

*Complete Solutions for Airborne Surveying*



**Experience. The Difference.**



ALTM Orion ultra-compact mapping system

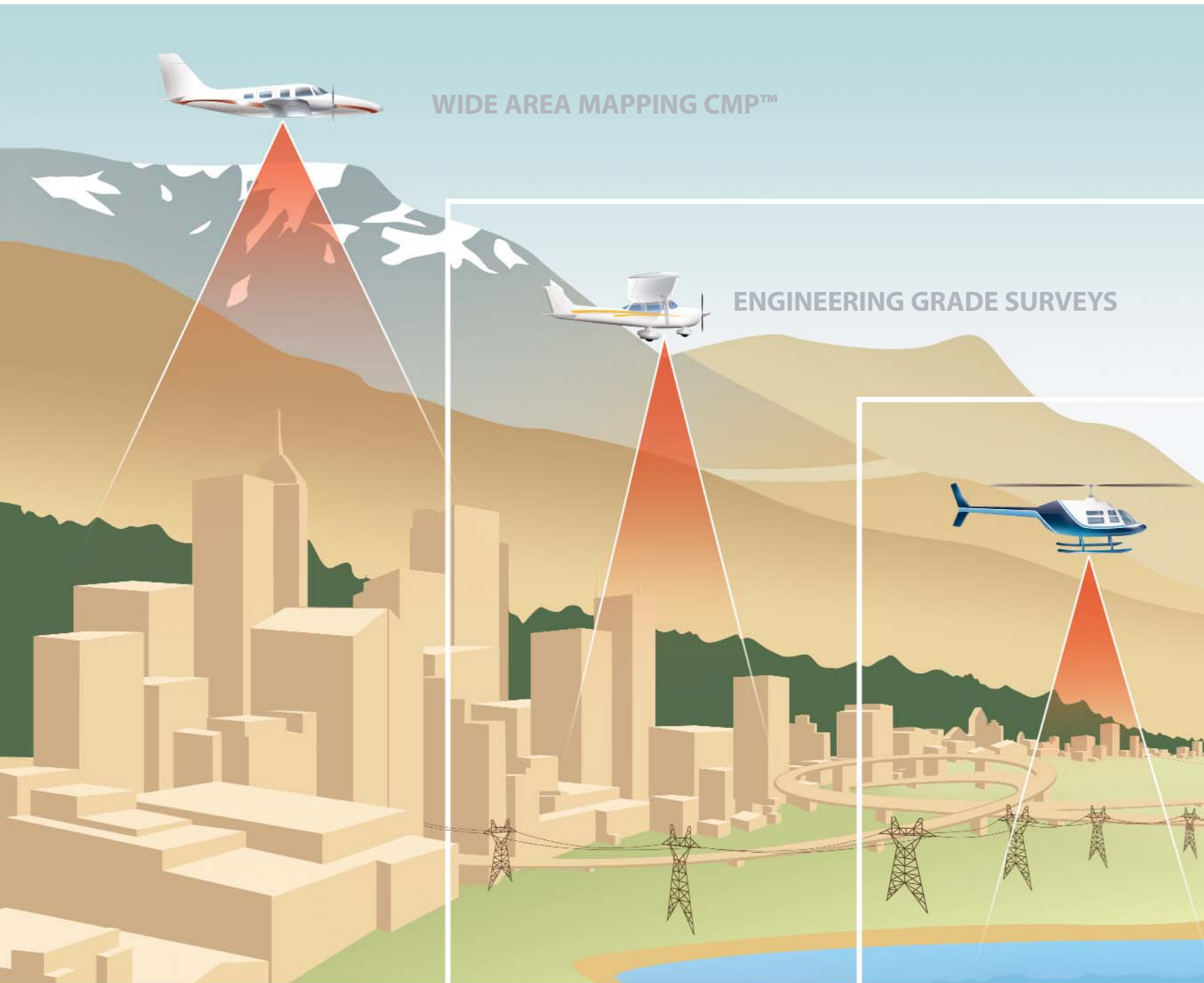


Optech's prominence as a world leader in the development and manufacture of advanced laser-based survey and imaging instruments extends over 35 years. During this time, Optech has worked closely with academic, government, military, naval, air force and space-based organizations to meet their specialized 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. Our market-leading SHOALS coastal mapping system enables water depth and bottom reflectance measurements 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.**

