BUSINESS INNOVATION SYMPOSIUM (E6) Public/Private Human Access to Space - Supporting Studies (2)

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INDUSTRIAL ECONOMICS OF LAUNCH VEHICLE ROCKET ENGINES

Abstract

This paper follows on the "Industrial innovation cycle analysis of the orbital launch vehicle industry" (2013, Aprea, Block, David) which attempted to match the Abernathy-Utterback model onto the global launch vehicle industry. While the 2013 paper performed analysis at launcher system level and covered topics such as staging, propellant choice and tanking; this new work will focus specifically on liquid propellant main stage rocket engines.

In the current market the choice of hydrogen versus kerosene propellant for the main stage propulsion and the rocket engine power cycle has not yet fully converged on one single dominant design. This paper explores the design and evolution of past and present engines as well as engines currently under development with a special focus on optimum engine size for each propellant and power cycle layout versus performance and production costs. Combining these dimensions and analysing the current market, the paper attempts to predict the likelihood of emergence of a dominant design in the near future.