SPACE DEBRIS SYMPOSIUM (A6)
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METHODICAL APPROACH TO COMPREHENSIVELY RESOLUTION THE PROBLEM OF ENVIRONMENTAL POLLUTION REDUCTION WHEN SLV WITH LPE LAUNCHES

Abstract

Two areas of the environment of the Earth surface (near-Earth space (NES) and impact footprint (IF)) with the most intensive impact because of launches of SLV with main LPE are considered. Separable parts (spent stage (SS) with remnants of fuel, transfer compartment (TC), the payload fairing (PF) are very dangerous for the environment. The presence of unused residues of liquid propellant in tanks for orbital SS (SSorb) leads to risk of explosion on orbit and the emergence of large number of space debris in NES. For lower SS (SSlow) falling to the IF it results in propellant spillage on the IF and / or to the risk of explosion in the atmosphere and accordingly, large size of IF area on the Earth's surface. Active controlled SSorb descent leads to a complete solution of the problem to exclude orbital debris appearance at launches of SLV in NES, at least, technological impact on the IF is increased considerably. Preferred methods to reduce anthropogenic impacts to IF are based on the use of active descent on-board systems (ADOS). Examples of ADOS are implemented SLV launches "Falcon 9" to bring the SSlow in the given area and the implementation of soft landing, the project "Rossyanka"with the SSlow return to the start area, aerodynamic maneuver SSlow of SLV "Angara" (with the system "Baikal"), and others. These solutions involve primarily reusable nature of the SSlow using, a soft landing and subsequent transportation to the plant manufacturer or cosmodrome. Below we consider the option of using ADOS based on the utilization of unused earlier residuals of the propellant in the tanks (up to 3The complete solution of the problem of PF fall may be accomplished by its burning (gasification) in dense atmosphere layers before they fall on the Earth's surface. It is proposed to add some thermite-based mixtures of powdered metals (e.g., magnesium, aluminum, titanium or their alloys) or mixtures of these powders with oxidizers.