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SYSTEM-THEORETIC PROCESS ANALYSIS APPLIED FOR A LAUNCH AND RESCUE OPERATION OF THE SARA SPACE VEHICLE

Abstract

This paper aims to present the application of a new systems approach on hazard analysis, called system-theoretic process analysis (STPA), applied on a launch and rescue operation of the SARA (acronym for atmospheric reentry satellite). SARA is a space vehicle conceived to perform technological experiments in microgravity environment, launched by a VS-40 two stages sounding rocket. The SARA launching operation includes activities as the pre-launch and launch tasks, the remote communication between ground stations and flight hardware, the team communication during the activities, the data exchanging during all mission phases, the microgravity, the reentry and the parachutes opening events and the search and rescue tasks. STPA also enables to accomplish safety requirements of the launch site regulations and procedures for the launch and rescue. In contrast with traditional methods used in the late stages of development, when more information about the system are required and the design changes are costly, STPA guides the safety-driven design of the launch and rescue operations allowing the anticipation of the safety requirements and design constraints in the early stages of the system conception and its operation.