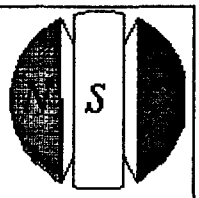

Confederation of Models Verification Validation and Accreditation (VV&A)

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The National Simulation Center
CONQUERING FRONTIERS

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Purpose

The purpose of this document is to provide an overall plan for Verification, Validation and Accreditation (VV&A) of the Aggregate Level Simulation Protocol (ALSP) Confederation of Models. The objectives of this plan are to:

1. Increase confidence in Confederation of Models VV&A by:

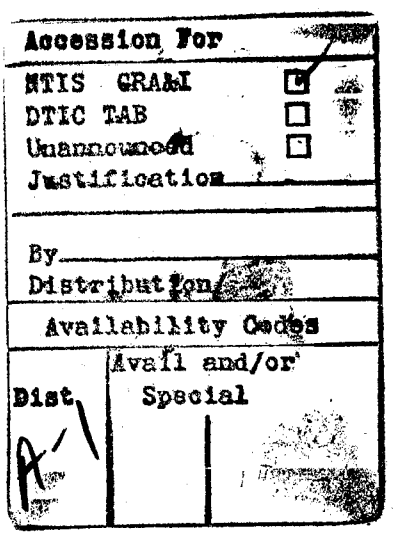
a. Establishing a VV&A methodology that, when applied, will provide feedback to model developers and proponents regarding model and interface deficiencies; provide a measure of confidence in the capability of 1994 ALSP Confederation to meet exercise requirements; and provide users with a characterization of model capabilities and a risk assessment.

b. Develop a uniform, rigorous test standard for integration and operational testing of the ALSP Confederation.

c. Provide a central document for the coordination of activities of all Confederation testing activities to ensure that all VV&A related issues are addressed in a complete and timely manner.

2. Increase our understanding of how to perform VV&A of confederated simulations.

3. Collect lessons learned for future VV&A activities in support of confederated simulations.



Part I

Verification, Validation and Accreditation (VV&A) of the 1994 ALSP Confederation

1.1 Background

This section provides a background discussion of the 1994 ALSP Confederation, the proposed ALSP Confederation VV&A process, and the 1994 ALSP Confederation VV&A Master Plan (CVVAMP). The discussion begins with modeling and simulation (M&S) including activities underway to connect existing simulations and simulators, the simulations currently seeking to participate in the ALSP Confederation, and the history of ALSP to the present 1994 ALSP Confederation.

1.1.1 M&S Background

Effective planning for the 1994 ALSP Confederation and for future joint training efforts is founded in knowledge of existing M&S systems and their historical development.

Simulations are generally intensive consumers of computing and software development resources, and they tend, therefore, to be narrowly tailored to give the best possible results for their proponents, rather than addressing general problem areas.

New opportunities are now emerging to integrate the simulation activities developed throughout the Department of Defense (DoD). In response to this opportunity, the Deputy Secretary of Defense has instituted the Defense Modeling and Simulation Initiative. The goal of this initiative to create an M&S based virtual battlefield environment in which to train, plan operations, and develop and test doctrine. The initiative will not only integrate DoD simulation activities, but will also spawn new applications made possible by the new technologies developed.

1.1.2 M&S Applications and Architectures

For ALSP Confederation, the most relevant M&S systems are training oriented battle simulation systems. A number of M&S systems have been developed to support training exercises at various echelons. An example of a training exercise is the command post exercise (CPX). CPXs provide training for high level command staff in a realistic, interactive environment. This type of training was developed to remedy perceived deficiencies in the traditional methods of training these commanders. CPXs provide a realistic combat command training experience without the uncertainties and costs of actual warfare or field training exercises.

A CPX places the command and control (C2) elements of selected units in a combat environment that stimulates decision making and interaction among the command staff, and develops group cohesion and coordination. In a CPX, the participating officers and staffs are located in actual command posts or tactical operations centers at field locations. Controllers play roles as the forces above, below,

and adjacent to these headquarters (HQs), and communicate with them through unit organic communications. The controllers function as actors, providing a realistic interface between the training audience and the simulated battle, feeding the trainee's orders into the model, and returning battle outcomes via normal command, control and communications (C3) channels. Controllers also 'play' the model to attain desired training effects.

There are many training oriented simulation and stimulator systems extant, each tailored to the training needs of a particular audience. The general success of these systems has led to a demand to broaden the scope of training, and for exercises that provide Joint Force training. Integrating existing simulations in an ALSP Confederation is an attempt to provide this.

Because of the high availability requirement and the large resource investment required to carry out a joint exercises, an effective VV&A effort applied to the ALSP Confederation will ensure a valid automated exercise support system and reduce the risk of failure.

