BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE POLICY DIRECTIVE 16-10

30 JANUARY 1995

Operations Support

MODELING AND SIMULATION
(M&S) MANAGEMENT

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1. M&S support the full spectrum of military tasks. The Air Force is committed to fostering a practical and affordable joint simulation environment which fully supports the warfighter, requirements, acquisition process, and the technology base.

2. Air Force policies are to:

2.1. Provide M&S management policies and procedures which identify opportunities and implement practical programs to reduce costs; eliminate duplication; promote exportability of models and simulations; promulgate standards; streamline model development; and create seamless, interoperable, live, virtual, and constructive distributed simulations responsive to the users' needs.

2.2. Where appropriate, promote M&S investments which incorporate enhancements of Department of Defense (DoD) M&S technologies in support of operational needs and the acquisition process.

2.3. Promote the use of common tools, methodologies, and databases to the maximum extent feasible.

2.4. Establish standards and protocols when needed or implement existing standards and protocols when available that promote the internetting, data exchange, open system architecture, and software reusability of M&S applications.

2.5. Publish a M&S Master Plan and a M&S Investment Plan.

3. Following are the responsibilities and authorities derived from the policies stated in **2.**:

3.1. The Assistant Vice Chief of Staff of the Air Force (HQ USAF/CVA) is the approval authority for M&S policy. HQ USAF/CVA represents the Air Force on the DoD Executive Council for Modeling and Simulations (EXCIMS).

3.2. The Directorate of Modeling, Simulation, and Analysis (HQ USAF/XOM) is designated the single point of contact for M&S issues and activities within the Air Force and represents the Air Force in joint, multi-service, and multi-agency M&S efforts. In conjunction with all Air Force M&S user communities, HQ USAF/XOM leads development of Air Force M&S policy for HQ USAF/CVA approval.

3.3. The Secretariat (SAF), Air Staff (HQ USAF), major commands (MAJCOM), field operating agencies (FOA), direct reporting units (DRU) will:

3.3.1. Require Air Force-owned models be accredited for the intended purpose in accordance with AFI 16-1001 *Verification, Validation, and Accreditation* in all studies, analyses (e.g., COEAs), and training exercises.

3.3.2. Explore opportunities for joint and cooperative M&S development with other DoD components before starting a major M&S development.

3.3.3. Establish tracking and control systems to reduce costs and eliminate duplication. AFI 16-1002 *M&S Management* provides guidance.

3.3.4. Prepare an annual report on key M&S applications for which they are the proponent and their verification, validation, and accreditation (VV&A) activities and plans. AFI 16-1002 contains format and instructions.

3.3.5. Provide information on M&S applications, standards, and databases to HQ USAF/XOM for inclusion in the DoD M&S Information Analysis Center.

3.3.6. For key M&S applications which meet the criteria for importance and level of investment specified in AFI 16-1002, designate a model proponent responsible for configuration and life-cycle management; and implement formal verification and validation procedures as delineated in AFI 16-1001.

3.3.7. For M&S applications which do not meet the criteria and thresholds for formal configuration management, establish guidelines and implement procedures to enhance confidence in those M&S applications by instituting tailored documentation and configuration management consistent with the intended use and level of investment in the M&S application.

3.4. The Office of the Assistant Secretary for Acquisition (SAF/AQ) shall provide policy guidance in coordination with HQ USAF/XO on the use of M&S in the acquisition process.

3.5. The Director of Test and Evaluation (HQ USAF/TE) shall provide policy guidance in coordination with HQ USAF/XO on the use of the particular M&S applications, standards, and databases during developmental and operational testing.

3.6. Other functional areas shall provide policy guidance in coordination with HQ USAF/XO on the use of M&S in their functional areas.

4. Data and data administration for DoD M&S applications shall conform to the policies and procedures for data administration specified in DoD Directive 8320.1, *DoD Data Administration*, September 26, 1991.

