

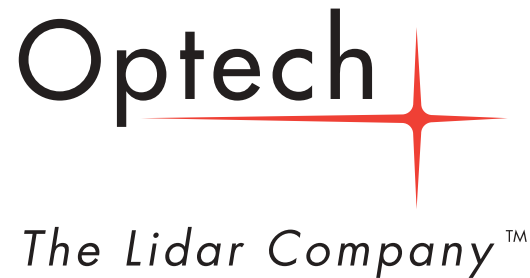
*Complete Solutions for Airborne Surveying*



**Experience. The Difference.**



ALTA Orion ultra-compact mapping system



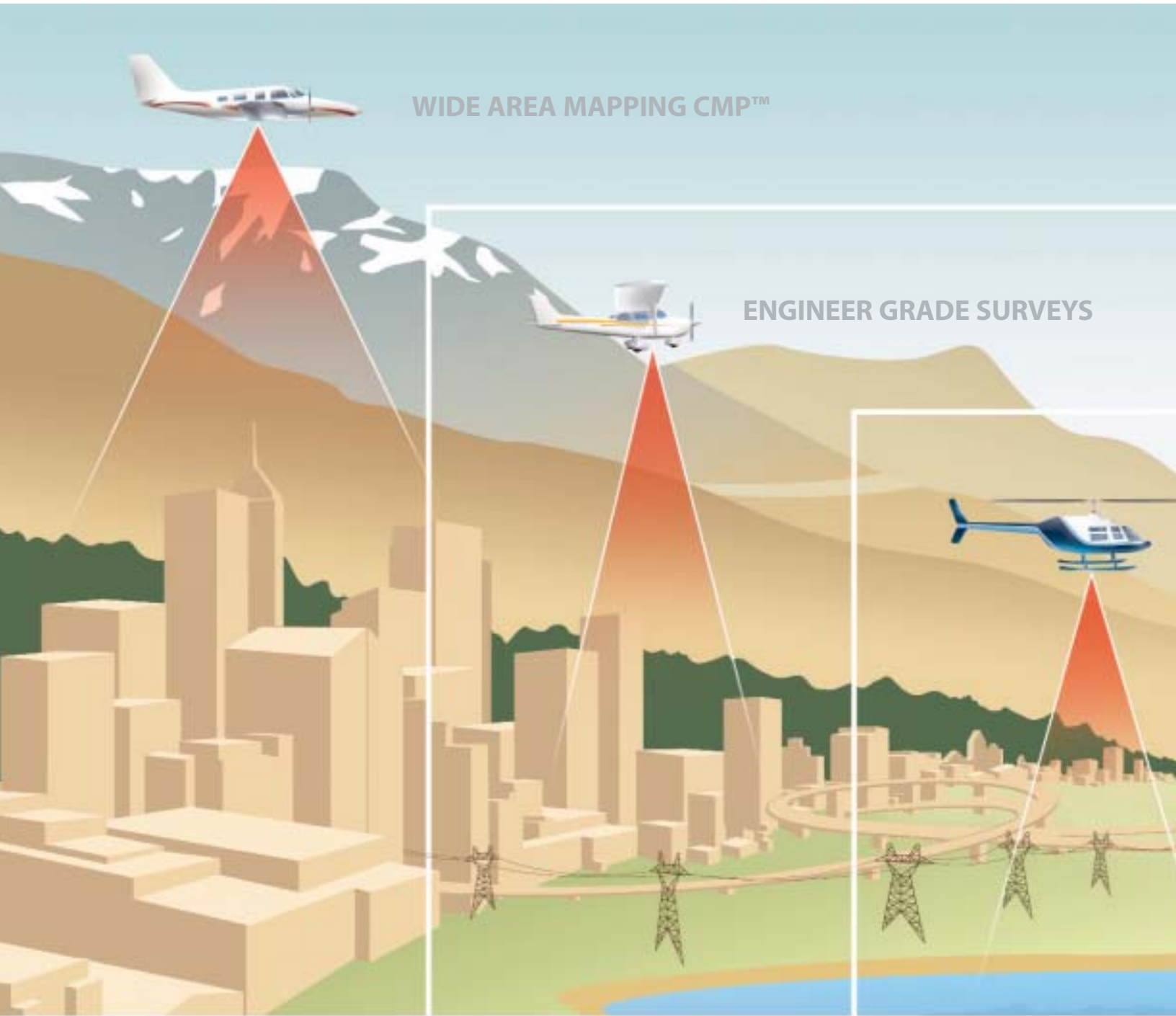
## Many Products – One Family

Optech's prominence as a world leader in the development and manufacture of advanced laser-based survey and imaging instruments extends over the last 35 years. During this time, Optech has worked closely with academic, government, military, naval, air force and space-based organizations to meet their specialized application requirements. From this innovation heritage, our commercial airborne clients have come to depend on us to provide industry leadership in new technologies and capabilities to maximize their collection accuracy and efficiency.

As a pioneer in the field of lidar imaging and ranging technology, Optech developed the world's first commercially available airborne laser terrain mapper, now known throughout the world as ALTM™. Available in both application and platform-dependent configurations, Optech ALTMs offer the greatest flexibility and efficiency available to the professional surveyor today. Whether it is a high-altitude wide-area mapping project, a low-altitude powerline survey, or a small payload, low-power platform requirement, Optech delivers complete data collection solutions for a full range of application and installation scenarios.

Optech also has extensive experience in laser waveform bathymetry. Its market-leading SHOALS coastal mapping system enables water depth and bottom reflectance measures for hydrographic charting and environmental modeling applications. Used extensively by government and private industry alike, SHOALS is a benchmark in the industry.

