



**NEW** 1,000,000  
Measurements/Second

# ALTM Galaxy T1000 Airborne Lidar Terrain Mapper

High-performance, ultra-compact, airborne lidar sensor for wide-area, mountain and corridor survey applications

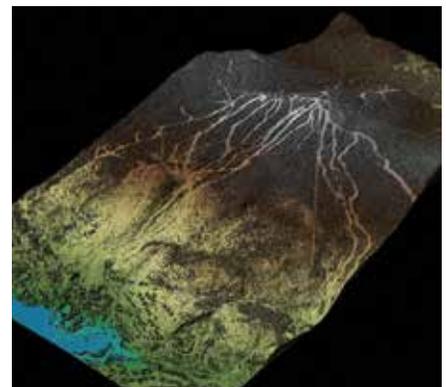
The new ALTM Galaxy is the ultimate wide-area lidar sensor, with best-of-class density performance and collection efficiency. Now with a 1-MHz "on-ground" collection rate, Galaxy is quite simply the highest-performance sensor on the market in the smallest form factor for maximum application and platform flexibility.

Galaxy represents a giant leap ahead of its competitors in every way. Whether gyro-stabilized or fixed-mounted, high-altitude or low, one camera or six, Galaxy offers incredible collection efficiency and configuration flexibility with the highest data precision and accuracy available.



**APPLICATIONS**

- » Wide-area mapping
- » Urban mapping
- » Natural resource management
- » Engineering & infrastructure modeling
- » Powerline & transportation corridor



Continuous Operating Envelope



Increased Vertical Density



Seamlessly Integrated Cameras

# What is the secret to Galaxy's performance advantage?

POWERED BY

PulseTRAK™

POWERED BY

SwathTRAK™



Galaxy includes an innovative set of lidar technology enhancements that significantly increases sensor performance and collection efficiency, improves data quality, and greatly simplifies the collection process.

**These new enhancements include:**

## 1. Continuous Operating Envelope

PulseTRAK™ technology enables a truly continuous operating envelope by eliminating the data coverage gaps and irregular point density commonly found with other multipulse-equipped sensors. This feature greatly simplifies mission planning and produces consistent data distribution throughout the entire dataset, even across receiver "blind" zones.

- » Enables consistent point density with no more receiver "blind" zones.
- » Complete collection freedom irrespective of terrain variability significantly enhances efficiency.
- » Greatly simplifies mission planning.

## 2. Dynamic Field of View (FOV)

Galaxy, with SwathTRAK™ technology, is the first sensor to incorporate a real-time dynamic FOV that maintains fixed-width swaths, even in varying terrain heights.

- » Maintains regular point distribution and improves point density consistency despite changes in terrain height.
- » Fewer number of flightlines, compared to fixed-FOV sensors, for maximum collection efficiency.
- » 40-70% collection cost savings, depending on terrain variability, over fixed-FOV sensor designs.

## 3. Real-time Sensor Protocol

Galaxy incorporates a real-time sensor protocol to enable in-air target observation and collection monitoring, significantly increasing collection confidence.

- » Real-time XYZi point display enables true-coverage verification over the entire operating envelope, even across multipulse transition zones.
- » In-air target detection and monitoring confirms detection of small targets such as powerlines in real-time.
- » Real-time LAS file generation produces immediate data deliverables.

## 4. High-Performance Scanner

A new, high-performance galvanometric scanner forms the foundation of Galaxy's exceptional performance capability. Featuring extremely high torque and minimal electrical inductance, the new scanner provides superior scan speeds at reduced voltages for a significant boost in performance, reliability, and scan linearity, enhancing data quality and point distribution. Improved scanner stability produces maximum calibration consistency.

