

BUSINESS INNOVATION SYMPOSIUM (E6)
Case Studies and Prizes in Commercial Space (1)

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POLICY'S IMPACT ON LAUNCH VEHICLE MANUFACTURING PRODUCTION LINES

Abstract

The ride to space continues to be one of the most costly elements of a space mission. Despite the heritage designs of most rockets used today, the cost to access space continues to be high. While substantial work has been done to explain costs from the perspective of political, cultural, and technological mechanisms, there has been limited integration of these perspectives. This work, on the other hand, combines these views for a composite understanding of the problem on a macro-level. This research aims to look at the problem by combining the impacts of policy decisions on technology by examining the ways policy level decisions impact production of launch vehicles. As such, we view the problem by decomposing the high cost of launch into costs associated with policy decisions and link them to costs associated with manufacturing/supply chain.

This work uses the evolution of the American launch vehicle industry from the heritage of ballistic missile designs to today's heavy lift rockets as a central case study. In particular, we build a process based cost model for the Atlas and Delta launch vehicles by mapping the vehicles' supply chain. From there, we look at the costs associated with producing a launch vehicle from the view of a commercial firm. This is used as a baseline estimate for production/manufacturing costs of a launch vehicle. Then, the research looks at the impact of policy decisions and how they influence the process based cost model's design. This work includes detailed research into the impacts of policy level statements on the technological development of the rockets

By highlighting the influence of policy decisions on a manufacturing system, this work highlights the differences between manufacturing production lines for government systems as opposed to systems on the commercial market. By isolating the impacts of policies such as the US Space Transportation policy, NASA and DOD appropriations budgets, and other important issues of legislation upon the EELV program, policy makers can see the impacts of their decisions on a specific program's supply chain and manufacturing production line. The implications of these findings are discussed, both in terms of recommendations to the EELV program, and more broadly in terms of relevance to new entrants to the launch vehicle market.