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Author: Dr. Hassan Naseh
Aerospace Research Institute, Ministry of Science, Research and Technology, Iran

Mr. Mahmood Ayoobi
University, Iran
Dr. Amir Hossein Hashemian
University, Iran

A NEW CONCEPTUAL SCHEME FOR AIR LAUNCH REUSABLE LAUNCH VEHICLE (ALRLV)

Abstract

The main purpose of this paper is to present a conceptual scheme for launching satellites and space cargoes into Low Earth orbits (LEO) at least cost and operating time by utilizing an aero-plane as a launch platform. This method can remove the existing limitations of the launch site. To this end, the world's Space Launch Vehicles (SLVs) progress and the various existing solutions for launching from 1957 to 2100 AC have studied. This study attempts to satisfy the world's needs and eliminate the global shortcomings in the SLS field. Then, a practical Air Launch Reusable Launch Vehicle (ALRLV) is proposed and introduced. The most important differences between the Reusable Launch vehicles (RLVs) are related to the various types of launch methods (from launch site, carrier aero-plane, balloons and etc.) and also various types of recovery methods (using the tilted wings, parachutes and etc.). The selecting the type of launch method and type of recovery method is affected on cost and operating time reduction. So with this look in two areas of launch and recovery, the best way to launch, is utilized the carrier aero-plane and captive on bottom of aero-plane's body by using pylon. The best way to recover is utilized from combinatorial method by using a folded wing and a parachute. Therefore, to achieve this aim, firstly, the statistical data of the types of launch and recovery methods are tabulated. Then, the mentioned launch and recovery method is selected based on the statistical data comparison. Secondly, the connection between the SLS and the aero-plane is modeled by using the pylon. Finally, the ultimate requirements are needed to meet the integrated ALRLV (SLS and carrier aero-plane and also pylon for connecting the SLS to carrier aero-plane). In the conceptual scheme attempts to satisfy the requirements and needed minimum variation in the carrier aero-plane. In conclusion, the proposed scheme will be validated by comparing with an existing ALV and RLV model. In case, the advantages and the innovations of the conceptual scheme are as follow: 1. Eliminating the limitation related to the launch site location to access different and various orbit and launching without any restrictions; 2. Reducing all costs of designing, manufacturing and implementing; 3. Speed up the launch and recovery process.