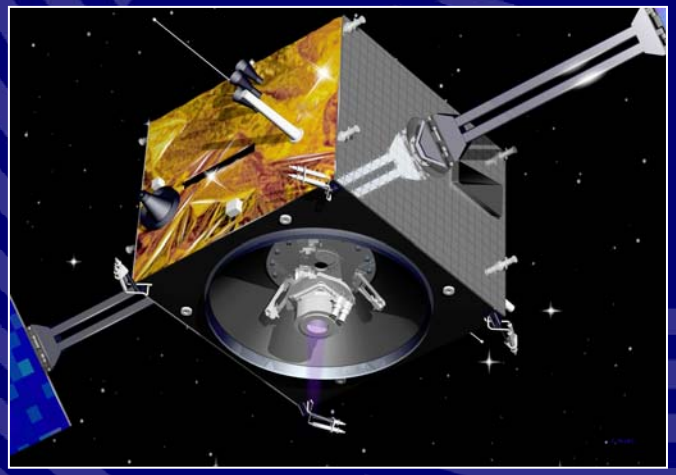
The SMART-1 Electric Propulsion Subsystem



Giorgio Saccoccia
Head of Propulsion and Aerothermodynamics Division
ESA/ESTEC

SMART-1 Media Day
3 April 2003
ESTEC

Space Propulsion

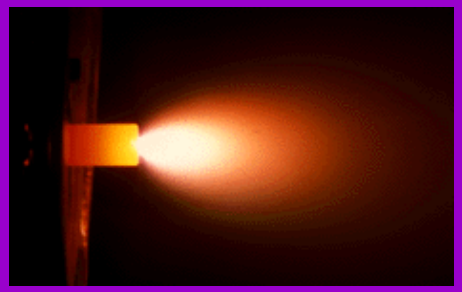
- ✓ Propulsion is an essential technology for space missions
- ✓ Space propulsion is in continuous evolution to:
  - Reduce the propellant consumption *(mass = money!)*
  - Increase reliability
  - Enabling new types of missions

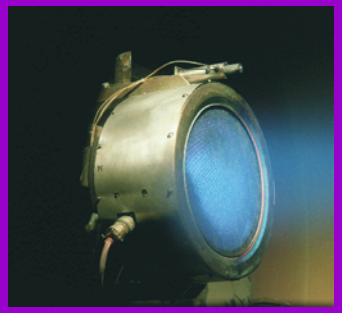
Electric Propulsion provides an answer to these needs

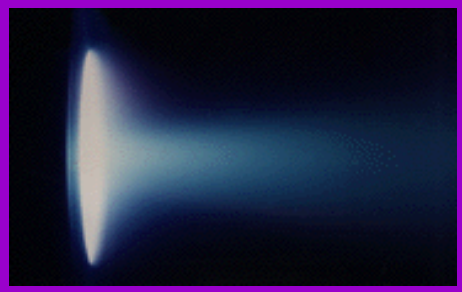
What is Electric Propulsion ?

Spacecraft **Electric Propulsion** (EP) technologies use electrical power to accelerate the spacecraft in a very efficient manner.

There are several types of electric propulsion thrusters, depending on the process used to accelerate the propellant.







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What are the advantages of Electric Propulsion ?

