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EUROPEAN RADIOISOTOPE-BASED SPACE NUCLEAR POWER SYSTEMS

Abstract

Space nuclear power systems are under development in Europe as part of a European Space Agency (ESA) programme. Radioisotope thermoelectric generators (RTG) and heater units (RHUs) are two key technology elements under development. A constant supply of electrical and thermal energy derived from radiogenic decay heat can benefit and enable a range of mission scenarios, providing more science return and increased mission longevity. The focus in Europe has been the cost effective production of americium-241 for the development of small scale RTG systems (10 W to 50 W in electrical power output) and RHUs in the 1 W to 5 W thermal power range. Thermoelectric conversion in americium systems can be achieved using cost effective bismuth telluride thermoelectric modules produced using well-established industry methods and which have been tested in a small-scale RTG configuration in the UK as part of

an ESA funded programme. This paper describes the most recent updates in system design and provides further insight into recent laboratory prototype test campaigns as well as the latest development in the RHU development programme.