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Single Integrated Air Picture (SIAP) Verification, Validation and Accreditation Guide for Models and Simulations

April 2003

SINGLE INTEGRATED AIR PICTURE
System Engineering
Task Force (SETF)
1931 Jefferson Davis Highway
Crystal Mall 3, Suite 1142
Arlington, VA 22203

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4/7/03	4/7/2003
CDR P. M. VOTRUBA, USN Date	CAPT J.W. WILSON, USN Date
Analysis Branch Head	Technical Director
4-7-03	4/8/2003
Col H. DUTCHYSHYN, USAF Date	Brig Gen JOHN W. MALUDA, USAF Date
Deputy System Engineer	System Engineer

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EXECUTIVE SUMMARY

This document defines the Verification, Validation, and Accreditation (VV&A) process for Models and Simulations (M&S)[1] used by the Single Integrated Air Picture (SIAP) System Engineering Task Force (SE TF). It specifies the participants, products, and process necessary to achieve accreditation.

The SIAP SE TF employs an M&S accreditation process that complies with Department of Defense (DoD) guidance for VV&A. The process is designed to accurately determine the ability of each designated M&S to fulfill its specific intended use through a defined series of plans and reports.

The VV&A process has 4 goals:

1. Documentation of Capabilities, Limitations and Assumptions
2. Integration with test planning
3. Accreditation before test
4. Objective assessments

This document also provides guidance on the VV&A for federations of M&S.

[1] The acronym "M&S" includes modeling and simulation, model and simulation, and models and simulations. Within this instruction, "M&S" will be used interchangeably with these various meanings as applicable.

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1. INTRODUCTION

1.1 PURPOSE

This document defines the Verification, Validation, and Accreditation (VV&A) process for Models and Simulations (M&S) used by the Single Integrated Air Picture (SIAP) System Engineering Task Force (SE TF). It describes the rationale and objectives for a VV&A process, as well as specifies the participants, products, and process necessary to achieve M&S accreditation.

Accreditation establishes the M&S as acceptable for specific uses in the design, development, test, and evaluation of the SIAP. M&S accreditation is accomplished in response to specific user requirements, and via a documented combination of Verification and Validation (V&V) techniques.

This M&S accreditation process is tailored to the needs of the SIAP SE TF, but complies with Department of Defense (DoD) instructions regarding VV&A (References 1 through 4).

1.2 PROGRAM DESCRIPTION

The DoD has substantial evidence that significant warfighting capability shortfalls exist today in the Joint counter-air mission area. Because of the prevalence of these shortfalls, the Joint Requirements Oversight Council (JROC) recommended designation of a lead system engineering organization to facilitate the transition of the SIAP requirement from concept to a fielded joint capability. The SIAP SE TF is satisfying this mission by implementing a disciplined system engineering process.

The SIAP SE TF performs systems engineering and analysis of current, programmed, and proposed theater air and missile defense systems, networks, interfaces, and Tactics, Techniques, and Procedures (TTP), as well as external supporting systems (e.g., global navigation and time distribution systems). The purpose is to identify and characterize SIAP issues and shortfalls, warranting correction, and to assess the expected operational benefits and military utility of correcting such shortfalls. The SIAP system engineering is conducted in close collaboration with representatives from the Joint Staff, the Military Services, and other DoD Agencies.

1.3 IMPORTANCE OF VV&A

The SIAP SE TF ensures that all M&S-based analysis tools used in block assessments are subjected to a VV&A process, which addresses the suitability of the M&S for the specific analysis. Since much of the SIAP SE TF's analysis is based on M&S, the results of the VV&A process are a critical part of the SIAP SE TF's system engineering.

DoD emphasis on VV&A began in 1995 when the Defense Modeling and Simulation Office (DMSO) initiated a VV&A Program in response to a tasking in the DoD M&S Master Plan (Reference 1). VV&A policy was established in the form of DoDI 5000.61, DoD M&S VV&A (Reference 2), and core guidance in the form of the DMSO VV&A Recommended Practices Guide (RPG) (Reference 3). DoDI 5000.61 implements policy, assigns responsibilities, and prescribes procedures for the VV&A of DoD M&S. As part of the DoD policy, M&S used to support the major DoD decision-making organizations and processes shall be accredited for that use by the DoD organization sponsoring the application.

VV&A guidance provided in the Interim Defense Acquisition Guidebook (Reference 4) states: "The Program Manager (PM) shall use verified, validated, and accredited models and simulations, and ensure credible applicability for each proposed use."

