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OF THE AIR FORCE**

AIR FORCE INSTRUCTION 16-1003

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Operations Support

**AIR FORCE STANDARD ANALYSIS
TOOLKIT**



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This Air Force (AF) Instruction (AFI) implements Air Force Policy Directive (AFPD) 16-10, *Modeling and Simulation*, and responsibilities described in Headquarters Air Force Mission Directive (HAFMD) 1-58, *Director Air Force Studies, Analyses and Assessments*. AFI 16-1003 describes the concept and philosophy that underpin the Air Force Standard Analysis Toolkit. It prescribes the procedures and criteria for both entering new models into and retiring models from the Air Force Standard Analysis Toolkit. This AFI assigns responsibilities for Air Force Standard Analysis Toolkit management and covers the policies and procedures that govern the management of the toolkit.

This instruction applies to all Regular Air Force, Air Force Reserve and Air National Guard organizations and civilian, military or contractor personnel managing or using tools in the Air Force Standard Analysis Toolkit or proposing entry of new tools into or retirement of existing tools from the toolkit. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule located in the Air Force Records Information Management System.

Direct questions, comments, recommended changes, or conflicts for this publication the Office of Primary Responsibility through command channels using the AF Form 847, *Recommendation for Change of Publication*, to Air Force Studies, Analyses and Assessments (AF/A9 or HQ USAF/A9). Major commands, field operating agencies, and direct reporting units may supplement this instruction. Send any supplements to this publication to the Office of Primary Responsibility for review, coordination, and approval prior to publication. The authorities to

waive wing/unit level requirements in this publication are each identified with a Tier (“T-0, T-1, T-2, T-3”) number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, Table 1.1 for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication Office of Primary Responsibility for non-tiered compliance items.

SUMMARY OF CHANGES

This rewrite of AFI 16-1003 accounts for process improvements and reorganizations. It changes the *Standard* level of models in the Air Force Standard Analysis Toolkit to now be called the *Intermediate* level to reduce linguistic confusion. It implements and clarifies tier waiver authority designations not present in the preceding instruction.

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Chapter 1

OVERVIEW

1.1. Introduction.

1.1.1. Digital models and simulations are among the most valuable tools commonly used by the Air Force (AF) analytic community. These tools are playing an increasingly important role in supporting analyses that underpin key programmatic and acquisition decisions and assess alternative warfighting concepts, doctrine, strategies, tactics, and courses of action. The Air Force Standard Analysis Toolkit is a registry of analytic computer models and tools accepted by the relevant certification authorities for analysis in support of decisions regarding strategic planning, capability requirements, weapon systems development, acquisition, and testing.

1.1.2. Air Force Standard Analysis Toolkit currently spans the engagement, mission and campaign levels of modeling supporting Air Force analysis requirements. The Air Force Standard Analysis Toolkit facilitates analytic best practices and standards, ensuring transparency and quality control for decision support. It is also a deliberate approach to vet and publicize accepted models and tools supporting those decisions.

1.1.3. The Air Force Standard Analysis Toolkit is centrally managed by AF/A9 and implemented by the Air Force Analytic Community Steering Group, with individual models managed by appropriate domain experts and model users. Models in the standard analysis toolkit at each of the three levels (Prime, Intermediate, Limited) must meet certain criteria corresponding to their respective toolkit levels (see Attachment 2) that provide users and accreditation officials the needed confidence in model validity and credibility when used by appropriately trained staff in accordance with AFI 16-1001, *Verification, Validation and Accreditation (VV&A)*.

Chapter 2

ROLES AND RESPONSIBILITIES

2.1. Director, Studies, Analyses and Assessments (AF/A9).

2.1.1. Air Force Analytic Community Steering Group. The Director, AF/A9, chairs the Air Force Analytic Community Steering Group chartered by Headquarters Air Force (HQ USAF). The steering group has membership consisting of representatives of Air Force analysis offices. The Air Force Analytic Community Steering Group oversees management of the Air Force Standard Analysis Toolkit. The steering group also provides supplemental guidance to the toolkit manager, model management organizations, and model managers, as needed. (T-1)

2.1.2. Air Force Standard Analysis Toolkit Prime level Approval Authority. The Air Force Analytic Community Steering Group is the approval authority for models and simulations to be entered into the Toolkit Prime level. The steering group is responsible for ensuring the entry policies, processes, and procedures are followed for all Toolkit Prime models in accordance with Paragraph 3.2 and criteria in Attachment 2. In addition, the Air Force Analytic Community Steering Group is responsible for ensuring all Toolkit Prime model maintenance policies, processes, and procedures are followed in accordance with Paragraph 3.3 and Attachment 3. (T-1)

2.1.3. Air Force Standard Analysis Toolkit Manager. Headquarters Air Force Mission Directive (HAFMD) 1-58, *Director Air Force Studies, Analyses and Assessments*, gives the Director, AF/A9, oversight responsibility for the Air Force Standard Analysis Toolkit. AF/A9A, as designated by the Director, AF/A9, is the Air Force Standard Analysis Toolkit Manager to manage the Air Force Standard Analysis Toolkit on behalf of the Air Force Analytic Community Steering Group. In this role AF/A9A will:

2.1.3.1. Manage the toolkit in accordance with the policies, processes, and procedures herein and any supplemental guidance provided by the Air Force Analytic Community Steering Group.

