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OVERVIEW OF EXISTING LAUNCH VEHICLE FUEL TANK PRESSURIZATION SYSTEMS AND
DEVELOPMENT PROSPECTS

Abstract

The fuel tank pressurization system has a significant impact on the mass-energy parameters of the launch vehicle, determines its general configuration and characterizes the level of sophistication of the entire vehicle. The paper provides a classification of pressurization systems (PS). The experience of domestic and world space launch system manufacturers with the most interesting approaches from the point of view of the adopted engineering solutions is discussed. The positive and negative aspects of the adopted solutions are shown. The main development prospects are shown for many of the discussed PS, including increasing the specific performance of the pressurant gas, improving the physicochemical and heat-mass transfer processes occurring inside the tank, regulating the PS parameters and correlation dependence, rational choice of the design and dimensions of the pressurization devices, features of the PS operation experimental testing and modeling, as well as using tools for destratification of the propellants thermal stratification. In general, their use contributes to a significant increase in the launch vehicle performance capabilities.