NASA SBIR 2011 Phase I Solicitation

S6.04 Integrated Mission Modeling for Opto-mechanical Systems

Lead Center: GSFC

Participating Center(s): ARC

NASA seeks innovative systems engineering modeling methodologies and tools to define, develop and execute future science missions, many of which are likely to feature designs and operational concepts that will pose significant challenges to existing approaches and applications.

Specific areas of interest include the following:

Low-cost Model-Based Systems Engineering (MBSE) methodologies (defined as some combination of tools, methods, and processes - refer to the "INCOSE Survey of MBSE Methodologies") for rapid and agile definition of mission architectures during the conceptual design phase. Here, "low-cost" is intended to capture multiple aspects of the investment in the methodology, including initial purchase, maintenance, and training/learning-curve. These methodologies must support requirements analysis, functional decomposition, definition of verification and validation methods, and analysis of system behavior and performance. Development of methods and applications based on, or supporting, standards such as UML and SysML is highly encouraged, as is tight integration with Microsoft Office and Microsoft Project.

Interfaces between existing (or proposed) MBSE tools and CAD/CAE/PM applications used to support NASA science mission development, which typically include (but are not limited to): Pro/E, NX, NASTRAN, ANSYS, ABAQUS, ADAMS (for MCAD and structural/mechanical systems analysis); TSS, SINDA, Thermal Desktop, TMG (for thermal systems analysis); Code V, ZEMAX, OSLO (for optical systems analysis); Hyperlynx Analog, Hyperlynx GHz, System Vision, DxDesigner, ModelSim (for ECAD and electrical systems analysis); Matlab, Simulink, STK (for guidance, navigation and control systems analysis); Excel, MathCAD, Mathematica (for general purpose numerical and symbolic analysis); DOORS (for requirements management); PRICE-H, SEER, SSCM, COSYSMO (for cost modeling)