ORGANIZATIONAL RISK TECHNOLOGIES

ENGINEERING FOR COMPLEX SYSTEMS

CHALLENGES

Organizational Risk Technologies (ORT) is designed to help NASA understand and reduce its agency-wide mission risks. ORT will address and improve poor understanding of system, human and organizational risk. Its tools and technologies will address how knowledge is managed, and methods on how human teams and organizations should operate to mitigate risk.

OBJECTIVES

Three major ORT efforts will evolve to:

- perform analysis and design of enterprise architecture to support mission design
- assess risk perception and management by teams and organizations in a real-time mission operations context at Johnson Space Center (JSC)
- study human judgment and decision making processes in risk based decision making in conceptual design of complex engineering systems at JPL
- integrate with Risk Tool Suite for Advanced Design

CUSTOMERS & COLLABORATORS

ORT current customers include

- JPL Product Design Center TeamX
- JSC Mission Operations Directorate

Major collaborators include, Carnegie Mellon University, Stanford University, UIUC, Washington State University, UCI, Naval Postgraduate School and Arizona State University.

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IMPACTS

Organizational Risk Models have been developed to characterize team and organizational activity, decisions, and risk management from conceptual and detailed design through operations and maintenance. At least one model will be computational and used for simulation experiments. It is the goal that all these models will converge to a common representation in the development of Organizational Risk Technologies.

TECHNOLOGIES USED

ECS started the development of ORT in late 2001 and schedules to deliver this product before the end of 2007. This 6-year effort will bring the NASA Technical Readiness Level (TRL) in this area up from 1 to 4.

The technical approach includes two main aspects. First, establising an Organizational Risk Model by:

- collecting data to identify Organizational risk issues with customer studies
- developing Organizational Risk Model using computational model of Organizational performance and how it affects mission risk with validation from customer/expert panel concurrence and prediction
- developing conceptual framework based on the analysis of existing research literature on risk perception and management, organizational culture and structure, cognition, and performance in teams and organizations.

The second aspect is to develop Organizational risk assessment for design and Organizational risk tools for operations by

- obtaining customer requirements and needs
- developing Organizational risk tools and technologies with evaluation and technology assessment.