1.1.3 Existing M&Ss

Simulations are the building blocks of confederated training simulations. A simulation represents all simulated entities, situations, and their interactions in software. ALSP provides a means for disparate simulations to exchange information and function as a confederation, hence the ALSP Confederation.

Some examples of existing simulations are:

a. Corps Battle Simulation (CBS). CBS is the Corps and Division level command staff trainer in the Army's Family of Simulations (FAMSIM). It is used as a CPX driver by the Battle Command Training Program (BCTP) and by the individual corps to train corps, division, and brigade staffs. CBS is also used by BCTP as a seminar trainer. It is currently used more than 100 times per year by I Corps, III Corps, V Corps, VII Corps, XVIII Corps, National Simulation Center (NSC), BCTP, United States (US) Army (USA) Central Command, and USA Command and General Staff College.

b. Air Warfare Simulation (AWSIM). AWSIM is designed to help train senior North Atlantic Treaty Organization (NATO) commanders and their battle staffs in the execution of wartime general defense plans emphasizing joint and combined operations. The model is used to develop team skills and to drive unscripted CPXs. AWSIM is used by all NATO military commands up to 12 times a year, depending on the Warrior Preparation Center's (WPC) exercise schedule.

c. Joint Theater Level Simulation (JTLS). JTLS is a simulation designed to evaluate theater level operations plans. It is used to evaluate different mixes of forces and logistics support, and also for high resolution seminars.

d. Research, Evaluation, and Systems Analysis (RESA). RESA is a research and evaluation tool for Naval C3 systems. It is used for operations plan evaluation, C2 training support for senior officers, joint C3 interoperability assessment, warfare systems architecture analysis, and naval exercise support.

e. Combat Support Service (CSS) Training Simulation System (CSSTSS). CSSTSS is an exercise driver for training of CSS commanders and staff personnel in C3. The training audience includes the CSS commanders and staffs in Echelons Above Corps, Corps Support Commands, and Division Support Commands as well as their subordinate HQs. CSSTSS is used to conduct logistical exercises.

f. Tactical Simulator (TACSIM). TACSIM is an interactive simulation supporting Intelligence and Electronic Warfare (IEW) system development and testing, CPXs, and testing of IEW and C3 functions. It supports decision making, systems evaluation, training, and the All-Source Analysis System and Enemy Situation Correlation Element program development.

These models are only a small fraction of publicized DoD simulations. The Joint Chiefs of Staff J-8 12th edition of the Catalog of Wargaming and Simulation Models lists 528 simulations. The total number of simulations in the M&S community is much larger.

1.1.4 ALSP

ALSP is both a software system and a data communication protocol that allows integration of disparate simulations called actors. Under ALSP, different simulations can join together and form a Confederation of Models. This becomes, in effect, a composite simulation. Figure 1-1 shows a diagram of single ALSP Confederation:

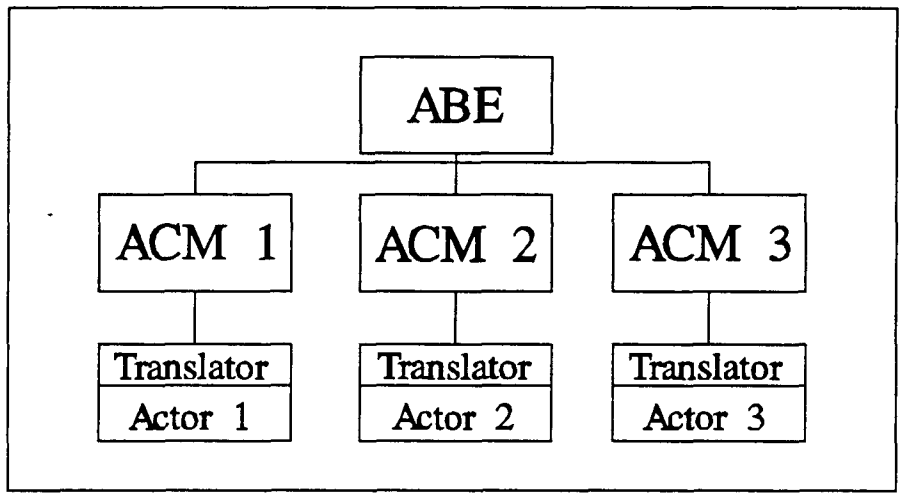


Figure 1-1: Single ALSP Confederation Diagram

An ALSP confederation has two main parts:

The ALSP software system - the ALSP software system is composed of the ALSP Common Module (ACM) and the ALSP Broadcast Emulator (ABE). The ACM serves as a common point of interface for all component Actor translators. One version of the ACM will function for all Actors, a separate copy is provided for each Actor in the confederation. The ABE serves as a message router for the confederation. Depending on the distribution of the simulations, multiple ABEs may be required.