Low propellant consumption

More payload

Longer missions

Cheaper launchers

Shorter trips

Low, highly controllable thrust

Precise pointing

Applications

Telecoms **Science**

Earth Observation

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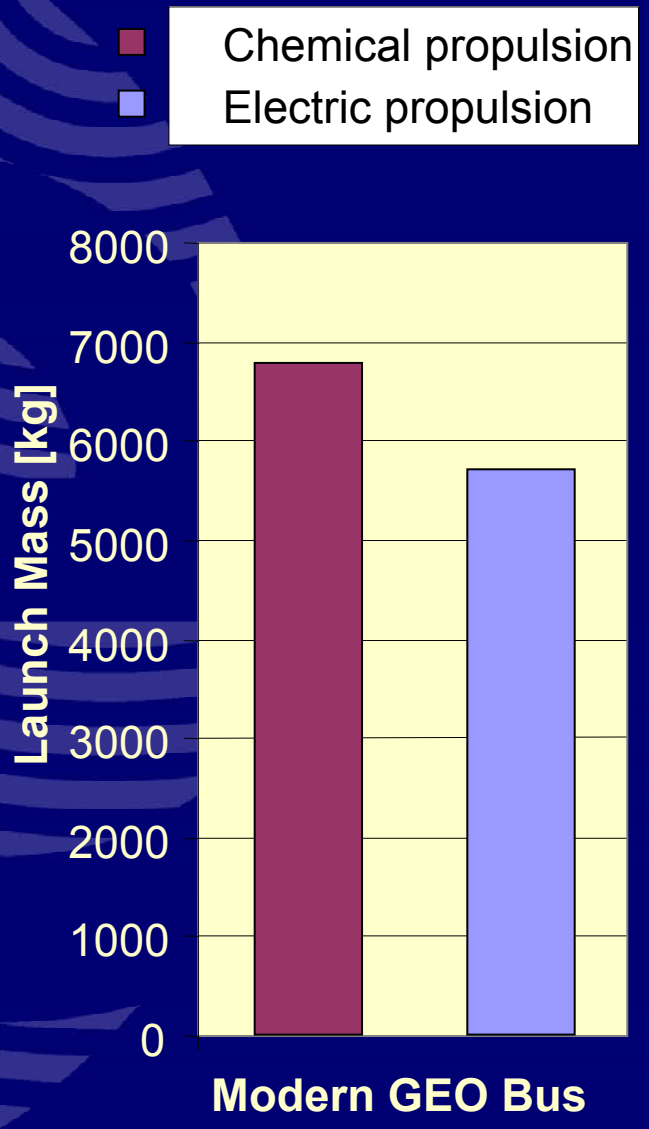
An Example of Application of Electric Propulsion

On a Commercial Spacecraft….



The SMART-1 Electric Propulsion System

On SMART-1, Solar Electric Propulsion will be used as Primary propulsion system for the first time on a European spacecraft.

- PPS1350 Plasma Thruster by SNECMA (F)
- Xe gas propellant (82 kg)
- Thrust 70 milli-Newton

