

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)  
Access to Space for Small Satellite Missions (5)

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LAUNCHER-1 RAPID REACTION APPLICATIONS, AN OVERVIEW

**Abstract**

This paper investigates the potential applications for cost effective rapid reaction launching of small satellites, specifically those applications for a combined SSTL / Virgin Galactic solution. The authors have studied traditional concepts such as operationally responsive space and disaster management, but also including some novel and innovative applications such as emergency delivery to space habitats including the ISS or space hotels, and LEO satellite servicing. The paper will initially outline some broad application areas covered in the work, then will identify missions that are representative of each application group. A technical analysis will then be conducted paying particular attention to the delta-v requirements (driving technical options), mission operations approaches, and flight dynamics necessary for each mission case. A mission timeline will be outlined for each of the rapid reaction cases, outlining the key phases both from a programmatic and technical point of view, from mission kick off to mission end. The economics of each mission case have been analysed at a top level and weighed against the mission benefits to various stakeholders – including any potential worldwide benefits – in order to make an initial conclusion on the viability of each case mission. The objective of this study is to help formulate requirements for a future small, affordable launcher which might be deployed from the WhiteKnightTwo carrier; and explore the cost-benefits of developing this in parallel alongside the next generation of low cost, fast build SSTL spacecraft to enable a new class of missions targeted at the responsive space user.