The component simulations (Actors) - an Actor is usually an actual warfare simulation. Each simulation wishing to join the confederation must develop a translator. Actors differ and the translator is tailored to provide a bridge between the Actor and the ALSP Confederation.

The 1993 ALSP Confederation had the following members: CBS, AWSIM, RESA, and the TACSIM ALSP translator. Candidates for the 1994 ALSP Confederation are CBS, AWSIM, RESA, TACSIM, Marine Air Ground Task Force Tactical Warfare Simulation (MTWS), Joint Electronic Combat Electronic Warfare Simulation (JECEWSI), and CSSTSS.

1.1.5 Confederation VV&A (CVVA) History and Lessons Learned

A brief history of the ALSP Confederation and lessons learned from its first use in a major exercise is presented below in order to foster a better understanding for the reasons underlying the need for a comprehensive plan for VV&A of the Confederation. For a more detailed and complete

history or the ALSP Confederation and its past uses, the reader is referred to The ALSP Program Status and History[1].

Significant advances are currently being made in linking together simulations. The first use of ALSP linked simulations to support a training exercise was Central Fortress 92. The linked simulations were CBS and AWSIM. Support for Ulchi Focus Lens (UFL) 92 and REFORGER 92 was also provided by these ALSP linked simulations. For UFL 92, the Navy RESA model was also included in the ALSP linking. The 1992 joint exercises involved thousands of participants distributed over several continents. In 1993, the joint community saw the first major joint exercise supported by multiple simulations linked over a network when the ALSP Confederation successfully supported UFL 93.

While the overall objectives of the joint exercises were met, a concern about using untested research oriented support systems surfaced. The need for a confederation testing process to ensure reliability was realized and validity of the interactions between the models (i.e. the Confederation) significantly impact the validity of the joint training exercise.

Some problems originate in the inherent difficulties of confederated software development by multiple agencies. Others result from the requirement that software designed to run stand alone be retrofitted to work in cooperation with other systems. The need to establish cooperative, coordinated development efforts focused on Confederation participation became evident. Communication between model developers is key to the success of the endeavor.

Many problems associated with ALSP confederation testing resulted from the different configuration control and development schedules of the organizations responsible for the testing. These problems were aggravated by the lack of any single point of authority to which problems could be addressed for resolution. Even though an Interface Control Document (ICD) existed for CBS and AWSIM, there were inconsistencies each time the models were linked after software changes.

Testing for the initial 1992 ALSP Confederation consisted of an integration test, two functional validations, and stabilization testing prior to each exercise. The goal was to freeze software development far enough ahead of each exercise so that it could be stabilized by testing prior to start of exercise (STARTEX). Because of the research nature of the 1992 ALSP Confederation, things did not work that way. Changes were still made right up to STARTEX, and the

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[1]Seidel, David W., The Aggregate Level Simulation Protocol Program Status and History, MITRE Corporation, McLean, VA 1993

predictable problems associated with these last minute changes occurred. Many occurred haphazardly and without configuration control.

Another problem area was reconciliation of databases. Since weapon and equipment types often do not match between simulations, a mapping function is used to handle differences. When data is sent from one simulation to another, all data values are converted first from originator simulation data values to ALSP values, and then from ALSP values to receiver data values. Unfortunately, the precise meaning of a datum often depends on its specific usage within each simulation. This problem was obvious, but its difficulty did not become clear until after the exercises had begun. As an example, Air Force (AF) players had a difficult time bombing CBS targets because CBS attrition algorithms were being used.

A problem area is that the Confederation requires more computer resources than a single simulation because it is composed of multiple simulations communicating via a common protocol. As such the Confederation is not an entity with built-in-test capabilities. While component simulations commonly have built-in-test facilities, but these do not support a confederated operation. This makes the evaluation of test results more difficult. Serious problems were encountered during exercises when one simulation sent messages containing values not expected by another. In one case, the messages contained invalid ALSP identifiers. This caused major data corruption in the receiving simulation. The simulations generally do not exhibit robustness when confronted with bad data inputs.

Performance testing, even for stand alone simulations, is difficult, and it is extremely difficult for the Confederation. Since the performance of the Confederation is very sensitive to workload, it is essential that valid characteristic workloads be used in performance testing. Since each exercise has unique performance characteristics it is essential that exercise planners provide realistic load parameters to be used during testing. Return of Forces to Germany (REFORGER) 92 provides a good example of how these unique performance characteristics can effect the Confederation performance. It was a two part exercise. One part was a BCTP Warfighter Exercise. The other part was REFORGER 92 proper. The performance of the Confederation was vastly different between these two parts. The Warfighter was a fast paced exercise with heavy combat and large numbers of air missions. At several points it was in danger of failure due to loss of clock time performance. On the other hand, REFORGER 92 proper, being slower paced, experienced few performance problems.

