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IAF SPACE PROPULSION SYMPOSIUM (C4)
New Missions Enabled by New Propulsion Technology and Systems (9)

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ASSESSMENT OF INTERSTELLAR FLIGHT FEASIBILITY WITH E-SAIL

Abstract

Much development is still needed to enable interstellar flight propelled by sails and Pekka Janhunen's E-sail is a compelling new consideration. His concept consists of a propulsion system that draws thrust from charged tethers on a spacecraft and the dynamic pressure of solar and interstellar wind. It is estimated that it would be possible to reach 550 AU in 25 years with a 50 kg spacecraft, 20 tethers of 10 km, and a radioisotope electric power source. Despite promising features, the concept remains theoretical and many aspects of the overall architecture need to be further explored. This paper would entail an assessment of the feasibility of an E-sail mission to escape the solar system, showing the technological advantages and shortcomings. The objectives include:reviewing the current performance estimation of the E-sail; presenting different mission options resulting from systems trade-offs; developing a baseline spacecraft and mission architecture; compiling information on existing interplanetary technology that can enable the mission as well as technologies currently under development; identifying critical aspects of this propulsion option; providing a rough cost analysis and mission programmatic scheme for the baseline option.