

SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE
ACTIVITIES (D5)

Safety of Vehicules and Ground Segment for Aerospace Missions (1)

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THE OBJECTIVE ANALYSIS OF RISK FACTORS AT FALLING OF THE SEPARATED PARTS OF
SPACE TRANSPORTATION SYSTEMS

Abstract

There is a problem of definition and reduction of fall zones of separated parts (SP) at designing and maintenance of space transportation systems (STS). Now, in connection with intensification of economic and transport activity in overland and water territories and toughening the ecological requirements, this problem became one of the key factor in forming the future STS concepts, irrespective of a launch site distance from shore.

New results of integrated simulation of unguided SP reentry are demonstrated. The results have revealed the "explosive" character of expansion of probable SP fall areas with the change of STS parameters, which cause to an increase in SP linear velocity at the separation point and/or to a drop in the angular velocity of SP rotation before atmospheric entry. These trends are typical for future STS generations with common core boosters. The hazard of appearance of such undesirable effects is estimated. The research outcomes are supported by examples of computer visualization of dangerous dynamic processes.