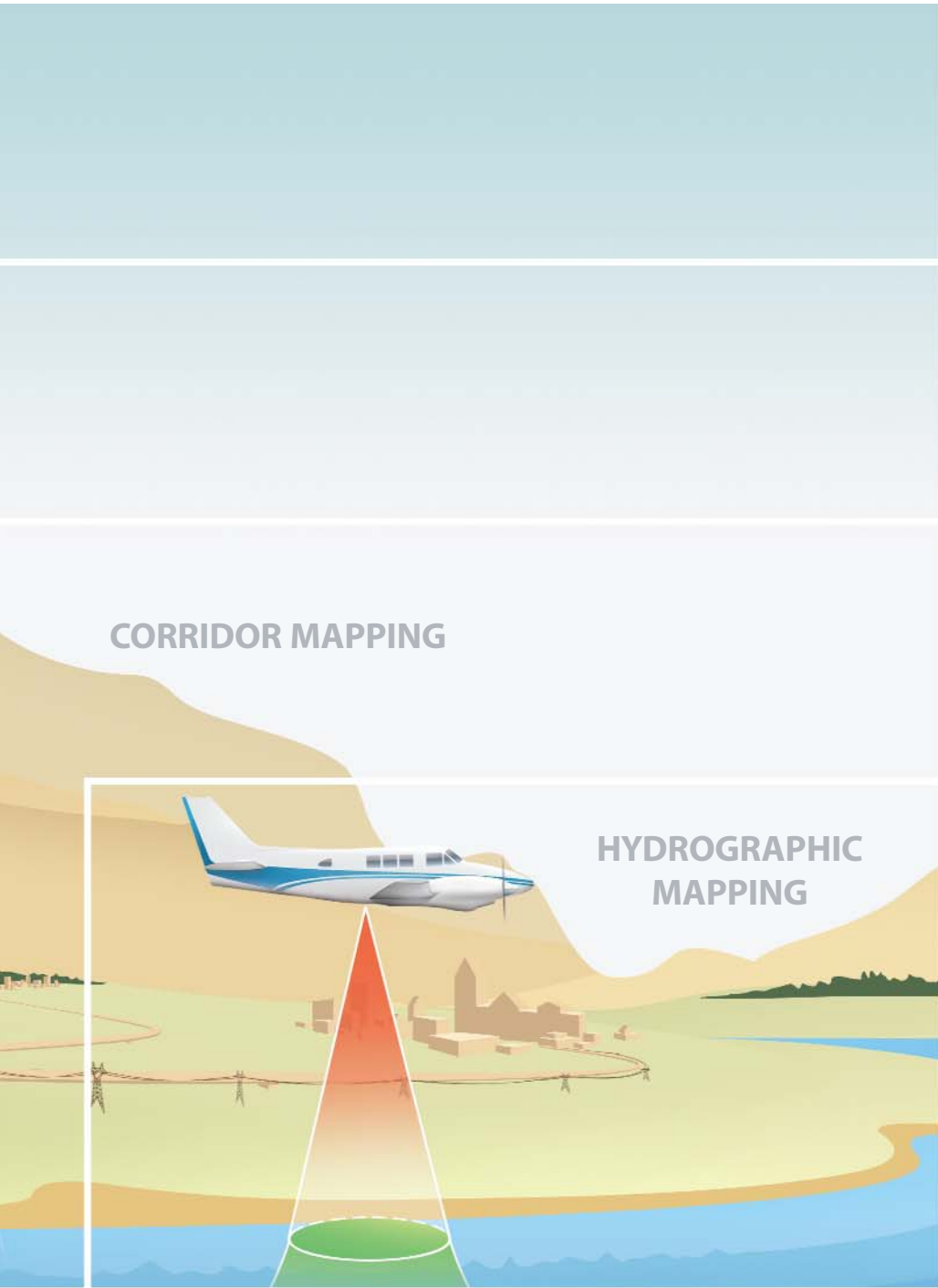


WIDE AREA MAPPING CMP™

ENGINEERING 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 faced with small-payload constraints, Optech has the sensor for you. Incorporating many standard features to maximize your survey efficiency, our sensors go one step further with the key features and capabilities designed specifically to enable high-resolution models with the highest possible accuracy and precision.