2.1.3.2. Designate a volunteer user organization as the model management organization to be responsible for management of each Air Force-owned model in the standard analysis toolkit in accordance with this AFI.

2.1.3.3. Will maintain a list of the toolkit models, their model management organizations, and contact information for individual model managers on the Air Force Standard Analysis Toolkit section of the AF/A9 page of the Air Force Portal.

2.1.3.4. Conduct the Biennial Air Force Standard Analysis Toolkit Model Review, per paragraphs 3.3.1.1 and 3.3.1.2 of this AFI.

2.1.3.5. Coordinate with the Air Force Agency for Modeling and Simulation (AFAMS) to ensure the toolkit is addressed in Air Force modeling and simulation repositories. (T-1)

2.1.4. Air Force Standard Analysis Toolkit Intermediate level Approval Authority. AF/A9 is the approval authority for models and simulations to be entered into the Toolkit Intermediate level. AF/A9 is responsible for ensuring the entry policies, processes, and procedures are followed for all Air Force Standard Analysis Toolkit Intermediate level models in accordance with Paragraph 3.2 and criteria in Attachment 2. AF/A9 is also responsible for ensuring all Toolkit Intermediate model maintenance policies, processes, and procedures are followed in accordance with Paragraph 3.3 and Attachment 3. (T-1)

2.2. Major Commands/Field Operating Agencies/Direct Reporting Units.

2.2.1. Model Management Organization. The Air Force Analysis Community Steering Group determines the using organization charged with management for each model in the toolkit. Field Operating Agencies, and Direct Reporting Units using a given toolkit component are potential model management organizations. The commander or director of the model management organization appointed for each model in the toolkit will designate in writing to the Air Force Standard Analysis Toolkit Manager one or more specific individuals to be the model manager responsible for management of the Air Force Standard Analysis Toolkit model in accordance with this instruction. The commander or director of the model management organization will update this information to the Air Force Standard Analysis Toolkit Manager when changes occur. (T-1)

2.2.2. Toolkit Limited Approval Authority. The commander or director of the each model management organization is the approval authority for that respective model or simulation to be entered into the Toolkit Limited level. He or she is responsible for ensuring the entry policies, processes, and procedures are followed for all Toolkit Limited models for which his or her office is the model management organization in accordance with Paragraph 3.2 of this instruction and criteria in Attachment 2. In addition, the commanders or directors of the model management organizations are responsible for ensuring all Toolkit Limited model maintenance policies, processes, and procedures are followed for those models in accordance with Paragraph 3.3 and Attachment 3. (T-1)

2.3. Model Sponsors, Manager, and Users.

2.3.1. Standard Analysis Toolkit Model Sponsor. The model sponsor is an Air Force Analytic Community member organization whose commander or director nominates a model for entry into the Air Force Standard Analysis Toolkit and continues as its advocate throughout the tenure of the model in the toolkit. Normally the model sponsor is the Air Force Analytic Community member organization that either provides the model manager (i.e., the model management organization) for a toolkit model, expends resources for a toolkit model's development, or is the primary user of a toolkit model. (T-1)

2.3.2. Standard Analysis Toolkit Model Managers. Model managers will be familiar with the Air Force Standard Analysis Toolkit model entry criteria listed in Attachment 2 of this AFI in the course of managing and enhancing their toolkit models. A deterioration of an Air Force Standard Analysis Toolkit model's status relative to the entry criteria could undermine the justification for the model to be in the toolkit and could result in a decision to retire it based on the process outlined in Paragraph 3.3. (T-1)

2.3.3. Standard Analysis Toolkit Model Users.

2.3.3.1. Prospective users of Air Force Standard Analysis Toolkit models will, if needed, contact the appropriate model manager for information regarding model availability, performance, and user requirements. A list of Air Force Standard Analysis Toolkit model managers and their contact information is maintained by the toolkit manager on the Air Force Standard Analysis Toolkit section of the AF/A9 page of the Air Force Portal. (T-1)

2.3.3.2. Use of toolkit models by Air Force Analytic Community organizations to conduct analysis is strongly encouraged from the viewpoint of Air Force modeling and simulation policy and Air Force investment strategy. Sponsors, users, and practitioners of analyses performed using models not in the Air Force Standard Analysis Toolkit shall be prepared to defend investments in other models in functional Air Force corporate investment reviews and understand that the analysis may be subject to increased scrutiny. (T-1)

