

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS (D2)  
Future Space Transportation Systems Technologies (5)

Author: Mr. Uwe Hueter

Science Applications International Corporation (SAIC), United States, uwe.hueter@saic.com

Mr. Richard W. Tyson

University of Alabama in Huntsville, United States, richard.w.tyson@uah.edu

ARES PROJECT TECHNOLOGY ASSESSMENT - APPROACH AND TOOLS -

**Abstract**

Technology assessments provide a status of the development maturity of specific technologies. Along with benefit analysis, the risks the project assumes can be quantified. Normally due to budget constraints, the competing technologies are prioritized and decisions are made which ones to fund. A detailed technology development plan is produced for the selected technologies to provide a roadmap to reach the desired maturity by the project's critical design review.

Various approaches have been previously used to assess technologies. One approach is to get a few experienced people in a room and discuss the merits and establish the technology level. This process required little investment in time and only limited manpower. Due to the unstructured nature of the assessment, the results tended to be inconsistent. Another method called Value Streaming approaches the assessment at the technologist level. The status of each technology is discussed in detail with specific experts advancing these technologies in the laboratories. This type approach is very manpower intensive requiring a lot of people and a great deal of time to complete, but provides an accurate assessment, especially when the concept is not well defined. The third approach is to use a technique called the Analytic Hierarchy Process (AHP) that decides the relative importance of technologies by comparing each pair of objectives and weight ranking them on a scale of importance. The process is less manpower intensive than Value Streaming, but still requires a substantial manpower investment and long lead time to set up the process. A fourth approach is to use the subsystem experts and conduct an interview based on a very specific set of questions to establish the technology level. The questions are based on the details normally expected in a development cycle and are tied to the technology readiness level scale. The main parameters focus on requirements' maturity; fidelity of test hardware; scaling issues; type of tests conducted; and test environments. This process requires the least amount of time and resource commitment to perform an assessment. Additionally, it also provides a consistent set of parameters that are considered for each assessment. This process is currently being used by the Ares project to conduct the technology assessments.

The paper discusses the Ares Project's approach to technology assessment. System benefit analysis, risk assessment, technology prioritization and technology readiness assessment will be addressed. Additionally, a description of the technology readiness level (TRL) tool being used will be provided.