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 Pegasus—The World's First Commercial Multi-Laser System**

The ALTM Pegasus is a breakthrough in conventional lidar system configuration. Using multiple lasers, the Pegasus operates at higher altitudes and with a higher ground point density than any other airborne lidar system today. Offering a wide field of view and a multi-look-angle configuration, the ALTM Pegasus excels at maximizing high-accuracy data coverage and providing increased vertical target detection when compared to traditional laser designs. To reduce laser shadowing and reveal fine detail and vertical surfaces, the choice is clear-ALTM Pegasus.



## **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 digital surface model (DSM), 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™*

## Multipulse - The Technology

Multipulse 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, without the hassle of planning around the data "blind zones" common to other multipulse technologies.



**Maximize  
Your Efficiency**

## Key Design Features

The ALTM Gemini has the only "drop-in" sensor on the market. Its half-portal size delivers easy installation and an 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

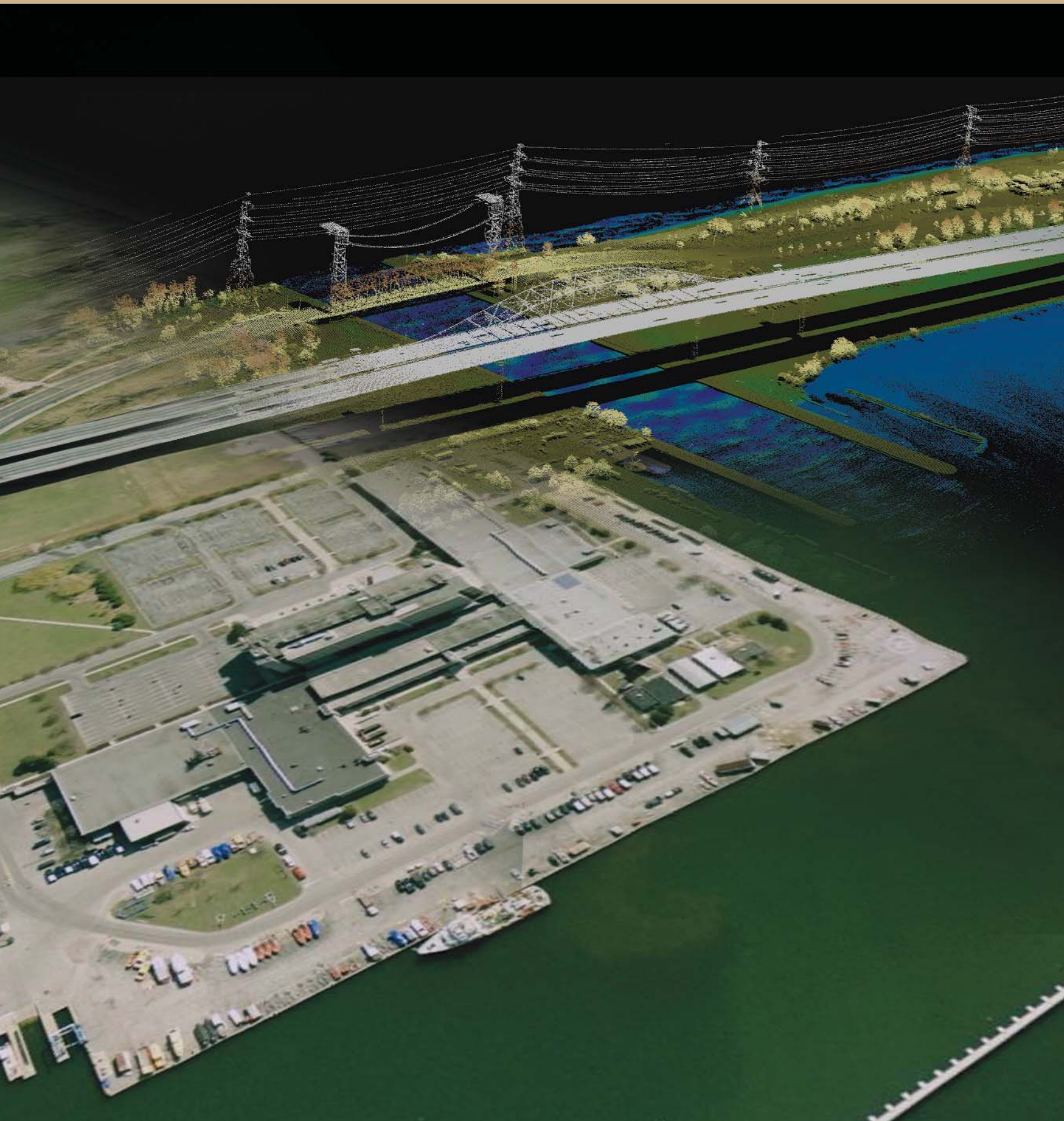
### Benefits

- 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, the Orion delivers 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 models for increased application flexibility, the ALTM Orion combines high-density data collection with high-precision results.

**The Orion M Series** is a mid-altitude, high-performance mapping sensor that provides the stunning data precision and accuracy typically demanded for engineering applications. Capable of collecting exceptional data quality at altitudes above 2000 m, the Orion M is the ideal choice when small payload platforms or multi-application flexibility is required.