2.3.3.3. The selection and use of an Air Force Standard Analysis Toolkit model for an analytic task does not relieve the using organization of the responsibility for ensuring accreditation of the model is completed for the specific intended use in accordance with AFPD 16-10, *Modeling & Simulation*, and AFI 16-1001, *Verification, Validation, and Accreditation (VV&A)*. (T-1)

Chapter 3

MODELS AND TOOLS

3.1. Air Force Standard Analysis Toolkit Levels. There are three levels of approval for models nominated to the toolkit. The level indicates the expected range/breadth of use and the toolkit approval authority; each is described here. The three levels of the Air Force Standard Analysis Toolkit are Toolkit Limited, Toolkit Intermediate, and Toolkit Prime.

3.1.1. Toolkit Limited. The Toolkit Limited level is targeted for models used by a single organization. The approval authority for model entry into the Toolkit Limited level is the respective model management organization. The benefits of model admittance into the Toolkit Limited level are gaining Air Force endorsement and justification for funding.

3.1.2. Toolkit Intermediate. The Toolkit Intermediate level is targeted for models used by multiple organizations. The approval authority for model entry into the Toolkit Intermediate level is AF/A9. The benefits of model entrance into the Toolkit Intermediate level are gaining Air Force endorsement and justification for funding in addition to receiving AF/DoD network certification.

3.1.3. Toolkit Prime. The Toolkit Prime level is targeted for models used Air Force-wide and/or by the joint community. The approval authority for model entry into the Toolkit Prime level is the Air Force Analytic Community Steering Group. The benefits of model admittance into the Toolkit Prime level are gaining Air Force endorsement and justification for funding in addition to receiving AF/DoD network certification and database maintenance.

3.2. Air Force Standard Analysis Toolkit Entry Policies, Processes, and Procedures. The model sponsor nominates a candidate model for Air Force Standard Analysis Toolkit entry to the appropriate approval authority via an entry nomination package described in Paragraphs 3.2.1 through 3.2.3. The candidate model is then evaluated for Air Force Standard Analysis Toolkit entry using the process described in Paragraphs 3.2.4 through 3.2.7.

3.2.1. Toolkit Limited Entry Nomination Package.

3.2.1.1. Mandatory requirements for the Toolkit Limited level entry nomination package are:

3.2.1.1.1. Description of model, model capabilities, past uses, model history, and user's manual. (T-1)

3.2.1.1.2. Self-evaluation against Air Force Standard Analysis Toolkit criteria (see Attachment 2). (T-1)

3.2.1.1.3. Information Assurance documentation. (T-1)

3.2.1.1.4. List of all other available documentation. (T-1)

3.2.1.2. A list of user organizations is an optional, though strongly encouraged, element of the Toolkit Limited level entry nomination package.

3.2.1.3. Other optional requirements for the Toolkit Limited level entry nomination package are:

3.2.1.3.1. Configuration Management Plan.

- 3.2.1.3.2. Support to the Community.
- 3.2.1.3.3. Verification and Validation Information.
- 3.2.2. Toolkit Intermediate Entry Nomination Package.
 - 3.2.2.1. Mandatory requirements for the Toolkit Intermediate level entry nomination package include all the mandatory requirements for the Toolkit Limited level contained in Paragraph 3.2.1.1, with the addition of Verification and Validation Information. (T-1)
 - 3.2.2.2. Optional, though strongly encouraged, elements of the Toolkit Intermediate level entry nomination package are:
 - 3.2.2.2.1. List of user organizations.
 - 3.2.2.2.2. Configuration Management Plan.
 - 3.2.2.3. Support to the community is an optional requirement for the Toolkit Intermediate level entry nomination package .
- 3.2.3. Toolkit Prime entry nomination package.
 - 3.2.3.1. Mandatory requirements for the Toolkit Prime level entry nomination package include all the mandatory requirements for the Toolkit Intermediate level contained in Paragraphs 3.2.1.1 and 3.2.2.1, with the addition of:
 - 3.2.3.1.1. Configuration Management Plan. (T-1)
 - 3.2.3.1.2. Support to the community. (T-1)
 - 3.2.3.1.3. A sample list of Air Force and, if applicable joint, user organizations justifying the Toolkit Prime criterion for breadth of use. (T-1)
 - 3.2.3.2. A comprehensive list of user organizations is an optional, though strongly encouraged, element of the Toolkit Prime level entry nomination package.
- 3.2.4. Air Force Standard Analysis Toolkit Entry Process.
 - 3.2.4.1. Toolkit Limited level.
 - 3.2.4.1.1. The model management organization evaluates the entry nomination package against the mandatory Air Force Standard Analysis Toolkit model entry criteria listed in Attachment 2. The model management organization estimates the resources required to complete the formal evaluation described herein in terms of people, time, and dollar cost, to include estimating the size and makeup (organizational membership) of the formal model evaluation team. The model management organization shall endeavor to complete the model entry criteria evaluation in Attachment 2 and model evaluation team resources estimate in less than two months total. (T-1)
 - 3.2.4.1.2. The model sponsor briefs the candidate model to the model management organization. (T-1)
 - 3.2.4.1.3. Based on the results of the entry criteria and the resources required for a full evaluation, the model management organization will recommend either rejection of the candidate model for the toolkit or formation of a model evaluation team and continuation of the model evaluation process. (T-1)