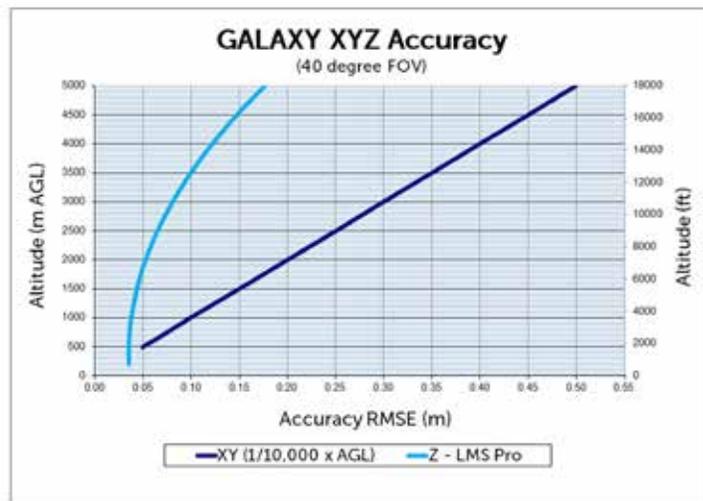
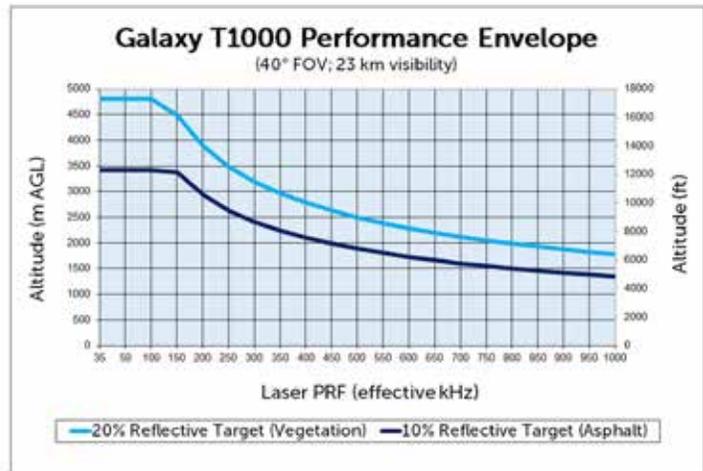
- » Improves XY point distribution at higher PRF sample rates.
- » Enables faster aircraft velocities and wider scan FOVs, as well as dramatic increases in point density at lesser FOVs.



**FIND OUT MORE** about Optech Galaxy  
[www.teledyneoptech.com/galaxy](http://www.teledyneoptech.com/galaxy)

# The ALTM Galaxy T1000 Advantage

- » 1-MHz "on-ground" collection rate enables unprecedented point density.
- » PulseTRAK™ technology enables a continuous operating envelope that can accommodate high-relief terrain with no data gaps or loss of density across multipulse transition zones.
- » SwathTRAK™ technology can reduce operating costs by as much as 70% by maintaining fixed-width flightlines for consistent point density and fewer flightlines in variable terrain.
- » Capable of up to 8 returns per emitted pulse, Galaxy guarantees the highest vertical density possible without the processing and storage burden of voluminous waveform capture (full waveform capture optionally available).
- » Unique real-time sensor protocol enables in-air point cloud display for true-coverage verification and immediate rapid-response deliverables in LAS format.
- » Optech Flight Management Suite provides integrated planning (with immersive 3D capabilities), navigation, and simultaneous control and monitoring for up to 8 sensors.
- » Industry-leading raw data precision and accuracy enables survey-grade deliverables for complete USGS Lidar Base Specification compliance (QL0/QL1/QL2) and the highest quality map products possible.
- » Gyro-stabilized and multi-sensor mounts maximize collection efficiency and enable custom sensor suites tailored to your application requirements.
- » Powerful Optech LMS Lidar Mapping Suite automates sensor calibration, maximizes laser point accuracies and quantifies project accuracy deliverables.



