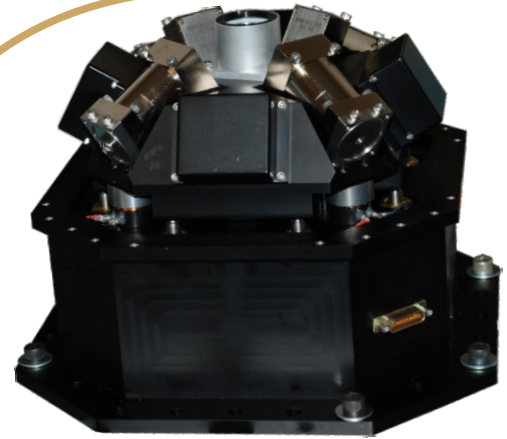


Optical Inertial Reference Units

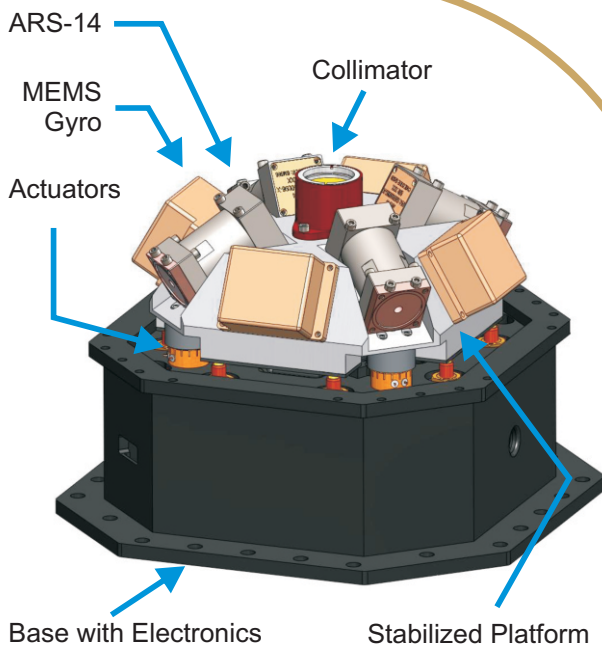
Precision Sensing, Measurement and Controls

Optical Inertial Reference Units (IRUs) are at the heart of modern acquisition, tracking and pointing (ATP) systems, and ATA has over 30 years experience solving the most challenging ATP problems through hardware and controls innovations. ATA develops and implements enabling component and system technology for both air and space programs such as the Airborne Laser, the Wide-Band Angular Vibration Experiment, Geostationary Operational Environmental Satellites, Advanced Land Observing Satellite, and the Mars Laser Communications Demonstration. ATA's unique combination of practical experience and patented component technologies are at the core of the best performing family of optical IRUs in the world today.



MIRU-LC

Magneto-Hydrodynamic Inertial Reference Unit (MIRU)



MIRU-LC
(<100 nrad, 1-1000 Hz)

In general, the ATA MIRU provides an inertially stabilized collimated optical beam with residual jitter on the order of 100-200 nrad (dependent on options selected) when subject to typical ground or space vibration environments. MIRU products have advanced inertial sensors with low cross-axis and linear vibration sensitivity.

The MIRU-LC is the latest IRU developed by ATA and stands as our flagship IRU. MIRU-LC incorporates the benefits of previous models. It includes several advancements and features not included in previous models such as MIRU 2. Advancements and additional features include:

- Space qualifiable design
- Pyramid sensor head allows sensing in 3-axis
- Built-in redundancy
- Integrated electronics
- Flexible processing architecture
- Optional high precision MEMS gyros for a broad bandwidth solution (DC-1000 Hz)

MIRU-LC Benefits

The immediate application of this technology is in the context of an optical inertial reference unit for laser communication. In this application, the MIRU-LC provides an optical reference beam (laser) for use as a precisely controlled “virtual star” that enables precise pointing and stabilization of the communication beam to be received at the opposite terminal of the transmit/receive link. ATA also recognizes the versatility of the MIRU-LC and determined additional applications in which a precise, small, and low-cost optical inertial reference unit is an enabling technology. Examples include:

- Precise pointing and stabilization of large aperture passive and active imagers
- Precise autonomous control of position and attitude control of spacecraft
- Acquisition, tracking, and pointing of laser systems for target blinding and/or destruction
- Target designation and geo-location systems operating from aircraft, high altitude airships, helicopters, and UAVs

MIRU-LC Specifications*

Mechanical	
Mass	11 lb.
Volume (Includes Base with Digital and Analog Electronics)	360 in ³
Angular Field of Regard	±10 mrad
Electronics	
Mass	4 lb.
Volume (Processing Electronics)	70 in ³
Power Consumption	50 W
Power Input	28 VDC
Analog	± 10 V Full Range
Digital	1 Gbps UDP/IP Ethernet
Packet Size	1500 bytes
Optics	
Wavelength	1310 nm**
Beam Diameter	20 mm circular
Beam Quality	λ/10 rms
Laser	
Laser Power	COTS (5 mW)
Mass	COTS (1 lb.)
Power Consumption	COTS (13 W)
Power Input	COTS (115 VAC or 5 VDC)
Performance	
Open-Loop Crossover	>300 Hz
Jitter NEA	<100 nrad, 2 axis, 1-σ, 1-1000 Hz

*Specifications do not include the MEMS Gyro option. **Custom wavelengths are available.

Cutting Edge Technology in Sensing and Controls

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