**Experience. The Difference.**

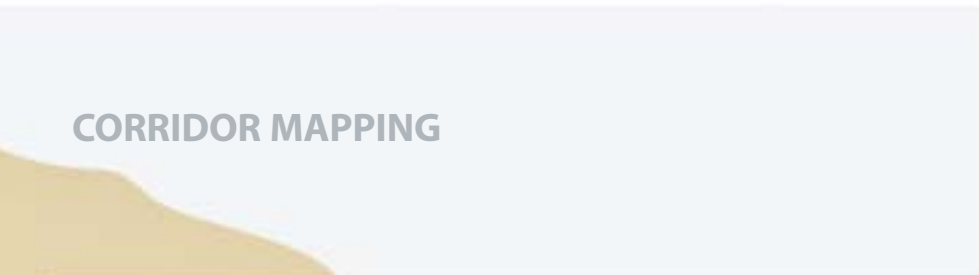


WIDE AREA MAPPING CMP™

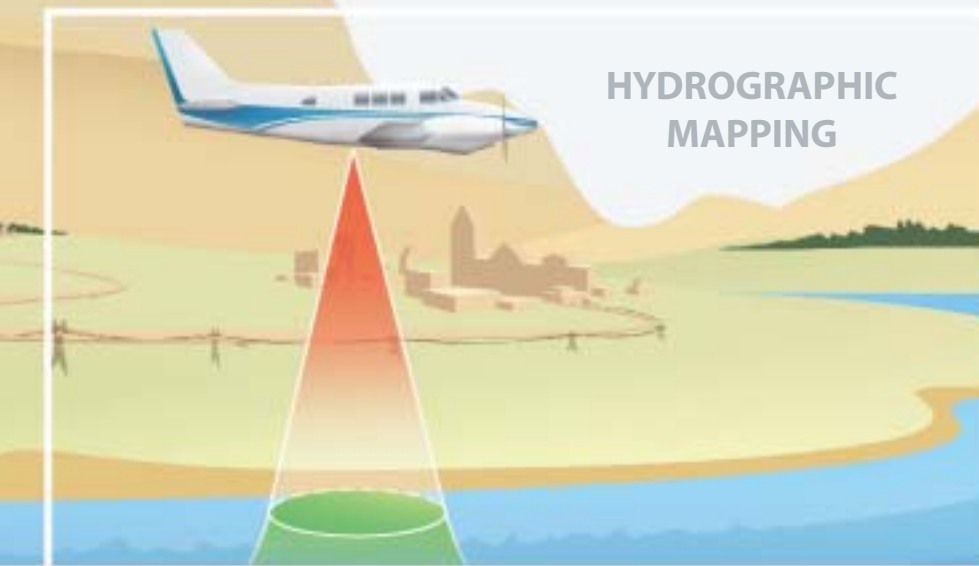
ENGINEER GRADE SURVEYS

## Complete Solutions for Today's Surveyor

Optech offers a broad range of airborne lidar sensor solutions. Whether your business is application-focused, or you have small payload constraints, Optech has the sensor for you. Incorporating many standard features to maximize your survey efficiency, our sensors go one step further by providing key features and capabilities specifically designed to enable high-resolution models with the greatest accuracy and precision possible.



## CORRIDOR MAPPING



## HYDROGRAPHIC MAPPING



GEMINI



ORION-M



ORION-C



SHOALS-3000



This chart identifies lidar sensor solutions as a function of platform types and applications. Simply select the solution that best meets your requirements.

## **ALTM Gemini – High-Altitude, Wide Area Mapping System**

The ALTM Gemini is a high-altitude, wide area mapping sensor that can operate just as effectively at lower altitudes. This added functionality makes the ALTM Gemini a natural choice for those who want the flexibility to operate in a variety of application areas. With numerous integrated peripheral sensor options, including laser waveform capture for complex modeling capability and high-resolution digital image capture, the ALTM Gemini offers a robust and universal design for the mapping professional.

*The image below merges a photograph (left) with a lidar DEM model (right), illustrating the ALTM Gemini's high-altitude capability.*



## The Gemini Advantage

The ALTM Gemini incorporates the industry's only fully-automated Continuous Multipulse (CMP™) technology system, without the range-gated data loss associated with other multipulse systems. Capable of collecting data at twice the altitude of conventional single-pulse systems for a given sampling rate, CMP™ can effectively double your collection efficiency.



*Fly at twice the altitude for maximum collection efficiency using CMP™*

