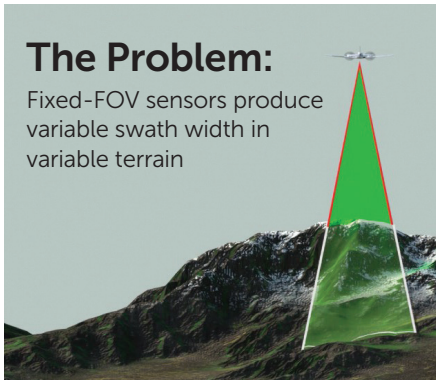
TELEDYNE OPTECH
Everywhereyoulook™
Part of the Teledyne Imaging Group

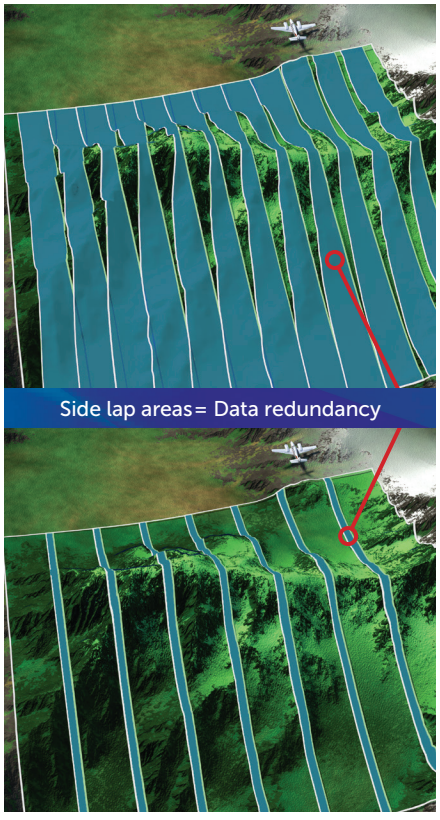
NEW G2 Sensor System

G2 Sensor System for Corridor and Wide Area Surveying

- Teledyne Optech's new G2 sensor system for the ALTM Galaxy is the perfect solution for doubling your collection efficiency and productivity on those really large survey projects.
- Designed specifically for the USGS 3DEP lidar program collections, the G2 sensor system enables efficiency and resolution comparable to FLASH lidar while maintaining independent range measurement and superior data fidelity.
- Leveraging the compact form factor of the award winning ALTM Galaxy, the G2 sensor system combines two Galaxy sensor heads and a 150 MP camera over a standard 19" aircraft sensor portal.
- The sensors are oriented and tilted in opposing directions to provide optimum scan geometry and point distribution of the combined data streams.
- The tilt is user configurable to 2.5 or 7 degrees which provides a forward and backward look at targets, and a maximized resolution on vertical targets like buildings, trees, and utility/telecom towers.
- The G2 sensor system enables full use of Galaxy's proprietary SwathTRAK capability to dramatically reduce collection and processing times in hilly and mountainous terrain, compared to fixed-FOV sensor configurations (see inset).
- A single flight management system controls and monitors both sensors, and is supported by a single high-accuracy Position Orientation System.
- The data from the sensors are co-processed and co-registered automatically in Optech's Lidar Mapping Suite, a lidar production workflow capable of processing both lidar and imagery.



Without SwathTRAK: 13 flightlines



With SwathTRAK: 8 flightlines

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G2 Sensor System

Key Features and Benefits

All the Features and Benefits of the ALTM Galaxy, now x2!

High Productivity — Reduce Your Collection Times in Half!

» The unique compact form factor of the ALTM Galaxy enables maximum configuration flexibility with a new option to install **two sensors into a single aircraft portal**, and/or fly separately for smaller jobs.

» Maintain all the unique Galaxy feature sets of SwathTRAK™ and PulseTRAK™ to stay ahead of your competition.

» With a doubling of the effective sampling rate, the G2 sensor system lidar point densities rivalling that of much more expensive FLASH lidar systems, but with the ease of collection, processing and data quality found only in a linear-mode lidar sensor.

Superior Data Fidelity

» Maintain the high measurement confidence possible only from independent range measurement (no data averaging required).

» 8 discrete returns with 8 intensity measures.

» Superior smooth surface repeatability.

Ease of Use

» Using your existing Optech workflows, plan and control both sensors via a single flight and mission management system.

» Single production workflow that processes, calibrates, co-registers and outputs survey-grade LAS files from both sensors, simultaneously.

Galaxy Configuration Options

1. Galaxy x2: Double Duty!

Two sensor heads co-mounted on a single sensor platform.

