

State of the Art Star Tracker Robustness Shown on the ASTRO APS Operation on Alphasat under the Recent September 10th Strong Solar Flare

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The Jena-Optronik GmbH ASTRO APS autonomous star tracker represents the state of the art technology of 3-axis optical attitude measurement sensors based on CMOS imaging devices. This type of star tracker is since July 2013 under in-orbit operation on Alphasat together with another 47 units on several satellites servicing in Earth observation, telecommunication and constellations. The transition from CCD based star tracker units to the CMOS imaging technology and the improvements in the processing capabilities increased the robustness of star trackers to a new qualitative standard. The ASTRO APS star tracker was launched in July 2013 on Alphasat as technology demonstration payload under ESA contract. Phase E of this contract covers a 6 years in-orbit performance data evaluation based on a 24hours 3seconds update rate data telemetry.

This unique possibility allowed Jena-Optronik to monitor a very seldom space environmental event such like the recent strong solar flare from September 10th. The state of the art star trackers incorporate a lot of hardware and software design measures in order to cope with such harsh environmental effects. The ground test capabilities regarding the high energy particle interactions in a complex unit like a star tracker are very limited so much the better to have real in-orbit data available. The presentation summarizes the ASTRO APS star tracker operation under the recent September 10th solar flare event which was categorized as “strong” by the Space Weather Prediction Center of NOAA.