## Continuous Multipulse - The Technology

CMP™ technology is a revolutionary approach to overcoming altitude constraints as a function of the timing limit associated with time-of-flight laser measurements. The timing limit refers to the time it takes for a pulse of light to travel from the laser transmitter, to the target, and back to the receiver. Traditionally, lidar sensors wait for the transmitted pulse to return to the receiver before emitting the next pulse. Consequently, the laser pulse rate directly limits the system operating altitude. CMP™ technology enables two or more pulses to be emitted and tracked, significantly increasing survey coverage rates.



**Maximize  
Your Efficiency**

## Key Design Features

The ALTM Gemini has the only "drop-in" sensor on the market. Its half-portal size means ease of installation and unlimited field-of-view. The design allows an off-nadir approach to surveying for increased vertical point density via an optional tilt-mount.

### Features

- Dual beam divergence
- Integrated video capture
- Continuous Multipulse (CMP™) technology
- GPS, GLONASS and L-band capable
- Waveform digitization option
- Fully integrated imaging sensor options

### Benefits

- Rapid coverage and data output capability
- Unrestricted bank-angle capability while maintaining high data accuracy and integrity
- Intensity capture with large dynamic range resulting in exceptional lidar image quality
- Ability to operate efficiently in all application areas and altitudes with maximum data density



## ALTM Orion – *Ultra-Compact Topographic Mapping System*

The ALTM Orion is the world's smallest complete lidar mapping solution. Representing the very latest in technology innovation and system design, Orion enables cost-effective, reliable surveying in an ultra-compact design, while maintaining all the features and performance benefits you have come to expect.

*The image below merges a Google Earth image (bottom) with a lidar point cloud model (top), illustrating the ALTM Orion's high density collection capability (survey flown at ~700 meters AGL).*



## Key Design Features

Optech's ALTM Orion incorporates the company's proprietary iFLEX™ technology. The result of decades of research into lidar measurement techniques and electronic design, iFLEX™ is the common platform at the core of Optech's next generation lidar technology—creating an infrastructure of unprecedented performance and accuracy across multiple products.

