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Distribution Statement A: Approved for Public Release



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Trideum Corp

Night Vision

Night Vision & Electronic Sensors Directorate



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Program Manager (PM) Model & Simulation (M&S) Playbook
A Tool for Program Managers to Employ M&S
In the Defense Acquisition Management System

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UNCLASSIFIED **BACKGROUND**



- When Used properly, M&S tools and processes can help to reduce costs, accelerate development, support test and evaluation, and better inform decision makers.
- Over the last two decades the Department of Defense initiated several efforts to assist PMs in using M&S throughout the Acquisition Life Cycle process.
- While most programs of record use M&S tools at some stage in the Life Cycle of the program, they still miss opportunities to utilize M&S throughout the entire process.

CHALLENGE

What is lacking is a capability that educates and informs PMs about how M&S can assist them.

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ADDRESSING THE CHALLENGE



- The US Army's Night Vision and Electronic Sensors Directorate (NVESD) Modeling and Simulation Division (MSD) is working to address this challenge.
- The goal of this project is to develop a M&S handbook that clearly defines for program managers how specific M&S tools and/or analyses can assist them.
- The MSP builds on the work conducted by the National Defense Industrial Association (NDIA) Systems Engineering Division's Modeling and Simulation (M&S) Committee.

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PROPOSED M&S PLAYBOOK



- Identify statutory and policy guidance for M&S
- Outline the M&S resources that are available and how they can be applied to solving development problems
- Provide information for the development of a plan for M&S use throughout the program
- Enable the development of a M&S support plan
- Focus on GFE

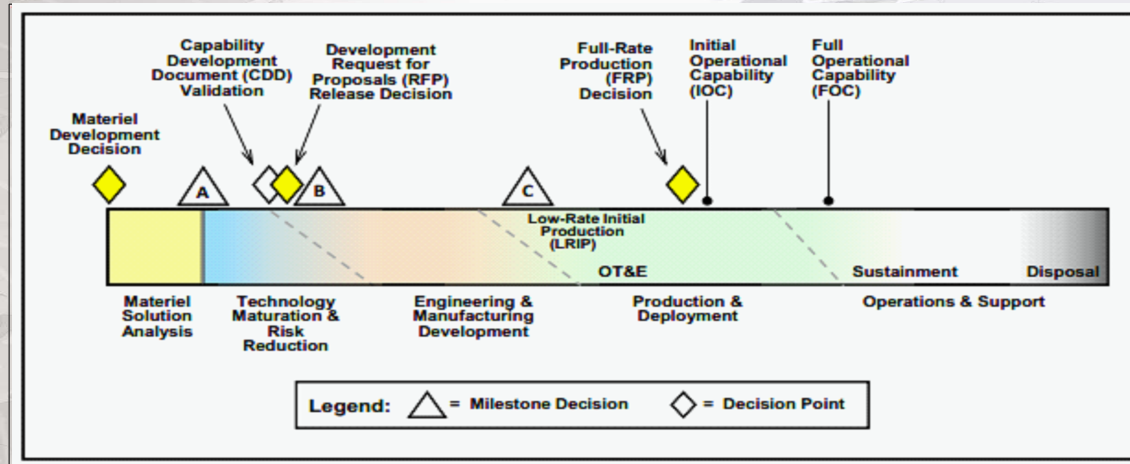
**Web-based tool that is easily implemented
with a low maintenance cost**

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DEFENSE ACQUISITION MANAGEMENT SYSTEM



model of a hardware-intensive development program

- The life cycle process consists of periods of time, called phases, separated by decision points called milestones). Some phases are divided into two efforts separated by program reviews.
- M&S can be used to support the life cycle process from determination of mission needs; research; development; production; deployment; support; upgrade; and finally, demilitarization and disposal.
- When used properly, M&S can help reduce costs, accelerate development, support test and evaluation, and better inform decision makers.

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US ARMY - RDECOM

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PLAYBOOK WALKTHROUGH



The Modeling and Simulation Playbook provides Acquisition Program Managers a web accessible aid on how to apply Modeling and Simulation (M&S) tools to the current Defense Acquisition Management System.

New? Sign Up

Returning? Sign In



Cost Savings

Modeling and simulation (M&S) facilitates the acquisition process and plays a critical role in streamlining acquisition. M&S tools reduce cost, minimize risk, and save time in the acquisition process. They are often integral to optimizing system performance.



Compliance

Several Defense Department Directives as well as Army Regulations and Department of the Army Pamphlets direct the use and planning of Modeling and Simulation across the lifecycle. Program Managers should plan for using Modeling and Simulation throughout the system Acquisition Process.