3.2.4.2. Toolkit Intermediate level.

3.2.4.2.1. The Air Force Standard Analysis Toolkit Manager evaluates the entry nomination package against the toolkit's mandatory model entry criteria in Attachment 2 and confirms model management organization responsibilities in para. 3.2.4.1.1 have been completed. (T-1)

3.2.4.2.2. The model sponsor briefs the candidate model to AF/A9. (T-1)

3.2.4.2.3. The Air Force Standard Analysis Toolkit Manager briefs the results of the entry criteria and the resources required for a full evaluation to AF/A9 and either will recommend rejection of the candidate model for the toolkit or formation of a model evaluation team and continuation of the model evaluation process. (T-1)

3.2.4.2.4. AF/A9 will decide whether to reject the candidate model for the Air Force Standard Analysis Toolkit or to approve formation of a model evaluation team to continue the model evaluation process. (T-1)

3.2.4.3. Toolkit Prime level.

3.2.4.3.1. The Air Force Standard Analysis Toolkit Manager evaluates the entry nomination package against the toolkit's mandatory model entry criteria in Attachment 2 and confirms model management organization responsibilities in para. 3.2.4.1.1 have been completed. (T-1)

3.2.4.3.2. The model sponsor briefs the candidate model to the Air Force Analytic Community Steering Group. (T-1)

3.2.4.3.3. The Air Force Standard Analysis Toolkit Manager briefs the results of the entry criteria and the resources required for a full evaluation to the Air Force Analytic Community Steering Group and will recommend either rejection of the candidate model for the toolkit or formation of a model evaluation team and continuation of the model evaluation process. (T-1)

3.2.4.3.4. The Air Force Analytic Community Steering Group will decide whether to reject the candidate model for the toolkit or to approve formation of a model evaluation team to continue the model evaluation process. (T-1)

3.2.5. Model Evaluation Team Formation and Preparation.

3.2.5.1. The model management organization will lead and coordinate the formation and preparation of the model evaluation team for Toolkit Limited models. For Toolkit Intermediate and Toolkit Prime models, the toolkit manager will lead and coordinate the formation and preparation of the model evaluation team. The model sponsor is also a member of the team in all cases. (T-1)

3.2.5.2. Participation in the model evaluation team by Air Force Analytic Community member organizations is voluntary when considering Toolkit Limited models, with the exception of the model management organization and the model sponsor. The model management organization recommends the organizational makeup of the model evaluation team. For Toolkit Intermediate and Toolkit Prime models, participation in the model evaluation team by Air Force Analytic Community member organizations is voluntary with the exception of the Air Force Standard Analysis Toolkit Manager and the

model sponsor. The toolkit manager recommends the organizational makeup of the model evaluation team. (T-1)

3.2.5.3. Each model evaluation team member organization is responsible for providing the resources required for their team member to participate in the candidate model evaluation. (T-1)

3.2.5.4. The model evaluation team endeavors to complete its review in three months or less. (T-1)

3.2.5.5. The model evaluation team reviews the entry nomination package. (T-1)

3.2.5.6. The model evaluation team holds an internal “calibration meeting” to discuss model evaluation team purpose and the Air Force Standard Analysis Toolkit entry criteria, and to formulate questions that need to be answered. (T-1)

3.2.5.7. The model evaluation team presents its questions and issues to the model sponsor. (T-1)

3.2.6. Candidate Model Presentation and Evaluation.

3.2.6.1. The model sponsor presents the case to the model evaluation team for Air Force Standard Analysis Toolkit entry. The presentation needs to include each of the components in the applicable entry nomination package. (T-1)

3.2.6.2. The model evaluation team evaluates the candidate model against each mandatory model evaluation team entry criterion (Attachment 2). (T-1)

3.2.6.3. The model evaluation team presents the results of the model evaluation to the model sponsor and solicits feedback. (T-1)

3.2.7. Air Force Analytic Community Model Entry Decision.

3.2.7.1. The model evaluation team prepares and presents a final briefing on the results of the model evaluation and the team’s recommendation to the appropriate approval authority. (T-1)

3.2.7.2. The approval authority will decide whether to admit the candidate model to the Air Force Standard Analysis Toolkit at the corresponding level. (T-1)

3.2.7.3. If the approval authority decides not to admit a candidate model to the toolkit, the rationale for that decision will be documented. (T-1)