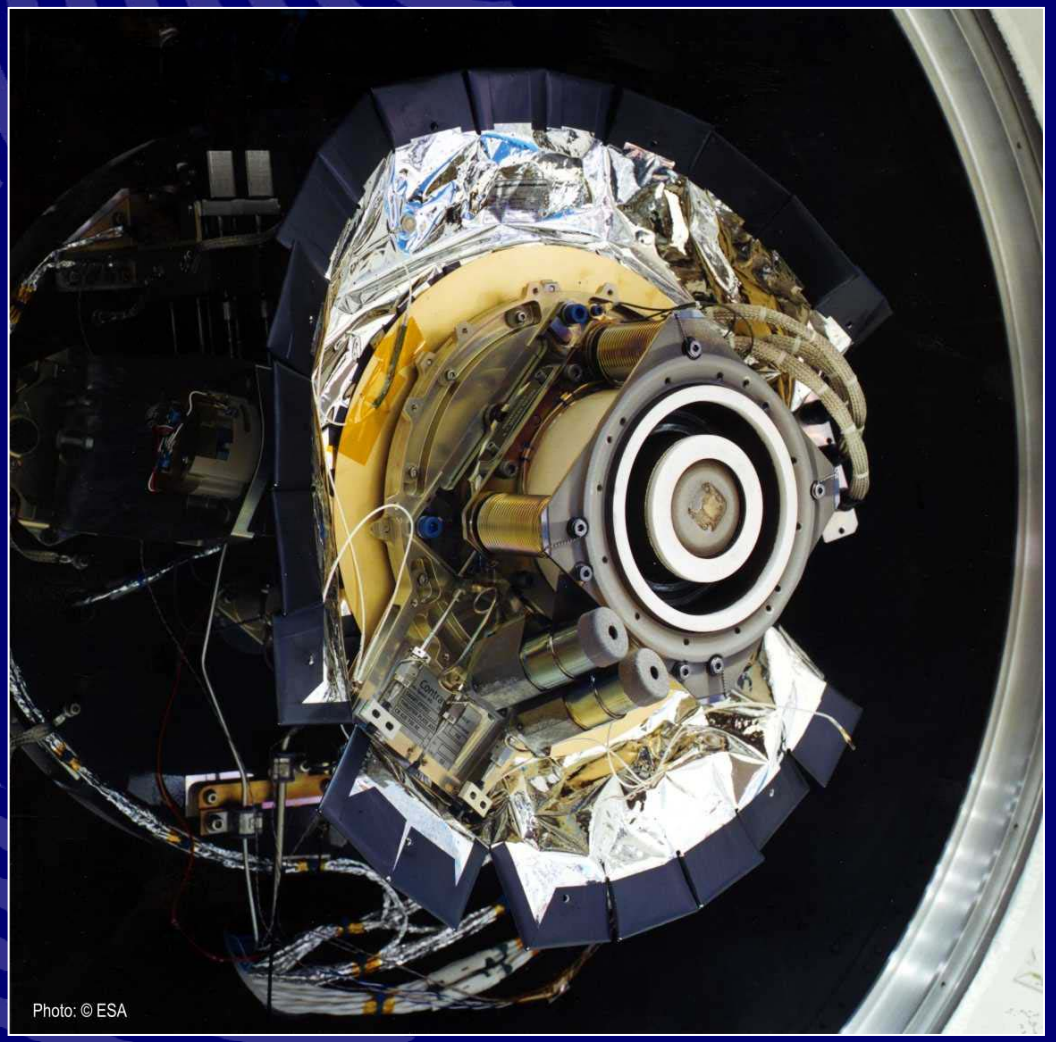


Photo: © ESA

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