Available in two different laser wavelength configurations for increased application flexibility, ALTM Orion combines high-density data collection with high-precision results.

**The Orion-M Series** is a mid-altitude, high-performance mapping sensor designed to provide stunning data precision and accuracy typically demanded for engineering applications. Capable of collecting data at altitudes greater than 2000 m, the Orion-M is the ideal choice when small payload platforms and/or multi-application flexibility is desired.

**Laser Classification:** 1.0  $\mu\text{m}$  Class IV (US FDA 21 CFR)

**The Orion-C Series** is a low-altitude system designed specifically for corridor applications where maximum object detail is required. Whether because of its tremendous ground density capability (200 kHz effective) or its ability to easily integrate multiple peripheral imaging sensors, Orion-C is the preferred choice of industry professionals.

**Laser Classification:** 1.5  $\mu\text{m}$  Class IIIB (US FDA 21 CFR)



**Think Big  
Go Small**

*ALTM Orion with optional digital camera and mount*

### Features

- Ultra-compact sensor solution enabling small platform operation
- Choice of laser wavelengths
- Multi-peripheral imaging sensor capable
- Latest laser technology featuring 200 kHz sampling capability
- Automated roll compensation for straight data swaths below the collection platform
- GPS, GLONASS and L-band ready

### Benefits

- Extremely narrow laser pulse widths enable high measurement precision and accuracy
- Fully programmable FOV for incredible density
- Intensity capture with large dynamic range resulting in exceptional lidar image quality and small target detection
- Modular design approach for ease of installation, portability and serviceability



## SHOALS-3000 – Airborne Coastal Mapping and Charting System

The Optech SHOALS airborne lidar bathymeter is a fast, efficient and cost-effective remote sensing tool designed for near-shore coastal mapping applications. Incorporating both lidar and imaging capabilities, this multi-sensor system is capable of providing seamless topographic data acquisition of above- and below-water features and surfaces.

*The image below illustrates the SHOALS-3000 near shore mapping capability.*

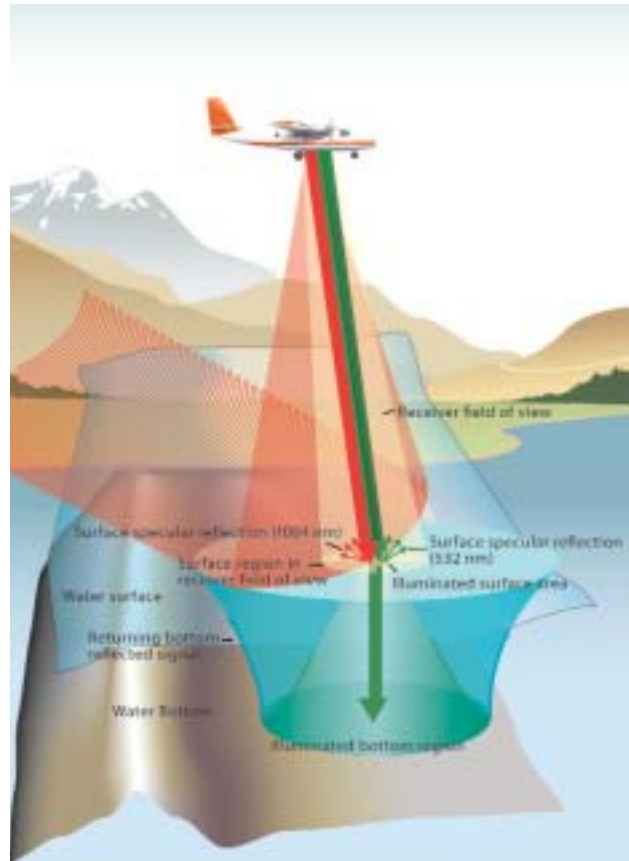


## Seamless Hydrographic Data Solutions

With 10% of the world's population living in coastal environments, topographic details below the water surface are just as important as those above it. Optech's SHOALS-3000 hydrographic mapping system is able to acquire high-resolution 3D data and imagery in the most efficient way possible, and in those areas not accessible by other methods, meeting the demand for data in the near-shore environment.

