

TEST BENCH FOR KEY COMPONENTS OF MEGAWATT CLASS INTERNATIONAL POWER AND PROPULSION SYSTEM GROUND DEMONSTRATION (ABSTRACT)

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Abstract

The objective of the DEMOCRITOS project (Demonstrators for Conversion, Reactor, Radiator and Thrusters for Electric Propulsion Systems) (financed under the EU Horizon 2020 Research Framework Programme) is to investigate the necessary demonstration activities in order to mature technologies for megawatt class nuclear power and propulsion systems (NPPS) [1]. The project is a follow-on activity of the successful European-Russian cooperation in the frame of the MEGAHIT (Megawatt Highly Efficient Technologies for Space Power and Propulsion Systems for Long-duration Exploration Missions) project [2,3].

Use of megawatt class nuclear power and propulsion systems will allow realizing new challenging near-Earth and deep space missions, which are hard to realize in other way. For example:

- Transport of multiple deep space exploration missions (e.g. asteroids, Mars and moons of Jupiter);
- Deflection of dangerous near-Earth objects like asteroids and meteorites as well as collection and removal of debris in Earth orbits;
- Building of Earth-Moon or Earth-Mars tug system;
- Use of nuclear power systems for planetary habitats and exploitation of planetary and asteroid resources.

During the DEMOCRITOS activities, several demonstrators' concepts are being defined. Demonstrators are destined for maturing technologies necessary for the development of spacecraft with NPPS. One of these concepts is ground demonstrator, which includes the conversion, thermal management, power management and distribution and electric propulsion subsystems [4].

The follow on of the international cooperation will enable the development and testing of the ground demonstrators on subsystem and system level. Keldysh Research Center test facilities are proposed to use for testing ground demonstrator. Successful ground demonstration will be the first step towards the realization of new ambitious international space missions.

1 Project ID: 640347. Description available online: http://cordis.europa.eu/project/rcn/193713_en.html.

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