

High-rate Fine Sun Sensor (HFSS)

The LASP High-rate Fine Sun Sensor (HFSS) is a precision sun sensor that provides calculated solar angles at up to 200 Hz for use in closed-loop attitude control systems. The HFSS is plug-and-play with standard data and power interfaces. The HFSS comes pre-calibrated and produces calculated solar angles for direct use in attitude control or for attitude knowledge. It is highly configurable by command with adjustable packet rates, digital filtering, alignment offsets, APID selection, and many other parameters.

The Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder is a world leader in space-based research including measurements of the Sun. Of critical importance to these solar measurements is an accurate understanding of instrument pointing with respect to sun-center. LASP has built sun position sensors for decades for sub-orbital sounding rockets and space missions such as SNOE, TIMED, and SORCE. These sensors first evolved into the Fine Sun Sensor (FSS) that was built and tested for NASA flight programs Glory, TSIS, GOES-R-EXIS, and TCTE, and then into the High-rate Fine Sun Sensor that has been providing class-leading solar pointing and stabilization for the TSIS 2-axis gimbal on the International Space Station since January 2018.

Custom solutions are also available upon request.

For more information, contact Pat Brown at 303-735-5609 or pat.brown@lasp.colorado.edu or visit <http://lasp.colorado.edu/home/about/publications/lasp-brochure/>.



(Courtesy LASP)

Specifications

Performance

- Precision:** 1 arcsecond 1σ
- Accuracy:** <20 arcseconds 1σ over $\pm 1^\circ$
- Field of view:** $\pm 2.5^\circ$ linear FOV, 10° glint-free FOV

Size

- Mass:** 0.6 kg
- Dimensions:** 38 x 101 x 108 mm (1.5" x 4" x 4.25")

Power

- Input voltage range:** 24–34 VDC
- Total power consumption:** <1.5 W

Environment

- Temperature:** Operational -20 C to 40 C, Survival -30 C to 50 C
- Radiation:** 50 kRad TID parts, SEU > 60 MeV-cm²/mg
- Vibration:** Qualified to GEVS workmanship levels

Interfaces

- RS-422 bi-directional serial communication (SpaceWire available at additional cost)
- CCSDS packetized command and telemetry with configurable APIDs
- 9-pin, 15-pin Airborne Micro-D connectors
- Commandable telemetry packet rates:** Up to 200 Hz



(Courtesy LASP)

Two HFSS units mounted at the center of TSIS



(Courtesy LASP)

HFSS Data and Power Interfaces