# Space Electric Propulsion - Medium Scale Vacuum Chamber (MSVC)

*Type of Infrastructure*

Electric Propulsion vacuum test chamber

*Main technical features*

The MSVC medium-scale electric propulsion facility, characterized by 2 m in diameter and 4.5 meters in length, is designed to conduct the three main types of tests on space electric thrusters up to 5kW and components, with the Hall effect, GIT, HPT technologies as reference:

- Characterization of engine performance, in terms of thrust, specific impulse, efficiency, etc.
- Characterization of the plasma produced by these thrusters by means of intrusive diagnostics (Faraday and Langmuir probes).
- Characterization of the thermal behavior of the thruster components and of the high frequency phenomena related to the plasma
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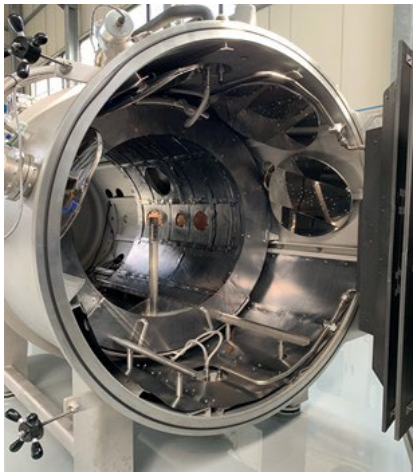
The facility has a cryogenic pumping system characterized by a total pumping speed in Xenon of 80000 l/s. The facility could perform testing with the following gases: Xe, Ar, Kr, $N_2$. It has been equipped also with a backing system that allows for a fast reconfiguration of the experiment.
The laboratory is equipped also with a clean area for the integration and with a UPS system.

MSVC laboratory area



Internal view of the facility with the cryo-panels visible.

### *Application Domains*

MSVC is used to increase knowledge in the field of low-power electric space propulsion, improving understanding of the basic phenomena and supporting the development of physical and numerical modelling and design skills. Moreover, it can be used to validate the design of thrusters, components and electric propulsion systems.

### *Main measuring instruments/techniques*

- Flir Thermo-camera
- Fast Camera
- Langmuir stand and 7 Faraday probes mounted on a movable rack.
- Thrust stand capable of measure thrust in the range 0.5-100 mN with 0.1 N of accuracy.
- Residual Gas Analyzer
- Pressure and temperature sensor to monitor the Test Article
- Optical fibers and viewports for inspection and monitoring the test article
- Control system based on NI architecture and LABview software.

### *Operational Status*

Fully operative