## GALAXY PRODUCTIVITY EXAMPLES (flat terrain) <sup>1</sup>

Average Point Density	2 pts/m <sup>2</sup>	8 pts/m <sup>2</sup>	20 pts/m <sup>2</sup>	60 pts/m <sup>2</sup>
Flight Altitude (AGL)	7220 ft/2200 m	4600 ft/1400 m	3770 ft/1150 m	1640 ft/500 m
Ground Speed	210 kn	150 kn	115 kn	115 kn
Swath Width	2540 m	1617 m	840 m	268 m
Productivity	990 km <sup>2</sup> /hr	450 km <sup>2</sup> /hr	170 km <sup>2</sup> /hr	57 km <sup>2</sup> /hr
Ground Measurement Rate <sup>2</sup>	550,000 meas./sec	1,000,000 meas./sec	1,000,000 meas./sec	1,000,000 meas./sec

1. 20% reflective target; 90% probability of detection 2. Assumes single target measurement per emission (up to 8 available)

# ALTM Galaxy T1000

## Technical Specifications

Parameter	Specification
<b>Sensor Performance</b>	
Performance envelope <sup>1, 2, 3, 4</sup>	150-4700 m AGL, nominal
Absolute horizontal accuracy <sup>2, 3</sup>	1/10,000 × altitude; 1 $\sigma$
Absolute elevation accuracy <sup>2, 3</sup>	< 0.03-0.20 m RMSE from 150-4700 m A
<b>Laser Configuration</b>	
Topographic laser	1064-nm near-infrared
Laser classification	Class IV (US FDA 21 CFR 1040.10 and 1040.11; IEC/EN 60825-1)
Pulse repetition frequency (effective)	Programmable, 50-1000 kHz
Beam divergence	0.25 mrad (1/e)
Laser range precision <sup>5</sup>	< 0.008 m, 1 $\sigma$
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)
<b>Sensor Configuration</b>	
Position and orientation system	POS AV™ AP60 (OEM); 220-channel dual frequency GNSS receiver; GNSS airborne antenna with Iridium filters; high-accuracy AIMU (Type 57); non-ITAR
Scan angle (FOV)	10-60°
Swath width	10-115% of altitude AGL
Scan frequency	0-120 Hz advertised (0-240 scan lines/sec)
Scan product	2000 maximum
Flight management system	Optech FMS (Airborne Mission Manager and Nav) with operator console
SwathTRAK™	Dynamic FOV for fixed-width data swaths in variable terrain
PulseTRAK™	Multipulse tracking algorithm with no density loss across PIA transition zones
Roll compensation	±5° minimum
Data storage	Internal solid-state drive (SSD)
Power requirements	28 V; 300 W
Dimensions and weight	Sensor: 0.34 × 0.34 × 0.25 m, 27 kg — PDU: 0.42 × 0.33 × 0.10 m, 6.5 kg
Operating temperature	0 to +35°C
<b>Optional Peripherals</b>	
External data storage	Ruggedized, removable 2.5" SSD
Image capture	Compatible with all Optech CS-Series and most 3rd party digital metric cameras
Full waveform capture	12-bit Optech IWR-3 Intelligent Waveform Recorder with removable SSD
Gyro-stabilization	SOMAG GSM 3000/4000 integration kit
Multi-sensor mounts and pods	2 and 4-station machined aluminum sensor mounts (aircraft and/or helicopter) Carbon-fiber sensor mounts supporting nadir and fore/aft oblique cameras Heli-pod mount options for Bell 206/407 (FAA-approved)

1. Target reflectivity  $\geq 20\%$ ; 90% detection probability
2. Dependent on selected operational parameters; assumes nominal FOV of up to 40° in standard atmospheric conditions (i.e. 23-km visibility) and use of Optech LMS Professional software suite
3. Angle of incidence  $\leq 20^\circ$
4. Target size  $\geq$  laser footprint
5. Under Teledyne Optech test conditions, 1 sigma

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