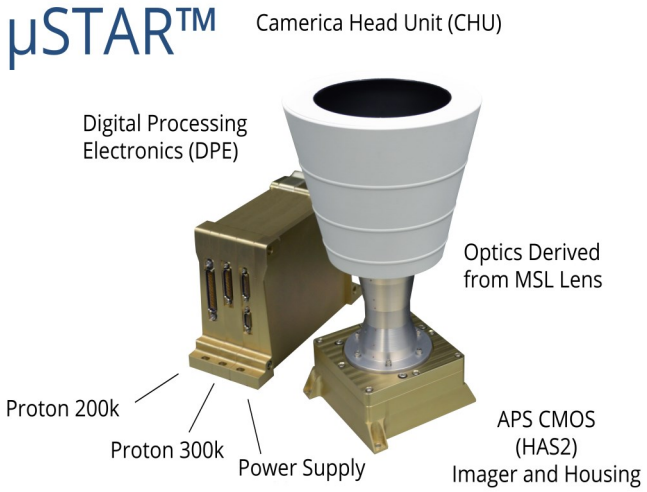
µSTAR Tracker

Space Micro celebrates its 13-year anniversary in 2015 and continues to support the Space Industry with innovative, affordable and high performance Digital/Image Processing, RF Communication and Attitude Determination Sensor Products.

Space Micro's µSTAR™ product line of space radiation hardened stellar attitude determination systems offers solutions from medium to high accuracy and from 1 up to 100 Hz update rates. The µSTAR™ products include flight demonstrated software that provides robustness to false stars and accounts for imaging degradation over the unit lifetime. The µSTAR™ features a modular architecture allowing for various Camera Head Unit (CHU) configurations with optics derived from lens assemblies flown in extreme space environments. The Digital Processing Electronics (DPE) have flight heritage and apply Space Micro's state-of-the-art radiation hardening techniques for SEFI and SEU. These features make the µSTAR™ the most advanced star tracker on the market.

FEATURES

- Radiation Hardened for Space Applications
- Modular Architecture with Camera Head Unit and Digital Processing Electronics
- APS CMOS Based FPA
- Flight Proven Software and Electronics
- Quaternion and Rate Output
- Kalman Filtering Option



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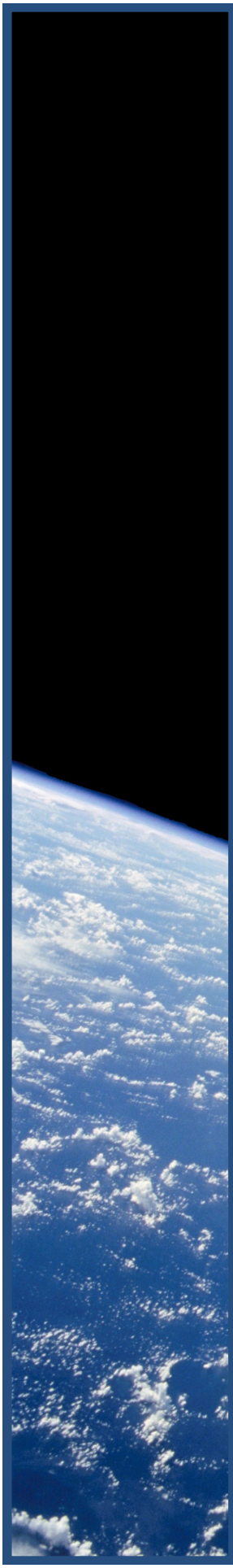

Applications

- Satellite Attitude and Rate Determination
- GEO and LEO Satellite Orbits
- Long Duration/High Reliability Missions

Software Features

- Star Identification Based on Pyramid Code
- Integrated Systematic Error Correction Allows for High Accuracy
- Real-Time On-orbit Calibration Accounts for Degradation
- Extended Kalman Filter Produces Attitude and Rate Estimates
- Less Sensitive to Spurious Signals and Upsets

Configuration Options

Feature	MIST	uStar-100M	uStar-200M	uStar-200H	uStar-400M
FPA	Ruby	HAS2	HAS2	HAS2	HAS2
Accuracy (1σ)	30 arcsec	5-20 arcsec	1-20 arcsec	< 1 arcsec	1-5 arcsec
Average Power	<3W	< 5 W	8-10 W	< 10 W	< 18 W
Update Rate	10 Hz	1 Hz	10 Hz	10 Hz	100 Hz
DPE Mass (kg)	0.5 (Integrated Unit)	0.9	1.2	1.2	1.2
CHU Mass (kg)		0.9	0.9	1.5	2.1
Total (kg)	0.5	1.8	2.1	2.7	3.3

*Contact Warehouse for availability

Radiation Tolerance

Total Ionizing Dose (TID)	> 100 and 300 krad (option)
Single Event Latchup (SEL)	> 80 MeV/mg/cm^2
Single Event Upset (SEU)	< 10^{-3} errors/system-day
Neutrons	> $2x10^{12}$ n/cm^2

Supporting Electronics

The µSTAR™ features proven, high-performance, radiation hardened supporting electronics to ensure accurate, reliable functionality in the harsh space environment.

Proton 200K™ Radiation Hardened Space Computer

The Proton200k™ space computer is flight-proven, high speed, and radiation hardened to provide extraordinary performance benefits by removing the barriers associated with commercial processor offerings. It is a qualified space computer for onboard data processing with 1.8 GFLOPS @ 200 MHz Floating Point, 900 MFLOPS @ 200 MHz with SEU mitigated to 1E-4 errors/day

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SPECIFICATIONS

Dimensions	
Digital Processing Electronics	179 x 75 x 112 mm
Camera Head Unit w/Baffle	150 x 150 x 232 mm
Mass	
DPE	1150 grams
CHU	922 grams
Optical Design	
Lens	50mm F#1.8 Rad-Hard Glass
APS CMOS Detector	OnSemi HAS2
Radiation Tolerance	
Single Event Latch-up Immune	63 LET (MeV-cm^2/mg)
Single Event Upsets	< 1 per 1,000 days (1.0 e-4, worst case GEO)
Total Ionizing Dose	100 krads (Si)
Single Event Functional Interrupt	100% recoverable, H-Core™ technology
Performance	**See table for specific models**
Electrical Interfaces	
Input Voltage	28V +/- 6
Data Interface	RS422, Options for 1553, Spacewire
Power Consumption	9 watts average
Operating Modes	
Autonomous	Quaternion and Rate Output
Commands	Health and Status, Window/Full Image
Mission Assurance	
Temperature Range	-24 to +61C baseplate
Vibration	Up to10 Grms Acceptance
Parts Level Options	Commercial Space, NASA Level I, II, III
Design Life	Up to 18 years GEO
FIT Rate	140 (MIL-HDBK 217, @ 30 C, Level II)

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Specifications Subject to Change Without Notice