Expertise

The Modeling and Simulation Community provides expertise within the uniformed, civilian, and contractor workforce across a variety of agencies. Program Managers need not rely on only their prime contractor for expertise, but can look for government source capabilities within the commands of RDECOM, TRADOC, and ATEC.

Front page prompts user login

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UNCLASSIFIED FOR THE PROGRAM MANAGER Unfamiliar with M&S



Playbook

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Welcome to Playbook

- Purpose
- + Why M&S
- Acquisition
 - How M&S supports the Acquisition System
 - Model based Systems Engineering
 - **Defense Acquisition System**
- + Common Issues when using M&S
- + M&S definitions
- + Resources
- Acronyms/Definitions

Defense Acquisition System



Explore Acquisition Process

The Defense Acquisition Management System life cycle process consists of periods of time, called phases, separated by decision points called milestones. Some phases are divided into two efforts separated by program reviews. These milestones and other decision points provide both the PM and milestone decision authorities the framework with which to review acquisition programs, monitor and administer progress, identify problems, and make corrections.

[Defense Acquisition System External Reference](#)



Outline-structured overview of the use of M&S in acquisition

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FOR THE PROGRAM MANAGER

Familiar with M&S and seeking solutions



Playbook

Overview

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Defense Acquisition Management System



Explore Acquisition Process by choosing a Phase.

Explore M&S solutions from any point in the acquisition process

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Explore Potential Solutions



Defense Acquisition Management System



Explore Acquisition Process » [Technology Maturation and Risk Reduction](#)

- [Development & technology risk reduction](#) 52
- [System integration](#) 51
- [Design](#) 32
- [Prototyping](#) 51
- [Military utility assessment](#) 27
- [Model environment and demonstrate technology](#) 1
- [Interoperability & supportability analysis](#) 32
- [Operational suitability](#) 5
- [Assess manufacturing risks](#) 2
- [Industrial/Manufacturing capability & readiness assessment](#) 1
- [Life-cycle sustainment planning](#) 3
- [Survivability analysis](#) 1
- [Update AoA](#) 182

[Defense Acquisition System External Reference](#)

Expand lists of activities that belong to a phase in the acquisition system

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Explore Potential Solutions



Defense Acquisition Management System



Explore Acquisition Process » [Technology Maturation and Risk Reduction](#) » [Industrial/Manufacturing capability & readiness assessment](#)

Investment cost modeling

The modeling of investment costs consisting of production and deployment costs incurred from the beginning of low rate initial production through completion of deployment.

Category: [Cost modeling](#)

Tools:

[SEER-H](#) [TruePlanning](#) [SEER-MFG](#) [ProModel Suite](#)

Definition Source:

Defense Acquisition Guidebook (DAG) - 3.1.3. Life-Cycle Cost Category Definitions [Adapted from 3.1.3.2. Investment Costs]



[Defense Acquisition System External Reference](#)

Display M&S Capabilities that support the chosen activity

“We recommend *Investment Cost Modeling* to support *Industrial/Manufacturing Capability & Readiness Assessment*”

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Explore Potential Solutions



Defense Acquisition Management System



Explore Acquisition Process » Production & Deployment

- Manufacturing development
- Interdependency & interoperability summary
- Risk management
- Technology maturity assessment 13
- Industrial/manufacturing readiness assessment
- CBRN survivability analysis
- **Human Systems Integration 9**
- Environment, Safety, and Occupational Health (ESOH) Models
- Military equipment valuation
- Corrosion prevention & control
- Support & cost baseline 3
- Supply chain management 2
- Refine life-cycle sustainment plan 2
- Production qualification testing
- IOT&E 38
- Joint interoperability certification/testing 3
- Modify HW/SW Specifications and configurations

Lack of numbers: *"The Playbook does not contain recommendations for this activity thus far"*

Numbers indicate: *"There are 9 M&S capabilities recommended"*

Defense Acquisition System External Reference

Starting over: expand a different phase

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Explore Potential Solutions



Defense Acquisition Management System



Explore Acquisition Process » Production & Deployment » Human Systems Integration

Constructive battle simulation

A means of predicting outcomes in highly realistic simulated environments for exercises that are impractical or too costly in live settings with distributed or local personnel.

Category: Mission training simulation

Tools: JLCCTC JSAF OneSAF

Definition Source: Adapted from MYMIC LLC, BattleTek



Game-based simulation

A simulation in which the participants seek to achieve some agreed upon objective within an established set of rules. For example, a management game, a war game. Syn: gaming simulation.

