Source: http://www.jena-optronik.com

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 0.1 arcsec class star sensors.

Highlight of the new sensor is an attitude random error of less than 0.1 arcsec combined with a bias error of less than 0.5 arcsec. ASTRO XP archives this exceptional performance in a compact and light weighted design whereat the separate optical head thermally dissipates only 1W to support a location close to the spacecraft main instrument.

Our ASTRO XP is designed to provide full functionality even under the conditions of a peak solar flare and over a lifetime of 18 years in a geostationary orbit. The high accuracy star sensor is available in various configurations, which comprises also a full redundant arrangement.

The following complementary design highlights enable 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 FaintStar2 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 FaintStar2 was fully developed under ESA contract.
- A full catoptric optics prevents chromatic errors whereat the entire optics is made from the same low CTE material 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 Jena-Optronik products such as ASTRO CL, ASTRO APS3 or ASTROhead cam can be involved.

Innovation and future: The ASTRO XP star sensor was rewarded with the “Thüringer Innovationspreis” in 2020. An ASTRO XP star sensor pre-qualification model passed the test-readiness review (TRR) in November 2022 whereat the production already involved all the demanding manufacturing technologies required to meet the specified performance.