As the confederation grows, testing complexity will increase. Each time a new simulation is added to the confederation, every current member simulation must be tested

against the new participant. Even though two simulations may have no direct interface, the presence of their message traffic may have unintended effects on each other. For example during UFL 92, RESA was added to the Confederation. It was intended that RESA only participate in the time synchronization aspects of ALSP. Since its ALSP interface was not adequately tested, it was to use its existing direct interface with AWSIM. All of the new code that interfaced with AWSIM via ALSP was supposedly commented out. However, some code was apparently missed and RESA sent several erroneous messages to CBS that could have had disastrous consequences.

In 1992 following the successful use of the research Confederation, Defense Advanced Research Projects Agency (DARPA) determined the ALSP project was now a functional project and needed to transition to the Services for management of future developments. A request for an organization to accept management responsibility was refused by the Joint Staff and other Services, so the Army was tasked to take responsibility for future ALSP Confederations. A Memorandum of Agreement between DARPA and the USA Simulation, Training and Instrumentation Command (STRICOM) formalized the transition of responsibility for ALSP to the Army.

In March 1993, the DoD Executive Council for Modeling and Simulations approved the ALSP Management Plan and formally designated STRICOM as the Executive Agent for ALSP. This provided the means for bringing a focus and structure to the ALSP Confederation Development and Testing processes. The identification of the DoD focal point for ALSP has made it possible to begin to alleviate many of the concerns and issues raised during the 1992 use of the research Confederation.

1.2 Management Plan

The management of the 1994 ALSP CVV&A process requires monitoring and coordination of tasks both within (internal to) and among the agencies involved. This section will describe and discuss the methodology and task structure for development of a CVVAMP and for carrying out the resultant VV&A procedures.

1.2.1 Management Philosophy

The VV&A process for the 1994 ALSP Confederation will focus on two objectives:

a. To ensure timely and effective coordination of the relevant activities of all members of the ALSP community.

b. To initiate configuration control policies for the 1994 ALSP Confederation of Models.

Conducting VV&A procedures and reporting the results may have profound organizational impacts, and these impacts raise concerns in the organizations effected. The most effective way to address these concerns is to adopt a team structured approach. This allows concerns to be raised and addressed directly in a non-adversarial setting, and leads to a spirit of commitment and cooperation.

In the special case where the VV&A Sponsor and Developer are related, special efforts must be made to preserve the objectivity and accuracy of negative assessments against normal organizational pressures to minimize bad news. A team approach emphasizes group commitments and responsibilities, rather than identifying culprits for problems, and so reduces apprehension and increases acceptance of VV&A results, whether they are 'good' or 'bad'. Also, because of their complexity, ALSP CVVA efforts are inherently team undertakings. This fact underlies the methodology of CVVA planning. The composition of a VV&A team depends on the sponsor of the VV&A effort, the simulation developer and proponent, the relationship between them, the type of model, and the resources available. Naturally, limitations on resources may restrict the scope of a VV&A effort.

The important players in a VV&A effort include the following:

a. Management. VV&A efforts are most effective when, once a team is selected and instructed as to the means available them and their overall purpose, they are then allowed to proceed without further interference to the conclusion their efforts. Management has the difficult task of maintaining oversight without interfering in the assessment, so long as it proceeds within the parameters established at the outset. Management is also responsible for the coordination of efforts among organizations involved in the assessment effort.

b. Developer. Obtaining the confidence and cooperation of the development team greatly facilitates an assessment effort. Both the original implementers of the system (when available) and the current staff are important. Implementers can provide essential insights into the design of the system, permitting a more sophisticated assessment. Current staff are often essential, and always desirable, in the operation of the system during the VV&A procedures.

c. User Community. It is frequently the user community of a simulation tool that sponsors an assessment. Their common intent is to determine the credibility and reliability of the simulation in meeting their specific needs. Potential or actual users of a simulation play an important role in identifying the goals of an assessment. Specific application of the simulation helps focus analysis and assessment on the

critical areas of capability and risk that characterize the model.

d. Assessment Team. The ALSP Confederation Assessment Team is composed of the model developers and systems engineers. They will provide the specialized expertise required to determine the validity of the model as a representation of reality. These experts may come from any source, provided they have the necessary expertise. Technical experts are acquainted with the host hardware and software architectures, software engineering methodologies employed in development, and the needs and abilities of both the technical and user communities for the model.

e. Accreditation Team. The Accreditation Team will conduct timely reviews of the data gathered during confederation testing and produce the accreditation document for the ALSP Community. Since the Confederation spans multiple military organizations, it is important that each organization be represented on the accreditation team. The ALSP Review Panel will review the final test results and make decisions relative to accreditation of the ALSP Confederation.

