

Orbital systems  
Satellites  
Transversal competencies



For over 50 years, the Space Electric Propulsion Directorate of Safran Aircraft Engines has been developing, integrating and testing chemical and electrical propulsion systems for spacecraft.

Safran Aircraft Engines is now a leading world player in electrical propulsion systems, especially advanced Hall Effect thrusters

## COMPETENCIES & CAPABILITIES

The Space Electric Propulsion Directorate is proposing:

- A complete range of Hall Effect thrusters (rated at 200 W to 20 kW) for Satellite station keeping, Orbital transfer and positioning, space exploration and navigation,
- Thruster modules and systems designed and built by Safran Aircraft Engines.

Safran Aircraft Engines is used to perform the following tasks:

- A post launch “on-site” support for the first Flight,
- Subcontractor assistance to spacecraft AIT,
- EGSE for spacecraft AIT,
- Subsystem or system End-to-End testing.

### A complete range of plasma thrusters

(200 W to 20 kW)

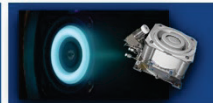
- Satellite station keeping
- Orbital transfer and positioning
- Space exploration and navigation



**PPS® X00** (200 – 1000 W)  
• Under development  
• Qualification in Q2 2022



**PPS® 1350-G/S** (1,500 W)  
• Qualified in 2006  
• Used on Alphas (2013) and Smart-1 (2003)  
• Qualified with single cathode in 2016



**PPS® 1350-E** (2,500 W)  
• EM test in 2014  
• Environmental Qualification done in 2017



**PPS® 5000** (5,000 W)  
• First test in 2006  
• Environmental Qualification completed  
• EOR Qualification review completed  
• NSIC Qualification on 2020/2021 according to mission needs



**PPS® 20K** (20,000 W)  
• Successfully tested in 2011

Thruster modules and systems designed and built by Safran



**Thruster Module Assembly (TMA)**  
• 16 modules for Eurostar 3000 platforms orbited since 2004



**Electric Propulsion Thruster Assembly (EPTA)**  
• Delivered for Small Geo in 2012

# SAFRAN AIRCRAFT ENGINES

## PRODUCTS & SERVICES

Main Hall Effect thrusters in Safran portfolio:

- PPS®X00 (200-1000W)  
Low-cost thruster optimized for high production rate aiming medium and large constellations  
Thrust range: 15-75 mN // Total impulse: 1 MN.s
- PPS®1350 (1500-2500 W)  
Designed for orbit-topping and station-keeping  
Thrust range: 90-140 mN // Total impulse: 3.4 MN.s
- PPS®5000 (2500-5000 W)  
Designed for all-electric satellites (orbit raising & station keeping)  
Thrust range: 100-300 mN // Total impulse: 14.5 MN.s

## MAJOR SPACE PROJECTS & REFERENCES

The PPS®1350 demonstrated its capabilities during ESA's Smart-1 probe's mission from Earth orbit into orbit around the Moon. Four of these thrusters handle North/South station-keeping duties on the Alphasat satellite, launched in 2013. It was selected by Space Systems Loral in 2015 and will equip Astranis satellites (first launch scheduled in 2020).

The PPS®5000, developed in the frame of the PIA2 programme, has been selected by Airbus Defence and Space, Thales Alenia Space and OHB for use on their Eurostar Neo, Spacebus Neo and Electra satellite platforms, respectively. It has also been selected by Boeing company in 2016. First flight planned in 2021.

The PPS®X00 has started its development early 2017 under H2020 European project through CHEOPS consortium. In 2018 CNES will also support this development through ESA ARTES program line.

## POINT OF CONTACT

**ADDRESS** Campus de l'Espace - 1 avenue Hubert Curien - CS30820 F-27207 Vernon Cedex - France

**WEBSITE** [www.safran-aircraft-engines.com/satellite-propulsion-future-electric](http://www.safran-aircraft-engines.com/satellite-propulsion-future-electric)

**PHONE** +33 (0)2 32 64 88 01

**POINT-OF-CONTACT** : Xavier CAVELAN, Programs Contract & Sales Director  
[xavier.cavelan@safrangroup.com](mailto:xavier.cavelan@safrangroup.com)

**TURNOVER** € 10.452 billion (2018)

**WORK FORCE** 16,700 (2018)

**SPACE TURNOVER** -