

SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)
Commercial Space Flight Safety and Emerging Issues (1)

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COST OF DESIGN-TO-SAFETY : THE ASTRIUM SPACEPLANE SHOWCASE

Abstract

As a starting point Design-To-Safety will be a matter of Vehicle architecture and mission analysis as well. Then it becomes a matter of design margins and either hardware or software redundancies. Ultimately it will impact the Maximum Take-Off Weight of any vehicle and then the need for more powerful powerplant for a given performance. According to energy at stake when addressing space related missions, it explains largely why space transportation business favors reliability over design-to-safety when developing a new launch system. Safety of flight for third parties (on ground) or crew on board is managed another way. For former parties, it will be a matter of safety range down the track of a launch system : in case of rocket getting out the safety range, the craft is disabled. For latter parties (astronauts) dedicated crew escape systems will be favored as far as practical and depending on the Space Launch System architecture. As soon as the business model imposes to offer an aeronautic-like safety level, impact to Vehicle and mission design will greatly differ from standard rocket designs, either expendable or reusable. Purpose of this paper is to give examples of how design-to-safety will weight the set of trades-off and Astrium Spaceplane will be used as a meaningful showcase.