3.2.7.4. If, within three months of a non-admission decision by the approval authority, the model sponsor makes changes to the model and re-nominates it for Air Force Standard Analysis Toolkit entry, the model entry process starting with Paragraph 3.2.6.1 through Paragraph 3.2.7.2 needs to be repeated. If more than three months passes from non-admission decision to re-nomination for toolkit entry, the entire model entry process needs to be repeated starting with Paragraph 3.2.4. (T-1)

3.2.8. Air Force Standard Analysis Toolkit Nomination Package Element Definitions.

3.2.8.1. Description of model, model capabilities, past uses, model history, and user’s manual—Model documentation for its creation, evolution, and use

3.2.8.2. Self-evaluation against Air Force Standard Analysis Toolkit criteria-Model Sponsor answers to criteria for entry detailed in Attachment 2 of this instruction

3.2.8.3. Cybersecurity documentation—Information Assurance (Air Force Network Integration Center Risk Management Framework and Software Certification) test results as described in AFI 17-101, *Risk Management Framework (RMF) For Air Force Information Technology (IT)*, for the model

3.2.8.4. A list of user organizations-Compilation of Air Force and non-Air Force user organizations currently using the model (default: user group members)

3.2.8.5. Configuration Management Plan-Formal plan to maintain configuration control over updates and user modifications of the model

3.2.8.6. Support to the Community-Plan of support and assistance provided to the model users by the model management team

3.2.8.7. Verification and Validation Information-Verification and Validation report from the formal Verification, Validation & Accreditation conducted for the model

3.3. Air Force Standard Analysis Toolkit Maintenance Policies, Processes, and Procedures.

3.3.1. Biennial Air Force Standard Analysis Toolkit Model Review.

3.3.1.1. Toolkit Limited Models. Every two years the model management organizations for Toolkit Limited models will each conduct a review of the latest officially released version of its respective model or models in the Toolkit Limited level. Based on this review, the model management organization will prepare a Model Retirement Candidate List. Reasons for placing a model from the toolkit on the Model Retirement Candidate List are listed in Attachment 3. When releasing new versions of models currently in the Air Force Standard Analysis Toolkit, model managers and model sponsors must be mindful not to degrade their model's status relative to the criteria in Attachment 3. The model management organization informs model sponsors when their models are on the Model Retirement Candidate List. The model management organization annotates the list with the model sponsors' positions on the proposed retirement of their models from the Air Force Standard Analysis Toolkit. (T-1)

3.3.1.2. Toolkit Intermediate and Toolkit Prime Models. Every two years the Air Force Standard Analysis Toolkit Manager will conduct a review of the latest officially released versions of the models in the Toolkit Intermediate and Toolkit Prime levels. Based on this review, the toolkit manager will prepare a Model Retirement Candidate List. Reasons for placing a model from the toolkit on the Model Retirement Candidate List are listed in Attachment 3. When releasing new versions of models currently in the Air Force Standard Analysis Toolkit, model managers and model sponsors must be mindful not to degrade their model's status relative to the criteria in Attachment 3. The Air Force Standard Analysis Toolkit Manager informs model sponsors when their models are on the Model Retirement Candidate List. The toolkit manager annotates the list with the model sponsors' positions on the proposed retirement of their models from the toolkit. (T-1)

3.3.2. Biennial Model Retirement Recommendation.

3.3.2.1. Toolkit Limited Models. The model management organization for Toolkit Limited models recommends actions indicated by the biennial review to the toolkit manager. Model sponsors who disagree with retiring their models from the toolkit can make their case to the toolkit manager. (T-1)

3.3.2.2. Toolkit Intermediate and Toolkit Prime Models. The Air Force Standard Analysis Toolkit Manager recommends actions indicated by the biennial review of Toolkit Intermediate and Toolkit Prime models to the appropriate approval authority (i.e., AF/A9 or Air Force Analytic Community Steering Group). Model sponsors who disagree with retiring their models from the toolkit can make their case to the approval authority. (T-1)

3.3.3. Out-of-Cycle Model Retirement Nomination, Review, and Recommendation.

3.3.3.1. Toolkit Limited Models.

3.3.3.1.1. A model sponsor may at any time nominate to the appropriate model management organization the retirement of any of its sponsored models from the Air Force Standard Analysis Toolkit. In such cases, the model management organization conducts an out-of-cycle review of the model nominated for retirement. (T-1)

3.3.3.1.2. Based on this review, the model management organization recommends to the toolkit manager either retirement or retention of the model. (T-1)

3.3.3.2. Toolkit Intermediate and Toolkit Prime Models.

3.3.3.2.1. Model Sponsors may at any time nominate their model to be retired from the toolkit to the toolkit manager. In such cases, the toolkit manager conducts an out-of-cycle review of the model nominated for retirement. (T-1)