**The Orion C Series** is a low-altitude system designed specifically for corridor applications where maximum object detail and high precision data sets are required. Offering tremendous ground density capability (200 kHz effective) and the ability to operate with complete eye-safety at extremely low altitudes (<7m NOHD), the Orion C is the preferred choice of industry professionals.



**Think Big  
Go Small**

*ALTM Orion with optional digital camera and mount*

### Features

- Ultra-compact sensor solution enabling small platform operation
- 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 for near-shore coastal mapping applications. Incorporating both lidar and imaging capabilities, this multi-sensor system delivers seamless topographic data of above- and below-water features and surfaces.

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

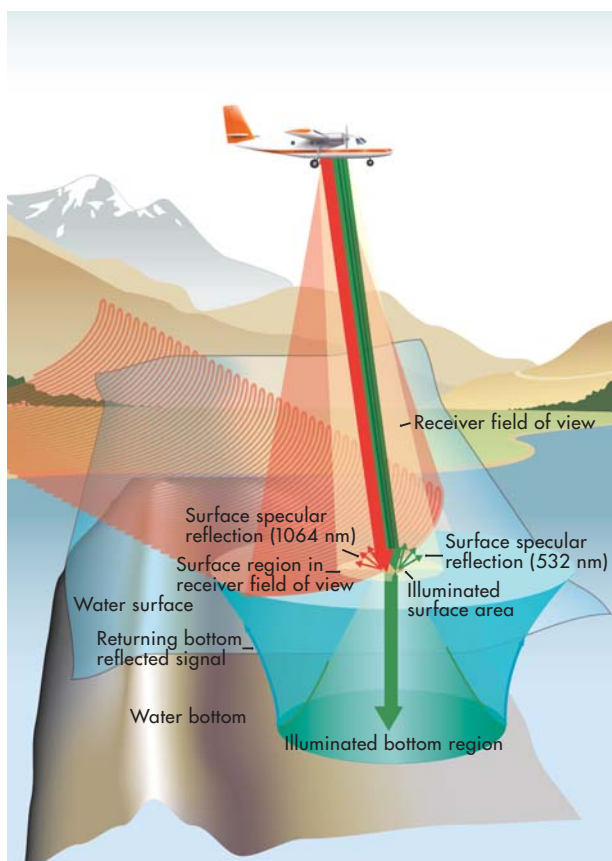


## Seamless Hydrographic Data Solutions

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 acquires high-resolution 3D data and imagery efficiently and in areas not accessible by other methods, meeting the growing 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 principle 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

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

#### Benefits

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

# Installation Scenarios

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

The ALTM Gemini has an independent sensor head and control rack. With the only drop-in design on the market, its half-portal sensor size provides easy installation and an 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 includes a complete flight management solution with LCD pilot display and in-air mission planning capability.

GPS/GLONASS/L-Band capable, the ALTM Gemini delivers accurate survey data results anywhere, any time.