Category: Operator training simulation

Definition Source: DoD M&S Glossary

Human-system integration simulation

Objectives of HSI M&S are to: (1) assess alternative concepts in terms of human performance, productivity, workload, and; (2) provide human performance inputs to system level simulation, and determine the impact of system design and organization on human performance and safety; (3) quantify

Category: Human-Systems M&S

Tools: Human Immersive Labs PVIDS

Definition Source:

Payoffs and Challenges of Human Systems Integration (HSI) Modeling and Simulations in a Virtual Environment, Naval Engineers Journal, <http://onlinelibrary.wiley.com/doi/10.1111/j.1559-3584.1998.tb02609.x/ab...>



Task-oriented constructive simulation

A means of training in highly realistic simulated environments for

Multiple capabilities available for this activity

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M&S Capabilities

Engaging the User Community



Human-system integration simulation

Objectives of HSI M & S are to: (1) assess alternative concepts in terms of human performance, productivity, workload, and; (2) provide human performance inputs to system level simulation, and determine the impact of system design and organization on human performance and safety; (3) quantify relationships between human capabilities and system characteristics; and (4) visualize and quantify spatial relationships between humans and system elements. Payoffs of HSI M & S are the ability to: (1) acquire data on human performance, skills, and safety provisions in advance of system construction; (2) model human performance in system concept alternatives; (3) assess human performance as a function of human machine interface (HMI) design concepts; and (4) assess team performance as a function of HMI design, communications design, and collaborative problem solving.

Category: Human-Systems M&S

Tools: Human Immersive Labs PVIDS

Definition Source:

Payoffs and Challenges of Human Systems Integration (HSI) Modeling and Simulations in a Virtual Environment, Naval Engineers Journal, <http://onlinelibrary.wiley.com/doi/10.1111/j.1559-3584.1998.tb02609.x/ab...>



PMs influence the playbook with Favorites and Comments

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M&S Capabilities Favorites



My favorites

Human-system integration simulation

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Category: [Human-Systems M&S](#)

Tools: [Human Immersive Labs](#) [PVIDS](#)

Definition Source:

Payoffs and Challenges of Human Systems Integration (HSI) Modeling and Simulations in a Virtual Environment, Naval Engineers Journal,



4 users favored this

Anti-air warfare mission simulation (Navy)

See category definition

Category: [Mission-level simulation](#)

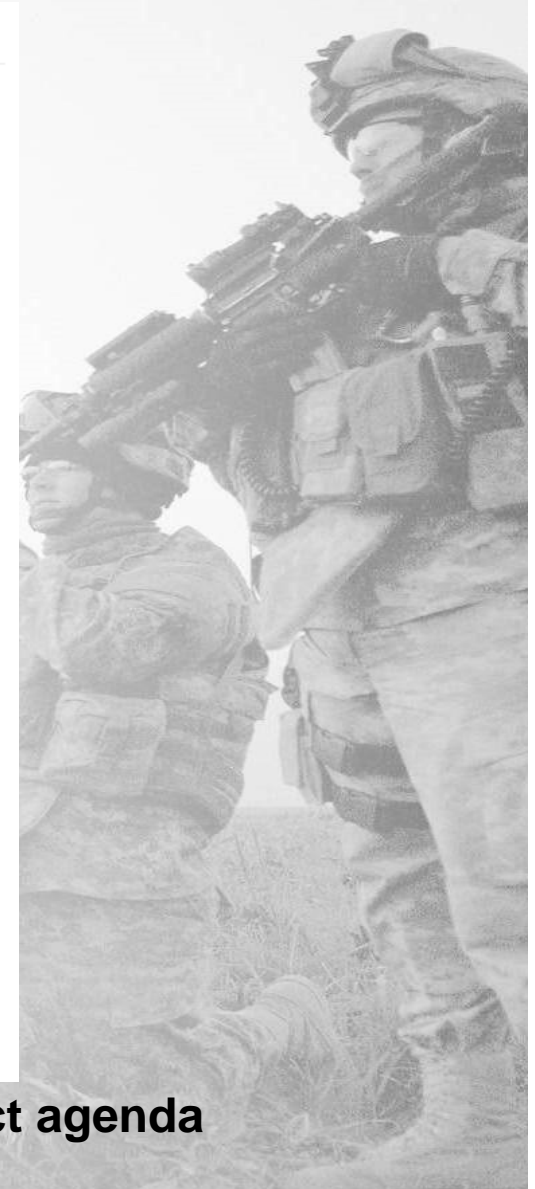
Tools: [EADSIM](#)

Definition Source: See category definition



PM creates a personalized toolkit for his project agenda

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M&S Capabilities Comments



Human-system integration simulation

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Comments

Submitted by [Demo Dave](#) on Tue, 09/02/2014 - 15:08

I recommend OpenHaptics and SEER-Sybil as well. Used on [example.gov](#)