DoDI 5000.61 provides the following definitions:

> Verification: the process of determining that a model implementation and its associated data accurately represent the *developer's* conceptual description and specifications. Verification answers the question, "Did I build the thing right?"
>
> Validation: the process of determining the degree to which a model and its associated data are an accurate representation of the *real world* from the perspective of the intended uses of the model. Validation answers the question, "Did I build the right thing?"
>
> Accreditation: the official certification (by the user) that a model, simulation, or federation of models and simulations and its associated data are acceptable for use for a specific purpose. Accreditation answers the question, "Does it suit my needs?"

2. ACCREDITATION APPROACH

The SIAP SE TF VV&A process has the following goals:

1. Documentation of Capabilities, Limitations and Assumptions (C/L/A)

   It is essential to understand the C/L/A that are inherent in the M&S as they pertain to the specific issues in the analysis. For example, by knowing what aspects of a real-world system have been approximated or are not addressed, the TF can assess how the M&S can be used in the analysis, as well as how the M&S can be improved.

2. Integration with test planning

   The VV&A process is integrated into the test planning and execution that occurs for each SIAP Block issue, since assessment of an M&S tool is done with specific reference to that issue. This test process is described in the SE TF Integrated Assessment Plan (IAP), Standard Data Management and Analysis Plan (DMAP) and Standard Test Plan (References 5 through 7). This approach recognizes there are resource (time, funding, personnel) limitations that affect the VV&A process and gives V&V issues greater visibility during test planning, execution and reporting.

3. Accreditation before test

   The SIAP SE should accredit the M&S environment as a part of the Test Plan approval prior to executing the test. The accreditation should reflect the Task Force's confidence that M&S C/L/A will not overshadow the evaluation results.

4. Objective assessments

   Validation by an independent organization (unrelated to the M&S Developer (MSD)) provides an objective assessment of whether the M&S has met its requirements. Such an organization may be available through the MSD's parent Service/Agency, a Government organization, a contractor/private organization or by assembling a team of personnel from within the SIAP community, Throughout the VV&A process there are also reviews that ensure the V&V activities have input from all interested Services and Agencies.

2.1 PARTICIPANTS

An overview of the roles and responsibilities of each of the SIAP VV&A participants is provided in Table 1.

Activities	Participant's Role					
	Issue Lead/Team	AA	SAT ESG	VV&A Action Team	MSD	Services
Define Problem	Lead		X			X
Define M&S Requirements	Lead/Approve		X	X	X	X
Define Acceptance Criteria	Approve		X	X	X	X
Designate M&S	Lead	Approve	Review	X	X	X
Provide V&V Guidance				Lead		X
Develop V&V Plan	X		Approve	Review	Lead	X
Execute V&V Plan	X			X	Lead	X
Develop V&V Report	X			X	Lead	X
Develop V&V Assess Report			Review	Lead		X
Make Accreditation Decision	X	Approve	X	X	X	X
Compile Accreditation Package				Lead		

Table 1. VV&A Roles and Responsibilities

Table 1 roles explanations (from DMSO RPG):

a. Approve: "Determines when an activity is satisfactorily completed and another can begin. Determines what activity should be pursued next (e.g., whether to continue on to the next scheduled activity or to return to a previous activity)"
b. Lead: "Leads the task. Normally involves active participation from others."
c. Review: "Participation normally limited to reviewing results of task and providing recommendations."
d. X – For purposes of Table 1 within this document only, X is used to denote a supporting, assisting, or other participating role.

2.1.1 Issue Lead/Team

The Issue Lead with supporting Subject Matter Experts (SMEs) and Service Representatives will employ the products or services from models, simulations, or simulation federations to achieve its purposes. The Issue Leads shall:

a. Define the problem to be addressed by M&S.
b. Define M&S objectives/requirements.
c. Define acceptance criteria.
d. Designate the M&S they will use to analyze their issue in the IAP.

2.1.2 Accreditation Authority

The AA is the SIAP SE, unless delegated to the Deputy SE or Technical Director. The AA shall:

a. Approve the M&S designation (through the IAP or a Designation Letter).
b. Accredit the M&S.

2.1.3 SIAP Analysis Team Executive Steering Group (SAT ESG)

The SAT ESG, per the SAT Charter (Reference 8), is a permanent body that provides overarching support for planning, execution, analysis, and reporting of SIAP analysis activities. The membership includes the SIAP SE TF M&S Chief, Service representatives, Issue Leads, and SMEs. The SAT ESG shall:

a. Review the IAP/Letter of Designation.
b. Approve the V&V Plan.
c. Review the V&V Assessment Report and provide an accreditation recommendation to the AA.