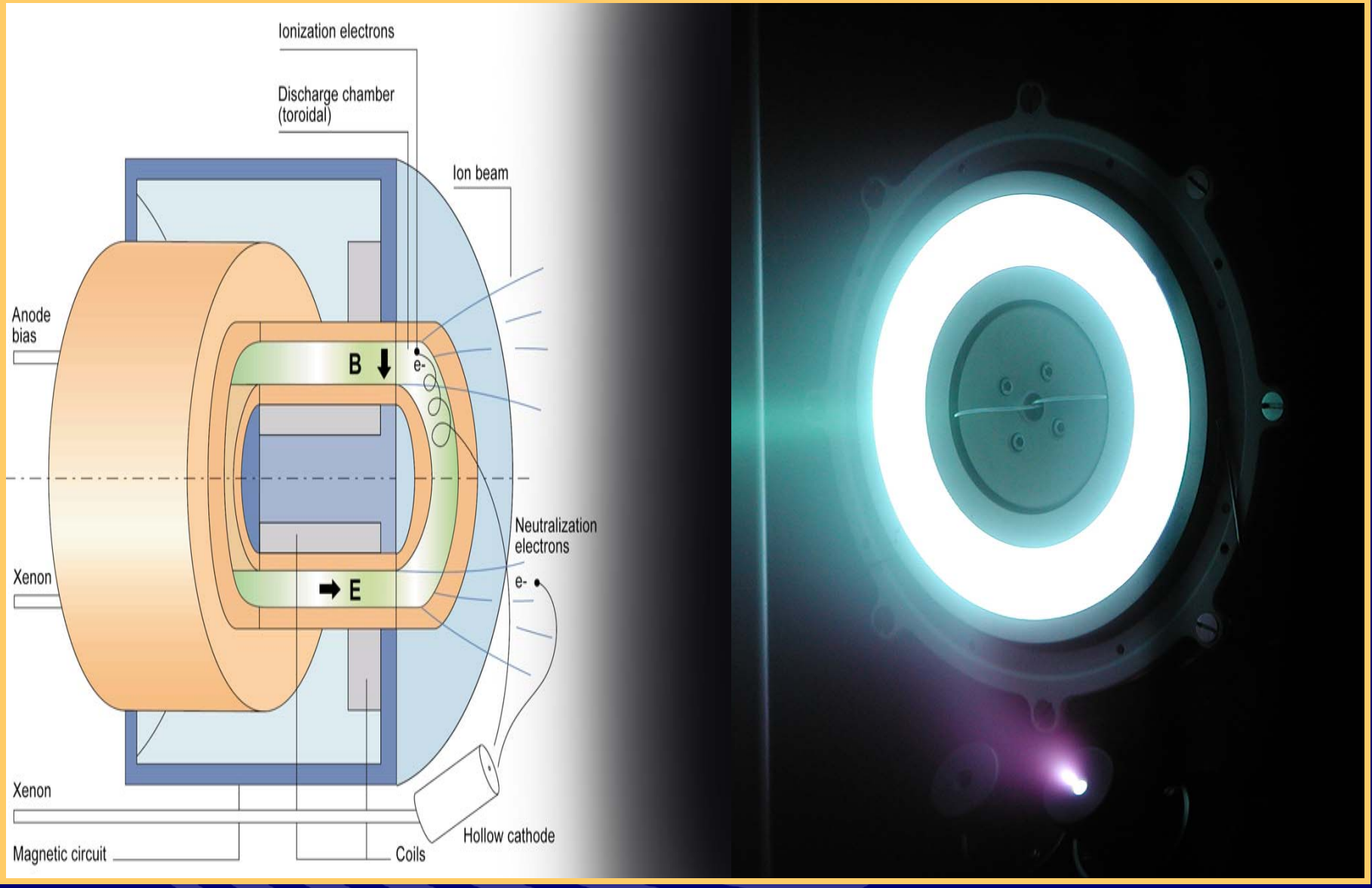
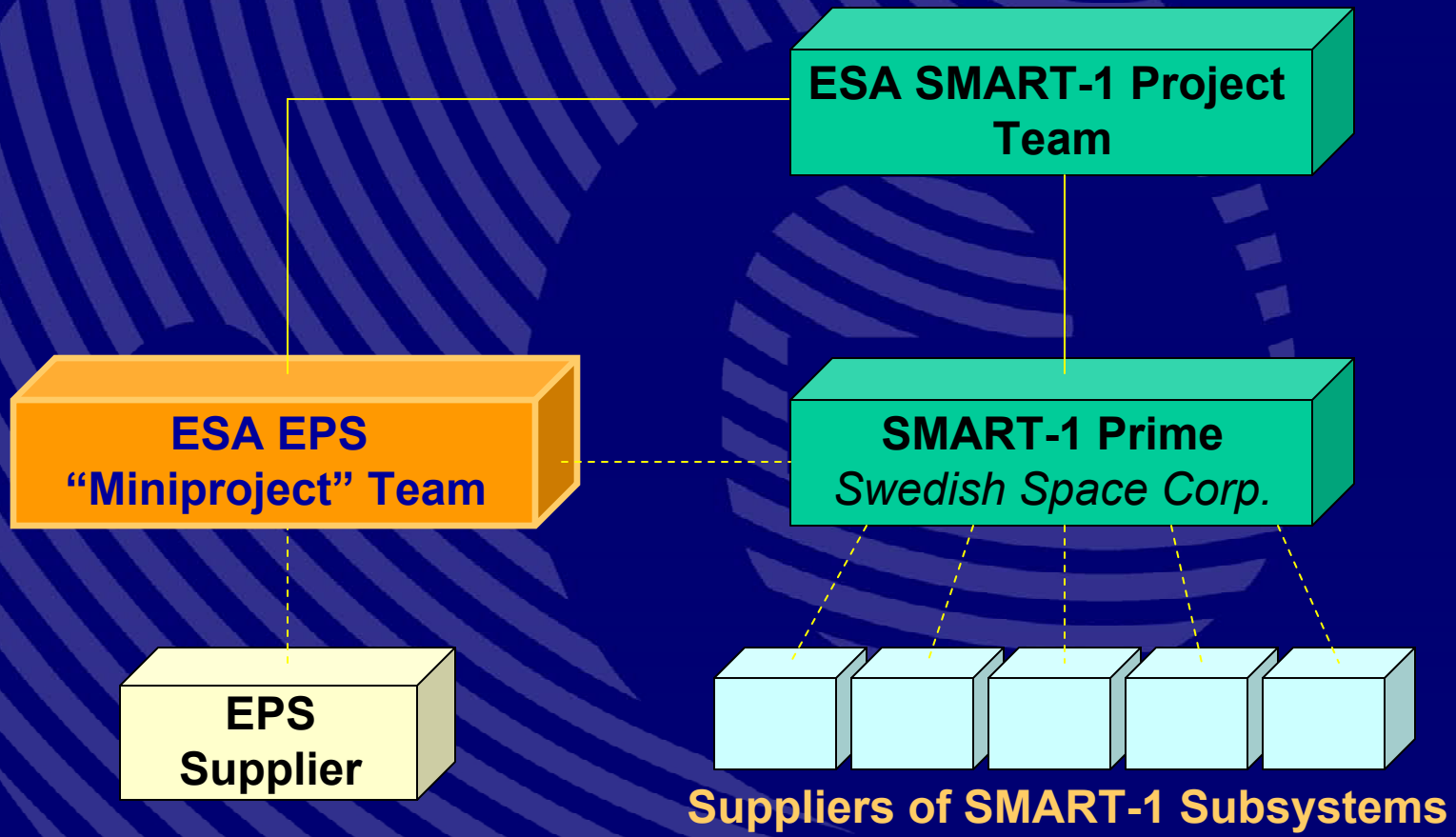
The SMART-1 Plasma Thruster

