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GENERATION OF POWER USING COMMERCIALLY AVAILABLE THERMOELECTRIC MODULES IN NANOSATELLITES

Abstract

In recent years, nanosatellites have been a premier tool for universities and small institutions to carry out space related research. However, most projects are restricted in the design of their system, particularly the payload due to the paucity of power produced by conventional solar panels.

This paper aims to demonstrate the usage of commercially available thermoelectric generators as the primary power source of a nanosatellite, and the advantages of doing so. These modules, operating on the Seebeck Effect, utilize the considerable temperature difference between the exterior and the interior of the satellite body. This temperature difference, although much smaller than that used in radioisotope thermoelectric generators, allows the module to produce significantly greater power than solar panels of similar dimensions. This makes it ideal for usage in cubesats and nanosatellites. In addition, this has the capability of producing power both in the sunlit and eclipse periods of the orbit, which greatly increases the average power generated.

Thus, these modules, which can first be used as a scientific payload, may prove to be a viable, more powerful alternative to photovoltaic power generation.