



**DEPARTMENT OF DEFENSE
ACQUISITION MODELING AND SIMULATION WORKING GROUP**

Systems Engineering Modeling, Simulation, and Analysis Fundamentals

1. The responsibility for planning and coordinating program modeling and simulation efforts belongs to the Program Manager and may be delegated to the Program Systems Engineer and other program staff as appropriate.
2. Modeling and simulation efforts are included in the systems engineering effort as part of program/project risk management and cost and schedule planning. Modeling and simulation efforts include identifying metrics that relate the use of modeling and simulation to cost savings and risk reduction.
3. Systems engineers use models to define, understand, communicate, assess, interpret, and accept the project scope; to produce technical documentation and other artifacts; and to maintain “ground truth” about the system(s).
4. Programs should identify and maintain a system model, representing all necessary viewpoints on the design and capturing all relevant system interactions.
 - a. Unless impractical, the program should develop the system model using standard model representations, methods, and underlying data structures.
 - b. The system model is a product of both system and design engineering efforts. The program should construct the model by integrating data consumed and produced by the modeling and simulation activities across and related to the program. The program should confirm the model baseline at appropriate technical milestones.
 - c. The program should construct depictions of system concepts developed in support of technical reviews using the system model as source data.
 - d. The system model should include, but should not be limited to, parametric descriptions, definitions of behaviors, internal and external Interfaces, cost inputs, and traces from operational capabilities to requirements and design constructs.
 - e. The system model should be a part of, and should evolve with, the program development baseline. The system model should be integrated throughout the program life cycle and across domains within a program’s various phases.
 - f. The system model can provide source data for the program to use to construct instantiated models to support system trades; optimizations; design evaluations; system, subsystem, component, and subcomponent integration; cost estimations; etc.
 - g. The program should update the system model throughout the program life cycle. Capturing these updates in the system model will provide continuity among the program modeling and simulation users and activities. Unless impractical, during the development and construction of models and simulations, the program should ensure the models will be applicable to other program areas such as training and testing.
5. The development of models, construction of simulations, and use of these assets to perform program definition and development activities (to include pre-MDD, and pre-milestone A) requires collaboration among all project stakeholders.
6. Proper use of modeling and simulation throughout the acquisition life cycle is critical for program success. The program should provide sufficient training to support the appropriate use of modeling and simulation. The program should identify metrics and track the metrics to support the linkage between the training and increased support to the program.
7. Modeling and simulation provides critical capabilities to effectively deal with issues including but not limited to interoperability, joint operations, and systems of systems across the entire acquisition life cycle.
8. Models employed in acquisition activities should be credible, and the program should use the models while acknowledging a level of risk appropriate to the application (see DoD Instruction 5000.61, DoD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)).