SENTINEL-3. Flip Mirror Subsystem

SENER AEROSPACE & DEFENSE / SPACE / ELECTROMECHANICAL SYSTEMS / DEVICES AND ELECTRONICS FOR SCIENTIFIC PAYLOADS / SPAIN

SENTINEL-3. FLIP MIRROR SUBSYSTEM

Cliente: ESA

País: Spain

Sentinel-3 mission, framed in the European Union-ESA Copernicus program, has as one of its main targets to monitor sea and land-surface temperatures with high accuracy and reliability. First Sentinel-3 satellite was launched in February 2016, followed by a second satellite to provide jointly maximum coverage.

Flip Mirror Mechanism, under Sener responsibility, places a mirror alternatively at two positions at high speed. As part of SLSTR (Sea Land Surface Temperature Radiometer) instrument, it allows a dual view technique that provides enhanced performance with respect to its predecessor (Envisat/AATSR).

Mechanism accuracy, repeatability and stability drive instrument image quality. On the other hand, high rotational speed is required to complete image sequence during the orbit. And these performances need to be maintained after 700 million cycles during 7 years lifetime of the instrument.

Sener has developed the mechanism concept, motion control and the electronics to implement it, designing a mechatron (mechanism plus electronics) with the following characteristics.

- **Configuration:**
- Single degree of freedom mechanism (rotation)
- Supported by flexural pivots
- Limited angle torque motor
- Position monitoring with 12 µrad resolution
- Adaptative control in closed-loop
- Implementation on firmware
- **Performances**

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- Rotation of 18,8º in 34 ms
- Stability < 47 µrad
- Repeatability < 23 µrad
- Lifetime > 700 millon cycles

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