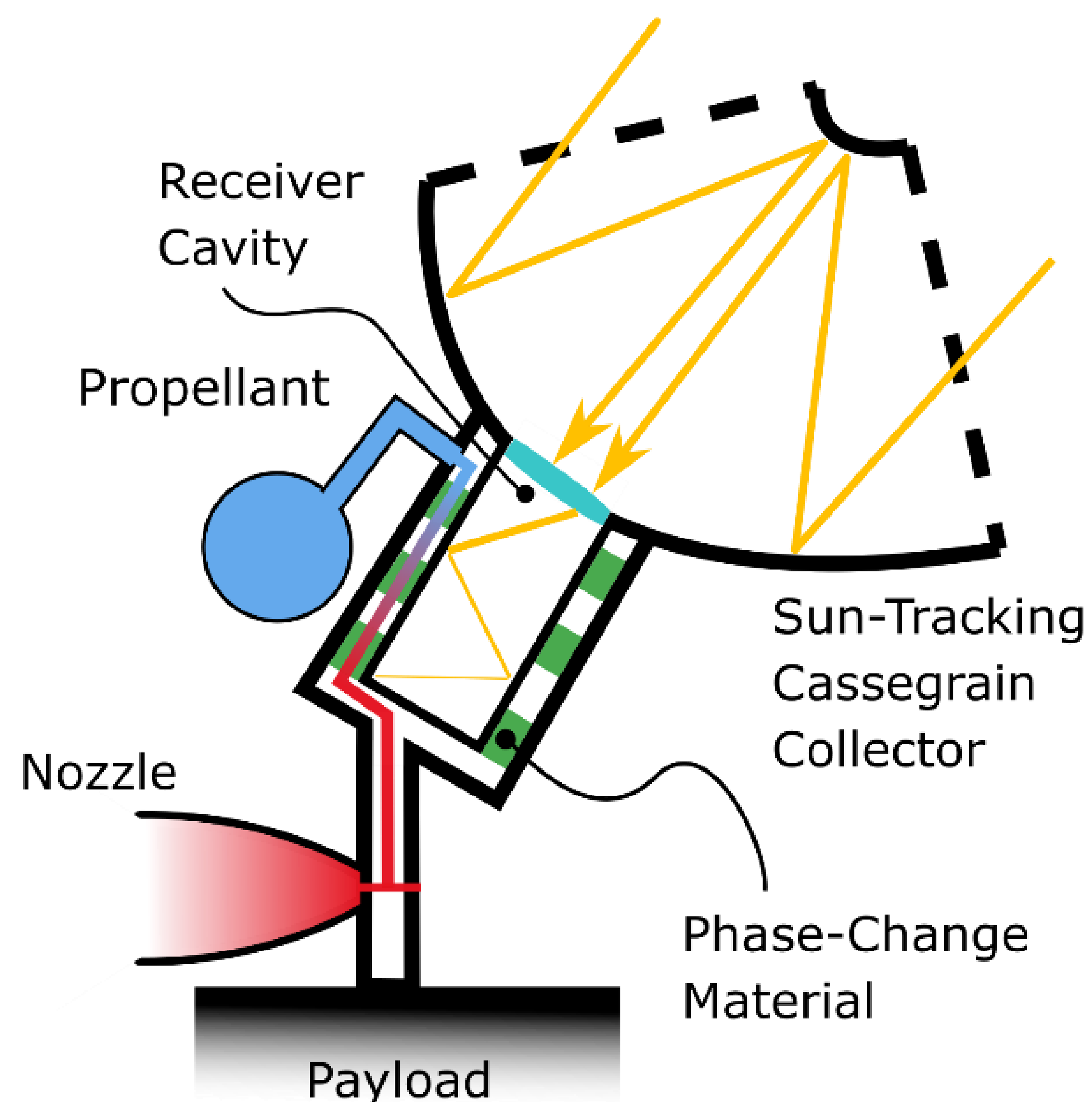
