

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

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MODULAR PAYLOAD DECK ELEMENTS FOR SMALL LAUNCH VEHICLES

Abstract

Small-scale, responsive space missions based on affordable miniature satellite platforms have proven to be a valuable addition to the more traditional space missions and large-scale flagship programs over the past years. These missions however depend on the availability of affordable, regular access to space.

Small payloads are typically launched as piggyback or auxiliary payloads on a launch that is governed by a primary payload in terms of schedule and orbit parameters. Significant delays resulting from schedule changes of the primary payload are rather common, unfortunately. Regular access to space to guarantee a certain short time to orbit are becoming more and more critical even for small satellite missions. To purchase a dedicated launch however is seldom an option.

To be able to serve this need for affordable, regular access to space for smaller payloads, launch service providers worldwide are developing smaller launch vehicles. These can be based on existing designs of larger vehicles, such as for instance the mini-PSLV or the Soyuz-1, or based on completely new designs. For reasons of efficiency and flexibility, these launch vehicles have a typical capacity of 250 to 500 kg, which is still relatively high compared to the typical mass of very small satellites. In order to keep the launch cost low, launching satellites in clusters, or 'multi-manifesting', is still inevitable.

As these satellites can be very different in terms of size, nationality and mission goals, determining the optimal configuration or cluster of smaller payloads can be an extensive, time-consuming activity, both technically and programmatically. To be able to configure a cluster efficiently and in a very short time, it is necessary have a standardized, but modular payload platform, in order to accommodate the various sizes and types of satellites.

This paper will present an overview and the preliminary results of a design and development of such 'Modular Payload Deck Elements', performed by ISIS and her Dutch partners, such as Fokker Stork and Mecon. The development will be based on the designs of small launch vehicles like the Shtil 2.1, the Falcon 1e and a launch vehicle initiative of a company active in the Space Tourism sector. The ultimate goal of being able to offer affordable access to space on multi-manifested launches every quarter or more often is strongly supported by the developers of these new small launch vehicles.