5. Data, information, and information technologies used in support of M&S are corporate assets and, where appropriate, shall adhere to the information management policies contained in DoD Directive 8000.1, *Defense Information Management (IM) Program*, October 27, 1992 and Air Force Supplement, September 30, 1994.

6. This policy directive implements DoD Directive 5000.59, *DoD Modeling and Simulation (M&S) Management*, January 4, 1994.

7. Specific Air Force responsibilities, procedures, formats, and guidelines are found in AFI 16-1001, *Verification, Validation, and Accreditation* and AFI 16-1002 *M&S Management*. Related policies are included in AFPD 33-1, *C^4 Systems*; AFPD 63-1, *Acquisition System*; AFPD 10-6, *Requirements Process*; and AFPD 10-14 *Mission Needs and Operational Requirements.*

8. See **Attachment 1** for measuring and displaying compliance with this policy.

9. See **Attachment 2** for terms used in this policy.

10. See **Attachment 3** for references used in this directive.

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Attachment 1

MEASURING AND DISPLAYING COMPLIANCE WITH POLICY
(RCS: HAF-XOM(A)9494, *MODELING & SIMULATION MGT STATUS REPORT*)

A1.1. Compliance with M&S management policy will be measured by collecting and reporting information on the number of models in use by level of model (campaign, mission, and engagement level). Models in use will not be counted for system / subsystem / engineering level models. This latter category of models may increase as new systems are developed in the Air Force, but may also decrease as other policies reduce duplication.

A1.1.1. Counting the number of campaign / mission / engagement models is an appropriate way to measure duplication in the near term (next 5-10 years). The specific tasks of these models (20-30) are comparatively small in relation to the number of models in these categories (150+). As the numbers are reduced and 2-3 models per task are chosen as standards, then a new metric will be required.

A1.1.2. Models for acquisition, cost, logistics, space, personnel, and mobility which can not be categorized by campaign or mission or engagement level will be not considered in this metric.

A1.1.3. Reference **Figure A1.1.** as an example.

A1.2. Compliance with M&S management policy will also be measured by the numbers of models verified and validated for all levels of models (campaign, mission, engagement, and system / subsystem / engineering).

A1.2.1. Models for acquisition, cost, logistics, space, personnel, and mobility will be considered in this metric. Where categorizing by model level (campaign, mission, engagement, or system / sub-system) is not feasible, categorize by type of model (acquisition, cost, logistics, space, personnel, mobility, etc.).

A1.2.2. Reference **Figure A1.2.** as an example.

A1.3. Refer to **Attachment 2** of AFPD 16-10 for definition of terms.

A1.4. Annual status reports will be maintained by MAJCOMs and provided to HQ USAF/XOM to determine overall Air Force progress in meeting M&S management goals.

