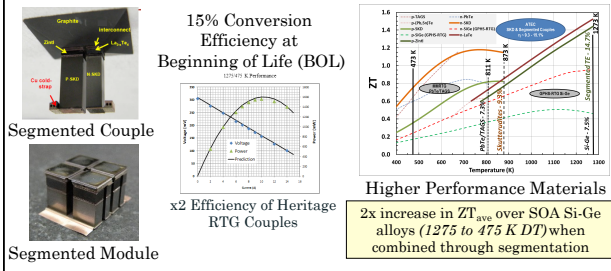


Parametric Analyses of an Advanced RTG

Advanced Thermoelectric Couple Technology



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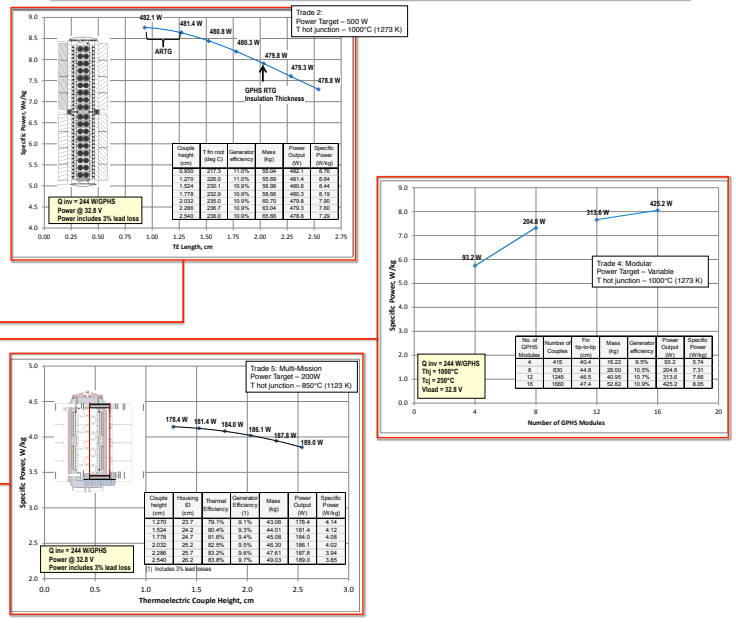
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How would the ARTGs perform? 3 examples



What trade space was explored?

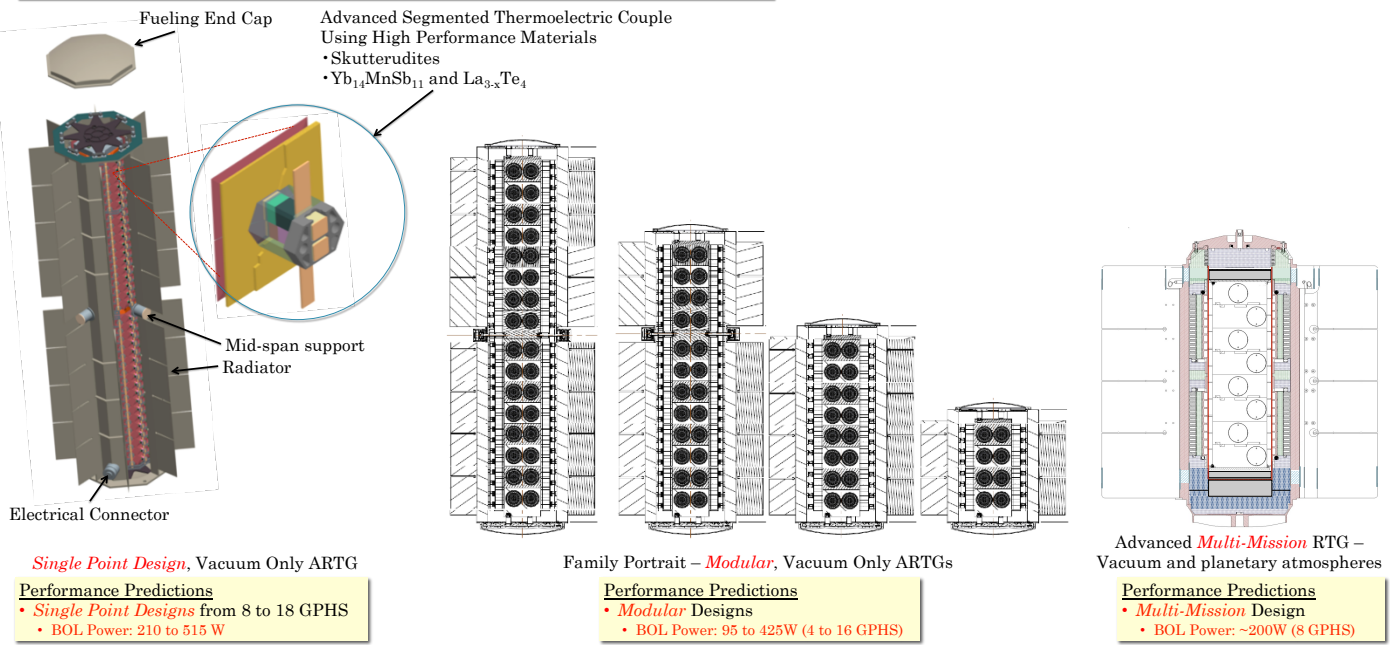
What kinds of Generators and Performance could you get putting JPL's Advanced Thermoelectric Couple Technology in a Cassini RTG (or GPHS RTG) and the MMRTG?

Trade	Name	Vacuum Only?	Number of GPHSs	Power Target, We	Upper Limit of T_{Hj}	Lower Limit on T_{Hj}
1	High Temperature/ High Efficiency	Yes	variable	200	1273 K/ 1000 C	
2	High Temperature/ High Efficiency	Yes	variable	500	1273 K/ 1000 C	
3	Medium Temperature/ Medium Efficiency	Yes	variable	200	1123K/ 850 C	
4	Modular	Yes	4,8,12,16	variable	1273 K/ 1000 C	1123 K/ 850 C
5	Multi-mission	No	variable	200	1123 K/ 850 C	

Requirements

- The thermal inventory of each GPHS, Step 2 module shall be 244 Wt at the Beginning of Mission (BOM).
- The ARTG shall be capable of providing electric power for at least 17 years; 3 years of storage, followed by 14 years after BOM (BOM is defined as Launch).
- The ARTG shall be designed to operate in a voltage range of 22-36 Vdc, with a design load voltage equal to 32.8 Vdc.
- The ARTG shall be designed to maximize reliability including the use of series-parallel circuitry.
- The conductive heat flow from the ARTG to the ARTG-S/C adaptor shall be between 0 W and 50 W.

Advanced Radioisotope Thermoelectric Generator Concepts



Five Take Away Points

1. KiloWatt-class power missions within reach
2. A 500W ARTG would have saved Cassini a generator
3. Graceful degradation
4. Quiescent power
5. Flexible design options