3.3.3.2.2. Based on this review, the Air Force Standard Analysis Toolkit Manager recommends to the appropriate approval authority either retirement or retention of the model. (T-1)

3.3.4. Model Retirement Decision.

3.3.4.1. Toolkit Limited Models. The model management organization will decide to retire or retain Toolkit Limited models recommended for retirement, whether based on the biennial review or an out-of-cycle review. The model management organization, may, at its discretion, not take an immediate decision, but instead direct the formation of a model evaluation team to conduct a formal model evaluation and make a retirement or retention recommendation back to the model management organization for subsequent decision. (T-1)

3.3.4.2. Toolkit Intermediate and Toolkit Prime Models. The appropriate approval authority will decide to retire or retain Toolkit Intermediate and Toolkit Prime models recommended for retirement by the toolkit manager, whether based on the biennial review or an out-of-cycle review. The approval authority, may, at its discretion, not take an immediate decision, but instead direct the formation of a model evaluation team to conduct a formal model evaluation and make a retirement or retention recommendation back to the approval authority for subsequent decision. (T-1).

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Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 16-10, *Modeling and Simulation*, 23 January 2015

AFI 16-1001, *Verification, Validation and Accreditation (VV&A)*, 22 June 2016

AFI 17-101, *Risk Management Framework (RMF) For Air Force Information Technology (IT)*, 2 February 2017

AFI 17-130, *Air Force Cybersecurity Program Management*, 31 August 2015

AFMAN 33-363, *Management of Records*, 1 March 2008

HAFMD 1-58, *Director Air Force Studies, Analyses and Assessments*, 7 May 2015

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AF—Air Force

AF/A9 (or HQ USAF/A9)—Air Force Studies, Analyses and Assessments

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

DAF—Department of the Air Force

DOD—Department of Defense

DODD—Department of Defense Directive

DODI—Department of Defense Instruction

HAFMD—Headquarters Air Force Mission Directive

HQ USAF—Headquarters United States Air Force

MAJCOM—Major Command

M&S—Modeling and Simulation

SES—Senior Executive Service

Terms

Accreditation—The accreditation determination considers the Verification and Validation status of a specific model version, its data support (source, quality, and verification) and the analysts/users that operate the model and interpret its results. The accreditation authority is the individual who is responsible and accountable for decisions or actions based upon the specific M&S.

Air Force Standard Analysis Toolkit—The set of approved models used by the air force analytic community to study, analyze, and assess Air Force problems, senior leader questions, and alternative systems and courses of action.

Campaign Model—A model that attempts to capture all important aspects of aerospace power over the duration of a conflict across an entire theater or theaters of operation in a force vs. force campaign length scenario.

Configuration Management—Application of technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a model or simulation, control changes, and record and report change processing and implementation status.

Engagement Model—A model that provides measures of effectiveness at the system level of representation by evaluating system effectiveness against enemy systems in a one-on-one or few-on-few combat scenario.

Mission Model—A model that captures one or more interacting aspects of aerospace power during the course of representing an aerospace mission or missions by evaluating mission effectiveness against enemy forces in a few-on-few or many-on-many combat scenario.

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

Model User Support Plan—The model sponsor's plan for supporting users of the model if it is admitted to the Air Force Standard Analysis Toolkit.

Simulation—A method for implementing a model over time for the purpose of testing, analysis, or training.

Validation—Rigorous and structured process of determining the extent to which M&S accurately represents the intended "real-world" phenomena from the perspective of the intended M&S use.

Verification—Process of determining that M&S accurately represents the model developer's conceptual description and specifications.

Attachment 2

AIR FORCE STANDARD ANALYSIS TOOLKIT MODEL ENTRY/REGISTRATION CRITERIA

A2.1. Does the candidate model provide data, answers, or insights that address a critical Air Force analytic capability?

A2.1.1. Does the model provide a capability not currently in the toolkit?

A2.1.2. For what studies has the model been used?

A2.1.3. What Air Force-level decisions has the model supported or impacted?

A2.1.4. Do the model's capabilities overlap those of other models in the toolkit?

A2.1.5. Could this model replace a current toolkit model?

A2.1.6. What level of analysis does this model support (campaign, mission, engagement, other)?

A2.1.7. Does the analysis supported by this model impact a significant segment of the Air Force Analytic Community?

A2.2. Does the candidate model have adequate documentation?

A2.2.1. Is there enough information for the evaluation team to knowledgeably evaluate the model?

A2.2.2. Is there enough documentation for an analyst to use the model within its valid bounds?

A2.2.3. Does the analyst's or user's manual describe the major model algorithms, algorithm and data relationships, input data requirements, and output data?

A2.2.4. Are there sample input-output data files and does the documentation describe how to organize, analyze and transform the model output into credible, actionable information?

A2.3. Is there a functioning and documented model configuration management process?

