

ASTRO XP

Autonomous high accuracy star sensor of the 0.1arcsec class

The ASTRO XP (eXtreme Precision) is designed for the next generation of scientific missions with high demanding requirements with respect to pointing accuracy. Consequently, ASTRO XP combines an outstanding measurement performance with a very low consumption of spacecraft resources to set a new standard for 0.1arcsec class star sensors.

Highlight is an attitude random error of less than 0.1 arcsec (1?) combined with a bias error of less than 0.5 arcsec while supporting angular rates of up to 6 deg/s (supported by an ASTRO APS3). Note that ASTRO XP archives this exceptional performance in a compact and light weighted design with an overall mass of less than 7kg whereat the separate optical head thermally dissipates only 1W to support a location close to the spacecraft main instrument.

ASTRO XP is designed to provide full functional even under the conditions of a peak solar flare and over a lifetime of 18 years in a geostationary orbit. Note that ASTRO XP is available in various configurations which comprises also a full redundant arrangement.

Note the following design highlights establishing the outstanding performance of the ASTRO XP:

- An optical measurement system (the optical head) that is separated from the remaining electronics (the electronics unit) to ensure a minimum of mass, envelope and power consumption of the hardware close to the spacecraft main instrument.
- A FaintStar image sensor, which guarantees high radiometric performance and low power consumption thanks to a system on a chip architecture in a radiation hard design. The FaintStar was fully developed under ESA contract.
- A full catoptric optics prevents chromatic errors whereat the entire optics is made from the same material (fused silica) to avoid thermal-induced misalignment.
- A catalogue of 45.000 guide stars to achieve a 100% coverage over the celestial sphere.
- State-of-the-art algorithms for attitude acquisition and tracking as well as for

image background correction.

- A high performance processing unit using state of the art processing hardware.
- The capability to connect up to three optical heads to one electronics unit supports various redundancy concepts and configurations, whereat other JOP products (ASTRO CL, ASTRO APS3, ASTROhead) can be involved.