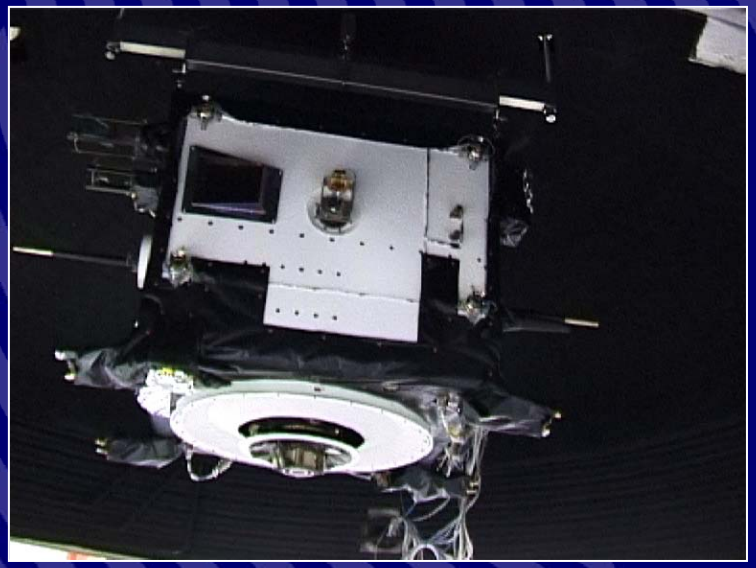


The Procurement of the SMART-1 Electric Propulsion Subsystem (EPS)



The SMART-1 EPS Project

Kick-off 1999 → Delivery 2002



ESTEC, December 2002

- Succesfull “end-to-end” test
- Absolute first for Europe.

First time a plasma thruster is fired mounted on a spacecraft.

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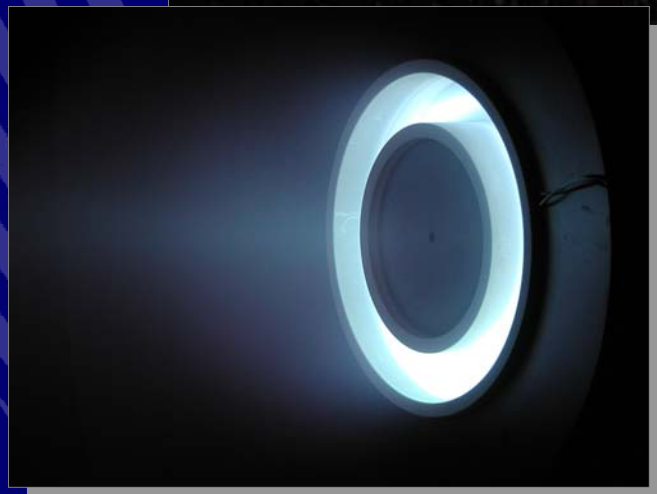

Electric Propulsion….
opens the way
to the future of space….

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