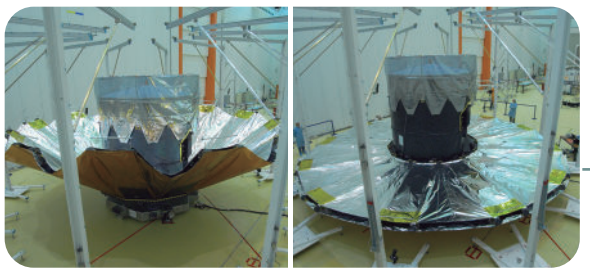
SENER
The way to see the future

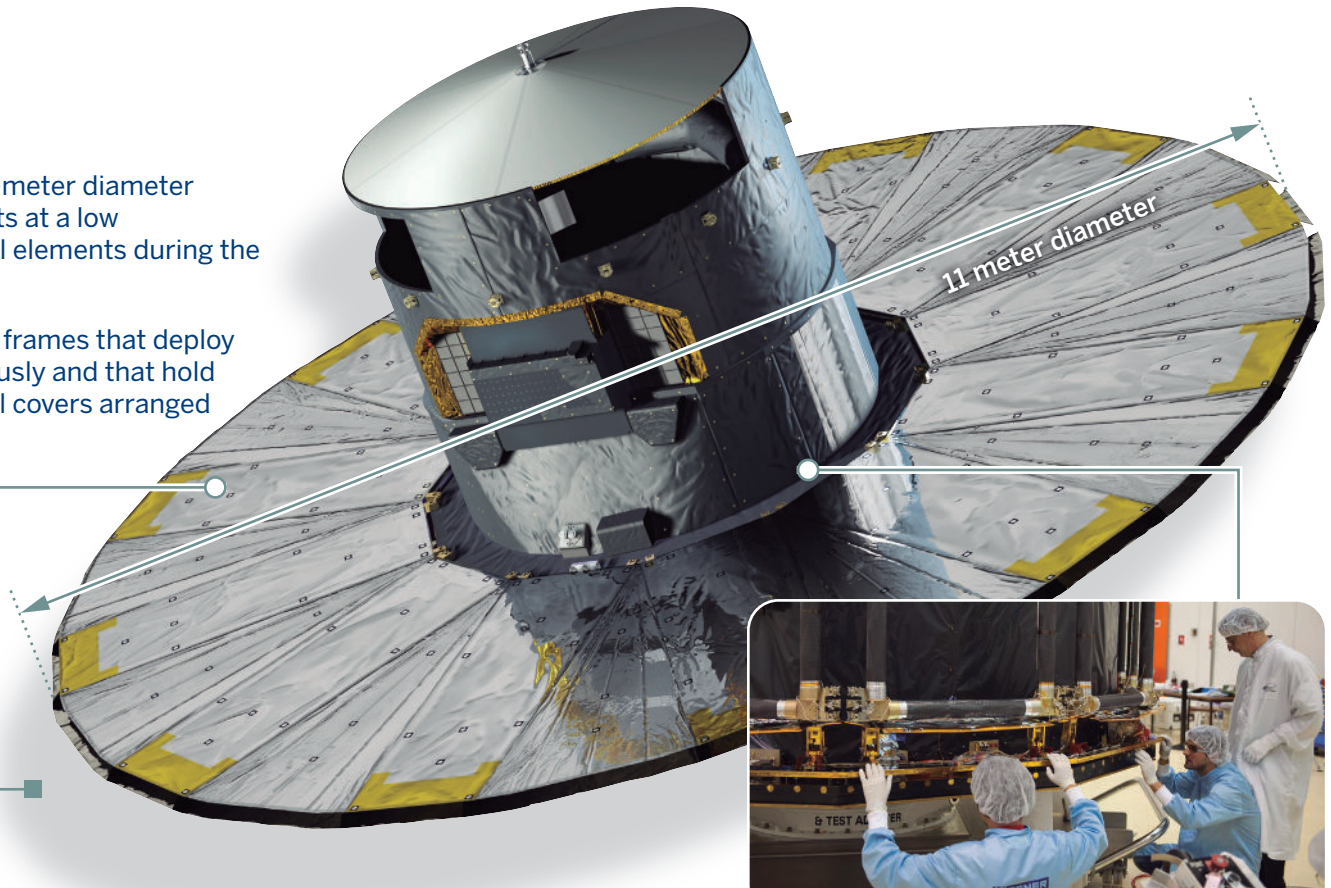
SENER in Gaia

1 DEPLOYABLE SUNSHIELD

SENER has designed, integrated and verified the satellite's 11-meter diameter deployable sunshield, which mission is to keep the instruments at a low temperature and guarantee the thermal stability of the optical elements during the five years of the mission.



