

Considerations for Closed-Loop Brayton Cycle for Nuclear Thermal Rocket with Decay Heat

Presented by Jacob Easley at Nuclear and Emerging Technologies for Space, Richland, WA

I had the opportunity to travel to Richland, Washington, to attend the Nuclear and Emerging Technologies for Space (NETS) 2019 conference from February 24-28. My conference paper was accepted in early January, and I had the privilege to present it alongside my coauthor, Chad Denbrock, from the University of Michigan. The paper focused on incorporating a Brayton power cycle to generate power for the habitat or science module of a nuclear thermal rocket built for deep-space exploration applications. Incorporating a nuclear-powered generation system allows for vast mass savings for the spacecraft in deep-space locations compared to solar power whose solar arrays add an abundance of mass. Incorporating a power cycle also allows for the cooling down of the nuclear reactor engine during non-thrust operations.

NETS hosts a collaboration of the leading nuclear scientists and researchers from all over the United States. It was a great chance to collaborate with professionals and experts in the field and learn about their research and vision for the future of the nuclear space industry. Numerous talks from industry leaders, military figures, and congressmen coupled the technical talks and space policy talks to form a holistic view of the future of space nuclear systems.

I performed my research at NASA Marshall Space Flight Center in Huntsville, Alabama, as a research associate during the summer of 2018 under the guidance and mentorship of Dr. Michael Houts. During my time at NASA, I was also a part of the NASA Leadership Academy through which I attended nightly lectures and participated in events and talks focused on discovering NASA's role in space and exploration in conjunction with private industry. I was able to talk to several current and past center directors of Marshall Space Flight Center as well as travel to Washington, D.C., to meet with NASA administration at NASA Headquarters.