### **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***

The ALTM Orion eliminates the need for an external control rack, simplifying installation and removal for an exceptionally portable system. With a total volume of less than 0.03 m<sup>3</sup> (1.0 ft<sup>3</sup>) and 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 for peripheral imaging sensors and components.

With an underlying design that can be configured for unmanned aerial vehicle (UAV) platforms, the ALTM Orion also offers remote operation capability in a readily available Commercial-Off-The-Shelf (COTS) solution for Intelligence, Surveillance, Reconnaissance (ISR) 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) provides real-time GPS correction 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**

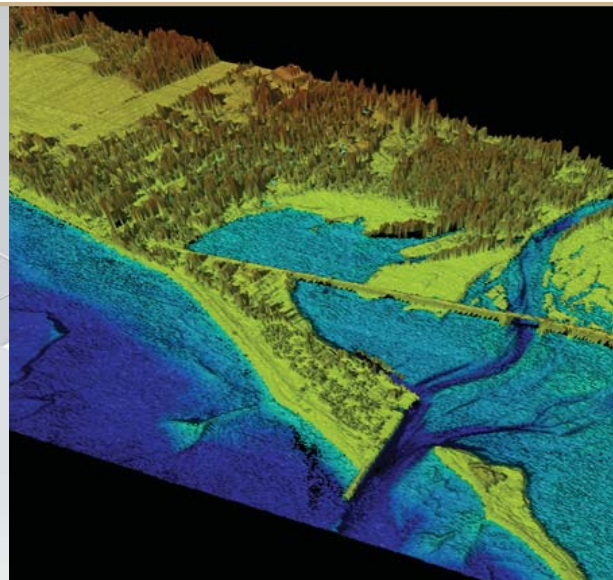
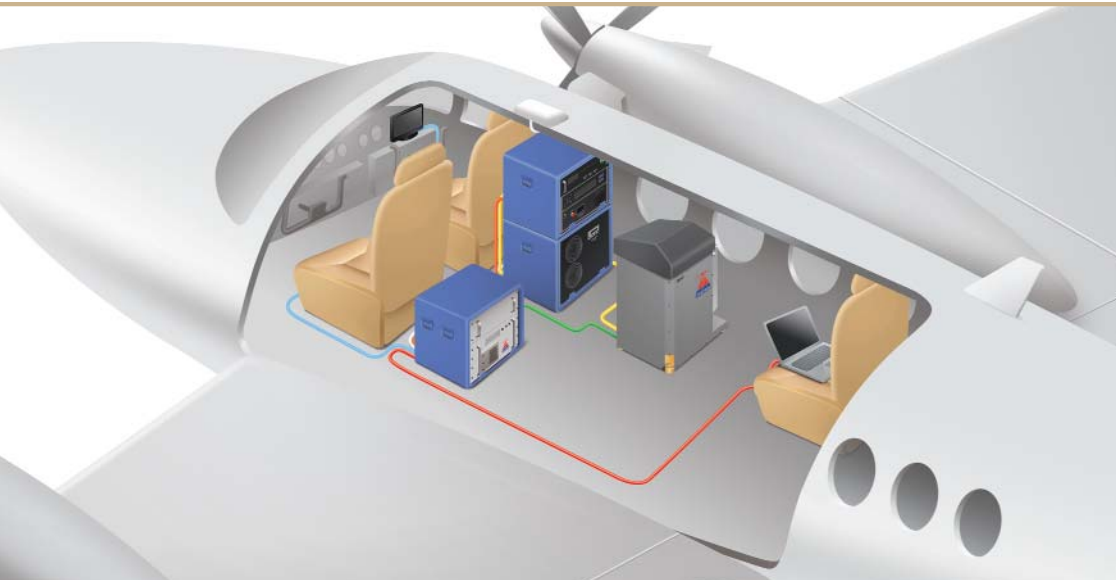
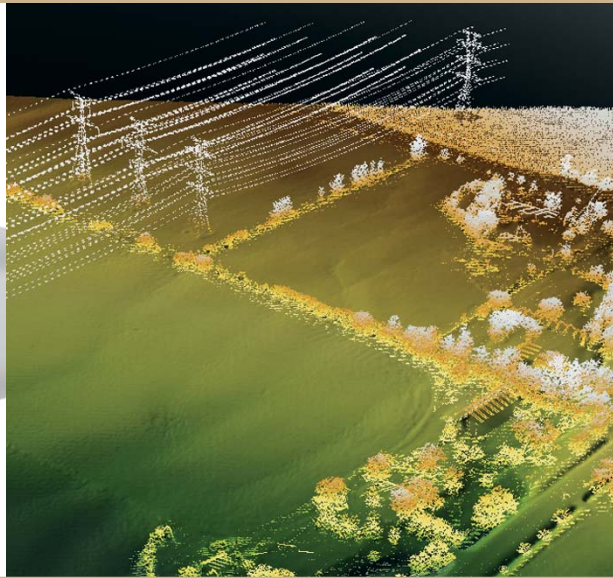
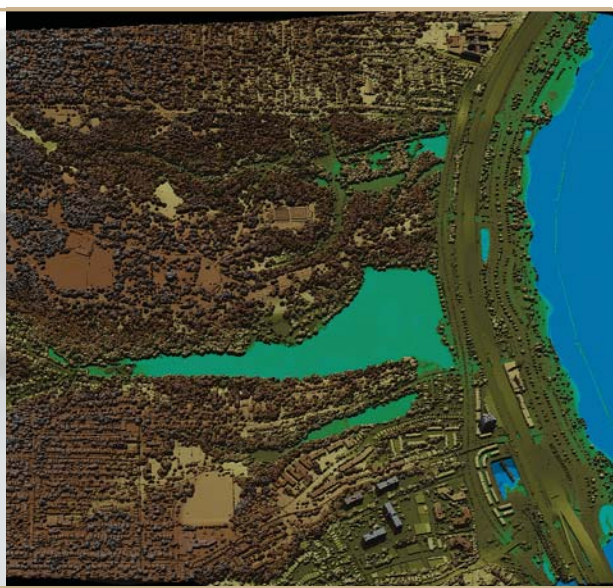
53 cm (w) x 59 cm (l) x 44H cm (h); 40 kg

