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SPINNER - CENTRIFUGAL FLUID TRANSFER IN MICROGRAVITY

Abstract

Transferring fluids between space vehicles is a necessity when conducting in-orbit servicing, assembly, and manufacturing (ISAM). Fluid resources such as propellant, coolant, and water are critical for space logistics. Terrestrial systems use a pump system and place the inlet in the source fluid's lowest gravity point; however, this results in gas ingestion and disrupts fluid transfer. Most fluid transfer in space utilizes pressure fed systems which are volumetrically less efficient than pump fed systems. A novel approach for leveraging centrifugal containers to concentrate fluid to leverage pump fed systems in microgravity are presented in this presentation. This includes a microgravity technology demonstration Zero-G microgravity flight from 21 May 2022 called "Spinner", where I have successfully tested and demonstrated the centrifugal fluid transfer experiment and transferred 70