs) / 1.73 kg (3.81 lbs)
Base Dimensions (without / with LiDAR)	132 x 102 x 73 mm (5.2 x 4.0 x 2.9 in) / 132 x 175 x 99 mm (5.2 x 6.9 x 3.9 in)
Power without LiDAR (typical)	14.4 W
Operational Temp Range	0 – 40 °C / 32 – 104 °F
Storage Temp Range	-20 – 60 °C / -4 – 140 °F

Part Number	Description
1007A-30710	Nano HP VNIR Turnkey Package on FreeFly Alta X UAV
1007A-30810	Nano HP VNIR Turnkey Package with LiDAR on FreeFly Alta X UAV
1007A-20710	Nano HP VNIR Turnkey Package on DJI M300 RTK[1] UAV
1007A-20810	Nano HP VNIR Turnkey Package with LiDAR on DJI M300 RTK[1] UAV
1007A-10710	Nano HP VNIR Turnkey Package on DJI M600 Pro UAV
1007A-10810	Nano HP VNIR Turnkey Package with LiDAR on DJI M600 Pro UAV
1007A-30711	Nano HP VNIR Payload Compatible with FreeFly Alta X UAV
1007A-30811	Nano HP VNIR Payload with LiDAR Compatible with FreeFly Alta X UAV
1007A-20711	Nano HP VNIR Payload Compatible with DJI M300 RTK[1] UAV
1007A-20811	Nano HP VNIR Payload with LiDAR Compatible with DJI M300 RTK[1] UAV
1007A-10711	Nano HP VNIR Payload Compatible with DJI M600 Pro UAV
1007A-10811	Nano HP VNIR Payload with LiDAR Compatible with DJI M600 Pro UAV

Headwall reserves the right to change or improve its products and specifications and to make changes in content without obligation to notify any person or organization of such changes or improvements.

www.headwallphotonics.com

Tel: +1 978-353-4100
Fax: +1 978-348-1864

Headwall Photonics Inc.
580 Main Street, Bolton, MA 01740 USA

information@headwallphotonics.com