TELEDYNE

Teledyne Geospatial

NEW Boost Mode and 6,500m AGL!

Galaxy PRIME+ Airborne Lidar Terrain Mapper

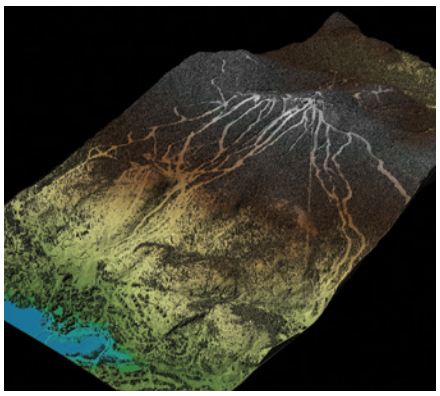
Maximum productivity for wide-area, mountain, urban and corridor survey applications

The new ALTM Galaxy PRIME+ is the ultimate wide-area lidar sensor, with best-of-class collection efficiency, smallest form factor and highest quality data sets to meet rigorous USGS lidar standards. Now with a 6500m AGL collection envelope and 1-MHz "on-ground" collection rate, Galaxy is quite simply the most productive sensor available with the lowest SWaP for maximum application and platform flexibility.

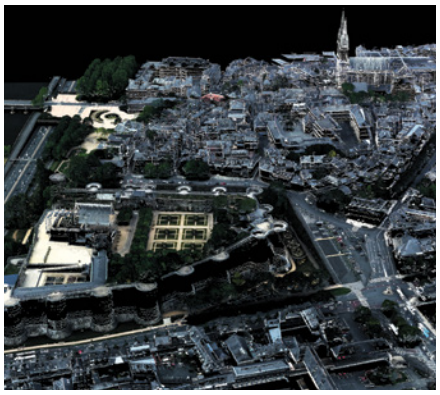
Whether gyro-stabilized or fixed-mounted, high-altitude or low, one camera or six, full waveform or discrete, Galaxy PRIME+ excels in all application areas with unmatched configuration flexibility, while providing the highest data precision and accuracy available.

APPLICATIONS

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



Continuous Operating Envelope



Increased Vertical Density

Seamlessly Integrated Cameras

www.teledyneoptech.com

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

POWERED BY PulseTRAK™ POWERED BY SwathTRAK™

Galaxy PRIME+ 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 only 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. Boost Mode

This new feature enables enhanced range performance and maximum detectability, day or night, when applications demand it.

» Improved range performance

» Improved small target detection

» Improved vegetation penetration

4. 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.

5. 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.

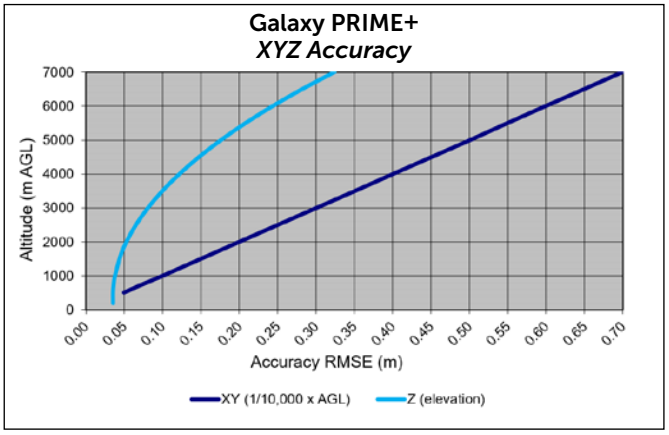
Galaxy PRIME+ Advantage

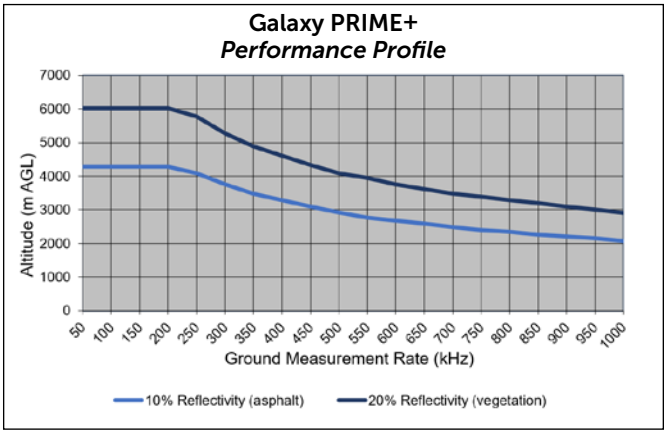
- 1-MHz "on-ground" collection rate enables unprecedented point density.
- Large performance envelope ensures collection confidence in both flat and rugged terrain types.
- PulseTRAK™ technology enables a continuous operating envelope that can accommodate high-relief terrain with no data gaps or loss 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.
- Innovative "Boost Mode" feature increases range performance by as much as 20%.
- 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 PRIME+ PRODUCTIVITY EXAMPLES [1, 2]

	BOOST MODE	STANDARD MODE	STANDARD MODE			
Average Point Density	**2 pts/m²**		**8 pts/m²**	**20 pts/m²**	**60 pts/m²**	**180 pts/m²**
Flight Altitude (AGL)	9810 ft/2990 m	8333 ft/2540 m	5216 ft/1590 m	3773 ft/1150 m	1640 ft/500 m	1640 ft/500 m
Ground Speed	315 kn	315 kn	210 kn	115 kn	115 kn	60 kn
Swath Width	2790 m	2370 m	1160 m	840 m	270 m	175 m
Instantaneous Coverage Rate	1465 km²/hr	1245 km²/hr	450 km²/hr	180 km²/hr	60 km²/hr	20 km²/hr
Ground Measurement Rate (kHz)	900,000 meas./sec	750,000 meas./sec	1,000,000 meas./sec	1,000,000 meas./sec	1,000,000 meas./sec	1,000,000 meas./sec

1. Calculated for 20% reflective targets; 99% detection probability, full footprint interception
2. Corrected for 10% flightline sidelap for 2 and 8 pts/m² (scanner roll compensation enabled)





Galaxy PRIME+
Technical Specifications

Parameter	Specification
Sensor Performance	
Performance envelope [1, 2, 3, 4]	150-6500 m AGL, nominal
Absolute horizontal accuracy [2, 3]	1/10,000 × altitude; 1 σ
Absolute elevation accuracy [2, 3]	< 0.03-0.25 m RMSE from 150-6500 m AGL
Laser Configuration	
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	0.16 mrad (1/e) or 0.23 mrad (1/e2)
Laser range precision [5]	< 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)
Sensor Configuration	
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	Removable SSD (primary); internal SSD (spare)
Power requirements	28 V; 400 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
Optional Peripherals	
External data storage	Ruggedized, removable 2.5" SSD
Image capture	Compatible with all Optech CS-Series and most 3rd party digital metric cameras (integration kits available)
Full waveform capture	12-bit Optech IWR-3 Intelligent Waveform Recorder with removable SSD
Gyro-stabilization	SOMAG GSM4000 integration kit
Multi-sensor mounts and pods	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 ≥20%; 99% 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 ≤20°
4. Target size ≥ laser footprint
5. Under Teledyne Optech test conditions, 1 sigma

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