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Insuring Quality and Safety in a Cost Constrained Environment: Which Trade-Off? (1)

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FLEXIBLE AND ADAPTABLE MISSION ASSURANCE APPROACH FOR LAUNCH VEHICLE
MISSION SUCCESS

Abstract

The TASC Rocket System Launch Program (RSLP) was established in 1979 to provide cost effective systems engineering and launch vehicle mission assurance services to the US Department of Defense and other US government launch programs. Typical space launch mission assurance efforts have been rigorous, structured and inflexible often leading to mission assurance costs being disproportionate to the level of complexity or risk tolerance of the mission. RSLP supports a broad range of payload customers with varying levels of cost and risk tolerance. Although a “one size fits all” mission assurance approach leads to the highest level of confidence for a launch, the costs are often a significant burden on the payload customer. The objective of this paper is to provide an overview of the flexible and adaptable TASC RSLP mission assurance approach and processes. The TASC mission assurance process is organized to support various phases of a launch program including: requirements definition, design, manufacturing, integration and test, mission analysis, software development, reviews and audits, and field and launch operations. We define the MA functions that we will perform for each phase of a mission life cycle using a comprehensive Mission Assurance Checklist, which lists all the potential mission assurance tasks that may be required for a launch program. The checklist is tailored according to cost constraints, risk tolerance and specific requirements for the mission. Tailoring is performed jointly with the customer to establish the mission assurance tasks that provide the highest level of risk reduction given the cost constraints. Tailoring of the checklist considers several factors including the flight history of the launch vehicle, trajectory/orbit requirements and payload configuration. The TASC approach emphasizes rigorous acceptance, qualification and system testing; independent analyses and IVV for critical flight analyses and software; and oversight of formal system testing and field processing. The TASC approach has made a solid contribution to mission success. Our team has supported over 70 successful launches for various customers including sixteen successful first flight launch vehicle configurations, with four different launch vehicle suppliers at eight different ranges.