1.3 Information Resources

Information from many sources will be collected to successfully complete the 1994 ALSP CVVA process. This information will be used to detail the V&V process, to develop test parameters and procedures, and to support VV&A conclusions. Some of the information resources are described in the following sections.

1.3.1 M&S Documentation

Documents referencing the M&S of the confederation will be used to determine the stand alone functions of each M&S of the confederation. The operation and results of these stand alone functions will be compared with the operation and results of the confederation to determine the effect of the confederation on each model. Many models in the confederation already conform to the standard for documentation outline in Department of Army Pamphlet 5-11. The documentation available is classified as follows:

Executive Overview - Provides a broad overview of the model. It typically describes the general characteristics of the model, and provides enough administrative and technical information to assist a potential M&S user or application sponsor in the selection of an M&S for a particular application.

User's Manual - Documents each component of an M&S, and provides assistance to the actual users in the proper operation and application of the model.

Installation Guide - Set of detailed instructions that walk the user through the installation of all M&S components. It typically includes such items as required hardware and software, and environmental specifications.

Operator's Manual - Provides the user with the detailed knowledge necessary to properly operate the model. This includes initialization procedures, default settings, and recovery actions.

Data Dictionary - Provides the user with a listing of all input data items, such as system component characteristics, force structure, and geographical data.

Analyst Guide - Documents detailed and technical descriptions of the model's algorithms and methodologies.

1.3.2 M&S Developers

The developers of each M&S should prove invaluable in determining the methodologies and operating assumptions of their respective models. The CVVAMP should identify Point of Contacts (POCs) for each of the models and developer Subject Matter Experts (SMEs) that can be contacted to evaluate issues that may surface during the VV&A process.

1.3.3 SMEs

SMEs will be used in the V&V process. The SMEs will perform the functional tests in each functional area of the individual models in the confederation. They will also record the results of these tests and will determine the validity of the results.

1.3.4 ICDs

The ICDs serve as the foundation of the confederation's verification requirements. The ICDs document the operational requirements of the interface, as determined by the ALSP Interface Working Group. They also describe modeling and implementation concepts. The Confederation V&V will include tests to determine whether or not the ALSP interface operates in accordance with these concepts, and whether the implementation of these concepts meets the operational requirements.

1.3.5 ICD Test Plans

The ICD test plans are used by model developers, proponents, and application sponsors to test each ALSP interface, determining whether or not the ALSP interface operates in accordance with the ICD's operational concepts, and whether the implementation of these concepts meets the operational requirements as published in the ICDs.

1.4 Technical Testing

Before progressing to functional issues, testing must be performed to ensure that the ALSP Confederation is technically sound and that procedures designed to keep models operational and synchronized work properly.

1.4.1 Technical Test Objectives

Technical items to be tested include all functions necessary to start, stop and maintain the simulations, both in stand alone mode and as a member of the ALSP Confederation. Such items include, but are not limited to, the following:

Start: Does each model correct start up and properly read in all necessary data files?

Join and Resign: Does each model correctly transition between linked and unlinked modes of operation?

Time synchronization: Is causality across the confederation maintained?

Checkpoint and Restart: Can the entire confederation take a joint checkpoint and restart from that checkpoint following the published checkpoint and restart procedures?

1.4.2 Technical Tests

Technical testing should be performed as part of each test involving the ALSP Confederation. These types of tests include:

a. Any verification tests that are a part of the development cycle for each respective model.

b. Stand alone tests to ensure that each model is "confederation ready".

c. Integration tests (ITs) among collections of two or more component models, to be run by developers prior to Confederation testing. Examples are Jet Propulsion Laboratory (JPL) and Combined Arms Support Command (CASCOM) efforts with CBS and CSSTSS, and the Developers' IT which took place at the NSC from 1 - 18 February 1994.

d. Confederation Tests (CTs). Technical testing is one of the primary goals of the Main CT.

1.5 Verification Testing

Because the Confederation consists of a group of individual models communicating through ALSP, it needs to be verified by means of two series of tests: stand alone tests

of each the component model systems, and interface verification tests between collections of two or more of the component systems.

1.5.1 Verification Test Objectives

The items that will be verified include: the component models, their ALSP translators, the ALSP System Software, and the 1994 ALSP Confederation. Verification should be designed to answer the following questions:

ALSP Compliance: Does each of the translators correctly implement the simulation management protocols specified in the ALSP Technical Specification?

Functional Interface: Does each of the model-to-model interfaces (translator pairs) correctly implement the functional interface protocol specified by the corresponding ICDs?