2.1.4 VV&A Action Team

A VV&A Action Team, per the SAT Charter, is an ad hoc team of SMEs, Model/Tool experts, Service representatives and other specialists. Its membership varies based on the specific objectives and M&S required, and it will normally be established as part of the Test Plan Working Group activities. The Action Team is organized and led by the VV&A Activity Manager, who is the SIAP SE TF M&S Chief. The M&S Chief works with Block Issue Leads, SMEs, MSDs, the SAT ESG, and the AA to ensure the VV&A process meets its objectives. The Action Team shall:

a. Provide guidance and resolve issues with the MSD throughout the VV&A Process.
b. Designate M&S with a Designation Letter (if not done in the IAP).
c. Review the V&V Plan and provide an approval recommendation to the SAT ESG.
d. Assess the V&V results and make an accreditation recommendation to the SAT ESG.
e. Compile the Accreditation Package (M&S Chief only).

2.1.5 M&S Developer (MSD)

The MSD is the organization that is responsible for developing and directing configuration control of a model or simulation. The MSD develops and executes a strategy for developing and maintaining the M&S throughout its life cycle.

The MSD shall:

a. Write the V&V Plan (as an Appendix to the Test Plan).
b. Execute the V&V Plan.
c. Write the V&V Report (as an Appendix to the Test Plan).

2.1.6 Services

The Services provide representatives and/or SMEs who participate in the VV&A process. These Service personnel shall:

a. Assist the Issue Leads in defining objectives/requirements, acceptance criteria and designating the M&S.
b. Assist as members of the VV&A Action Team.

2.2 PRODUCTS

The M&S VV&A process is marked by documentation that records all accreditation phases. The specific documents, or products, associated with the accreditation process are discussed in the following paragraphs.

2.2.1 M&S VV&A Designation Document

The intent to use a particular M&S for a specific analysis is determined through a deliberate process, documented, and then approved by the AA. In the VV&A process, there are two types of Designation Documents. The first is the IAP (Reference 5). The Block Issue Leads normally create or update their issue's section in the IAP (Appendix C for FY02-03 efforts) prior to test execution, with the IAP being approved by the SIAP SE or their designee. Since the information in the IAP covers the use of a particular M&S for each issue, designation of the M&S occurs with approval of the IAP by the SIAP SE/AA.

The second type of Designation Document is the Designation Letter (see Appendix A-2 for a sample format). The VV&A Action Team writes the Designation Letter when it is necessary to separate the designation decision from IAP updates to meet schedule demands or other needs. It notifies the MSD of the AA's need to conduct VV&A on the uniquely identified M&S and directs the MSD's support of this effort. The AA or their designee signs the letter.

2.2.2 V&V Plan

The V&V Plan, developed by the MSD, details the V&V methodologies that shall be used by the MSD to establish the suitability of the M&S for accreditation. For each M&S requirement, the Plan defines the set of procedures intended to generate the data necessary for an assessment of M&S capabilities and limitations. The V&V Plan is an Appendix of the Test Plan, and it should address the following areas:

2.2.2.1 M&S Requirements/Acceptance Criteria

What are the requirements guiding the analysis and the specific use of the M&S, as defined during the Designation Process? How will V&V assess the capability of the M&S to address these requirements, i.e., what are the acceptance criteria for the M&S? What capability must be demonstrated for the M&S to be viewed as sufficiently credible for the AA to accredit?

2.2.2.2 Capabilities/Limitations/Assumptions (C/L/A)

What aspects of the problem or system can and cannot be modeled that affects the use of the M&S in this specific analysis? What limits are there on what data can be used? What simplifying assumptions were made regarding operational systems and scenarios (i.e., perfect connectivity or sensor capabilities), or the method of implementing applicable MIL-STDs?

2.2.2.3 V&V Methods

Describe the specific techniques that will be used. The V&V execution should consider use of the V&V methods defined in the DMSO RPG, which provides information on over 75 V&V techniques.

2.2.2.4 Data Certification

Document who provides the data, scenario or other input to the M&S, and summarize how they certify it has been correctly recorded and/or is operationally valid. This is especially important for data from "live" events and Common Reference Scenarios.

2.2.2.5 M&S Development Methodology

Is this a legacy model with no changes and a well-documented history? Or a legacy model that will be changed? Or is it completely new? How are changes/new development achieved—using spirals or single step capability?

2.2.2.6 Configuration Management Plan

An important factor for the accreditation of M&S is sound Configuration Management (CM) practices in the development of the M&S. The CM Plan, developed and executed by the MSD, documents the configuration control process for the designated M&S. The CM Plan is normally a stand-alone document, but is referenced in the V&V Plan. This is especially important if the M&S will be changed/upgraded during the course of the test. Section 1.6.3 of the DMSO RPG provides additional information on CM.

