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DEFINING SAFETY CRITERIA FOR CREW TRANSPORTATION SYSTEMS AND HUMAN
SPACEFLIGHT MISSIONS

Abstract

The advancement of design techniques for crew safety is crucial for the implementation of future Human Spaceflight missions. This requires defining Safety requirements as well as methods for Safety assessment in cooperation with international partners, and also considering project constraints.

The definition of Safety criteria for crew transportation systems depends on various parameters that are based on technical considerations, but also on programmatic (cost/ schedule) aspects. Through the hazard control process, several risk mitigation strategies may be found suitable to reach the requested level of crew mission safety. For this reason, securing the crew mission success requires both:

- Regulated Safety assessment process, shared and approved worldwide, and
- Definition of Safety criteria that are dependent of the mission objectives, and need to be approved by the Certification Authority.

This paper assesses the definition of the Safety criteria related to failure conditions applied to crew transportation and operation capabilities through the past and current crew transportation systems. It also evaluates the possible extrapolation to future human space exploration missions, wrt the existing standardized process for civil airborne systems (the world's most severe civil aviation standard, and enriched by decades of maturation and improvement). This standardized process has already demonstrated synergies in terms of methods for conducting a Safety assessment process that are expandable to Space Exploration. In this frame, it represents the good example of international consensus on how to define adequate Safety requirements and Safety orientations to be targeted by the space agencies to ensure to crew a safe journey and return to Earth.