A2.3.1. Is there a process for identifying, prioritizing, and funding model upgrades and corrections?

A2.3.2. Is there a process for notifying users about model bugs, corrections, changes, developments, and plans for future modification or development?

A2.3.3. Are there Version Description Documents?

A2.3.4. Is there a Configuration Control Board?

A2.4. Is there support to the using community?

A2.4.1. Are there regularly scheduled Users' Group meetings?

A2.4.2. Is there ready access to the model developer and maintainer for questions and problems?

A2.4.3. Is there a user training program or plan?

A2.4.4. Are users notified of bugs, changes, developments, and plans for future modification or development?

A2.4.5. Are the data needed to run the model available to the Air Force Analytic Community?

A2.4.6. If data are provided to users, are the sources documented?

A2.5. Is the candidate model readily usable?

A2.5.1. Are the time and resources required to modify the source code reasonable?

A2.5.2. Are the time and resources required to create a scenario, enter data, process data, make model runs, and analyze the results reasonable?

A2.5.3. Once a scenario has been run, is the time needed to run excursions off the baseline run reasonable?

A2.5.4. Are there baseline test cases that produce expected results, and do they cover the operational domain of the model?

A2.5.5. Does the model allow sensitivity analysis across a reasonable range of key inputs?

A2.5.6. Is the cost of the model and required supporting software appropriate for the level of analysis?

A2.5.7. Does the model run on a wide variety of standard platforms?

A2.5.8. Can the model easily operate in a classified environment?

A2.5.9. Does the user interface minimize data errors and include adequate error-checks?

A2.5.10. Are runtime errors clearly identified and easily fixed?

A2.5.11. Are there intermediate results to aid in error isolation and analysis?

A2.5.12. Is the output well organized and easy to interpret and analyze?

A2.5.13. Can the user easily modify data output, display, and post processing to help the analyst gain an understanding of the underlying model outcomes and establish transparent, traceable cause and effect relationships?

A2.5.14. Can the user trace the logic flow and behavior of key entities?

A2.6. Is there a Verification and Validation foundation available for review?

A2.6.1. Is there enough Verification and Validation documentation to show what has been done so far?

A2.6.2. Is there a documented Verification and Validation plan?

A2.6.3. Are the model's assumptions, algorithms, and modeling approach appropriate?

A2.6.4. Are the model's critical entities and elements represented at a reasonable level of fidelity, detail, and completeness?

A2.6.5. Are the model's logic and representations accepted by subject matter experts?

A2.6.6. Is there a solid basis in theory and experimental data underlying the modeling approach?

A2.6.7. Is there internal validity, i.e., is the model consistent and reliable across runs?

A2.6.8. Are data consistent throughout the model?

A2.6.9. Are data intrinsic to or used in the model traceable to accepted lower-level models, standard data sources, or first principles?

A2.6.10. Has the Air Force Analytic Community demonstrated acceptance of the model's results?

A2.6.11. Have the model results been validated against historical or physical test results?

A2.6.12. Are the bounds of the model's domain defined, and is the model accurate across its domain?

A2.7. Have model security vulnerabilities and dependencies been addressed in accordance with AFI 17-130, *Air Force Cybersecurity Program Management*?

A2.7.1. If to be installed on a network, has the model or simulation been through a DoD-approved security review for vulnerabilities?

A2.7.2. Are identified vulnerabilities made known to the user community?

A2.7.3. What patches, service packs, or updates are required?

A2.7.4. Is there a system for informing the user community about necessary updates?

A2.7.5. Are there limitations on the distribution of model software (e.g., classification, open source licensing, network vulnerabilities)?

A2.7.6. Have all necessary executables, registry settings, and software dependencies been made known to the user community?

A2.7.7. What Open Source or commercial-off-the-shelf software packages are needed or recommended to run the model?

A2.7.8. What is the cost to use the model?

Attachment 3

AIR FORCE STANDARD ANALYSIS TOOLKIT MODEL RETIREMENT CRITERIA

- A3.1. The model can be replaced by a new, better model.**
- A3.2. The model no longer not meets the mandatory Air Force Standard Analysis Toolkit model entry criteria (Attachment 2).**
- A3.3. The model is no longer an Air Force standard for use in Analyses of Alternatives and other studies supporting senior decision-makers.**
- A3.4. The model has become unusable or is not being used for Air Force analyses.**
- A3.5. The model has become cost-prohibitive to own and use.**
- A3.6. The model management organization has resigned and a replacement cannot be found.**

Attachment 4

IMPLEMENTATION PROCESS

Figure A4.1. Model Nomination for Air Force Standard Analysis Toolkit Limited Level.