2.2.3 V&V Report

The V&V Report, generated by the MSD, describes the results of the V&V execution and explains test anomalies or the inability of the M&S to meet the acceptance criteria. It is an Appendix to the Test Plan.

2.2.4 V&V Assessment Report

The V&V Assessment Report is a memorandum that summarizes the overall V&V execution, provides an official assessment of the extent that the collected data supports the V&V requirements, and makes a recommendation on accrediting the M&S for the specific analysis. It is generated by the VV&A Action Team and reviewed by the SAT ESG.

2.2.5 Accreditation Package

The Accreditation Package is the complete set of unclassified VV&A documents for a specific analysis, and it is posted on the SIAP SE TF Worksite for reference on future Block analyses and access by Issue Leads.

2.3 PROCESS

The SIAP M&S VV&A Process is divided into four phases: designation, planning, V&V execution, and accreditation (see Figure 1).

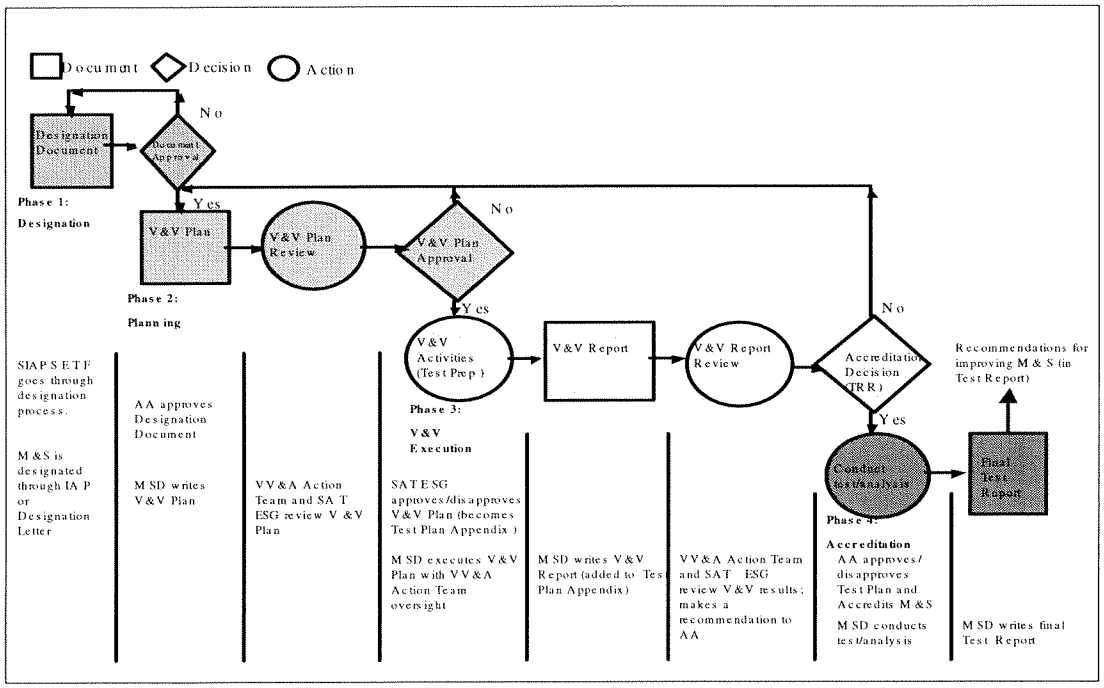

Figure 1. SIAP M&S VV&A Process

2.3.1 Phase 1: Designation

Designation occurs when the intent to use a particular M&S for a specific analysis is documented in writing and approved by the AA or their designee. This will be done in either the IAP or a Designation Letter (see Section 2.2.1).

2.3.1.1 Designation Process

The designation process establishes the direction and pace of the resulting VV&A effort. It is a critical factor in the success of that effort. When possible, the SIAP SE TF follows a five-step designation process that allows the SIAP SE TF and the MSD to agree that the M&S selected is capable of satisfying the specified need, and there are sufficient resources to complete accreditation. The designation process will minimize any surprises with the M&S at the end of the accreditation process, and provides a justification as to why one M&S may be selected over another. The Issue Lead(s) with the supporting SMEs and Service Representatives on their team normally execute this process, with support from the VV&A Action Team, MSD, and SAT ESG.

1. Identify need

   Define the specific intended use for the M&S and establish the necessity of accreditation based on what kind of data is needed to conduct

analysis of the SIAP issue.

