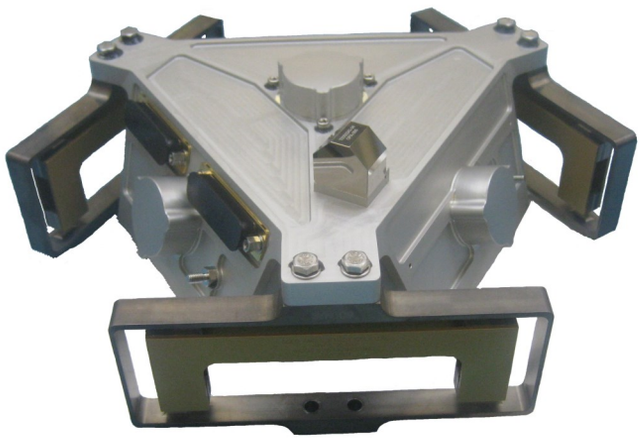
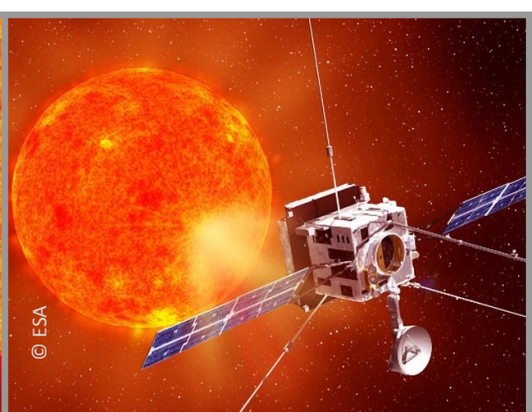
Acceleration Measurement Unit



The Acceleration Measurement Unit (AMU) is an independent measurement unit. The AMU is composed of four accelerometers disposed on a regular tetrahedron. It includes an accelerometer adaptation electronic board with four electrically independent channels connected to each Fibre Optic Gyro (FOG) Electronic Module (FEM) of the Gyro Electronic Unit (GEU) by an electrical harness.

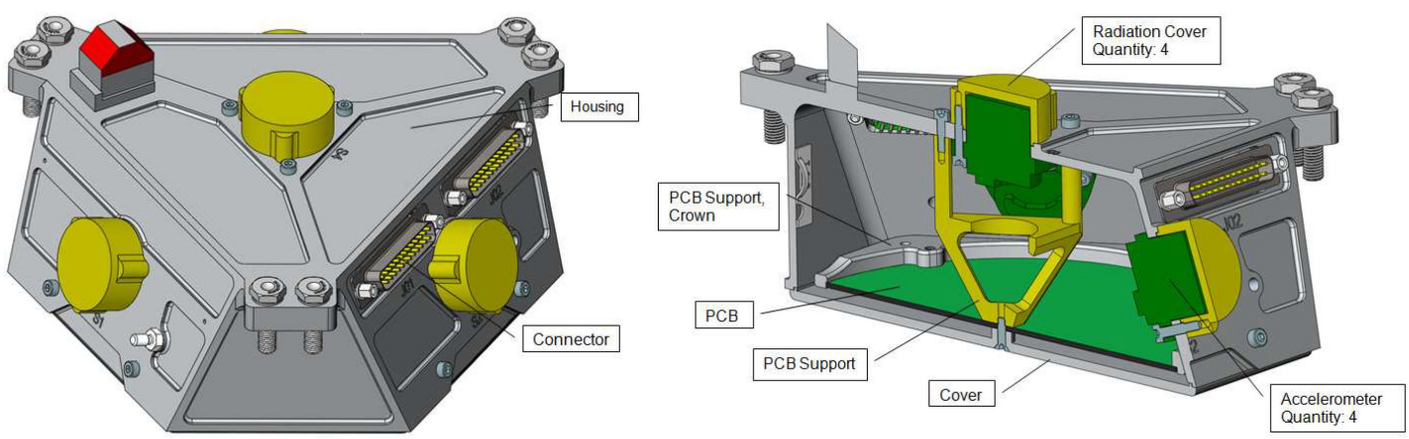
The AMU provides acceleration measurements to the traditional Inertial Measurement Unit (IMU). The AMU is constructed out of an aluminum housing and three titanium isolators bolted to the housing. The tetrahedral shape of the housing allows ideal axes orientation for the three accelerometers. In addition the housing contains a single Printed Circuit Board (PCB) which contains the conditioning electronics. The special titanium isolators dampen the mechanical loads applied to the AMU housing during launch in order to prevent over-stressing of the accelerometers.

The AMU will fly on the Solar Orbiter and the Euclid missions. Solar Orbiter will be the first satellite to provide close-up views of the Sun's Polar Regions, which are very difficult to see from Earth, providing images from latitudes higher than 25 degrees. It will be able to almost match the Sun's rotation about its axis for several days, and so it will be able for the first time to see solar storms building up over an extended period from the same viewpoint. It will also deliver data of the side of the Sun not visible from Earth. Euclid will accurately measure the acceleration/ expansion of the universe through investigation of the redshifted light of galaxies at various distances from Earth. In this way a better understanding of dark energy and dark matter is to be gained.



Acceleration Measurement Unit

Parameter	Value
Power Supply	+/-15.6 V (min +/-14.5 V and max +/-16.4 V)
Input Acceleration	+/-7.5 mg, full performance (with +/-500 µg BOL error and +/-1400 µg BOL error) +/-1.1 g, extended range
Minimum (Dead Zone)	+/-2 µg
Acceleration Output Range	0.04 ~2.9 V, full performance 0.04 ~2.9 V, extended range
Analog Anti-Aliasing Low Pass Filter for Full Performance	Cut off frequency: 0.47 Hz, Overshoot: 1.3 dB, Attenuation at 16 Hz: < -57 dB
Analog Anti-Aliasing Low Pass Filter for Temperature Measurement	Cut off frequency: 2.95 Hz, Overshoot: < 1 dB, Attenuation at 16 Hz: < -14.7 dB
Temperature Measurement Range	-45°C ~75°C (with +/- 0.1 °C BOL error and +/- 2.17 °C EOL error)
Temperature Output Range	0.04 ~ 2.9 V
Operating Temperature	performance temperature: -10 °C ~ 50 °C design temperature: -20 °C ~ 60 °C acceptance temperature: -25 °C ~ 65 °C qualification temperature: -30 °C ~ 670°C
Lifetime	7 years on ground, 10.2 years in orbit
Telecommand	26 V, 16 msec pulse
Total Mass	< 2035 g



The figure above shows the AMU mechanical structure without the titanium isolators. It is composed with four independent channels with four accelerometers disposed on a regular tetrahedron.

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ABOUT

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

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