The goal of this subtopic is to maximize the credibility of the integrated systems analysis efforts being performed within ASCT by providing validated systems design, system analysis, and systems engineering tools. This will include the development of tools to produce: a modeling and simulation environment, design and analysis databases, system engineering models, engineering discipline analysis, parametric-based risk analysis, and probabilistic risk analysis (PRA), etc. This effort will closely coordinate with and support the development of the Simulation Based Acquisition (SBA) system in support of Exploration System Mission Directorate (ESMD) program acquisition and analysis.

The scope of System Design and Analysis Tools includes tool development activities in the following areas: advanced systems simulation modeling environment; design and analysis databases and system models; performance and structural sizing; SBA advanced systems engineering tools for mid-technology level simulation and visualization of life cycle cost, risk, reliability, supply chain logistics, maintainability, availability, and other system engineering Figures of Merit.

This subtopic is currently focusing on the following technology areas:

- Systems engineering tools and discipline analysis tools in support of Simulation Based Acquisition. See ESMD-RQ-0025, ESMD-RQ-0026 and SBA Strategy in the Crew Exploration Vehicle Procurement Bidder’s library (http://exploration.nasa.gov/acquisition/cev_procurement.html) for additional information.
- Advanced engineering tools that integrate performance, risk, and cost modeling.
- Development of system engineering tools that implement new analytical methodologies and techniques in support of both ESR&T and SBA activities.
- Advanced systems simulation modeling environment that includes database technologies and data collection tools.
- Seamless integration of design tools, modeling tools, simulation tools, and other systems engineering tools via standards-based software interoperability.
- Novel approaches to assessing the performance, cost, or risk of proposed mission architectures.
- Techniques for characterizing and optimizing investments in Modeling and Simulation.
• Methods to extend and reuse models and simulations over the program lifecycle.

• Model-based techniques for optimizing designs in distributed, multi-organization, multi-contract design teams.