2. Establish objectives/requirements
   Document functionality requirements to support the specific intended use. Consider what level of fidelity must be demonstrated to provide data of sufficient accuracy for the analysis.

3. Understand M&S functionality
   Document the current M&S capabilities that appear to be able to meet the requirements This will require discussions with MSDs to determine if there are several M&S that can do the job, or none. It may be important to understand the software development capabilities of the MSD, to include any maturity levels achieved (such as from the Software Engineering Institute Capability Maturity Model) as well as previous V&V efforts and M&S experience. It may also be necessary to improve the capabilities of M&S tools in order for it to be useful in the specific intended use.

4. Conduct a Front-end Assessment of Alternatives
   Identify the programmatic issues (schedule, cost, risk) for each M&S alternative being considered.

5. Make Designation Decision
   Use technical and programmatic assessments to designate the "best choice" M&S for accreditation.

2.3.2 Phase 2: Planning

The planning phase of the VV&A process begins with the development of the V&V Plan by the MSD. The plan contains the specific qualitative and/or quantitative testing requirements to satisfy the acceptance criteria. V&V Plans may vary greatly based upon previous V&V efforts, complexity of simulation functionality, length of use, scope of intended use, and clarity of application area requirements. The MSD should consider use of the various V&V techniques defined in the DMSO RPG, and work with the VV&A Action Team and Block Issue Lead(s) to provide a Plan that balances analysis objectives with resources (time, funding, personnel), risk, Service/Agency M&S directives and their own organizational culture/experience.

The VV&A Action Team assesses the V&V report and makes an approval recommendation to the ESG. At this point in the planning, it is expected that the Test Plan will still be a "draft" document, but the V&V Plan should be submitted as a "final" version. This requires V&V activities be addressed early in the test planning. The draft Test Plan should be available to ensure the V&V Plan is reviewed in context. The ESG then reviews the V&V Plan and decides if it is acceptable (approves) or recommends changes (disapproves).

Reviewing the V&V plan early in the test planning process results in significant risk reduction for the test readiness and accreditation decision by providing the SIAP SE TF and Services/Agencies insight on the test plans. ESG approval of the V&V plan should not be construed as "guaranteeing" accreditation—it is intended to be part of a collaborative effort between the SIAP SE TF, the MSD and Service SMEs during every step of test planning and execution.

2.3.3 Phase 3: V&V Execution

The VV&A Action Team monitors V&V execution progress and addresses issues or concerns. When all required V&V efforts and documentation is complete, the MSD provides the V&V Report to the VV&A Action Team for evaluation. The latest version of the Test Plan should be available to ensure the V&V Report is reviewed in context.

The V&V Report summarizes all V&V efforts in accordance with the requirements set forth in the V&V Plan. The VV&A Action Team evaluates the report for consistency, correctness, and completeness and makes a recommendation to the ESG via the VV&A Assessment Report. As the V&V Report is a critical document in the accreditation process, modification to the report might be necessary to clarify V&V results or to correct deficiencies. This ensures issues can be resolved or at least properly documented prior to the Test Readiness Review (TRR) and Accreditation Decision. After evaluation of the Assessment Report, the SAT ESG makes an accreditation recommendation to the AA.

2.3.4 Phase 4: Accreditation

The AA or their designee conducts the TRR to determine if the test planning is complete and to assess the risk associated with using the M&S. When the AA signs the Test Plan and approves conducting the test/analysis, they simultaneously accredit the M&S. The AA can also approve a limited accreditation, request additional information, or deny the accreditation.

The accreditation remains in effect as long as the intended use or limitations/assumptions of the M&S do not change, or until revoked by the AA. If it is desired to expand or change the intended use or assumptions/limitations of the M&S defined in the M&S Accreditation Decision Letter, the M&S must be submitted for re-accreditation.

The MSD conducts the test/analysis per the Test Plan and documents results in the Test Report. It is essential that any issues related to M&S be described in the report, especially recommendations for improving the fidelity and/or capabilities of the M&S. The M&S Chief and the VV&A Action Team evaluate this information. Lastly, the M&S Chief posts unclassified VV&A documentation to the SIAP Worksite.

3. High Level Architecture (HLA)/Federations of M&S

The HLA is a general-purpose architecture for federations of M&S. The HLA was developed under the leadership of the Defense Modeling and Simulation Office (DMSO) to promote reuse and interoperability across the large numbers of different types of simulations developed and maintained by the DoD. The HLA Baseline Definition was completed on 21 Aug 96. The Under Secretary of Defense for Acquisition and Technology (USD (A&T)) approved it as the standard technical architecture for all DoD simulations on 10 Sep 96.

