

## ASTRO CL rad-hard star tracker for constellations



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 18 years lifetime in geo orbits.

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

## ASTRO CL Star Tracker Performance

Parameter	Value
EEE-parts:	$\geq 50\text{krad}$ , SEL $\geq 62.5\text{ MeVcm}^2/\text{mg}$ latch-up free, no SEB constellation grade up to high-rel as customer option (life time & reliability), all from high-rel manufacturers
Life time:	10 years $\leq$ 1200km low-earth orbits 18 years geo-synchronous orbit
Accuracy:	Total Random Error: $< 6/35\text{ arcsec xy/z } 3\sigma$ , @ $< 0.1\text{deg/sec}$ LSFE: $< \pm 2/10\text{ arcsec}_{p-p}\text{ xy/z}$
Lost in Space:	$< 400\text{ms}$ at 4Hz up to 3deg/sec
Sun/Earth exclusion angle:	Option#1: 32deg / 28deg half-cone, baseline Option#2: 34deg / 30deg half-cone Option#3: 26deg / 22deg half-cone
Update / Angular rate:	2 ... 10Hz acquisition & star tracking $\leq 3\text{deg/sec}$ 100% acquisition & tracking
Power consumption:	$< 1\text{W}$ at 3.5 ... 5V <sub>DC</sub>
Mass / Envelope:	$\leq 280\text{g}$ , 60 x 60 x 104 mm (32deg Baffle)
Software:	Libraries: SpaceWire decoder, mode control, acquisition, tracking, star catalogue
Temperature range:	Operational: -30 ... +45°C Non-operational: -40 ... +70°C
Interfaces:	Mechanical: 4 x M4 to flat spacecraft plane TM/TC: SpaceWire Software: Libraries

