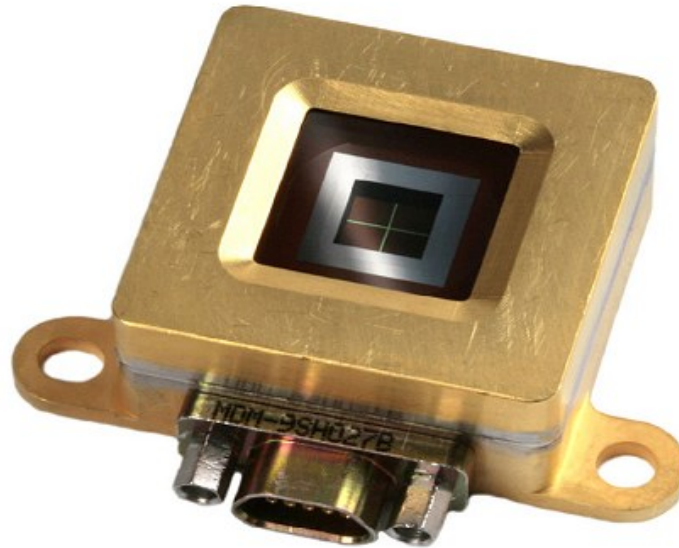




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# MINI FINE SUN SENSOR



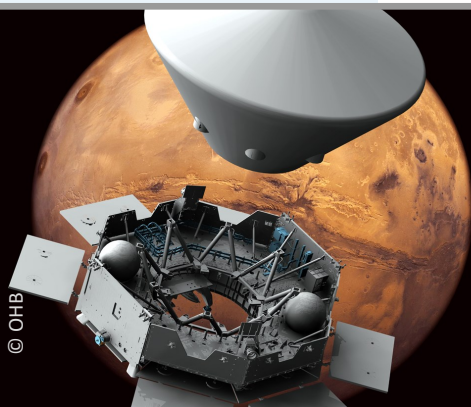
The Mini Fine Sun Sensor (Mini-FSS) is designed to deliver exact information about the position of the sun. This information is used for yaw steering of the spacecraft and therefore applied in earth pointing devices and solar array orientation.

The Mini-FSS is an analogue sensor, based on the use of a quadrant detector which is capable of measuring the solar aspect angle in two axis. Processing the four quadrant outputs results in the two components and of the solar aspect angle. The applied algorithms cancel out all disturbances that are common to the four quadrants, such as temperature effects, particle radiation degradation, window performance and scale factors. For the conversion to signals that can be used by the spacecraft electronics system, the spacecraft may use passive conversion into signal voltages across load-resistors, or active conversion using current-to-voltage converters.

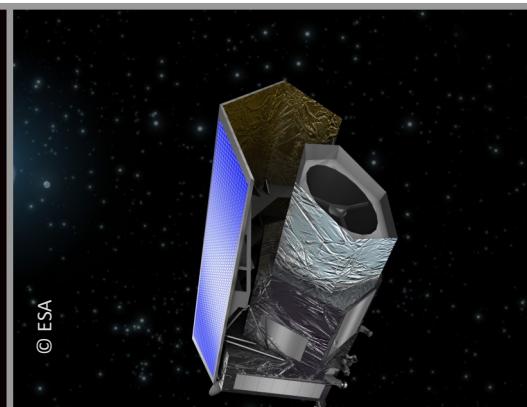
The Mini-FSS is designed for long duration low earth orbit missions. The Mini-FSS variant without read-out electronics is especially suited for small satellites.

## Key Advantages

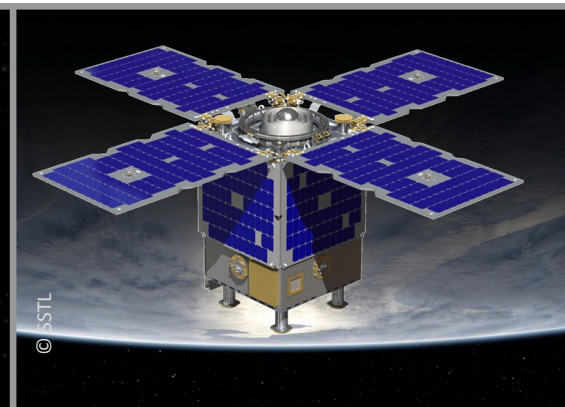
- Qualified for low Earth orbits with many temperature excursions
- Qualified for very severe radiation regions (LEO in Van Allen Belts)



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# Mini Fine Sun Sensor

Characteristic	Performance / Interfaces Budget
Mass	50 grams
Dimensions: envelope including mounting feet	50 x 46 x 17 mm
Nominal FOV	128° x 128° (i.e. $\pm 64^\circ$ x $64^\circ$ )
Unobstructed FOV (to be free of straylight sources)	172° x 172° (i.e. $\pm 86^\circ$ x $86^\circ$ )
Accuracy	(Figures apply without Albedo)
Without on-board implementation of look-up table	$\pm 1.5^\circ$ (3 $\sigma$ )
With on-board implementation of look-up table	$\pm 0.2^\circ$ (3 $\sigma$ )
Resolution	Better than 0.03 degrees of arc
Noise equivalent angle	Less than 0.05 degrees of arc (3 $\sigma$ )
Power consumption	Nil: Mini-FSS is passive
Signal level	2.8 mA $\pm$ 10% per quadrant
Max output current per quadrant and at 1 SC AMO	3.6 mA $\pm$ 10%
Reliability	10 FIT @ +40 °C
Alignment	Provisions implemented in the three mounting holes (caliper hole, slotted hole and
Qualification temperature	-50 °C to +80 °C
Radiation environment	The detector active element is made of p-type epitaxial silicon. With the shielding (3 mm of cover glass thickness) the accumulated dose will remain low in virtually all missions. The degradation of the device output will be limited to less than 5% in current and a delta increase in temperature coefficient of 0.10%/°C max. Degradation

## Variants of Mini-FSS Available

1 FSS with readout electronics (multiplexed quadrant outputs)



### ABOUT

Bradford is a high-tech European developer and manufacturer of satellite control sub-systems and components.

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