VV&A activities will be conducted as an integral part of the federation systems engineering process. VV&A of M&S federations identifies risks to the credibility of the federation results for the purposes of a specific analysis, as well as the actions required to mitigate those risks. The SIAP M&S VV&A Process also applies to federation accreditation.

3.1 Federation Development and Execution Process (FEDEP)

The development of federations designed to support TF engineering efforts follow the six-phase FEDEP process, which has been used for Joint Distributed Engineering Plant (JDEP) events. The phases in this process are shown in Figure 2. The VV&A process shown in Figure 1 is still applicable to the FEDEP process, with the same documentation and reviews.

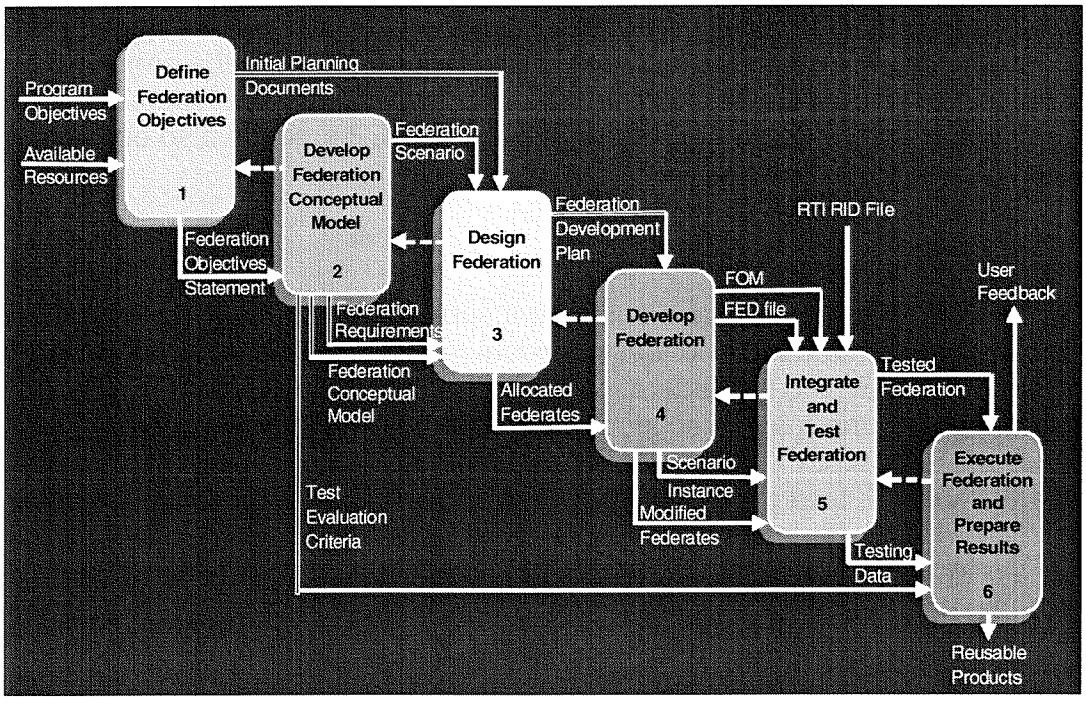

Figure 2. Federation Development and Execution Process

3.1.1 Phase 1: Define Federation Objectives

As with any VV&A process, the first step is to clearly define the federation objectives. Phase 1 of the FEDEP process is equivalent to the Designation phase of the SIAP VV&A Process.

3.1.2 Phase 2: Develop Federation Conceptual Model

The next phase is to define characteristics of federates and the federation needed to address issues. Of particular importance is credibility of the scenario and its appropriateness as a context for the analysis (sufficient numbers and positions of friendly and enemy forces). These federation requirements drive the selection of federates and the VV&A of the federation. This phase requires active participation of the SMEs and the MSDs, since it is dependent on a sound understanding of the problem area, the substantive issues to be addressed in the test, and requirements for selection of the federates to meet the needs of the test. Phase 2 of the FEDEP process occurs during the Planning phase of the SIAP VV&A Process.

3.1.3 Phase 3: Design Federation

The next phase is to identify specific federates, develop the Federation Object Model (FOM), and delineate federate upgrades to support federation. The federation design reflects the decision of how to satisfy the federation requirements with specific federates, scenarios and data exchanges. It may be necessary to review the objectives for clarity, and return to the conceptual analysis with more detail to ensure the requirements for the federation are well articulated and understood. Phase 3 of the FEDEP process also occurs during the Planning phase of the SIAP VV&A Process.

