



## *Continuous Learning Module*

# *“Modeling & Simulation for Systems Engineering”*

SAIC Support  
DUSD (A&T)  
Systems and Software Engineering  
Developmental Test & Evaluation

Mr. Michael Truelove  
1550 Crystal Dr., Suite 1004  
Arlington, VA 22202  
Michael.R.Truelove@saic.com

# *Purpose*

---

**Modeling and simulation is recognized as an important tool to assist in the systems engineering process.**

**With the advent of acquiring Joint capabilities, modeling and simulation takes on a more important role.**

**Testing systems in a system-of-systems will necessitate greater augmentation of models and simulations.**

**There was a recognized need to better educate the workforce in the proper application of models and simulations.**

# *Background*

---

**One year in the making**

**Resources included approximately 15 subject matter experts**

- **Input**
- **Review**
- **Critique**
- **Beta Testing**

**Incorporates:**

- **Audio**
- **Text**
- **Graphics**
- **Animated Graphics**
- **Video**
- **SCORM Compliance**

**Developed in coordination with the Defense Acquisition University**

**Available On-Line at: <http://www.dau.mil/>**

# *Targeted Career Fields*

---

**Systems Planning, Research, Development and Engineering (SPRDE)**

**Program Management**

**Test and Evaluation**

**Available to Anyone**

# *Scope of the CLM*

---

**Self-Paced**

**Approximately 3 hour duration**

**A level above an Introductory modeling & simulation course**

- **A link to an Air Force introductory course on M&S is provided for those that want it**
- **Adding an additional link to “Essentials of Modeling and Simulation” developed by the Defense Modeling and Simulation Office**

**Can be taken for credit (3 continuous learning points)**

**Can be taken for no credit (self edification)**

# *Suggested Prerequisites*

---

**Knowledge of the Systems Planning, Research, Development and Engineering (SPRDE) Process**

**Basic knowledge of the acquisition process**

**Basic knowledge of Modeling & Simulation**

# *CLM Content*

---

- 1. Overview: Modeling & Simulation in Systems Engineering**
- 2. The New Acquisition Process**
- 3. Current DoD Acquisition Policy and Guidance**
- 4. M&S Role in Systems Engineering and Capability Based Acquisition**
- 5. Sharing Modeling & Simulation Resources**
- 6. Modeling & Simulation: Verification, Validation and Accreditation**
- 7. How to Plan for Effective Modeling & Simulation**
- 8. Contracting Associated with Modeling & Simulation**

# *CLM Content (cont.)*

---

## **1. Overview: Modeling & Simulation in Systems Engineering**

This lesson presents how the Continuous Learning Module (CLM) is organized and what you'll learn in the other lessons. It provides:

- Definitions (Also available through a “Quick Reference” Tab)
- Target Audience
- Links to more basic courses  
(Modification added for a link to “Essentials for M&S”)
- Gives examples of M&S value

# *CLM Content (cont.)*

---

## **2. The New Acquisition Process**

### Discusses:

- How the acquisition process has evolved over the years,
- Capabilities Based Acquisition (CBA),
- Lessons learned from studying acquisition history.

### Goals at the end of this lesson are to identify:

- Implications of the new acquisition process on systems engineering,
- Barriers to change for implementing the new process,
- The three types of architectural views,
- Ways M&S contributes to the new acquisition process.

## *CLM Content (cont.)*

---

### **3. Current DoD Acquisition Policy and Guidance**

#### Discusses:

- The documents that support the way the Government acquires new products and services.
- Where to find valuable M&S and acquisition policy and guidance information needed to formulate future acquisition plans.

#### Goal at the end of this lesson:

- Ability to locate key items of acquisition policy and guidance information in the documents you're presented.

## *CLM Content (cont.)*

---

### **4. M&S Role in Systems Engineering and Capability Based Acquisition**

#### Discusses:

- How M&S is an integral part of the Systems Engineering (SE) process at all phases in the process.

#### Goals at the end of this lesson are to identify:

- How M&S supports SE processes across the acquisition phases,
- Benefits of robust M&S to enable acquisition,
- Expected impact of applying M&S to program versus not applying M&S within another program,
- How M&S can facilitate systems-of-systems engineering to achieve joint mission capabilities.
- The value of M&S application in systems acquisition.

# *CLM Content (cont.)*

---

## **5. Sharing Modeling & Simulation Resources**

### Discusses:

- Why different systems need M&S and other data that can be shared across systems.

### Goals at the end of this lesson are to identify:

- The roles of interoperability and standards for integrated architectures,
- Resources for obtaining advice and assistance in developing an M&S strategy that promotes reuse and sharing,
- How to incorporate/develop M&S in a cost-effective manner by sharing data,
- The benefits of sharing credible data and using it responsibly and major obstacles to effective sharing and reuse of M&S data.

