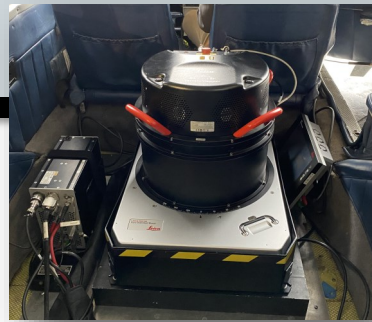


**AIR DATA
SOLUTIONS**
BY LAND. BY AIR. BY SEA.

Leica TerrainMapper is one of the laser-based systems Air Data Solutions uses for the acquisition of high-density topographic and return signal intensity data from a variety of airborne platforms. The data is computed using digitized return signal waveforms from which range and return signal intensity measurements are derived in real time and recorded in-flight along with position and attitude measurements from an airborne GNSS/inertial sub-system. The TerrainMapper falls into the category of airborne instrumentation known as LiDAR.

By measuring the location and attitude of the system, the distance to ground and scan angle, a ground position for the impact point of each reflected laser pulse can be determined. Return signal waveforms are analyzed in real time, return signal timing derived and stored. The peak signal intensity attribute allows the creation of georeferenced images in addition to providing the intensity characteristic for each point in the point cloud. Finally, complete waveforms for each received return pulse can also be stored at sub-sampled rates.



Leica Terrain Mapper Product Specifications

Leica Hyperion2 + LiDAR Unit

Laser wavelength	1,064 nm
Laser divergence	0.23 mrad (1/e**
Pulse repetition frequency	Up to 2MHz (height dependent)
Return pulses	<ul style="list-style-type: none"> • Programmable for up to 15 returns, including intensity • Full waveform recording option at down-sampled rates • Real-time waveform analysis and pulse extraction • Multiple-Pulses-in-the-Air (MPiA): Up to 35 MPiA zones • Gateless MPiA



TerrainMapper Pod

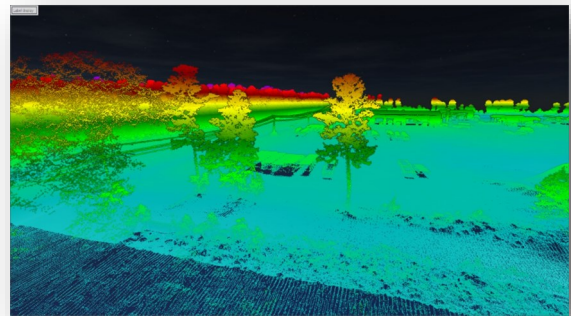
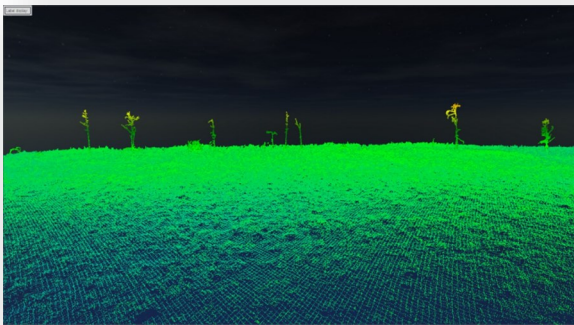
Consists of	<ul style="list-style-type: none"> 1 x Leica RCD30 CH82 multispectral camera in nadir 1 x Leica Hyperion LiDAR unit
IMU	SPAN CNJ55-H, no export license required US ECCN 7A994

Camera Head Leica RCD30 CH82

CCD size (80MP)	10,320 x 7,752 pixels
Pixel size (80MP)	5.2 um
Dynamic range of CCD	73 dB

This system provides remarkable levels of efficiency for urban mapping applications, which allows ADS to collect at higher flying heights and speeds while still delivering the same GSD and positional accuracy.

ADS uses HxMap, a high-performance multisensor workflow, featuring one of the industry's fastest data throughput. We process the data captured with the CityMapper in one simple, intuitive user interface and generate the SmartBase, a comprehensive geospatial base layer, at the push of a button.



Leica CityMapper Product Specifications

LEICA HYPERION2 + LIDAR UNIT

Laser wavelength	1,064 nm
Laser divergence	0.23 mrad 1/e
Pulse repetition frequency	Up to 2MHz (height dependent)
Return pulses	<ul style="list-style-type: none"> • Programmable for up to 15 returns, including intensity • Full waveform recording option at down-sampled rates • Real-time waveform analysis and pulse extraction • Multiple-Pulses-in-the-Air (MPiA): Up to 35 MPiA zones • Gateless MPiA



CITY MAPPER POD

Consists of	1 x Leica RCD30 CH82 multispectral camera in nadir 4 x Leica RCD30 CH81m oblique camera, viewing angle 45° 1 x Leica Hyperion LiDAR unit
IMU	SPAN CNJ55-H, no export license required US ECCN 7A994

CAMERA HEAD LEICA RCD30 CH82

CCD size (80MP)	10,320 x 7,752 pixels
Pixel size (80MP)	5.2 um
Dynamic range of CCD	73 dB

Phase One iXM-RS 280

Air Data Solutions uses the Phase One 280 Aerial System which offers an ultra-high image capture rate and dynamic range and increases the overall quality and accuracy of the final photogrammetric products we deliver.

