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SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

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CONCEPTUAL LAY-OUT OF A SMALL LAUNCHER W.R.T. TRANSIENT PHASES

Abstract

Miniaturized satellites represent the current forefront of space technology. Indeed, the progress in the area of structure and electronics has led to smaller satellites and thereby reduced the size requirements of launch vehicle. The development of a small launcher will reduce the launch cost and allow time flexibility. Furthermore, the trend seen in small launcher augmentation is to develop a small launcher based on existing stage in order to use existing technologies and thereby to reduce the cost of a new production.

The objective of this paper is to present the conceptual lay-out of a small launcher w.r.t. transient phases like booster separation, fairing separation, upper stage separation, Payload separation and de-orbiting. In a first step the requirements are identified and existing systems are examined w.r.t. compliance to the requirements. This compliance check is conducted with the support of simple quick-loop tools. In a second step a trade-off is performed in order to identify the most interesting solution. These tow steps are performed for each transient phase.

Afterwards it is tried to combine the various systems for the transient phases in a more global approach so that one system is covering several transient phases and by this leading to a further mass respectively performance improvement.

It is concluded that based on simple tools it is possible to perform a first sizing of systems needed for performance of transient phases on a small launcher. By this an optimization of the separation systems is possible at an early stage of the launcher development.

The content of this paper is new and was hence not presented at previous conferences. Also the attendance of the author in Peking, China to deliver the paper is assured.