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RESEARCH ON THERMODYNAMIC VENT SYSTEM FOR LONG-TERM ZERO-BOIL-OFF (ZBO) HYDROGEN STORAGE

Abstract

Cryogenic propellant has a low boiling point and will be resulting in a large number of evaporation by the influenced of outer space heat flow. Thermodynamic vent system (TVS) technology can promote a low rate of propellant loss for cooling, and can be to control the pressure, take away most of the heat leakage, and eliminate the thermal stratification. Through the heat exchange, the cold energy is transferred to the tank fluid, the vent mass accounted for only 2% of the circulating flow, and reduce the vent back pressure can be beneficial to improve the efficiency of the system, but the pressure must be higher than the triple point. Studies have shown, TVS is a key technology for long-term Zero-Boil-Off (ZBO) hydrogen storage in space.