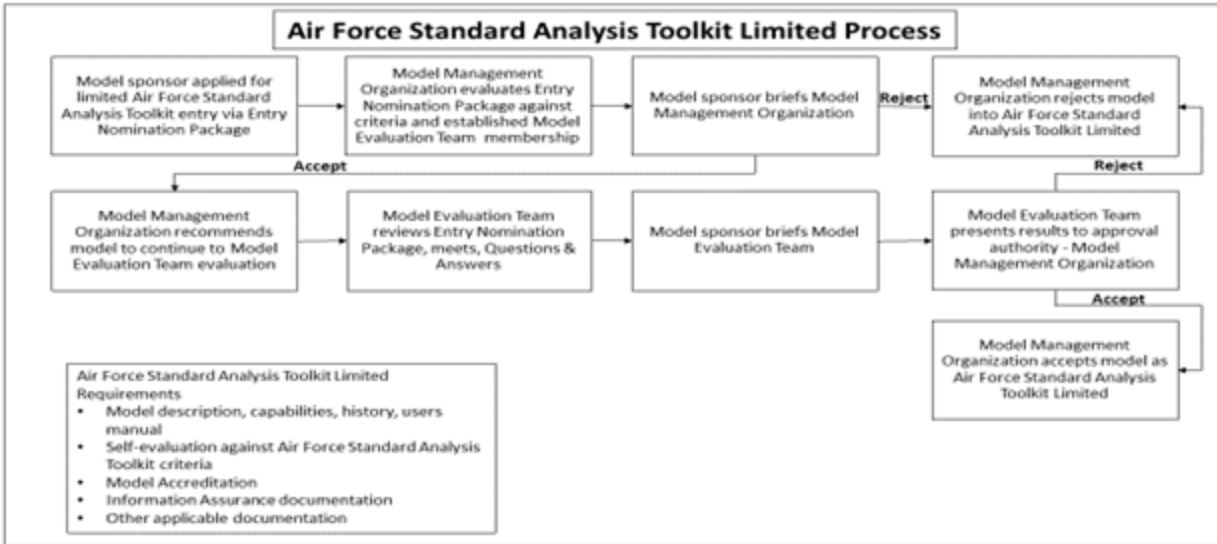


Figure A4.2. Model Nomination for Air Force Standard Analysis Toolkit Intermediate Level.

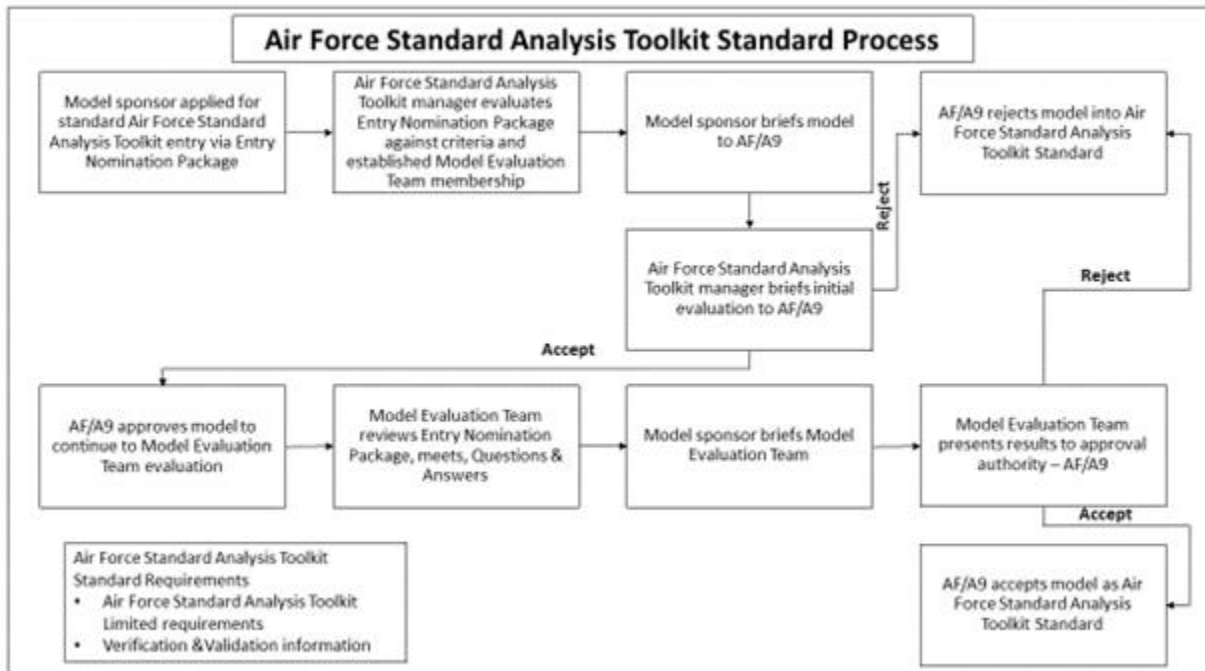


Figure A4.3. Model Nomination for Air Force Standard Analysis Toolkit Prime Level.

