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RADICAL LOW-COST SOLUTION TO A COMMERCIALLY FEASIBLE NANOLAUNCHER

Abstract

This work had focus on analyse of feasibility to convert VSB-30 sounding rocket in a NanoLauncher, based on removing payload bay and replacing it by a really optimized upperstage. This work detail technical aspects of this choice, as the commercial and financial too, totally inside NewSpace moviment. Before all technical analyses, was analysed cost trends of more representative launch providers in 3 main levels, considering companies with TRL7 to 9, TRL3 to TRL6 and startups in preliminare designs in TRL1 and 2. With data from this groups, was established a relation of cost trends in function of time, predicting feasible cost for payload in orbits in next decades to conclude what kind of technology will be mandatory, as determine if our solution can be competitive in today and in next decades. Considering an upper stage based on a Liquid Rocket Engine - LRE, and applying some innovative manufacturing solutions, was concluded the feasibility to convert this suborbital rocket in an launch vehicle. The new architecture is based on employment of two S30 SRM as first and second stages aiming a very low cost solutions, with a cost around EUR 100k each stage with a upper stage based on a Ti4Al6V hybrid structures, with an light common dome tank. To simplify more, the LRE was designed based on Ti4Al6V additive manufactured chamber, with catalytic bed and fed by an electrical propellant pump. For this configuration, thinking in reliability, low cost and intermediary performance, was selected Rocket Grade Hydrogen Peroxide (90

(Will be added design and detailed mass distribution, as orbital performance and manufacturing cost estimation of this solution)