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C2Or4C-01: Development of a two-phase, variable nozzle jet-pump for pressure control in liquid hydrogen systems

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Liquid hydrogen systems require pressure control methods when flowing through complicated plumbing networks. Methods vary from autogenous pressurization, introducing a secondary fluid, buffer volumes, or utilization of transfer pumps. To address this need, a jet pump was designed, built, and tested with liquid hydrogen to assess variable primary nozzle position in relation to secondary fluid mixing and inlet/outlet pressure differentials. This paper reviews the technology development, testing, and results of the efficiency when using a venturi jet pump for liquid hydrogen applications. This new liquid hydrogen pumping paradigm has the potential to reduce the frequency of maintenance required by reducing complex sealing surfaces while decreasing the two-phase mixture quality at the outlet.

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