## *CLM Content (cont.)*

---

### **6. Modeling & Simulation: Verification, Validation and Accreditation**

#### Discusses:

- The importance of an effective Verification, Validation & Accreditation (VV&A) process.

#### Goals at the end of this lesson are to identify:

- What is meant by VV&A
- The benefits, importance, and responsibilities for developing and using trustworthy M&S,
- Lessons learned regarding VV&A.

# *CLM Content (cont.)*

---

## **7. How to Plan for Effective Modeling & Simulation**

### Discusses:

- The importance of planning in advance to incorporate M&S in programs so it will be most effective, both in the current program and reusable in the future among other programs.
- A notional flow for M&S planning.

### Goals at the end of this lesson are to identify:

- How to plan for M&S as a tool to support SE.

## *CLM Content (cont.)*

---

### **8. Contracting Associated with Modeling & Simulation**

#### Discusses:

- How the Government should pay for M&S when contracting for SE services.

#### Goals at the end of this lesson are to identify:

- Appropriate M&S roles for government and industry,
- Source selection criteria when contracting for M&S,
- Contracting language for M&S

## *Of Note*

---

**A level above an introductory course**

**Provides step-by-step guidance on how to plan for M&S use in a program**

**Provides contracting suggestions on how to best procure M&S**

**DAU Professor of Systems Engineering is working to incorporate the CLM as a prerequisite to some of the Systems Engineering Courses**

**Effective October 1, 2006 the CLM is a Level I certification requirement in the T&E Career Field.**

**Some portions of the course have been used in a Caltech Systems Engineering class.**

**Starting a CLM for “M&S in Test and Evaluation”**

## *CLM Statistics*

---

- The course went online June 6, 2006
- As of the end of September there have been 201 graduates from the course.
- Not known how many have browsed the course (taken the course for no credit)

## *How to Access the CLM*

---

<http://www.dau.mil/>

*Back Up*



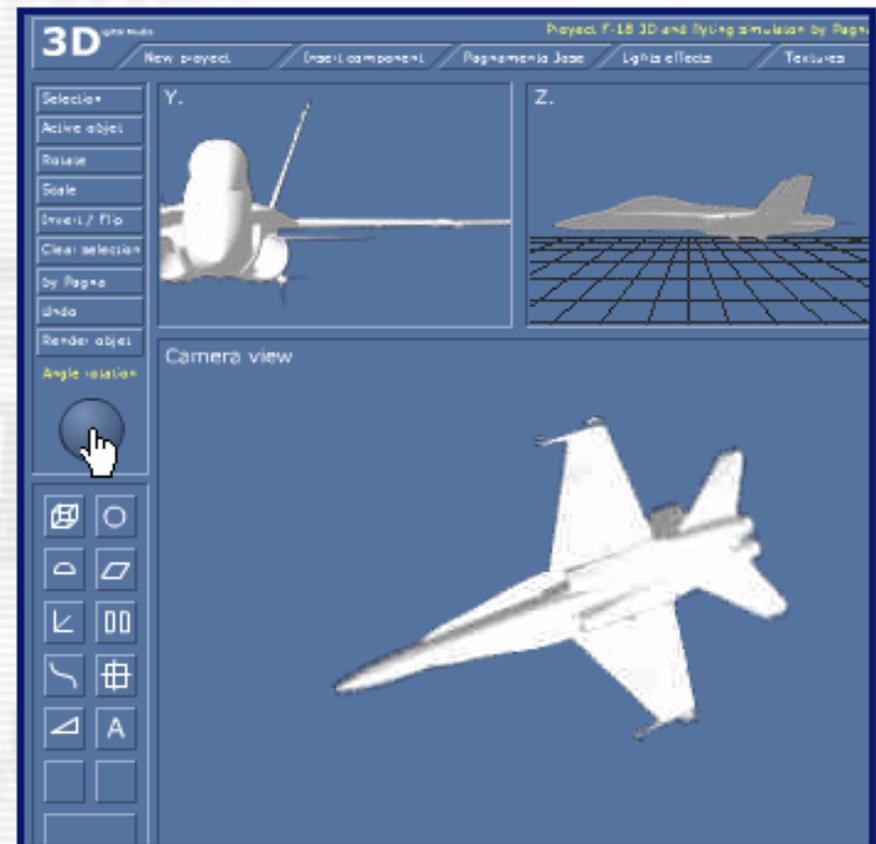
## Course Overview

Welcome to the course Modeling and Simulation (M&S) in Systems Engineering. This course will present you information about how M&S:

- Can be a benefit over the entire life cycle of a project
- Supports Systems Engineering
- Needs to be credible
- Can be planned and shared along with their data and results

You will learn about this and more over the next two to three hours of instruction.

Select **NEXT** to continue.



D