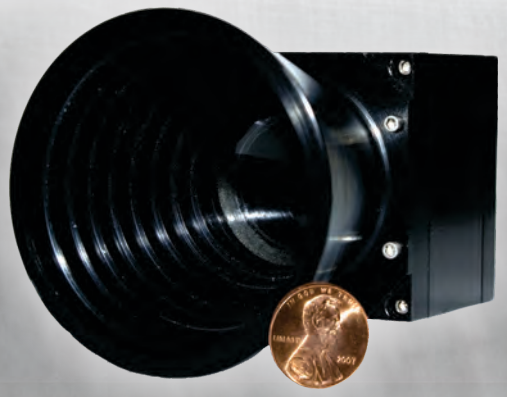
COMTECH AA
AEROASTRO, Inc.®

Miniature Star Tracker

Comtech AeroAstro's Miniature Star Tracker is the first very compact and affordable, all-optical star tracker with autonomous lost-in-space recovery and high-angular-rate tracking capability. Solely through image processing of rapidly acquired pictures of star fields, the unit can simultaneously perform the essential navigation, rotation sensing and attitude determination functions that formerly demanded much larger, power hungry and more expensive components. This system can recover from typical spacecraft tumble conditions and determine the inertial 3-axis attitude of the spacecraft without first being provided an estimate.

Comtech AeroAstro's design is a small, low power (less than 2W) star tracker with an on-orbit demonstrated accuracy of better than ±60 arcseconds in the yaw and pitch axes (1σ), and ±140 arcseconds in the roll axis (1σ). Our Miniature Star Tracker has also verified its ability to survive and recover from being pointed at the sun. It has a 24 × 30 degree field of view, a tracking update rate of ~2 Hz, and a mass of only 375g without baffle—providing reasonable star tracking accuracy with low mass and power consumption at less than half the cost of other available star trackers.

Our Miniature Star Tracker is available in a low-cost commercial-off-the-shelf version tolerant up to 30 krad and can be modified for higher radiation tolerance. It also provides a lost-in-space capability and is currently being enhanced to achieve fast angular rate sensing.



Comtech AeroAstro's Miniature Star Tracker features a user-definable star catalog and powerful hybrid processor. With a 1 megapixel CMOS array, the star tracker is sensitive up to 4th magnitude stars.

Images can be downloaded for ground processing and custom code can be incorporated. Built-in test routines include the ability to upload images and verify Miniature Star Tracker performance.

Mass:	375g
	200 to 400g optional baffle, depending on customer needs
Dimensions:	2.375” × 3” × 3” (6 × 7.62 × 7.62 cm)
Power:	<2W
Radiation Tolerance:	Up to 30 krad (si), more with shielding
CMOS Imager:	~1024 × 1280 pixel array, each pixel ~6.7µm square
Accuracy:	Better than ±70 arcseconds about yaw and pitch axes, ±150 about roll axis (1σ)
Sensitivity:	Up to 4th magnitude stars
Stars Tracked:	Up to 9 simultaneously
Star Catalog:	CAA catalog containing 1200 stars, can employ user-defined catalogs
Update Rate:	~2 Hz
Maximum Pitch / Yaw Rate:	10° / second (goal)
Image Rate:	0 to 24 fps
Output:	Quaternion, Centroids and custom
Self Test:	Images can be up / downloaded for verification
Thermal Test Levels:	-29 to +66°C
Operating Temperature:	-20 to +60°C
Vibration Test Levels:	14.1g protoqual

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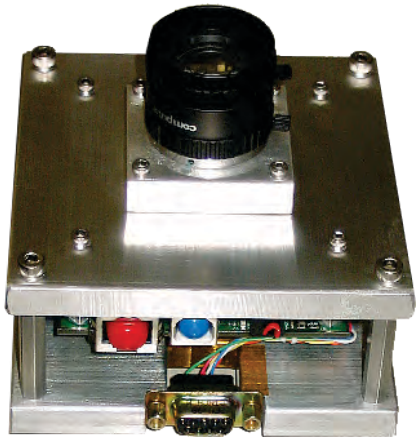
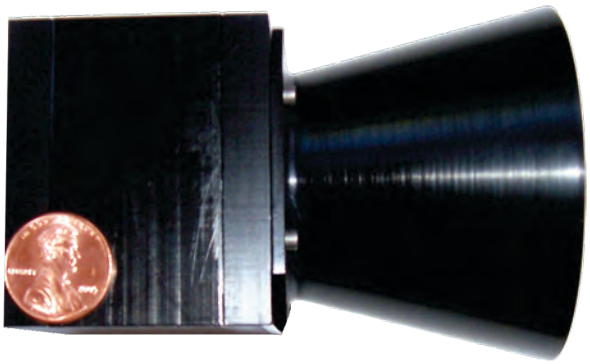


Breadboard Test Unit



Miniature Star Tracker with Baffle

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