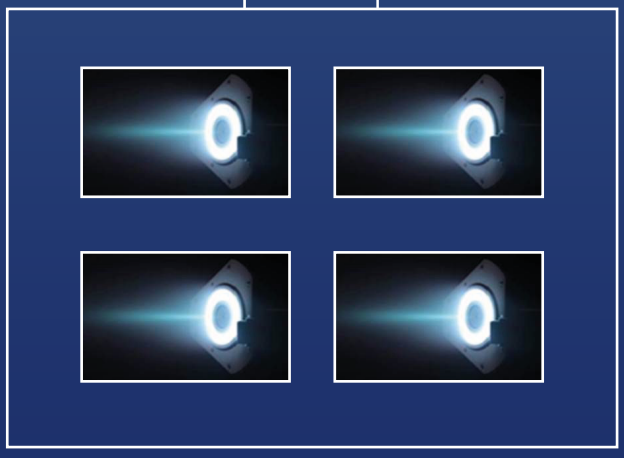
DEFENCE AND SPACE
Space Products

Topaz / THORs

Electric Propulsion Subsystem for New Space Applications

PureLine



The PureLine Topaz/THORs subsystem offers an end-to-end solution for the satellite electric propulsion, in our most compact, innovative and flexible design ever. Specifically tailored to New Space types of applications, it features a lifetime of 10 years in LEO, with latch-up-free parts and error protection. Topaz/THORs is well suited for orbit raising, station keeping and deorbiting maneuvers.

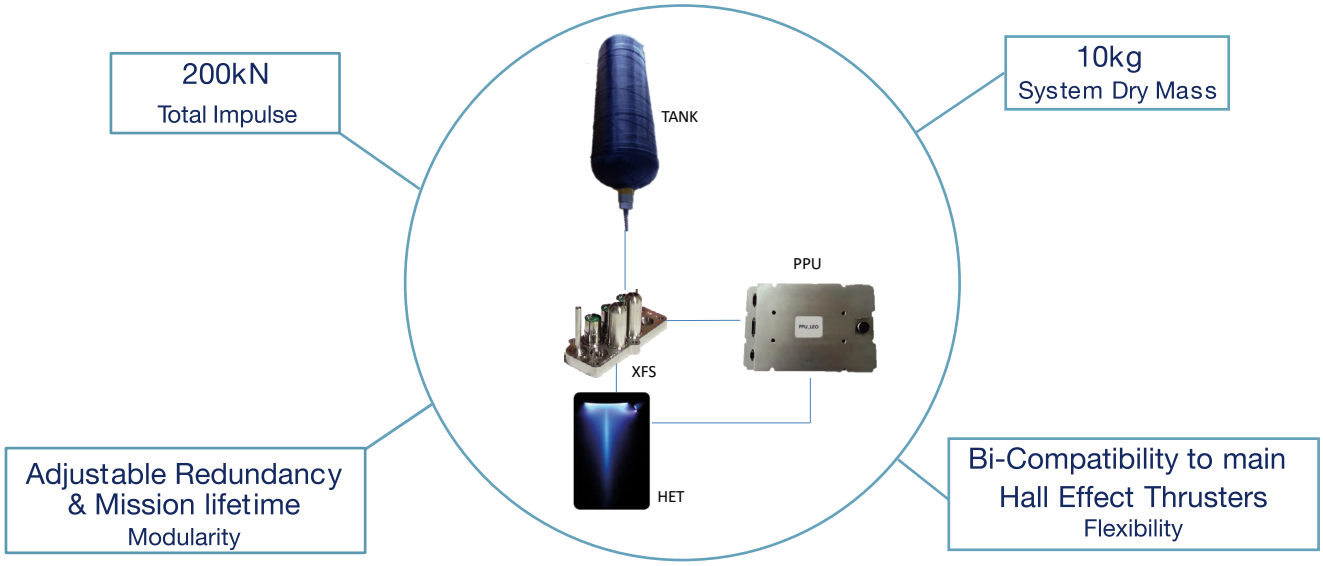
About PureLine - The PureLine series was initially developed for constellation applications with large quantities, paving the way to offer disruptive unit prices while keeping high quality products. This approach can now be extended to global satellite applications.

PureLine is aimed at markets that can embrace the following key features: models are produced in large batches, with automotive quality grade parts and justification files based on constellation heritage. The main advantage of this product line is that it offers very cost-effective products without compromising reliability and quality. This new value proposition is a pivotal enabler for commercial space-based applications, and is made possible solely thanks to the innovative business approach of Airbus Spacecraft Equipment.

Topaz is based on low power Hall Effect Thruster Technology. Its building blocks can be configured to answer specific mission needs in terms of thrust, redundancy and mission lifetime.

Topaz/THORs elements are as follows:

- Hall Effect Thrusters (Low Power class)
- Xenon feed system (in charge of Xenon regulation, able to drive both pressure and mass flow rate)
- Power Processing unit (PPU):
  - Power conditioning and control of the HET Thruster and Xenon feed system
  - TM/TC interface with OBC via redundant SoCAN or RS422 serial bus or MIL-1553 bus and discrete commands
- Xenon Tank: Scalable tank capacity according to mission needs



KEY FEATURES

- End-to-end innovative &flexible solution
- User-friendly in thruster operations
- Breakthrough price-performance ratio
- Efficient integrated electric propulsion system
- Bi-compatibility to the latest generation plasma thrusters
- Xenon gas operated
- Compact module accommodation
- Pressure management and regulation
- Modular system to answer specific needs in terms of thrust, redundancy and mission life time
- High reliability with unprecedented flight heritage

ENVIRONMENT / RELIABILITY

- Temperature: [-30°C; +60°C]
- Vibration level: // 18.3g Rms ⊥ 9.5g Rms
- Shock level: 2 000g (10 000Hz)
- EMI/EMC: ECSS-E-ST-20-07C
- Reliability better than 950 FIT (FIDES standard)

RADIATION

- Latch-Up-Free parts
- Error Protection Mechanisms
- Total dose TID compatible with typical 10 years LEO

BUDGETS

- System total impulse per string up to 200kN
- System Dry Mass 10kg (single configuration)

MAIN THRUSTER BUDGETS

- Thrust per thruster @300V: 16mN
- Specific impulse: >1 200 seconds

MAIN PPU BUDGETS

- Output power: 300W
- Energy transfer efficiency > 90%
- COTS design

MAIN XENON TANK BUDGETS

- Up to 14kg per tank

INTERFACES

- Input Power Bus I/F: 27-38V
- TM/TC interface: SoCAN bus or RS422 or MILBUS 1553

HERITAGE

- Airbus quality legacy
- Automotive COTS process
- Baseline for traditional and new space missions
- On orbit since February 2019

Hardware and Functional architecture

Topaz/THORs has been conceived as a flexible end-to-end solution to answer mission needs in terms of thrust, redundancy, total impulse and mission lifetime.

AIRBUS

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