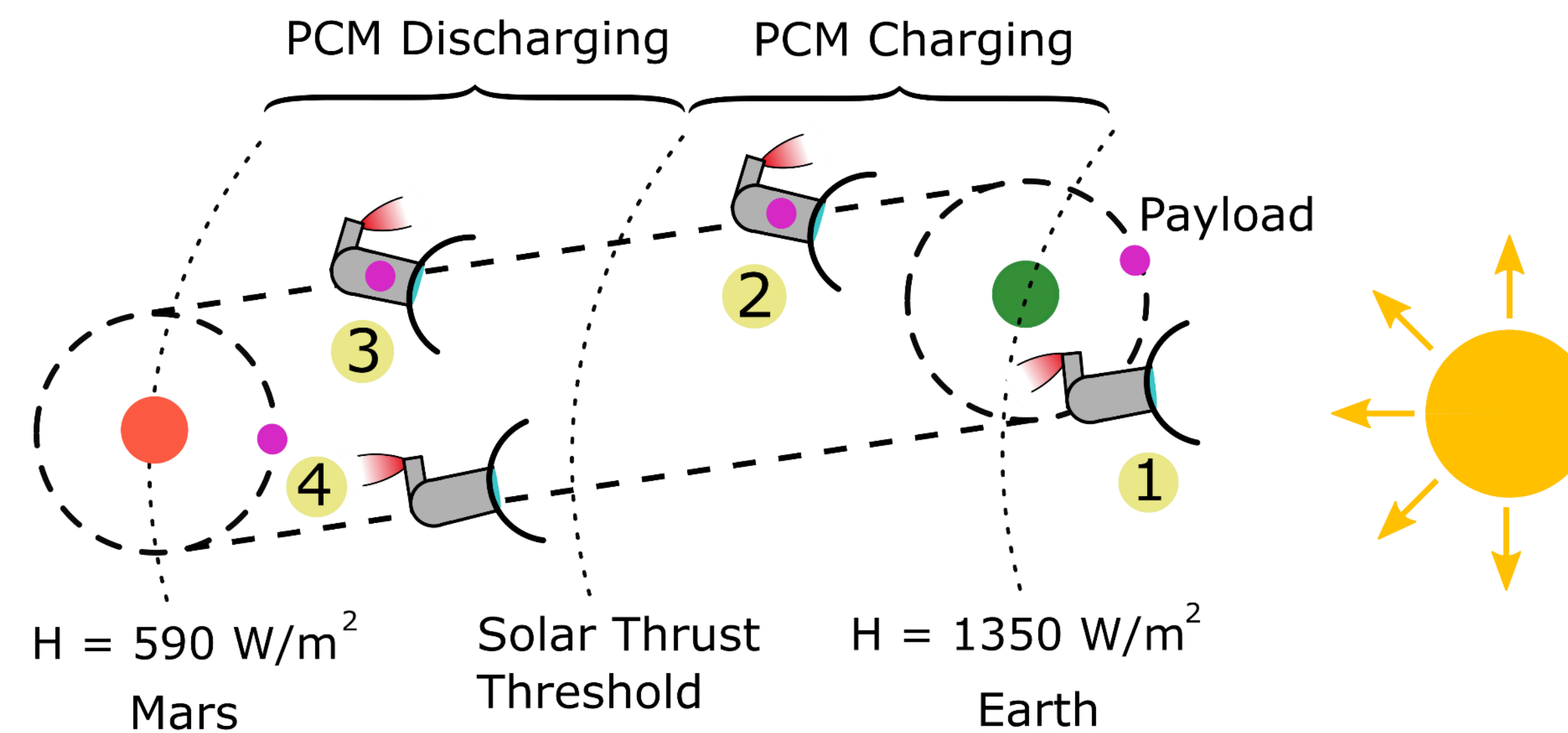


