jenaoptronik

ASTRO CL star tracker

The rad-hard **ASTRO CL star tracker** from Jena-Optronik meets the specific requirements for the New Space economy in terms of cost, high volume production and performance.

Jena-Optronik is one of the leading suppliers for the space industry with a broad customer base and reliable partner in national and international projects. The product range covers Attitude and Orbit Control System sensors including star trackers (star sensors) and LIDAR systems.

ASTRO CL has been developed to meet the specific requirements for the "new space" market in terms of low cost, radiation robustness, high volume production and performance.

All applied parts and materials are consequently radiation hard and latch-up free by design.

The unit is able to withstand radiation critical orbits used by state-of-the-art constellations.

It can serve as star tracker or navigation camera system up to 15 years lifetime in geo orbits.

EEE-parts level is selectable from constellation grade (baseline) to high-rel.

ASTRO CL Star Tracker Performance

Layout	
Architecture	Optical Head with Software (ASTROlib) to be integrated in On-Board Computer
Field of View (circular)	25deg full-cone
Optics	Focal length 23mm, F/1.4
Image Sensor	FaintStar2 system-on-chip - 1024px x1024px
Performance[1]	
Update Rate (Tracking)	5 or 8 Hz
Attitude Accuracy[2] XY / Z @ 1σ	≤ 2.0 / 12 arcsec at BOL (T_{DET} = 20°C) @ 0.05°/s ≤ 2.2 / 16 arcsec at EOL after 7 years 1200 km (T_{DET} = 20°C) @ 0.05°/s ([2] Total Error incl. LSFE & HSFE)
Coverage (Acq. Propability)	≥ 99% at EOL after 7 years 1200 km (T_{DET} = 20°C) up to 1.0°/s
Tracking Stability	≥ 99% at EOL after 7 years 1200 km (T_{DET} = 20°C) up to 1.0°/s
Slew Rate in Acquisition	≥ 3.0 deg/sec
Magnitude Limit	5.8 mi
Moon in Field of View	No Degradation
Reliability	90 FIT (MIL-HDBK-217 @ 30°C baseplate; better reliability available on demand)
Max. Number of Stars Tracked	16
Environment	
Operating Temperature	-35°C to +50°C
Storage Temperature	-40°C to +70°C
Radiation	Up to 15 years in LEO and GEO orbit without additional shielding
Physical	
Sun Exclusion Angle (half cone)	26.0 deg
Earth Exclusion Angle (half cone)	Approx. 22.0 deg
Nominal Envelope (L x W x H)	60 × 60 × 129 mm
Mass	≤ 320 g
Layout	
Supply Voltage	4.2 V - 5.5 V
Nominal Power Consumption	≤ 1.2 W
Output	Attitude Quaternion and Rate Vector, Status and Health Telemetry (Output from ASTROlib SW Library)
Operational Interface	80 MHz SpaceWire (Lower transmission rates from OBC to the OH accepted)

[1] A detailed performance analysis is available for various orbits / conditions / mission duration

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