#### **Laser Rack**

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

### **Power Requirements**

28 VDC; 70 A (nominal)



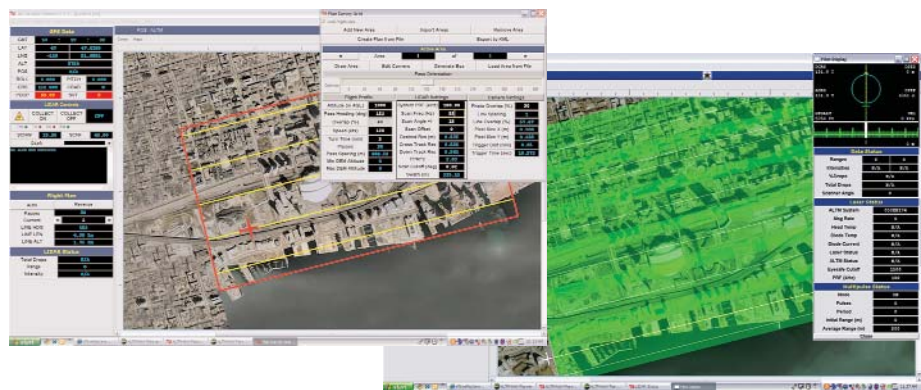
## Complete Workflow Solutions

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



### ALTM-NAV™

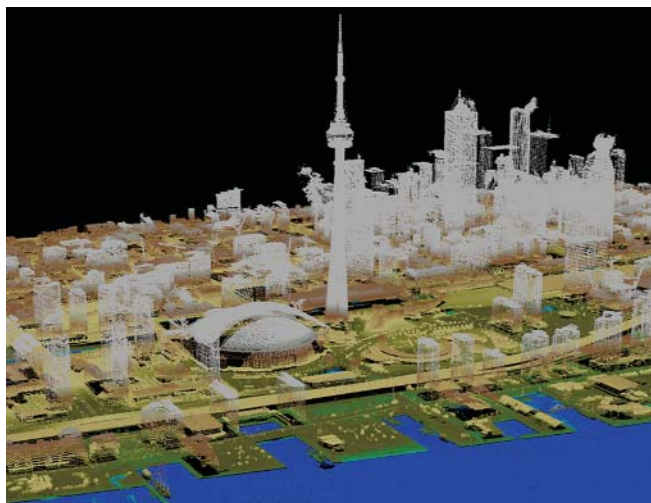
Optech's ALTM-NAV Flight Management Software provides complete pre-mission and in-air flight planning capability, sensor system control and monitoring, and navigation, all in a single easy-to-use package. With integrated lidar and camera planning capability for simultaneous multi-sensor data collection,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