## Airborne Laser Bathymetry

Airborne laser bathymetry relies on the differential timing of laser pulses reflected from the water surface and under the water surface to determine the water depth at the point where the laser pulses strike the water surface. The SHOALS-3000 sensor and data processing systems implement this principle via waveform analysis for maximum target accuracy.



Physical principles of operation in the SHOALS-3000 airborne laser bathymeter



## Your Total Survey Solution

### Key Design Features

Optech's SHOALS-3000 hydrographic mapping sensor creates seamless data models with the latest in processing workflows and real-time data display capability.

#### Features

- GPS, GLONASS and L-band ready
- Fully automated workflow with Shallow Water Algorithm (SWA)
- Data end-products that include detailed above- and below-water surface models with assigned confidence limits, supporting photo imagery, bottom reflectance imagery for subsurface classification, and waveforms

#### Benefits

- Collects 3,000 water depth soundings per second
- Achieves IHO Order 1 standard (or better)
- Capable of area coverage rates as high as 70 km<sup>2</sup> per hour



# Installation Scenarios

## ALTM Gemini – High-Altitude, Wide Area Mapping System

ALTM Gemini comprises an independent sensor head and control rack. The only “drop-in” design on the market, its half-portal sensor size means ease of installation and unrestricted field-of-view. The design allows an off-nadir approach to surveying for increased vertical point density via an optional tilt-mount.

The standard system comes with a complete flight management solution with LCD pilot display and in-air mission planning capability.

GPS/GLONASS/L-Band capable, ALTM Gemini enables accurate survey data results anywhere, anytime.

### Dimensions and Weights:

**Sensor:**

26 cm (w) x 19 cm (l) x 57 cm (h); 23 kg

**Control Rack:**

65 cm (w) x 59 cm (l) x 49 cm (h); 53 kg

### Power Requirements:

28 VDC; 35 A (nominal)



## ALTM Orion – Ultra-Compact Mapping System

ALTM Orion eliminates the need for an external control rack, simplifying installation and removal, and enabling exceptional system portability. With a total volume of less than 0.03 m<sup>3</sup> (1.0 ft<sup>3</sup>), and possessing a relatively low power rating (< 300 W), installation of a complete lidar sensor solution in even the smallest of airborne platforms is now possible.

An optional power distribution unit and conditioner provides additional power capability to peripheral imaging sensors and components.

With an underlying design configurable for UAV (unmanned aerial vehicle) platforms, ALTM Orion also offers remote-operation capability in a readily available COTS (Commercial-Off-The-Shelf) solution for ISR (Intelligence, Surveillance, Reconnaissance) applications.

### Dimensions and Weights:

**Sensor:**

34 cm (w) x 34 cm (l) x 25 cm (h); 27 kg

### Power Requirements:

28 VDC; 12 A (300 W) nominal

## SHOALS-3000 – Airborne Coastal Mapping and Charting System

The SHOALS-3000 is a multi-chassis design featuring system control and operation via a ruggedized laptop for increased flexibility and reliability. Optional L-Band (OmniStar) enables real-time GPS correction capability for accurate surveying results when GPS ground stations are not available.

