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CONCEPT OF SOCIOTECHNICAL RESILIENCE FOR NEW SPACE SECTOR

Abstract

The role of space sector is rapidly changing from pure scientific missions to an active player in the future economy. The growing volume and variety of data and signals affect down-stream (Earth-based) systems' reliable operation. Though the old space era can be considered as a resilient era the through analysis shows that this assumption is not correct since it does not fulfill all the criteria of a resilient system such as self-reliance, overlap, diversity and ability to learn. The New Space sector's rapid development challenges the concept of resilience for this sector.

Risk assessment methods for ground-based or terrestrial systems were traditionally based on vulnerabilities identification for a specific component to an adverse event followed by its functionality loss. The subsequent risk management was focused on hardening specific components to an acceptable risk level in order to prevent the overall system failure. Though higher risk levels were accepted in old era's space sector, methodology for risk assessment remained the same. The current commercial/industrial model transformation in the New Space sector increases the system's complexity, creates risks and hides vulnerabilities. This fosters research on sociotechnical resilience concept development.

A large number of risk reports is dedicated to resilience properties in the electricity, nuclear, transportation and other sectors, and space sector is out of focus. The proposed article aims at presenting a New Space resilience framework, describing methodologies for its assessment and introducing quantitative indices. It is especially important in light of increasing public awareness.