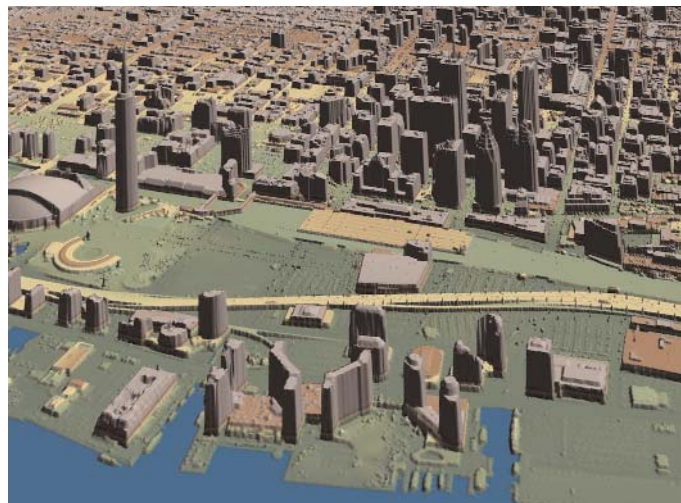
Mission planning and data collection via ALTM-NAV

### 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



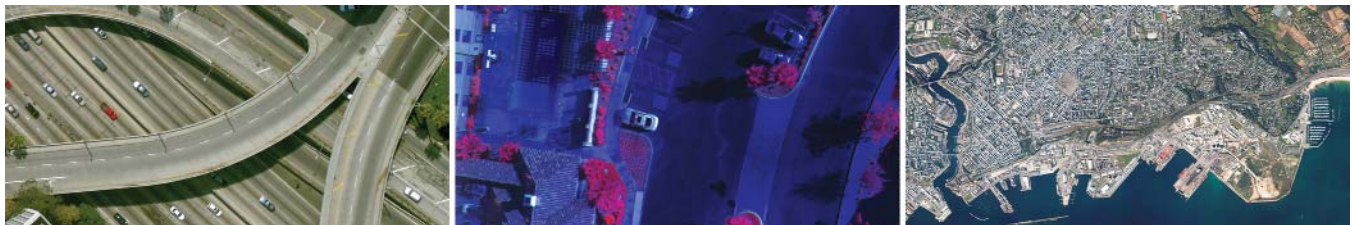
Lidar DEM

## Complete Line of Aerial Digital Cameras

Optech's high-performance aerial digital cameras are ready for integration with the ALTM. Available with a wide array of multi-sensor mounts and lenses, Optech cameras let you build a sensor suite that perfectly fits your application requirements.

Applications include:

- High-accuracy orthographic photography
- Oblique imaging
- Thermal imaging
- Multispectral imaging.



## Optech's Commitment to Global Support

Optech's commitment to servicing and supporting its products is backed up by our 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 technical support 24 hours a day throughout the year (excluding December 25 and 26).

Highly experienced Field Service, Hardware Service and Software Services personnel assist and train clients during installation and surveys, perform remote hardware maintenance, diagnostic and in-field repairs, and deliver on-demand assistance for everything related to lidar surveying.



## About Optech

Optech is the world leader in the development, manufacture and support of advanced lidar and imaging-based survey instruments. With operations and staff worldwide, Optech offers both standalone and fully integrated lidar and camera solutions in airborne terrestrial mapping, airborne laser bathymetry, mobile mapping, mine cavity monitoring, and industrial process control, as well as space-proven sensors.

## Optech Incorporated

300 Interchange Way  
Vaughan, ON  
Canada L4K 5Z8

Tel: +1 905 660 0808  
Fax: +1 905 660 0829

[www.optech.ca](http://www.optech.ca)