1.5.2 Verification Tests

Any of the following types of tests can serve as part of the verification testing for the ALSP Confederation:

Component tests that are a part of the development cycle for each participating model. These are to specifically include any design reviews, code walk throughs, unit tests, and other formal testing procedures. This category of tests is the responsibility of the model developer and model proponent.

Functional interface tests that ensure each model is "confederation ready". These tests are a series of tests among the models sharing a functional interface and are the responsibility of the model developers and model proponents.

ALSP Confederation IT is the developers test involving all models participating in the ALSP Confederation. Models participating in this test affirms that all components and functional interface testing has been completed.

ALSP CT is the users test involving all models participating in the ALSP Confederation and others models providing non-ALSP point-to-point interfaces with models in the ALSP Confederation. This test includes technical, functional, and load testing.

1.6 Validation

Validation is the rigorous and structured process of determining the extent to which a simulation accurately represents the intended "real world" phenomena from the perspective of the intended use of the simulation.

Interface validation testing can be conducted at differing levels of rigor, depending of the resources available:

a. Limited Interface Validation Test (IVT) - This test is executed by applying realistic parameters to the IVT specifications, and then comparing the results with expected values provided by SME.

b. Full IVT - Full IVT requires running test cases over a wide range of interface parameters and reviewing each functional area of the translator for each model. Test cases must be constructed by SME's for each functional area to be tested. The results from these test cases are then collected and analyzed by the SME and compared with accepted historical norms.

Where the individual models have already been validated, it may be sufficient to perform interface validation. IVT validates only those functional areas that are directly affected by the interface.

1.6.1 Validation Objectives

In M&S validation, the object is to qualify the model as an accurate representation of reality for its intended usage. With respect to the ALSP Confederation the object is somewhat broader: the scope of the validation includes not only the individual models, but also the operation of the models when joined as a confederation. Specifically, the question that the validation of the ALSP Confederation should address is as follows:

> Does the confederation accurately represent reality from the perspective of its intended use?

1.6.2 Validation Tests

The following tests serve as part of the validation of the ALSP Confederation:

a. Validation testing that is part of the development cycle for each respective model. These are to specifically include any design reviews, code walk throughs, unit tests, and other formal testing procedures. Each individual model should be validated by the model's respective proponent. The results of this validation will be forwarded to the accreditation team and incorporated into the Confederation accreditation documentation.

b. Validation testing of the entire Confederation. This is one of the primary goals of the CT. The results of the validation will be forwarded to the accreditation team along with the other results from the CT for their use in the accreditation process.

1.7 Load Testing

A Load Test Plan will be used to assess the Confederation's ability to meet performance requirements. Also, the sensitivity of the Confederation's performance (speed) to certain exercise parameters will be tested. The following are some examples of load test metrics:

a. Effective game ratio - the maximum ratio of game time to clock time,
b. The percentage time each model waits on the Confederation,
c. The percentage time each model spends computing,
d. Network utilization metrics,
e. The amount of time required for Confederation checkpoints,
f. The amount of time required to refresh work stations.

During load testing internal monitoring tools such as IMON will be used to determine those subroutines which use the highest amount of CPU percentage, Inputs and Outputs, etc.

1.7.1 Load Test Objectives

The purpose of the Performance Evaluation Plan is to assess the overall performance of the ALSP Confederation and ensure that it can perform adequately to meet joint training exercise objectives. The specific issues which must be addressed are as follows:

a. Can the ALSP Confederation maintain a ratio of 1:1? That is, can game time keep up with real time?
b. What specific routines, functions, entities, etc. consume the largest amount of CPU resources?
c. Can the local and wide area networks used for exercise support handle the amount of data generated by the Confederation?

The achievement of these objectives will allow exercise support personnel to develop performance scaling factors to apply in developing future performance estimates and planning future exercises and determine possible methods of dealing with future performance problems during an exercise.

1.7.2 Load Tests

The Confederation Load Test is one of the primary goals of the CT. The results of the load test will be analyzed and then forwarded to the accreditation team for their use in the accreditation process. The analysis of the load test will provide an assessment of the abilities of the models to meet performance requirements.

1.8 Accreditation

The accreditation of the ALSP Confederation will be performed by the Accreditation Team. The specific accreditation of the ALSP Confederation for use in an exercise should be conducted by those personnel responsible for the support of that exercise.

1.8.1 Accreditation Methodology

The Accreditation Team will be given access to all documentation generated and collected during Confederation testing. This documentation will serve as the basis for the accreditation decision. Models are given accreditation not only to serve in the targeted exercises, but also as a memorandum of agreement among all affected parties as to the uses and limitations of each member of the Confederation. The Accreditation Team must identify and acknowledge problem areas in order to promote the most effective use of ALSP Confederation.