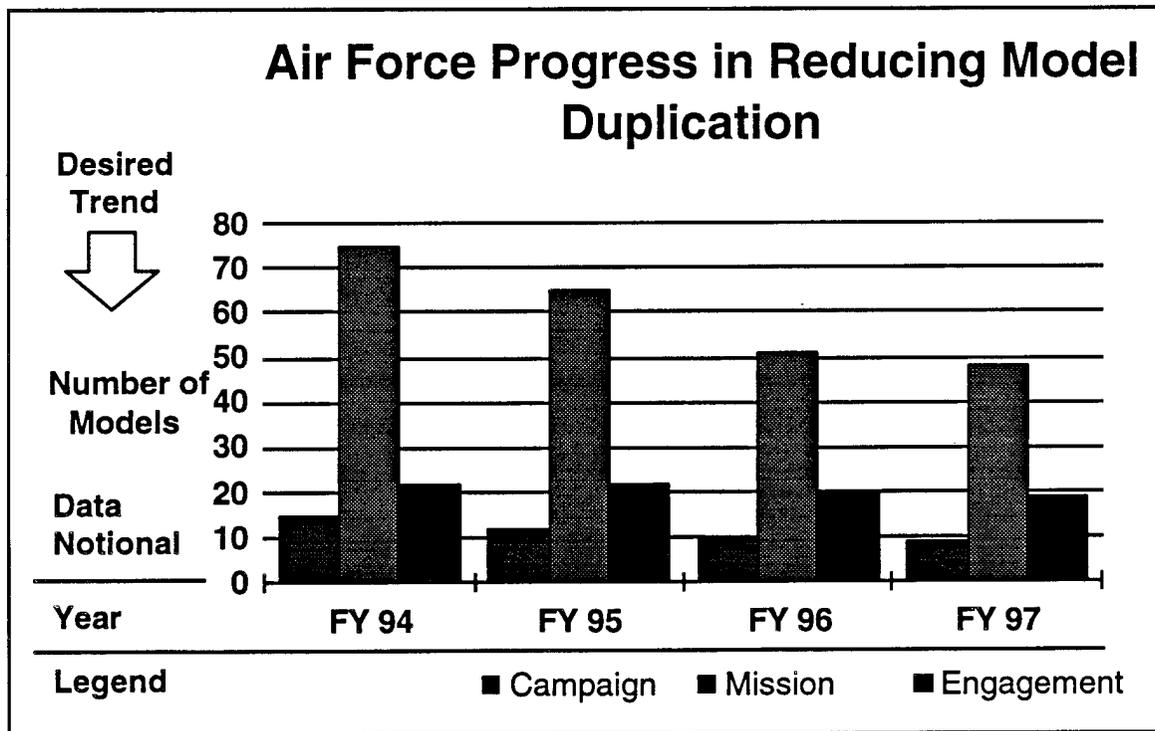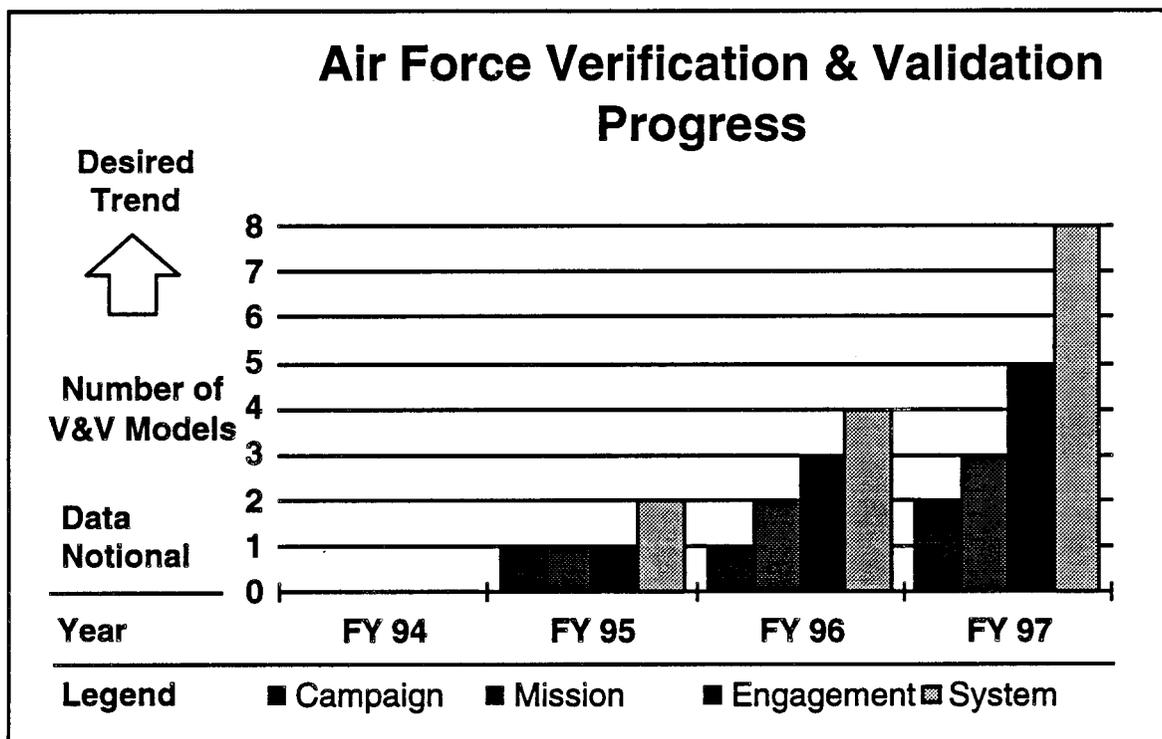**Figure A1.1. Sample Metric of Air Force Progress in Reducing Model Duplication.**