### Dimensions and Weights:

**Sensor:**

50 cm (w) x 58 cm (l) x 80 cm (h); 75 kg

**Control Rack:**

53 cm (w) x 60 cm (l) x 40 cm (h); 34 kg

**Laser Chiller:**

53 cm (w) x 59 cm (l) x 44H cm (h); 40 kg

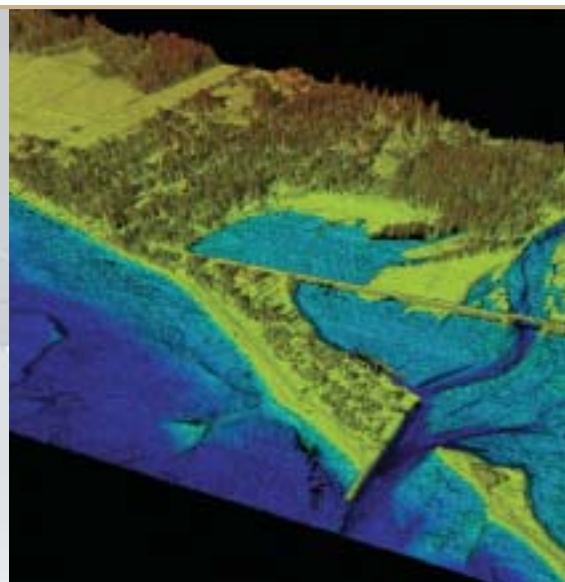
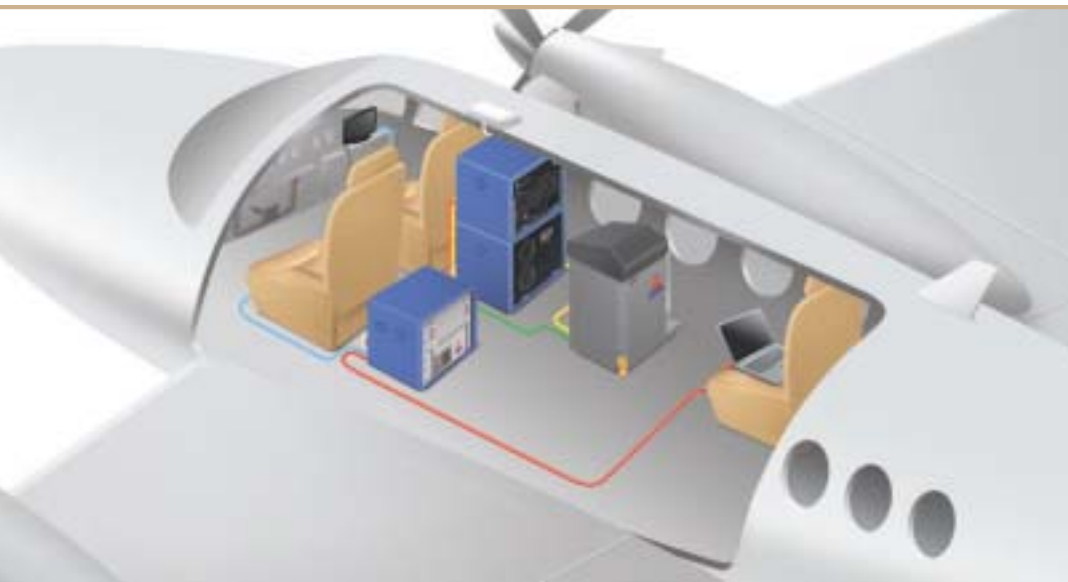
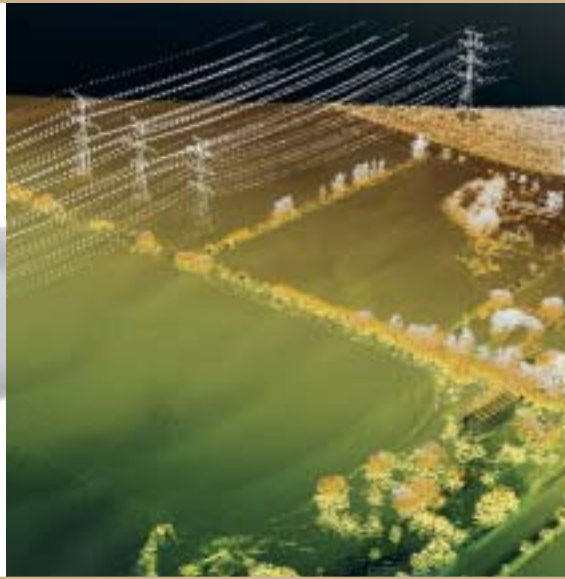
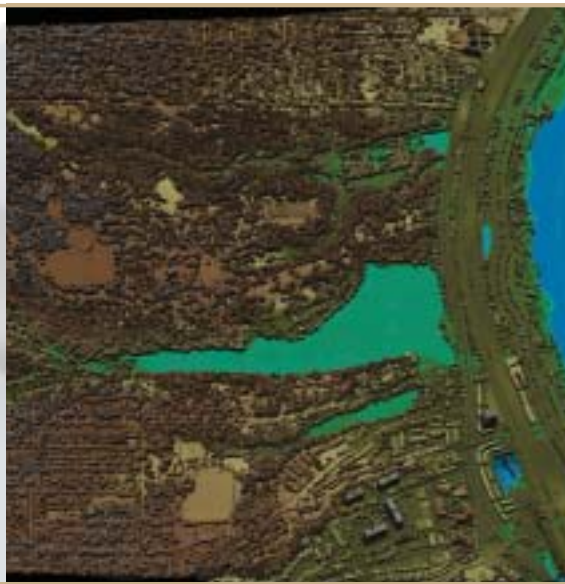
**Laser rack:**

