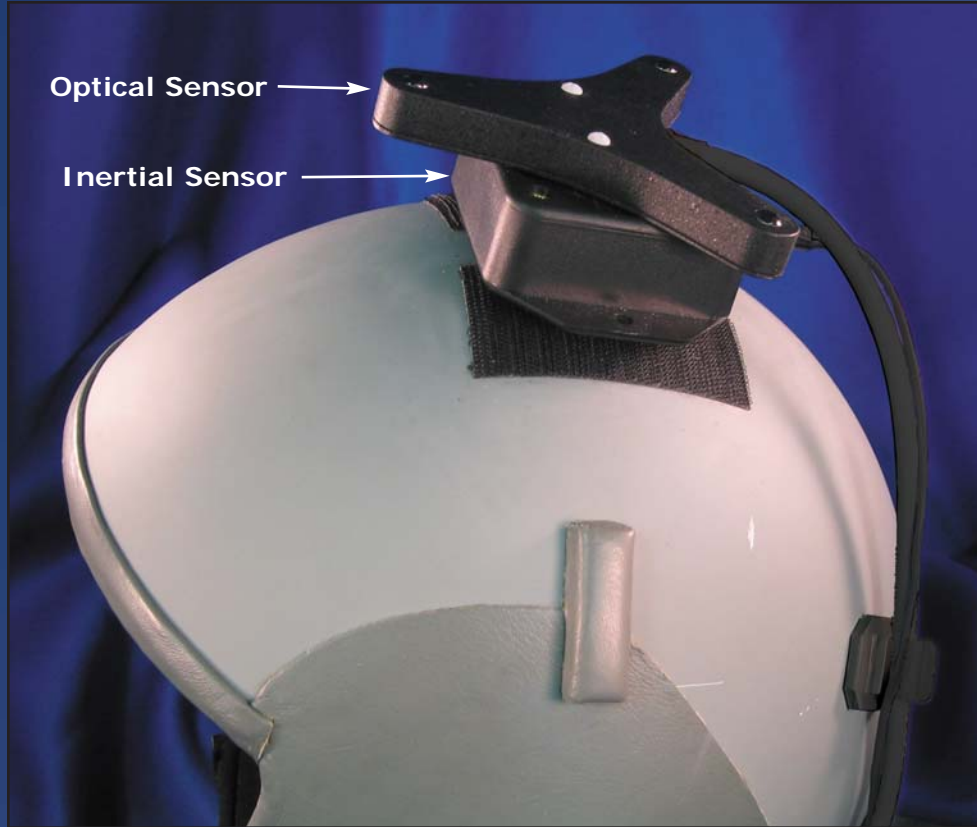


# Hy-BIRD<sup>TM</sup>

## Hybrid Optical / Inertial Tracker



*Optical and inertial sensors mounted on flight helmet*

## All-Attitude Helmet Tracking Without Occlusions

Hy-BIRD fuses optical and inertial technologies into one compact tracking solution. Its primary optical technology outputs highly accurate, fast tracking data. A fully integrated inertial tracker seamlessly continues tracking whenever the optical scanner is blocked or its field of view exceeded.

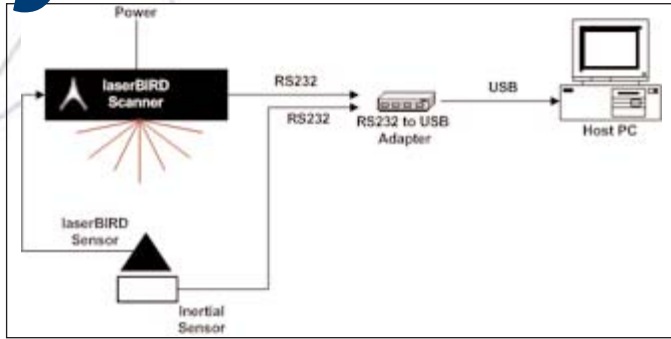
- Fused data streams for flawless 360° tracking
- High speed tracking with minimal lag
- Wide operational temperature range for inertial sensors
- Robust inertial sensor with embedded microprocessor