Figure A1.2. Sample Metric of Air Force Verfication & Validation Progress.

Attachment 2

TERMS USED IN THIS POLICY DIRECTIVE

Accreditation--The official certification that a model or simulation is acceptable for use for a specific purpose.

Campaign--Models which emulate all elements of aerospace power over the duration of a conflict and across the theater / theaters. Usually represents the operational level of war.

Constructive--A class of simulation typified by wargames, models, and analytical tools.

Databases--A collection of data.

DoD Executive Council for Modeling and Simulation (EXCIMS)--An organization established by the USD(A) and responsible for providing advice and assistance on DoD M&S issues. Membership is determined by the USD(A) and is at the Senior Executive Service, flag, and general officer level.

Engagement--The modeling of weapon and/or support system performance in a limited environment with engagements ranging in size, or a portion of full system capability. Represents the tactical level of warfare.

Live--A class of simulation that uses live personnel in real equipment in the process.

Mission--Models with one or more interacting elements of aerospace power across all or part of the theater. Usually represents the operational or tactical levels of war.

Model--A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process.

Modeling and Simulation (M&S) Investment Plan--A published Air Force plan that establishes short-term (present to 6 years) and long-term (beyond 6 years) programs and funding joint and common use M&S to achieve the specified goals and objectives outlined in the DoD M&S Master Plan.

Modeling and Simulation (M&S) Master Plan--A published Air Force plan that establishes short-term (present to 6 years) and long-term (beyond 6 years) Air Force goals and objectives for the application of M&S for joint and common use within the Air Force. It also includes an assessment of current M&S capabilities, a status report of M&S efforts under development, and a road map that delineates the management, investment, and technical strategies required to achieve DoD M&S objectives.

Operational Level of War--The operational level of war focuses on campaigns. Decisions at this level orchestrate forces to accomplish strategic objectives within a theater. These objectives are achieved through the design, organization, and conduct of campaigns and major operations that guide tactical events.

Simulation--A method of implementing a model over time. Also a technique for testing, analysis, or training in which real-world systems are used, or where real-world and conceptual systems are reproduced by a model.

System/Subsystem/Engineering--Modeling of detailed engineering or scientific simulation of a single system, subsystems, and components.

Tactical Level of War--The tactical level of war focuses on battles and engagements. Decisions at this level apply combat power to create advantages when in contact with or proximity to the enemy.

Validation--The process of determining the degree to which a model is an accurate representation of the real-world from the perspective of the intended uses of the model.

Verification--The process of determining that a model implementation accurately represents the developer's conceptual description and specifications.

Virtual--A class of simulation using live personnel and simulated environments.

Attachment 3

REFERENCES

DoD Publications

DoD Directive 5000.59, *DoD Modeling and Simulation (M&S) Management*, January 4, 1994.

DoD Directive 8000.1, *Defense Information Management (IM) Program*, October 27, 1992 and Air Force Supplement, November 30, 1994.

DoD Directive 8320.1, *DoD Data Administration*, September 26, 1991.

Air Force Policy Directives

AFPD 33-1, *C^4 Systems*

AFPD 63-1, *Acquisition System*

AFPD 10-6, *Requirements Process*

AFPD 10-14 *Mission Needs and Operational Requirements*

Air Force Instructions

AFI 16-1001, *Verification, Validation, and Accreditation*

AFI 16-1002 *M&S Management*