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Ensuring quality and safety in a cost constrained environment: which trade-off? (1)

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DETERMINISTIC APPROACH TO LAUNCH SYSTEMS OPERATION SAFETY ASSURANCE

Abstract

The application of rocketry in commercial projects requires a different approach to ensure its operational properties in comparison with analogues that were created earlier for military operators. Launch systems safety and increased requirements to ensure successful and safe launches are a real problem, and providing a viable solution to this problem can provide a competitive advantage in the launch services market. The deterministic approach is an analytical procedure that is widely used in the design of nuclear power plants. It attempts to take into account any probable situations, and in particular accidents, and ensure that the monitoring systems, and engineered safety and safeguard systems will be able to prevent occurrence of abnormal situations with undesirable consequences. The deterministic approach is based on principles of safety margins and the concept of defense in depth. Defense in depth anticipates potential equipment failures and human errors and ensures that sufficient preventive measures are in place to respond to the failures and limit their consequences. My work was to study, modify and adapt the conceptual safety assurance solutions from the nuclear power industry, to be used in aerospace engineering. As a result, a list of conceptual solutions that have to be implemented at the launch systems design phase has been formed. Implementation of the proposed solutions allows us to eliminate or reduce the risks at every stages of operation to within acceptable level and to ensure the safety of the launch system. Furthermore, implementation of these results allows for the verification of compliance with customer set launch system safety requirements. This is essential for carrying out international commercial projects.