3.1.4 Phase 4: Develop Federation

Next, federate owners implement support for the FOM and enhancements in federates as needed and test individual federates. This is done by the owners of the federates and the federation developers. Phase 4 of the FEDEP process occurs during the V&V Execution phase of the SIAP VV&A Process.

3.1.5 Phase 5: Integrate and Test Federation

Incremental testing of federation capabilities and sets of federates is completed to prepare for the federation execution to support the test. Phase 5 of the FEDEP process also occurs during the V&V Execution phase of the SIAP VV&A Process.

3.1.6 Phase 6: Execute Federation and Prepare Results

A TRR is held and the test is conducted using the federation following the test process and procedures. Phase 6 of the FEDEP process occurs during the Accreditation phase of the SIAP VV&A Process.

Table 2. FEDEP/SIAP VV&A Mapping Chart

FEDEP PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6
Define Federation Objectives	Develop Federation Conceptual Model	Design Federation	Develop Federation	Integrate and Test Federation	Execute Federation and Analyze Results
Identify needs					
Develop Objectives	Develop Scenario	Select Federates	Develop FOM	Plan Execution	Execute Federation
Identify Federation Requirements	Perform Conceptual Analysis	Allocate Functionality	Establish Federation Agreements	Integrate Federation	Process Output
		Prepare Plan	Implement Federate Modification	Test Federation	Prepare Result
SIAP VV&A: *Designation*	*Planning*		*V&V Execution*		*Accreditation*

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15. BMDO Directive 5011, BMDO M&S VV&A Policy, 26 February 1996.

6. GLOSSARY OF TERMS

ACCREDITATION: The official certification that a model, simulation, or federation of models and simulations and its associated data are acceptable for use for a specific purpose.

ACCREDITATION AUTHORITY: The government organization that is responsible for the results from usage of the designated M&S. The accreditation authority shall approve designated M&S for VV&A and accredit the M&S.

DATA: A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means.

FEDERATE: An individual model or simulation that is part of a federation of models and simulations.

FEDERATION: A system of interacting models and/or simulations, with supporting infrastructure, based on a common understanding of the objects portrayed in the system.

MODEL: A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process.

M&S DEVELOPER: An individual, group, or organization responsible for actually developing or modifying a simulation in accordance with design requirements and specifications. The MSD provides the required V&V information, conducts V&V activities, and supports the SAT ESG as tasked.

M&S USER: The individual, group, or organization that employs or will employ a model, simulation, or simulation federation, its products, or its services to achieve a set of objectives.

SIMULATION: A method for implementing a model over time.

SUBJECT MATTER EXPERT: An individual who, by virtue of position, education, training, or experience, is expected to have greater-than-normal expertise or insight relative to a particular technical or operational discipline, system, or process. They may be an individual from the Program Office, a contractor, a field activity or a laboratory.

VALIDATION: The process of determining the degree to which a model (simulation) 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 (simulation) implementation accurately represents the developer's conceptual description and specifications.

7. ACRONYMS

Acronym	***Definition***
AA	Accreditation Authority
BMDO	Ballistic Missile Defense Office
CM	Configuration Management
DMAP	Data Management and Analysis Plan
DMSO	Defense Modeling and Simulation Office
DoD	Department of Defense
HWIL	Hardware-in-the-Loop
IAP	Integrated Assessment Plan
JROC	Joint Requirements Oversight Council
M&S	Modeling and Simulation
MSD	Modeling and Simulation Developer
OSD	Office of the Secretary of Defense
POA&M	Plan of Action and Milestones
RPG	Recommended Practices Guide
SAT ESG	SIAP Analysis Team Executive Steering Group
SE TF	System Engineering Task Force
SIAP	Single Integrated Air Picture
SME	Subject Matter Expert
TRR	Test Readiness Review
V&V	Verification and Validation
VV&A	Verification, Validation, and Accreditation

APPENDIX. SAMPLE PRODUCT FORMATS

DEPARTMENT OF DEFENSE
SINGLE INTEGRATED AIR PICTURE
SYSTEM ENGINEERING TASK FORCE
1931 JEFFERSON DAVIS HIGHWAY
CM3 SUITE 1142
ARLINGTON VA 22202-3523

IN REPLY REFER TO

9800
Ser SIAP/072
19 Sep 02

From: Single Integrated Air Picture System Engineer
To: Center for Naval Analyses (Attn: Mr. Paul Symborski)

Subj: DESIGNATION OF OPERATIONAL DATA DRIVEN SIMULATION FOR CORRELATION ALGORITHM PERFORMANCE EVALUATION (ODDSCAPE) IN SUPPORT OF SINGLE INTEGRATED AIR PICTURE (SIAP) FOR VERIFICATION, VALIDATION AND ACCREDITATION (VV&A)

