

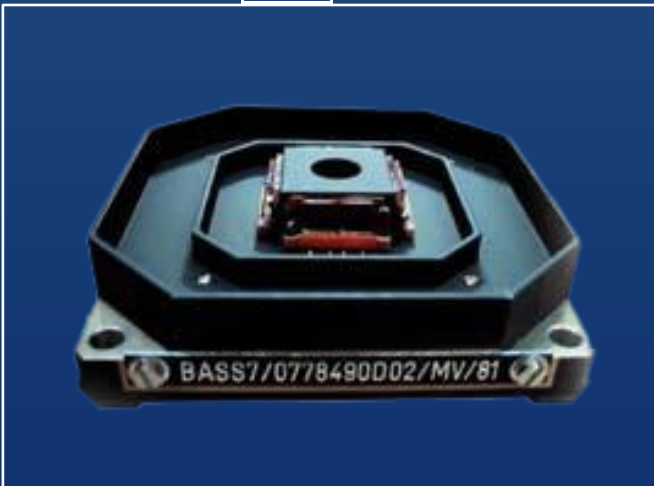
DEFENCE AND SPACE
Spacecraft Equipment

BASS

Coarse Bi-Axis Sun Sensor



A v i o n i c s



BASS7, BASS17, BASS17R and BASS17R GEO are simple analogue sensors: angle measurement is obtained by comparing intensities produced by two silicon solar cells mounted on opposite sides of a pyramid. The body of the equipment gives a $\pm 90^\circ$ sensor fine field of view on each measurement axis. For specific programs, the coarse FOV can be reduced by adding specific external baffles to protect from straylight.

The BASS consists of:

- 4 pairs of solar cells
- A pyramidal block of aluminum on which the solar cells are fixed
- A Printed Circuit Board to connect the cells
- A support block of aluminum on which the pyramid and the PCB are fixed
- Wiring AWG26

The BASS family has been under production in Toulouse for more than 25 years, with more than 290 in orbit, totalizing more than 2 500 000 h of operation without failure.

Key features

- Two sun detection axes in one unit
- Full passive equipment
- Space qualified components and technologies
- ATOX resistive paint
- Low mass, low cost
- High temperature range
- High strength capability
- Standard field of view
- Thermal coating adapted to mission

Main Application Fields

- All space applications, LEO, GEO and deep space

Heritage

- More than 100 BASS17 and 17R models are in-orbit without failure. The BASS17 and 17R are the base-line product for the Astrosat family of Airbus.
- More than 220 BASS7 and BASS17R GEO have been produced to date, including 190 models in-orbit without failure. The BASS7 and the BASS17R GEO are the base-line products for the EurostarSatCom and the ONESAT family of Airbus.

Performance

- Sun Field of View +/- 15° (on 2 axis)

Budget

- Mass 65g
- Volume 70 x 82 x 23 mm³
- Power none, passive equipment

Environment

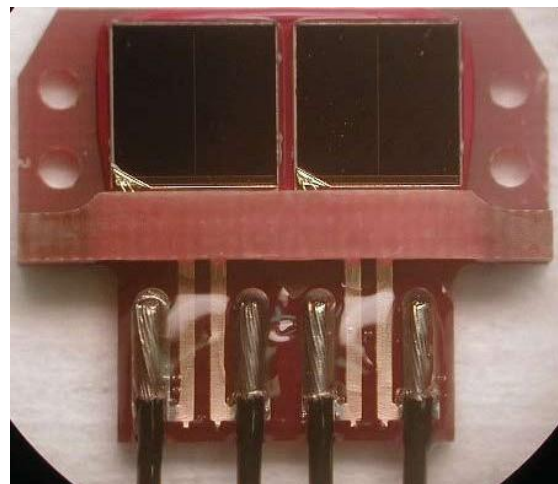
- Thermal -40 to +90 °C (performance)
-80 to +95 °C (operation)
- Vibrations 20g sine, 44 grms
- Shocks 800g up to 10 000 Hz
- Radiation 2.10¹⁵ elect/cm² of 1 MeV at solar cell level
- Lifetime 55 000 cycles -40/+70 °C
8 500 cycles -55/+105 °C

BASS is a complete family of coarse sun sensor products

	BASS17	BASS17R	BASS7 & BASS17R GEO
Orbit	Low Earth Orbit		GEO
Host Spacecraft	Spot/Helios, Metop, Envisat, Odin, Myriad,....	Rocsat, ATV, Kompsat, Pleiades, Theos	Eurostar (BASS7), ONESAT constellation (BASS17R GEO)
Pyramid Inclination	17° => linear range of +/-15°		7° => linear range of +/-5° 17° => linear range of +/-15 (BASS17R GEO)
PCB Wiring	<ul style="list-style-type: none"> • No redundancy • I_{max} = 18 mA 	<ul style="list-style-type: none"> • redundancy is ensured • I_{max} = 8.8 mA 	<ul style="list-style-type: none"> • redundancy is ensured • I_{max} = 8.8 mA
Slope in Linear range	-600µA/° ≤ slope ≤ 250µA/°	-290µA/° < slope < 190µA/°	175µA/° < slope < 250µA/°
Support block	Aluminized Kapton and ATOX resistive coating		Aluminized Kapton and black paint
External baffle	None; the field of view is optimized to 180° x 180°. Custom baffle can be designed on demand		

A pair of photovoltaic cells are located on two opposite faces of a pyramid

- The current generated by the sun light on each cell (I_i, I_j) is provided.
- The information given by the difference of the currents I_i and I_j is quasilinear when the two opposite faces of the pyramid are simultaneously lighted by the sunbeam.



The solar cells are key to determine the performance, robustness and reliability of a sun sensor. All the sun sensors produced by Airbus are made from the same solar cells from OSI and benefiting from Airbus skills in the procurement and qualification of opto-electronic components for space application.

