NASA SBIR 2018 Phase I Solicitation

S5.04 Integrated Science Mission Modeling

Lead Center: JPL

Participating Center(s): GSFC, KSC

Technology Area: TA11 Modeling, Simulation, Information Technology and Processing

The focus for the coming year is on the integration of model-based approaches into NASA's life-cycle processes: Design, Build, Assemble, Integrate and Operate. Specific areas of interest supporting one or more of these life-cycle processes are listed below.Â Proposers are encouraged to be familiar with the State-of-the-art in these areas.Â Proposers are also encouraged to address more than one of these areas with an approach that emphasizes integration with others on the list.Â Â

Visualization and tool interaction

Techniques and tools for:Â

- Using MBSE to support trade evaluation and capabilities for visualization and comprehension of results/options.Â NASA needs the ability to engage the intuition and experience of those without significant tool expertise.
- Enabling SysML profiles to be more easily created, integrated and compared with other profiles.Â NASA has a wide variety of users and use cases and the ability to better manage profiles (or the equivalent) is important.
- Enabling early phase agility. In the early phases, rapid trade space exploration presents challenges in utilizing typical models or library elements, trade space navigation, rationale capture, and archival/retrieval of options.**Â**

Model Management:

- Methods for archiving/storing, retrieving and integrating model fragments.Â The approach should be easy to use and not require significant new infrastructure investment.
- Approaches for defining and utilizing permission/access control in a collaborative environment.**Â**

Training and Engagement

As NASA continues down the Model-based approach to the engineering disciplines it will be imperative to engage and develop the skilled engineers necessary to achieve our desired end state.Â To that end, NASA seeks approaches for initial engagement with MBSE/SysML that are â€œlightweightâ€ without onerous costs and complexity.Â This must include approaches for transitioning to â€œfull

featuredâ€ tool sets without significant retraining. Â Proposers encouraged, but not required, to consider utilizing plug-ins to existing tool sets. Â

Tool and Process integration

As MBSE continues to develop at NASA, it is critical to explore and develop tools and techniques for better integration at the boundaries of Systems Engineering both breadth (other disciplines) and depth (detailed information). Â Integration (breadth) includes integration with other discipline tools and processes (e.g., Finite Element Modeling, Circuit Analysis) as well as business and programmatic processes. Â Integration (depth) includes integration, or at least interfacing, with lower-level information (e.g., Â Piece part data, assembly process Â specifications). Â It is critical that we understand the nature of these interfaces, and reduce the complexity and difficulty of developing and maintaining these interfaces.