[reply](#)



Playbook users contribute additional information in moderated comments

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FOR THE CONTENT CREATOR

Maintaining internal and external content with Drupal



Human-system integration simulation

Title *

Human-system integration simulation

Category

Human-Systems M&S

Description

Source

Format

Objectives of HSI M & S are to: (1) assess alternative concepts in terms of human performance, productivity, workload, and; (2) provide human performance inputs to system level simulation, and determine the impact of system design and organization on human performance and safety; (3) quantify relationships between human capabilities and system characteristics; and (4) visualize and quantify spatial relationships between humans and system elements. Payoffs of HSI M & S are the ability to: (1) acquire data on human performance, skills, and safety provisions in advance of system construction; (2) model human performance in system concept alternatives; (3) assess human performance as a function of human machine interface (HMI) design concepts; and (4) assess team performance as a function of HMI design, communications design, and collaborative problem solving.

Describe the M&S Capability.

Tools

Human Immersive Labs (1706). PVIDS (1753)

List of Example Tools, separated by commas

Definition Source

tual Environment, Naval Engineers Journal, <http://onlinelibra>

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Edit content using a standard editing interface

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Data Import Interface



Import capability data

Import

Import [CSV files](#) with one or more of these columns: M&S Capability Category, M&S Capability Name, M&S Capability definition/description, Definition Source, Example tools.

- Columns **M&S Capability Name**, **M&S Capability definition/description** are mandatory and values in these columns are considered unique: only one entry per value in one of these column will be created.
- [Download a template](#)

Delimiter

TAB

☐ No Headers

File

cat.csv

2.16 KB

text/csv

Browse...

No file selected

Import

Update or create multiple items in one click

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Massive Data Updates



	A	B	D	E	F	G	H
1	M&S Capability Name	M&S Capability Category	M&S Capability definition/description	Definition Source	Example tools		
44	Human-system integration simulation	Human-Systems M&S	Objectives of HSI M & S are to: (1) assess alternative concepts of human performance, productivity, workload, and human performance inputs to system level simulation, and (2) determine the impact of system design and organization on human performance.	Payoffs and Challenges of Human Systems Integration (HSI) Modeling and Simulations in a Virtual Environment, Naval Engineers Journal, http://onlinelibrary.wiley.com/doi/10.1111/j.1559-3584.1998.tb02609.x/ab...	Human Immersive Labs;PVIDS		
45	Constructive battle simulation	Mission training simulation	A means of predicting outcomes in highly realistic simulation environments for exercises that are impractical or too costly to conduct in live settings with distributed or local personnel. People are commanding and controlling simulated weapons systems in a simulated environment.	Adapted from MYMIC LLC, BattleTek	JLCCTC;JSAF;OneSAF		
46	Game-based simulation	Mission training simulation	A simulation in which the participants seek to achieve an objective within an established set of rules. Syn: gaming simulation, management game, a war game. Syn: gaming simulation.	DoD M&S Glossary	VBS2;Delta3D		
47	Virtual team training simulation	Mission training simulation	Virtual simulations involve real people operating in a virtual environment. Virtual team training simulations are virtual simulations that involve two or more persons to achieve a common goal.	Adapted and expanded upon from the DoD M&S Glossary	CCTT		
	Air drop mission simulation (Air Force)	Mission-level simulation	See category definition	See category definition			

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Modeling and Simulations in a Virtual Environment, Naval Engineers Journal, <http://onlinelibrary.wiley.com/doi/10.1111/j.1559-3584.1998.tb02609.x/ab...>

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Modular, extensible tools to build our system



Data Definitions and Import

- Entity Reference
- Job Scheduler/Job Scheduler Trigger
- Feeds/Feeds Tamper
- Chaos Tools Suite
- Views
- Features

User Interface

- Front Page
- CKEditor
- DHTML Menu
- Font Awesome
- Libraries/jQuery Update
- Flag

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CONCLUSION



- Although still in the prototype stage, MSP demonstrates the functionality of combining off the shelf software into an easy to maintain, web-based tool to assist the PM in employing M&S.
- The MSP:
 - Lowers barriers to the utilization of M&S throughout the entire Defense Acquisition Management System Life Cycle.
 - Provides the PM the ability to access the key M&S information to support each acquisition phase from determination of mission needs; research; development; production; deployment; support; upgrade; and finally, demilitarization and disposal.
 - Educates the PM on how, when used properly, M&S can help reduce costs, accelerate development, support test and evaluation, and better inform decision makers.

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