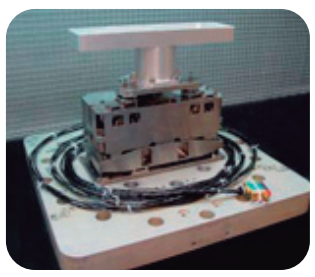
12 identical frames that deploy simultaneously and that hold two thermal covers arranged in parallel.



The sunshield guarantees that the payload of the satellite is always at a regular temperature of 103 K (kelvin).

2 M2M POSITIONING SUBSYSTEM

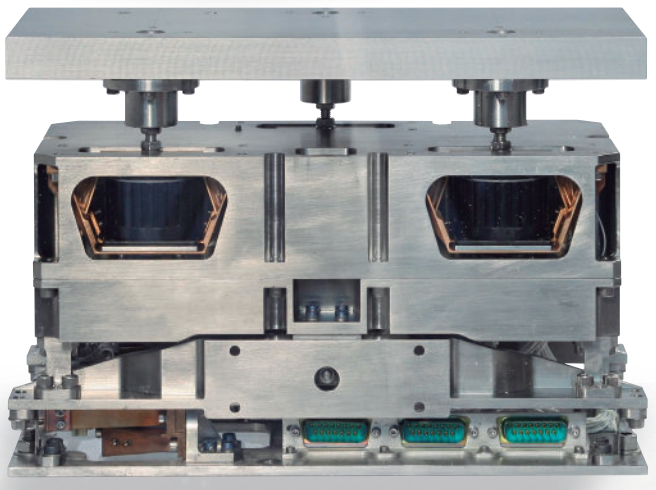
SENER has developed the subsystem that regulates the positioning of the secondary mirrors of the telescopes, called M2M, that comprises one of the most critical precision mechanisms of the satellite, the M2MM.



Angular resolution < 5 µrad

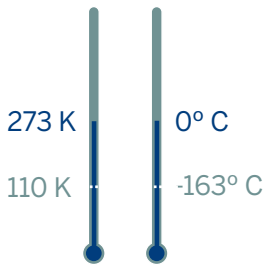
1 degree ⟷ 3,600 seconds

1 second ⟷ 4.85 µrad



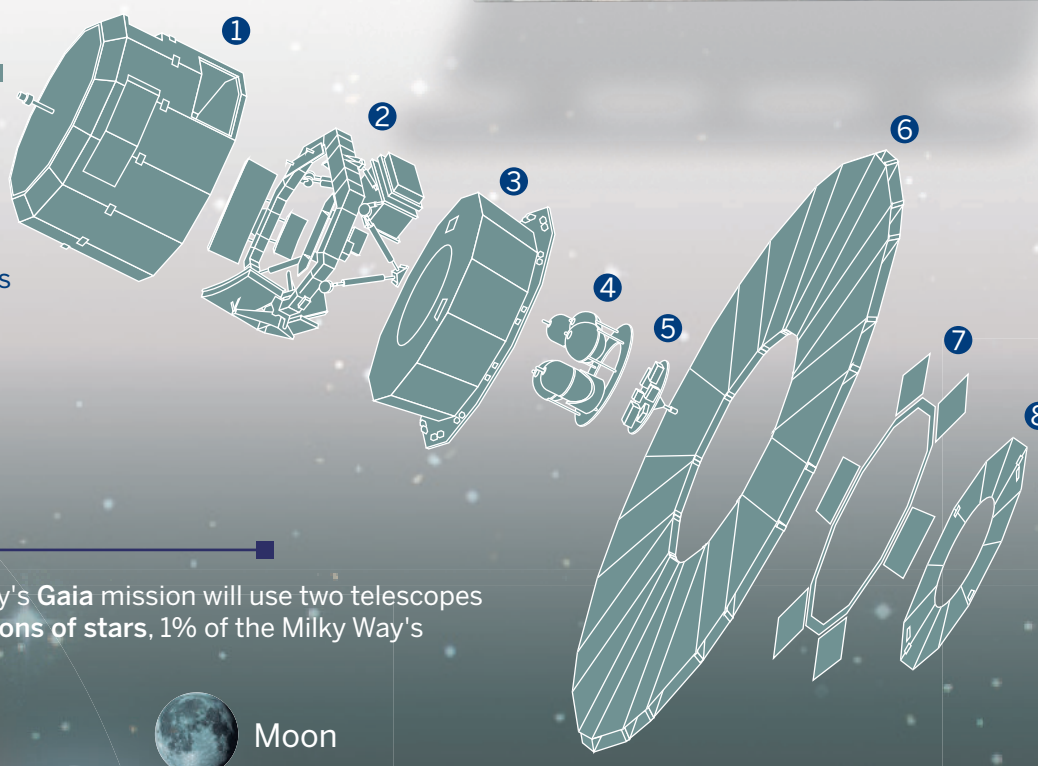
It allows an accurate sub-micrometric adjustment of five degrees of freedom that corrects any misalignments of the telescope, especially after the launch.