Results of confederation testing will be forwarded to the Directors of Exercise Support for all major exercises planned for the year. Each Director, if they so choose, may send an accreditation report and recommendations to the Exercise Director. The Exercise Director, based upon this information and with full awareness of the capabilities and limitations of the ALSP Confederation, can then make an informed decision concerning accreditation of the ALSP Confederation for use in their exercise.

1.8.2 Acceptance Criteria

The following are the criteria on which accreditation decisions for the Confederation of Models should be based:

a. Was the Confederation V&V thorough?
b. Will the Confederation support its intended uses?
c. Are the risks associated with using the Confederation for its intended purposes significant?
d. Should the intended uses of the Confederation as a whole be modified or constrained to mitigate risks?

Part II

1994 ALSP Confederation VV&A Master Plan (CVVAMP)

2.1 General

This part comprises the CVVAMP for the 1994 ALSP Confederation of Models. The CVVAMP was developed by applying Part I of this document to the testing of the Confederation of Models. While Part I describes a method of applying a rigorous and systematic approach to VV&A to the ALSP Confederation, Part II describes the methods which were actually used to test and accredit 1994 ALSP Confederation, given real world constraints in time and resources.

2.2 1994 ALSP Confederation Management Plan

The management of the 1994 ALSP CVVA process required monitoring and coordination of tasks among the agencies involved. This section describes the methodology and task structure for development of the 1994 ALSP CVVAMP and for carrying out the resultant VV&A procedures.

2.2.1 Identification of Responsible Agencies with POCs

Appendix A provides a complete listing of all agencies involved in the 1994 ALSP CVVA process and of POCs for each agency. In addition, exercise directors who will be asked to serve on the Accreditation Team are identified.

This section publishes and clarifies VV&A related responsibilities agreed to by the specified agencies with regard to ALSP Confederation. It also serves to identify the model proponents and other interested agencies.

a. ALSP Executive Agent and Test Director - STRICOM as executive agent will serve as the Test Director of the VV&A IT and CT. As the Test Director, STRICOM develops the test plan for the IT.

b. ALSP VV&A Functional Director - NSC serves as the Functional Director at the VV&A CT. The responsibilities assumed by the NSC are to write the CVVAMP and to develop the Integrated Test Plan for the CT.

c. ALSP VV&A Technical Director - The MITRE Corporation serve as the Technical Director for VV&A of 1994 ALSP Confederation to produce and maintain the ALSP Confederation Master Calendar. As the Technical Director, MITRE runs the CT per the guidance of the Executive Agent and Test Director.

Verification of Component Models - The proponent agency for each model in the ALSP Confederation is responsible for V&V of their model. Models participating in the 1994 ALSP Confederation will have been individually verified and validated prior to the ALSP Confederation IT.

Validation Parameter Development - The model proponents are responsible for development of parameters to be used in

validating the Confederation. Because of the sensitive nature of this issue and the inability to reach agreement among the various agencies on the proper methods and data to be used, validation of the Confederation was not undertaken for 1994.

Collection of Test Data - The SMEs conducting each individual test had the responsibility for recording test results and observations. The Joint & Combined Division, M&S Directorate, NSC, is responsible for the collection, collation, and preparation of result functional data for presentation to the Accreditation Team. The system engineer collected technical and load data. They are responsible for collecting all data and presenting it to the ALSP Review Panel.

Accreditation - The Accreditation Team is comprised of the ALSP Review Panel. They are responsible for preparation of the Accreditation Recommendation Report for ALSP CT and to provide the report to the Application Sponsors and the ALSP Executive Agent. The Application Sponsors are the Exercise Directors for the major exercises in which ALSP Confederation will be used. In addition, the Director of the NSC prepared an Accreditation Report for the use of the Augmented Confederation (consisting of 1994 ALSP Confederation and CSSTSS) in support of General HQ (GHQ) Phase III 94.

2.2.2 1994 ALSP Confederation Management Methodology

2.2.2.1 VV&A Requirements

The models tested during the 1994 CT are CBS, AWSIM, RESA, JECEWSI, MTWS and TACSIM. The interfaces were tested and the models involved in each interface are listed in Table 2-1.

ALSP Interface	Models Involved
Air-Ground	CBS, AWSIM, RESA, MTWS
Air-Air	AWSIM, RESA, MTWS
Maritime	AWSIM, RESA, CBS
TBM/CM	AWSIM, RESA, CBS
Ground Unit Initialization	JECEWSI, CBS
TACSIM Interface	TACSIM, CBS
Sustainment	CBS, CSSTSS

Table 2-1 ALSP Interfaces and Involved Models

Test hosts were responsible for ensuring that the operation requirements for each model were fulfilled. The NSC hosted the Developer's IT from 1 - 18 February 1994. The WPC

hosted the 1994 CT from 14 - 25 March 1994. Model proponents were responsible for delivering the test hosts their requirements in the areas of hardware and software support, personnel requirements, security procedures, communications systems, and operational parameters.

