

IAF SPACE PROPULSION SYMPOSIUM (C4)
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DEVELOPMENT STATUS OF THE SPS-40 PROPULSION SYSTEM

Abstract

Introduction

In the Space Electric Thruster Systems Company (SETS) the propulsion system SPS-40 was developed, produced, and fully tested. The propulsion system provides the thrust 14-30 mN, specific impulse up to 1550 s at consumption power of 300-500 W.

Discussion

Electric Propulsion System SPS-40 consists of a Hall Thruster ST-40, Power Processing Unit, Xenon Feed System, and Xenon Tank. All subsystems cover a full list of qualification and acceptance testing, results will be provided. The propulsion system is the plug-in system, which fully controls internal power and control distribution. The main feature of the propulsion system is the Power Processing Unit, which uses power stabilization for the discharge at thruster. Also, a heatless cathode is used with a discharge source with discharge voltage up to 1200 V. Xenon Feed System uses a bang-bang system with xenon vaporizer to avoid the liquid phase of pressurized xenon in a wide range of temperatures.

Conclusion

Subsystems of SPS-40 successfully passed all qualification and acceptance tests: functional, mechanical, thermal-vacuum, EMC/EMI testing. The PPU also was conducted SEE testing with protons with energies up to 184 MeV. The functional test was performed for customized and assembled SPS-40 electric propulsion system in the vacuum chamber. The article presents the main characteristics of the propulsion system, each subsystem separately, and testing results.