The iXM-RS 280 offers an additional configuration allowing us to simultaneously capture RGB and NIR images. The 280MP 4-Band solution comprises dual 90mm lenses for capturing RGB information and a 50mm lens for capturing NIR information, which provide 4-Band (R,G,B,NIR), or CIR imagery.

Backside illuminated (BSI) CMOS sensor

Wide dynamic range

Improved light sensitivity



iXM-RS 280F 4-Band Product Specifications

Flying Height and Swath Width

GSD (cm)	Altitude (m)	Altitude (ft)	Swath (m)
2.5	598	1,963	504
5	1,197	3,926	1,008
10	2,394	7,853	2,015
15	3,590	11,779	3,023
20	4,787	15,706	4,030
25	5,984	19,632	5,038
30	7,181	23,559	6,045
33	7,899	25,915	6,650
35	8,378	27,485	7,053
40	9,574	31,412	8,060
45	10,771	35,338	9,068

Frame Geometry	Central projections
Resolution	284MP 20150 x 14118
Image formats	Phase One RAW, IIQ-L, IIQ-S
Output formats	Distortion-free RGB, NIR, CIR, RGBN, NCDI in TIFF AND 9 AND 16 Bit or JPEG
RGB/NIR ratio	1:1.8
Frame width for 10cm GSD (m)	2015
Frame height for 10cm GSD (m)	1412
Frame area for 10cm GSD (sq.km)	2.84
Typical image size (MB) for TIFF (8 Bit)	1100

TELEDYNE Optech Galaxy T2000

The new ALTM Galaxy T2000 is a wide-area lidar sensor, with high density performance and collection efficiency, delivering the highest quality data sets to meet rigorous USGS lidar standards. Now with a 6500 m AGL collection envelope and 2-MHz “on-ground” collection rate, Galaxy is one of the highest performance sensors on the market in the smallest form factor for maximum application and platform flexibility.

Whether gyro-stabilized or fixed-mounted, high-altitude or low, one camera or six, one Galaxy or two, the Galaxy T2000 excels in all application areas with endless configuration flexibility, while providing the highest data precision and accuracy available.



SENSOR PERFORMANCE

Performance envelope	150-6500 m AGL, nominal
Absolute horizontal accuracy	1/10,000 x altitude; 1 σ
Absolute elevation accuracy	< 0.03-.025 m RMSE from 150-6000 m AGL

LASER CONFIGURATION

Topographic laser	1064-nm near infrared
Laser classification	Class IV (US FDA 21 CFR 1040.10 and 1030.11; IEC/EN 60825-1)
Pulse repetition frequency (effective)	Programmable, 100-4000kHz
Beam divergence	0.16 mrad (1/e) or 0.23 mrad (1/e ²)
Laser range precision	< 0.008 m, 1 σ
Minimum target separation distance	< 0.7 m (discrete)
Range capture	Up to 8 range measurements, including last
Intensity capture	Up to 8 intensity measurements, including last (12-bit)

Our metric cameras enable us to effortlessly execute mapping missions, capture high-resolution images, and create 2D and 3D maps.

The iXM 100MP incorporates medium format sensors with backside illumination (BSI) technology for improved high-light sensitivity and dynamic range and is engineered for imaging missions. ADS utilizes the iXM camera for unmanned missions as it easily integrates it with UAVs for diverse inspection and mapping applications.



iXM-100 Product Specifications

Sensor type	CMOS
Resolution	100MP 11664 x 8750
Dynamic range (dB)	83
Color options	RGB & Achromatic
Light sensitivity (ISO)	RGB: 50-6400 ACH: 300-25600
Max field of view (°)	63
Max shutter speed (sec)	1/2.500
Camera type	Medium format
Continuous frame rate (fps)	3
RAW file compression (appx) (IIQ)	65 MB

A lower weight platform ensures that the camera can be integrated to new or existing payloads.

The iXM-100's high dynamic range means it captures exceptionally detailed images under varying light conditions.

High capture speed for an array of different flight conditions. Capture rates of up to 2 fps and shutter speed up to 1/2500s.