HYDRA-TC

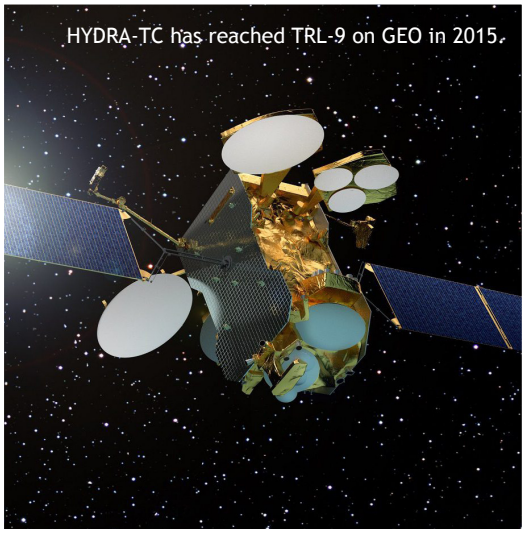
HYDRA-TC replicates Sodern's flight proven HYDRA-Baseline Star Tracker but featuring a single internally redundant Electronic Unit and with only two Optical Heads.

It was originally developed for GEO communication satellites but has application to any other mission type than can benefit from this HYDRA configuration.

HYDRA-TC can survive high mechanical loads and performs under very harsh conditions (dynamic, protons, stray-light…).

Embedded FDIR functions can autonomously manage any situation and the sensor will always deliver accurate attitude data in operating domains with preselected update rates up to 16 Hz.

Its versatility and modularity allows an easy and cost effective adaptation to a wide range of missions.



HYDRA-TC has reached TRL-9 on GEO in 2015.

Fully Redondant Electronics

Designed for 18-year Geo Satcom

SODERN

OPTRONIC
SPACE EQUIPMENT

TECHNICAL SPECIFICATIONS

2 Optical Heads may be connected to a fully redundant Electronic Units with up to 8m cable length

Optical Head (OH)
- Baffle protecting the lens from direct Sun and Earth illumination
- Lens made of Rad-Hard glasses
- HAS-2 APS (CMOS) detector and its Thermo-Electric Cooler
- Spacewire interface (MIL 1355) with Electronic Unit

Electronic Unit (EU)
- Fully redundant architecture with internal cross-strapping
- Power Converter supplying the OH and the Processing Unit
- Embedded software processing OH's data and computing the attitude
- Embedded Star Catalog

Typical Attitude accuracy in 2 head blended solution (EOL 15 years in GEO)
- Bias < 11 arcsec
- Thermo-elastic error <0.055 arcsec/°C
- FOV spatial error <0.9 arcsec @ 3σ three axes
- Pixel spatial error <3.1 arcsec @ 3σ three axes
- Temporal NEA <0.8 arcsec/vHz @ 3σ three axes

Additional Performance Features
Autonomous Attitude Acquisition in less than 2.5 seconds

Attitude tracking up to 2 heads simultaneously:
- 15 Stars per OH
- Update rate up to 16Hz

Robustness:
- Acquisition up to 8 deg/s from lost in space
- Tracking up to 8 deg/s and 2.5 deg/s2 @10Hz
- Sun Exclusion Angle: 26 deg, Earth limb Exclusion Angle: 18.5 deg
- No performance degradation with full Moon in FOV
- Robust to Sun and Earth blooming on one heads with two heads operating
- Robust to peak Solar Flare in acquisition and tracking

Environmental Characteristics

Temperatures:
- Full performance -20°C to +60°C
- Operating range -30°C to +60°C
- Storage -40°C to +70°C

Mechanical loads: Random 30 gRMS, Shocks 2350 gSRS

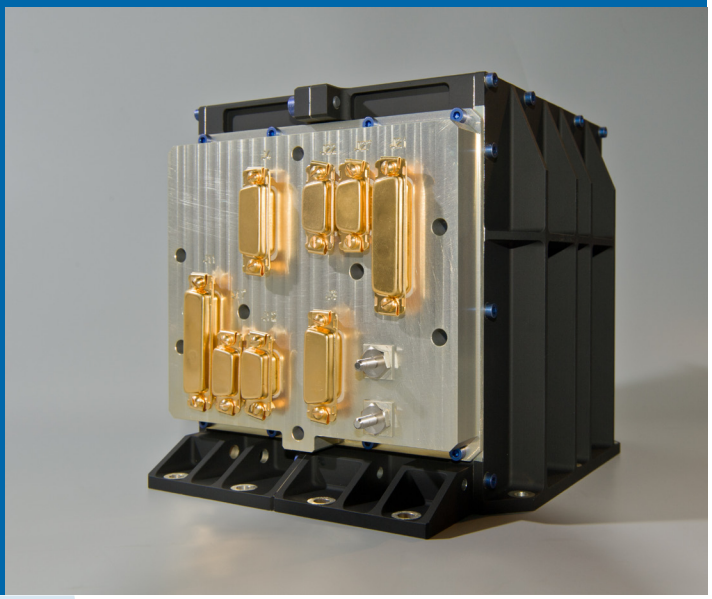
Mechanical Interfaces
1 OH: Mass 1.4 kg, Dimensions Ø146.5mm x H283mm
1 EU: Mass 3.9 kg, Dimensions 194 x 166 x 159 mm^3

Electrical Interfaces
Typical power consumption @ 20°C for 1EU and 2OH: 8 W
Electrical Consumption @ 20°C per OH < 1 W
Power supply: 21 to 52 Volts
Output data: MIL1553B or RS422 (AC/CS16 protocol)

Reliability and Lifetime
1 OH: Level 1: 190 FIT, Level 2: 241 FIT1 EU: Level 1: 512 FIT, Level 2: 736 FIT

GEO 18 years - GTO 6 months

Product developed with CNES funding



SODERN: ENABLING YOUR AMBITIONS
Since 1962, Sodern keeps on developing cutting edge technology and constantly brings innovation-based solutions to the market. Sodern's products are successfully used in competitive markets all over the world through a wide range of applications spanning from the extremely small (Neutrons) to the infinitely large (Outer Space). Sodern is the market number one supplier of star trackers and has also acquired an extensive expertise in the space optoelectronic instrumentation domain.

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