» Galaxy 1
» Galaxy 2
» G^2 mount
» Shared POS
» Shared FMS
» Lidar/camera processing software (Optech LMS)

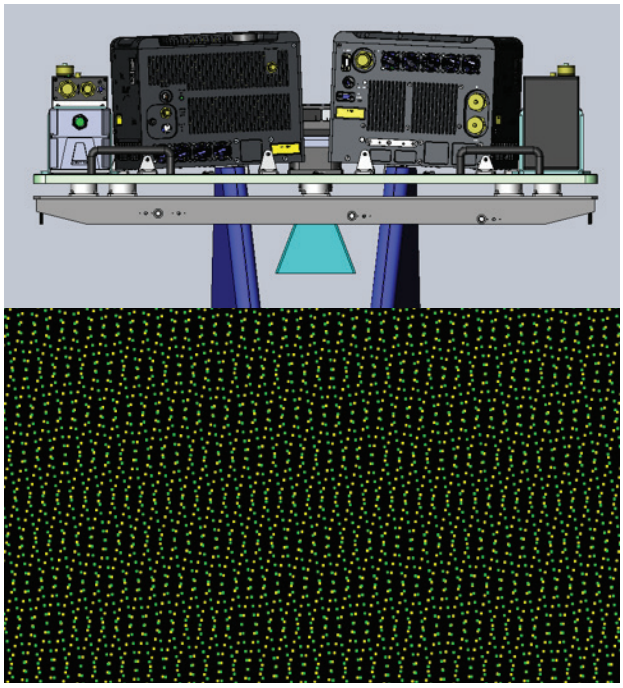
2. Galaxy 1+1: Divide and Conquer!

Separate and create two independent configurations for multiple projects.

GALAXY SYSTEM 1
» POS
» FMS
» Lidar/Camera Mount

GALAXY SYSTEM 2
» POS
» FMS
» Lidar/Camera Mount

» Lidar/camera processing software (Optech LMS) for both systems



Opposing sensor orientations enable more regular point distribution and improved target coverage.

Beam Geometry and Application Enhancement

Alternative laser beam geometry has unique advantages for improving data quality.

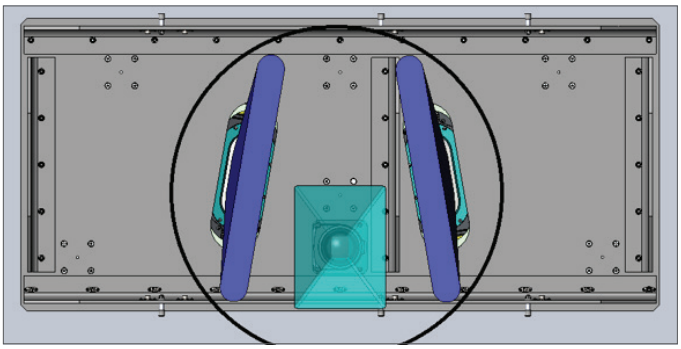
1. Inwardly facing fore/aft sensor tilt (2.5 or 7 degree pitch) enables forward and reverse look angles at the target in the flight direction, across the entire swath width. This helps to:

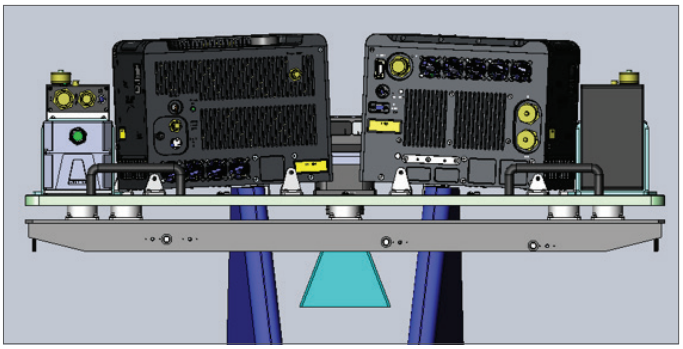
» Increase resolution of vertical surfaces/objects.
» Minimize ground "shadowing", or occlusions, for improved ground coverage.
» Provide a double pass over the target to increase overall model density and vegetation penetration success.

2. Opposing sensor orientations (±10° yaw) help to:

» Create a more regular point pattern on ground, and avoids scanline phasing for more consistent point density.
» Provide different look angles to the terrain for additional target coverage.

2x Galaxy T2000 Installed on G2 Sensor System Specifications





PARAMETER	SPECIFICATION
Mount Details	
G2 Mount Dimensions (with sensors)	1168 mm x 533 mm x 286 mm
Weight (G2 Mount)	16 kg
Weight (G2 mount + 2x Galaxy + iXM-RS150MP)	79 kg
Sensor Performance	
Range Performance [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) [1]	Programmable, 100-4000 kHz
Beam divergence	0.16 mrad (1/e) or 0.23 mrad ($1/e^2$)
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) [6]	10-60°
Maximum scan frequency [1]	640 scan lines/sec
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 x2 = 800 W

1. Galaxy T2000; 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 per sensor
6. Dependent on aircraft portal diameter and fuselage depth

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