

SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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INVESTIGATION OF THE POSSIBILITY TO CREATE THE STATIONARY PLASMA THRUSTERS
(SPT) WITH HIGH SPECIFIC IMPULSE.**Abstract**

As it is known the Electric Propulsion's (EP) are successfully used to fulfill the spacecraft Deep Space missions and by now these missions were realized only with usage of the ion thrusters (IT) having mean specific impulse value per whole mission within the range (2000-3000)s. At the same time the so-called stationary plasma thrusters (SPT) are widely used in the geostationary satellites orbit correction systems and application of these thrusters for the spacecraft transportation from the near Earth to Moon satellite orbit had been started by Smart 1 mission. In this connection an idea to use SPT in the Deep Space missions had appeared. Existing studies of this idea confirm such possibility and advantages of this option is high reliability and significantly lower cost of propulsion system on base of SPT in comparison of the PS on base of IT [1]. The mentioned approach is more actual for Russia where the most significant progress was achieved in the development and application of SPT. But to realize such approach it is necessary to develop SPT having specific impulses at least within the range of (2500-3000)s. Therefore it is reasonable to investigate the main problems of the competitive high specific impulse SPT development. And consideration of these problems and some results of investigations supporting results of such consideration are presented in this paper. Particularly, results of the known SPT-100 and SPT-140 laboratory model characterization under their operation with high specific impulses as well as some of these models erosion test results are considered in the given paper. The last ones allow estimation of the expected lifetime of the SPT with high specific impulse what is important because the required thruster lifetime in the Deep Space missions is significantly larger than in the Near Earth missions.

References 1. Th.M.Randolph. Qualification of Commercial Electric Propulsion Systems for Deep Space Missions - paper IEPC-2007-271, 30th International Electric Propulsion Conference, September 17-20, 2007, Florence, Italy.