Ref: (a) DoDINST 5000.61, DoD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)

Encl: (1) Draft SIAP Technical Report 2002-013, SIAP Accreditation Process for M&S (in signature process)
(2) SIAP Technical Report 2002-005, SIAP Integrated Assessment Plan (IAP)

1. Summary. This letter initiates the SIAP system Engineering Task Force's accreditation of the Center of Naval Analysis (CNA's) ODDSCAPE SIAP Block 1 Phase 1 analysis. We expect to accredit this model for perturbation analyses addressing correlation/decorrelations algorithm (ICP) parameter optimization, Track quality Sensitivity (TQ) corrections, and inactive Precise Participant Location and Identification (PLI) logic, (specified in Appendix C of enclosure (2)).

2. Background. Reference (a) establishes procedures and guidance for the use of Modeling and Simulation (M&S) used to support major DoD organizations and processes, including the Joint Requirements Oversight Council. Enclosure (1) provides specifically tailored VV&A guidance for the SIAP Block1 Phase 1. Enclosure (2) is the primary planning document for SIAP Block System Engineering Analyses.

3. Action. The SIAP SE needs your continued CNA support for the SIAP Analysis Team Executing Steering Group (SAT ESG) VV&A effort. The SAT ESG shall coordinate this effort and should be contacted if there are any questions regarding M&S accreditation. The POC for VV&A within the SIAP SE Task Force is CDR Paul Votruba. He can be reached at (703) 602-6441. x217, or by email at votrubapm@navsea.navy.mil.

H. V. DUTCHYSHYN
By direction

DEPARTMENT OF DEFENSE
SINGLE INTEGRATED AIR PICTURE
SYSTEM ENGINEERING TASK FORCE
1931 JEFFERSON DAVIS HIGHWAY
CM3 SUITE 1142
ARLINGTON VA 22202-3523

IN REPLY REFER TO

9800
Ser SIAP/008
14 Feb 03

From: Single Integrated Air Picture System Engineer
To: Center for Naval Analyses (Attn: Mr. Paul Symborski)

Subj: ACCREDITATION OF OPERATIONAL DATA DRIVEN SIMULATION FOR CORRELATION ALGORITHM PERFORMANCE EVALUATION (ODDSCAPE)FOR USE IN ANALYSES OF ASCIET 00 AND JCIET 02 DATA

Ref: (a) Memo For Record, SIAP Analysis Team (SAT) Executive Steering Group Chairman, 6 Feb 03
(b) Verification and Validation Report for ODDSCAPE, CNA, 7 Nov 02
(c) ODDSCAPE Designation Letter, 9800 Ser SIAP/072, 19 Sep 02
(d) DoDINST 5000.61, DoD Modeling and Simulation (M&S) Verification, Validation and Accreditation (VV&A)

1. Based on the information contained in references (a) through (d), the Center for Naval Analyses' ODDSCAPE is accredited for use to support SIAP Block 1 analyses. Specific use is to be limited to perturbation analyses addressing Correlation/ Decorrelation algorithm (Interface Change Proposal) parameter optimization, Track Quality (TQ) sensitivity corrections, inactive Precise Participant Location and Identification (PPLI) logic and Data Registration. This accreditation covers the analysis of data from ASCIET 00 and JCIET 02.

2. This accreditation applies only to ODDSCAPE Version 2.0. Major changes to this model's configuration and/or a change of specific use not addressed here should be separately accredited through this office.

3. My point of contact for VV&A is Maj David Borowsky, (703)602-6441 x265 or by email at borowskydj@navsea.navy.mil.

H. V. DUTCHYSHYN
By direction

Copy To:
NSWC Corona (Mr. Dan Bergstrom)
PEO AMD (Mr. Ray Washburn)
MARCORSYSCOM (Maj Madsen)
ESC/DI (Mr. Basel Brown)

Sample Configuration Management Plan

Scope
Reference Documents
Configuration Management Environment
Configuration Control Process

Sample V&V Plan

Executive Summary
Model Description
M&S Requirements and Acceptance Criteria
V&V Approach
M&S V&V History
Schedule
References

Sample V&V Report

Executive Summary
Differences from V&V Plan
V&V Results
V&V Summary

Sample V&V Assessment Report

1. Summary
2. Application M&S Requirements and Acceptance Criteria
3. Model Capability
4. V&V Report Summary
5. Comparison Analysis of Requirements Versus Capabilities
6. Comparison Analysis Summary
7. Other Accreditation Information
8. Recommendations