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UPPER STAGE AND LANDING MODULE LIQUID ROCKET ENGINES WITH COMBINED STORABLE PROPELLANT SUPPLY SYSTEMS

Abstract

Currently liquid rocket engines applicated onto booster stages use either turbopump propellant supply systems because of its minimal size and mass and its high efficiency, or the expulsion propellant supply systems because of its reliability and simplicity. Yuzhnoye SDO has developed a principally novel pneumopump propellant supply system that combines the advantages of turbopump and expulsion propellant supply systems: the liquid rocket engines using a pneumopump propellant supply system have minimal size and mass (like the engines using a turbopump supply system), are structurally simple and uses pressurized gas to supply the propellants to the combustion chamber (like the expulsion system). Moreover the application of a pneumopump propellant supply system provides less than 1Yuzhnoye SDO experience in the development of liquid rocket engines with combined supply systems (RD866) indicates that propulsion systems using both pneumopump and turbopump supply systems will have a combination of characteristics unreachable for classical schemes. This paper presents the appearances and characteristics of such LRE, possible version of its design and propellant supply system characteristics.