Temperature operational range from 100 K to 323 K



M2M is designed to operate in a temperature range that goes up to 110 K with a very good thermal stability and, equally, it is able to stand the launching loads without hold down.

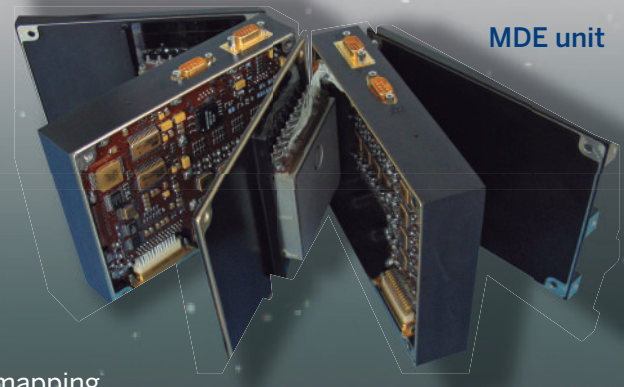
3 GAIA SATELLITE



1. Thermal cover
2. Load module
3. Service module
4. Chemical propulsion and micro-propulsion systems
5. High Gain Antenna
6. Deployable sunshield
7. Deployable solar arrays
8. Fixed solar arrays

5 ELECTRONICS

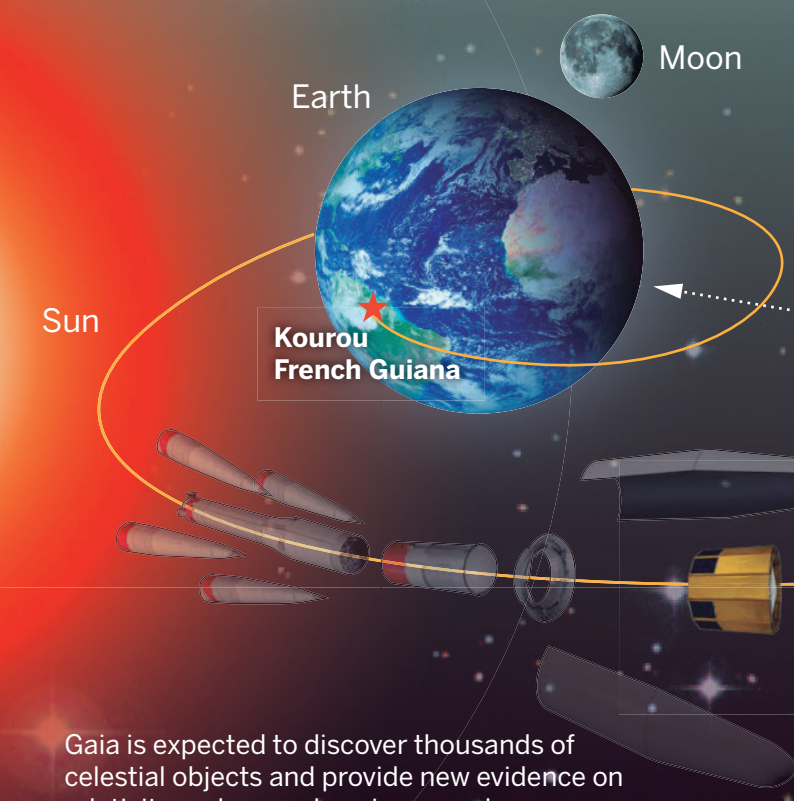
SENER has designed and manufactured the electronic units that regulate both the sunshield deployment (the two SDE units) and the accurate movement of the M2M, the MDE unit.



MDE unit

4 THE MISSION

The European Space Agency's **Gaia** mission will use two telescopes to observe and catalog **millions of stars**, 1% of the Milky Way's contents.



Gaia will be devoted during five years to a complete mapping of the celestial sphere and will obtain huge scientific information, from each star motion and three-dimensional position to its chemical composition.

Gaia is expected to discover thousands of celestial objects and provide new evidence on relativity and cosmology in general.

Gaia will make the largest three-dimensional map of our Galaxy, 10,000 times bigger than the one we have to date and with an accuracy multiplied by 100.