OBJECTIVES

- Development of a prototype of Solar Thermal Ferry's (STF) power plant to transfer satellites from LEO to Lunar or Martian bases.
- Simplified and reusable propulsion system as compared to the conventional chemical spacecraft propulsion.
- Thermal Energy storage and transfer system achieved by using Phase Change Materials (PCM) as heat exchanging media.
- Reduction of costs and resources required for interplanetary supply and distribution.



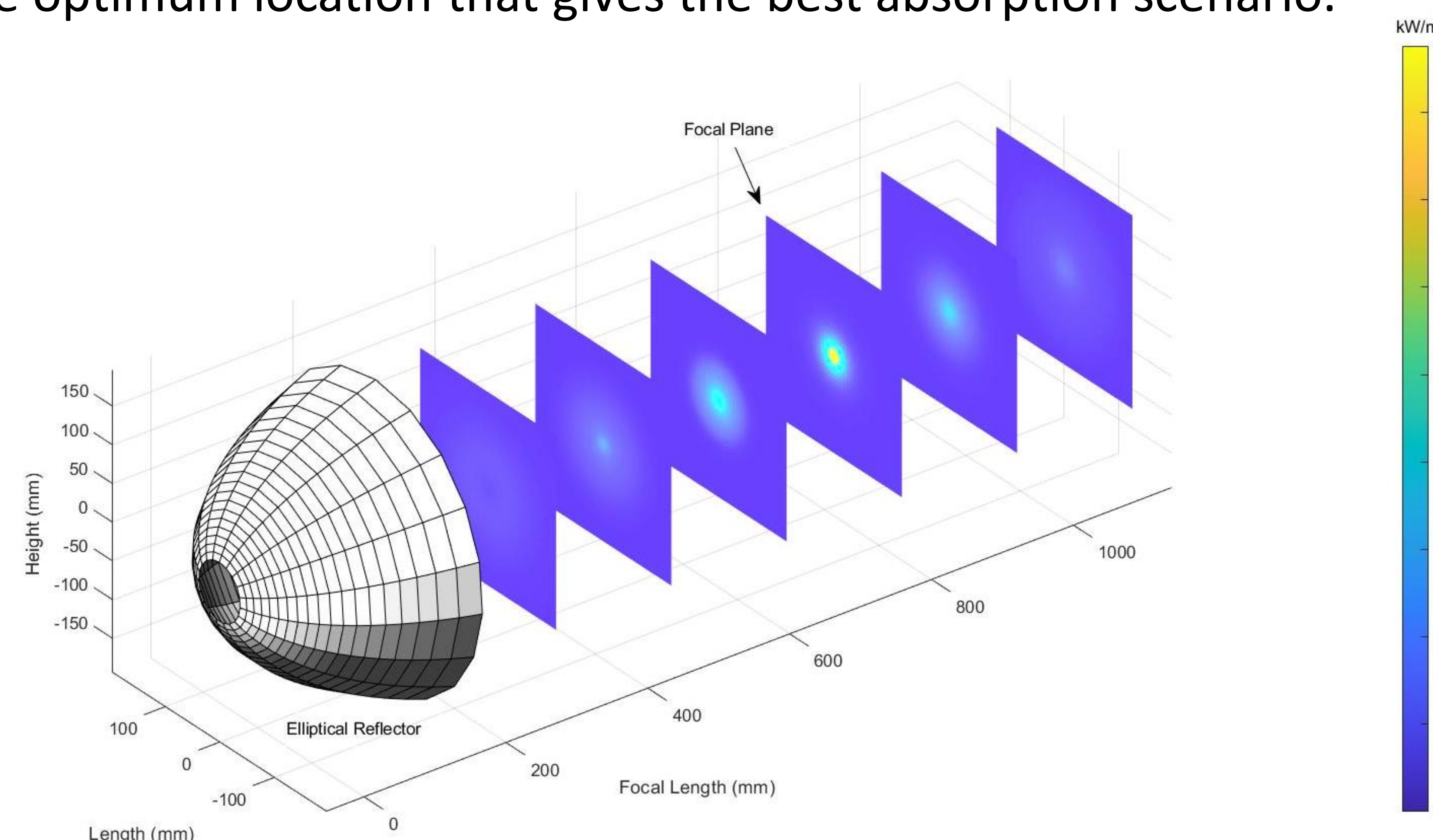
SPACE FLIGHT MISSION OF STF



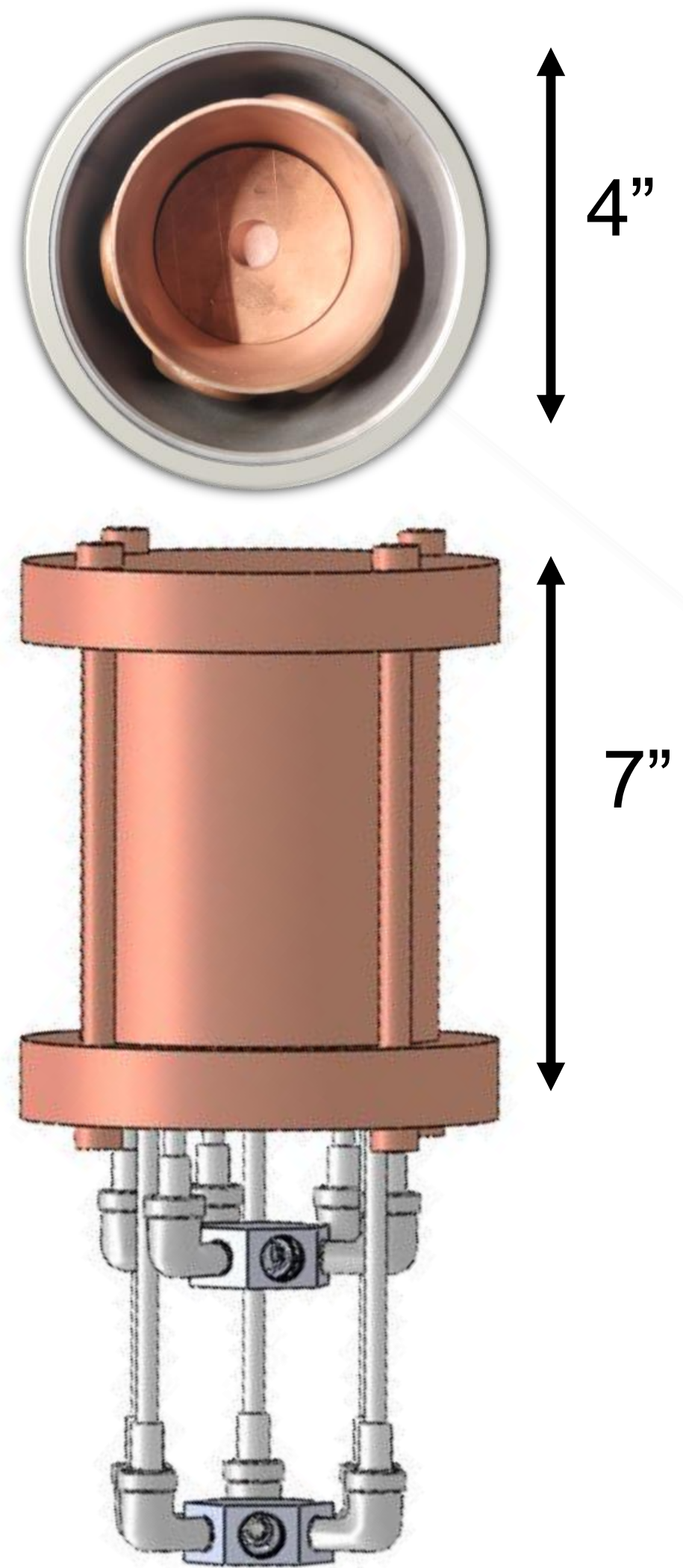
- Four mission stages to complete the successful rendezvous (stage 1) and deployment of payload (stage 4)
- Changes in solar irradiance/input as the STF moves farther away from the Earth.
- PCM stores latent thermal energy (stages 1 and 2) and provides energy to the propellant (stages 3 and 4) to avoid instabilities in thrust due to inadequate solar energy.

MONTE CARLO RAY TRACING (MCRT)

- Simulation of solar energy using high flux (~2500 KW) lamps concentrated using elliptical reflector.
- Tracing of around 3.67 million replicated "solar rays" using MCRT simulation.
- Heat flux/flow calculations for different placements of receiver system at various focal points of the elliptical reflector to determine the optimum location that gives the best absorption scenario.



CURRENT AND FUTURE WORK



- Carrying out experimental investigation of performance of various PCM's (Phase change at 160C and 305C) at different power inputs (250-1500 W) with Nitrogen as propellant with a cartridge heater as thermal input.
- Utilizing the High Flux Solar Simulator and Cassegrain collector for future studies