53 cm (w) x 59 cm (l) x 49 cm (h) : 45 kg

### Power Requirements:

28 VDC; 70 A (nominal)





## Complete Workflow Solutions

Optech's software suites incorporate the latest toolsets and algorithms to deliver the results you need when you need them, and in the most efficient means possible. Whether you require a change to your mission plan parameters while in the air, or the ability to generate a "quick-view" of the data immediately following a collect, Optech has you covered.



### ALTM-NAV™

Optech's ALTM-NAV Flight Management Software provides complete pre-mission and in-air flight planning capability, sensor system control and monitoring, and navigation in a single easy-to-use package. With integrated lidar and camera planning capability for simultaneous multi-sensor collects, underlying DEM planning capability, and real-time swath coverage directly exportable to Google Earth™, ALTM-NAV enables ease of use and efficiency.



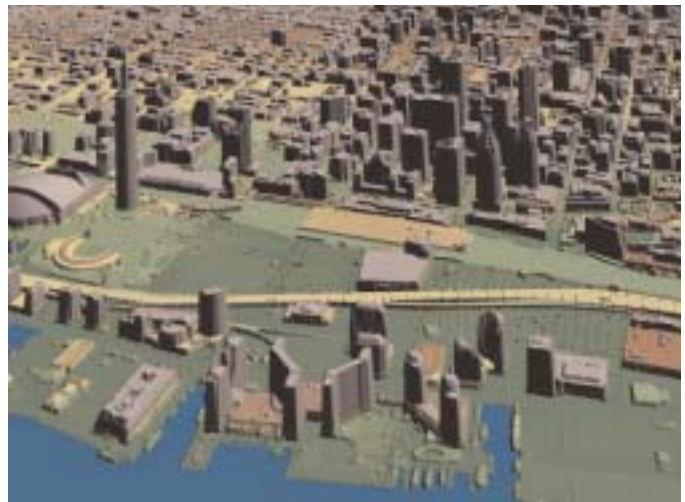
*Mission planning and data collection via ALTM-NAV*

### DASHMap™

A fully featured processing suite, DASHMap enables you to process mobile data quickly and accurately. Apply filters to your data, perform coordinate transformations, and output the data to a variety of file formats, all with DASHMap's simple interface. Designed to handle large data volumes, DASHMap optimizes your processing speed.



*DASHMap lidar point cloud*



*Lidar DEM*

## **Optech's Commitment to Global Support**

Optech's commitment to servicing and supporting its products is proven by its dedicated support system. Staffed with knowledgeable data analysts and hardware technicians, Optech's goal is to minimize downtime and maximize productive survey time.

### **Optech Services Helpdesk and 24/7 Client Support**

To ensure prompt responses, all warranty holders have a direct line to Optech Services, which provides necessary support 24 hours a day, throughout the year (excluding December 25 and 26).

Providing highly experienced Field Service, Hardware Service and Software Services personnel, Optech's Services team assists and trains clients during installation and surveys, performs remote hardware maintenance, diagnostic and in-field repairs, and delivers on-demand assistance for anything related to lidar surveying.



## About Optech

Optech Incorporated is the global market leader in the development, manufacture and support of advanced laser-based surveying, mapping and imaging instruments.

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