

SPACE SYSTEMS SYMPOSIUM (D1)  
System Engineering - Methods, Processes and Tools (2) (6)

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DESIGN DRIVEN APPROACH TO OPTIMIZE THE RESEARCH AND DEVELOPMENT  
PORTFOLIO OF A TECHNOLOGY ORGANIZATION**Abstract**

Innovation focused technology development involves funding and managing a portfolio of loosely coupled projects through their project lifecycles. An organization and its projects are influenced by diverse internal and external factors, often beyond the institutional needs, and the typical linear disciplines of technical feasibility, cost, and schedule. At a higher strategic level the influencing factors and tradeoffs are often unique and not understood until a solution is formulated. These complexities can be elucidated through the model of wicked problems. Furthermore, the introduction of design thinking could also benefit portfolio management, future planning, and result in closer ties with stakeholders. Technology organizations are dynamic systems, where project performance may deviate from the plans throughout the project lifecycle, due to the unmatched variety between management, projects, and the environment. Thus regular strategic-level project performance assessments are required, which goes beyond linear project management approaches. In this paper we introduce the Project Assessment Framework Through Design (PAFTD), a tool created within NASA, to address this need for high- and mid-TRL system level projects. It is easy to use and customizable. PAFTD can be used to assess internal and external root causes of project performance at NASA centers, federally funded research and development centers (FFRDCs), and outside the organization. The PAFTD framework is also aligned with the viable system model (VSM). PAFTD-based assessments enable dynamic performance trend modeling, and assessment of option trade spaces. Based on PAFTD's performance measures, senior leadership can prioritize investments that contribute to well-calibrated and optimized outcomes. We outline its applicability to a space technology portfolio compared to other project assessment methods, and highlight its benefits in reducing organizational barriers related to strategic assessments and decision making, leading to an effective and dynamically responsive organization.