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Recent progress in Space Nuclear Propulsion

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Abstract:

The safe use of fission-based Space Nuclear Propulsion (SNP) systems offers the potential for revolutionary increases in performance and mission capabilities, as compared to the state-of-the-art chemical systems. In order to realize that potential much design, development, testing, safety analysis, regulatory pathfinding, and demonstration is needed. There is a renewed emphasis in space nuclear system at NASA and driving towards development of operational systems. A overview of recent progress will be provided, focusing on nuclear thermal propulsion.

Biography

Adam Butt serves as the NASA Space Nuclear Propulsion (SNP) Project Deputy Chief Engineer, and Chief Engineer for a potential flight demonstration project, to deliver and test a compact HALEU-fueled nuclear reactor in orbit and demonstrate nuclear thermal rocket engine operation. Since joining NASA in 2006, he has held key technical leadership roles across major human spaceflight and propulsion programs, including serving as Launch Vehicle Lead Engineer for the Commercial Crew Program, where he led Falcon 9 crewed flight certification and the first ever crewed booster reuse certification for missions from DM-1 through Crew-6. His earlier work spans propulsion development for the Dragon, Starliner, and Orion spacecrafts and Ares I roll and reaction control systems, as well as advanced in-space propulsion concepts. Before NASA, he gained hands-on propulsion and test experience at Purdue University's High Pressure Rocket Test Facility. Adam holds dual master's degrees in Aeronautical and Astronautical Engineering and Nuclear Engineering (, along with a bachelor's degree in Aeronautical and Astronautical Engineering from Purdue University. His expertise covers chemical, nuclear, and advanced propulsion systems, with deep experience in system integration, safety assurance, and human-rated flight readiness. He has been recognized with major NASA honors, including the Early Career Achievement Medal, Outstanding Leadership Medal, Silver Snoopy Award, MSFC Director's Commendation, 19 Group Achievement Awards, the Space Flight Awareness Trailblazer Award, and AIAA Best Paper Awards.