

SPACE PROPULSION SYMPOSIUM (C4)
Advanced Propulsion : Non Chemical, Non Electric (6)

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NON-CHEMICAL, NON-NUCLEAR ADVANCED PROPULSION FOR SPACE APPLICATIONS :
PANORAMA AND ROADMAP

Abstract

This position paper has been prepared in the frame of IAA Advanced Propulsion Working Group (IAA Study Group #3.1) and is focused on non-chemical, non-nuclear propulsion concepts for space application, excluding Breakthrough-Propulsion Physics concepts. Four main families of propulsion concepts have been identified: catapult launch assist systems (chemical or electromagnetic railguns), beamed energy propulsion (Solar/Laser/Microwave Thermal Propulsion), beamed momentum propulsion (solar and electromagnetic sails) and tether systems (electromagnetic and momentum exchange tethers). The paper reminds the principle and physics behind each concept and variants and gives an updated view of the current Technological Readiness Level, including recent technological developments as well as ground and in-flight experimentations. The advantages, drawbacks and positioning of these concepts with regards to other propulsion solutions are discussed. Finally, a roadmap is proposed, including the next steps identified to increase the Technical Readiness Level and pave the way to operational space applications.