

RIPS: Rotor/Impeller Power System



Image 1. Preliminary rotor/impeller probe design showing two counter-rotating sets of blades. Blades are ~9 cm long for a ~1 meter diameter hemisphere probe.

Image 2. Contour plot of total probe mass as a function of probe radius and maximum rated power; contours are labelled every 50 kg. Lines indicate 0.45 and 0.25 probe radius, and 3 kw and 10 kw rated power levels.



The Rotor Impeller Power System (RIPS) uses counter-rotating rotors in place of a parachute to provide power to a planetary atmospheric entry probe while also slowing the probe descent.

- Two rings of rotors blades with magnets turning around the exterior of a spherical or other solid shape drive current through coils on the interior without the need for hull penetrations.
- RIPS designs provides up to 20x the specific energy of the Galileo probe at Jupiter, and multiple kilowatts of continuous power for communications and scientific instruments.
- RIPS power may enable new descent mission concepts and deep atmosphere science capabilities at Saturn, Uranus, and all planets with atmospheres.

N. Izenberg et al., (2023) 2023 IEEE Aerospace Conference, pp. 1-20, doi: 10.1109/AERO55745.2023.10115647.