**Metal Immunity. Drift Compensation.**

 **Ascension**  
Technology Corporation

# Hy-BIRD™

## Hybrid Optical/Inertial Tracker



Hy-BIRD Block Diagram

### TECHNICAL

Degrees of Freedom:	<ul style="list-style-type: none"> <li>■ 6 (Position and Orientation) for optical mode;</li> <li>■ 3DOF for inertial or hybrid mode</li> </ul>
Tracker Field of View:	360°
Measurement Rates:	<ul style="list-style-type: none"> <li>■ Optical mode only: 240 Hz</li> <li>■ Inertial mode only: 100 Hz</li> <li>■ Hybrid mode: 70 - 75 Hz</li> </ul>
Interface:	RS-232 via USB serial adapter
RS-232 Reporting Time:	1.0 ms; 115.2 k Baud, Position and Euler Angles
Prediction:	laserBIRD only; customizable up to 50 ms
Range:	All attitude coverage from 0.15 m to 1.83 m
Positional Accuracy:	0.7 mm RMS; AVG filter on (optical mode only)
Positional Resolution:	@ 1 m: 0.1 mm
Angular Accuracies:	<ul style="list-style-type: none"> <li>■ laserBIRD: 0.5°; AVG filter on</li> <li>■ Inertial Unit: ± 0.5° (static); ± 2° typical (dynamic)</li> </ul>
Angular Resolution:	<ul style="list-style-type: none"> <li>■ laserBIRD: 0.05° at 1 m</li> <li>■ Inertial Unit: 0.1° minimum</li> </ul>

### PHYSICAL

Optical Scanner Dimensions:	32 cm x 9 cm x 4 cm (L X W X H)
Scanner Weight:	1.53 kg
Laser Sensor Dimensions:	10 cm x 9 cm x 1 cm (L X W X H)
Inertial Unit Dimensions:	6.5 cm x 9 cm x 2.5 cm (L X W X H)
Inertial Unit Weight:	74.6 g

### Laser Safety Standards Incorporated into laserBIRD:

EMC:  
EN61326-1: 1998; 47CFR; Part 15;  
Subpart B; Class A limits

Safety:  
EN61010-1; 1995

Laser Safety:  
FDA/CDRH: 21 CFR 1040.10-11  
Laser Hazard Classification: Class 1  
CE: EN 60825-1  
Laser Hazard Classification: Class 1



Certified ISO 9001:2000



Hy-BIRD is composed of an optical scanning unit with embedded electronics (above) and two head-mounted sensors – optical and inertial. The optical sensor can be seen in the right foreground. Optical and inertial data streams are fused and transmitted to a host computer via a USB serial adapter.

### Applications:

- Helmet Tracking
- Simulators & Trainers
- Virtual Reality
- Biomedical Instrument Registration and Gating
- Biomechanical Measurement and Analysis
- Military Vehicles
- Situational Awareness Systems

CRITICAL FEATURES	KEY BENEFITS
240 optical measurements/second; 70-75 measurements per second in hybrid mode	Fast updates with no discernable lag
Full 360° coverage; no FOV limits	Smooth, continuous orientation tracking even when optical detector is occluded or its FOV exceeded
IR laser scanning technology with temperature compensated, calibrated inertial sensors	Accurate, undistorted tracking in fixed, motion-based and mobile environments
Built-in optical correction for inertial drift	Constant data flow without jumps or interruptions.
Small footprint for emitter and detectors	Easy set-up with minimal impact on cockpit/vehicle real estate
Fast, one-time calibration for misalignments	Flexible placement of optical and inertial sensors on helmet



Call: 800-321-6596

Outside N. America: 802-893-6657

Visit our web site at: [www.ascension-tech.com](http://www.ascension-tech.com)

e-mail: [ascension@ascension-tech.com](mailto:ascension@ascension-tech.com) Fax: 802-893-6659

PO Box 527, Burlington, VT 05402 USA

Specifications subject to change without notification.

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Specifications