
Radioisotope Thermoelectric Generators (RTGs) and Heater Units (RHUs) for the European Space Nuclear Power Programme

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Abstract

Radioisotope thermoelectric generators (RTG) are under development in Europe as part of a European Space Agency (ESA) funded programme. Aimed at enabling or significantly enhancing space science missions, the development programme relies on the cost effective production of americium-241 as the radiogenic heat source and an iterative engineering approach to developing the systems which include isotope containment architectures and in the case of RTG systems bismuth telluride based thermoelectric generators. The RTG containment systems rely on the use of inner platinum-rhodium alloy cladding, insulation layers and carbon-carbon composite outer aeroshells. The RTG heat source configuration is designed to deliver 200 W. The modularity of the RTG design allows the 200 W heat source to build scalable RTG systems with electrical power outputs ranging between 10 W and 50 W per RTG unit. In addition, radioisotope heater units (RHUs) are being developed for thermal management applications. These are designed to deliver 3 W of thermal power per unit. This paper describes the most recent updates in system designs and provides further insight into recent laboratory prototype test campaigns of RTG and RHU systems.

Keywords: radioisotope, power, systems

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