2.2.2.2 Development of the Draft CVVAMP

The first draft of the CVVAMP was begun at the NSC on October 1, 1993. It focused on the concepts and methods of VV&A of the Confederation.

2.2.2.3 Collection of ICD Test Plans

ICD test plans were written by model developers and/or proponents for use in the Developer's IT. The agencies which wrote the tests for each ICD are as follows:

Air-Ground	JPL
Air-Air	Sonalysts, Inc.
Maritime	Sonalysts, Inc.
JECEWSI Ground Unit	CACI Products Co.
TACSIM Interface	The MITRE Corporation
Sustainment	JPL

2.2.2.4 Deliver Draft CVVAMP

A rough draft of the CVVAMP was delivered by the NSC on October 19, 1993. This rough draft was revised and refined based on comments from the ALSP community and the first draft of the CVVAMP was delivered on November 8, 1993, for the review by all involved and interested parties including model proponents, model developers, SMEs and users of the simulations. The draft CVVAMP will then entered a comment and review cycle among those parties. These comments were collected, reviewed, and submitted for inclusion in the next draft by the Configuration Manager of the CVVAMP (see section 2.2.3).

2.2.2.5 Revise Draft CVVAMP

Following extensive revision based on comments from all interested parties, the second draft of the CVVAMP was delivered on January 14, 1994. The first draft of the ALSP Confederation IT Plan was included in this draft.

2.2.2.6 Apply CVVAMP to VV&A of the Confederation

Following another round of review and comment, the ALSP Confederation IT Plan was used to execute the functional verification testing of the Confederation of Models during the 1994 ALSP CT held at the WPC from 14 - 25 March 1994. This plan was executed and the results were collected and analyzed in accordance with the CVVAMP.

2.2.2.7 Present V&V Data to Developers and Accreditation Team

Data collected by the assessment team during CT was collated and presented to the CT Director for review and comment. Following this, the accreditation package was delivered to the ALSP Review Panel, which served as the Accreditation Team for the ALSP community. In addition, the accreditation report was updated based upon the results of GHQ 94 CT conducted from 5 - 17 May 1994; and an Accreditation Report for the use of 1994 ALSP Confederation in support of GHQ 94 was prepared and sent to the GHQ 94 Exercise Director by the Director, NSC.

2.2.2.8 Evaluate CVVAMP

The CVVAMP should be reviewed and evaluated on the basis of experience gained during GHQ 94 on the basis of relevance, effectiveness, and completeness as a VV&A tool for the Confederation.

2.2.2.9 Enhance CVVAMP for Future Confederations

The lessons learned from GHQ 94 have been incorporated into this final version of the CVVAMP for 1994 in order to aid in the testing and accreditation of the ALSP Confederation for 1995.

2.2.3 Configuration Management

Development of CVVAMP continued throughout the life cycle of CVVA effort. Because of the developmental character of the plan, a configuration management discipline was applied to the CVVAMP to ensure operational consistency and cooperation among the agencies involved.

The Chief, Joint & Combined Division of the NSC, M&S Directorate was appointed Configuration Manager for the CVVAMP. As Configuration Manager, he received and dated the initial draft of the CVVAMP, received and collated comments on the CVVAMP from model developers and proponents and other interested parties, and ensure the integration of those comments into the CVVAMP.

2.2.4 Configuration Control

Because no one agency has control over every actor which interfaces to the Confederation, Configuration Control Managers (CCMs) for each model and the ALSP software itself were responsible for ensuring that those models used in Confederation Exercises are the same version as those tested and verified during the CT. Minor changes and bug fixes provided for models following the CT were thoroughly tested prior to use in GHQ 94.

The Chief, Joint & Combined Division, M&S Directorate, NSC is presently serving as the CCM for all FAMSIM models participating in the Confederation including CBS, CSSTSS, and TACSIM. As CCM, he also coordinates with the CCMs of the other confederation models in order to keep track of modifications and verification of those modifications. This function will only be in place for 1994.

2.2.5 ALSP Confederation Calendar of Events

Appendix B contains the ALSP Confederation Calendar of Events which was used through the verification life cycle. The ALSP VV&A Technical Director is the POC for any revisions to the calendar.

2.3 1994 ALSP Confederation Information Resources

2.3.1 1994 ALSP Confederation M&S Developers

Developers of the models participating in 1994 ALSP Confederation are as follows:

CBS	JPL 4800 Oak Grove Drive Pasadena, California 91109
AWSIM	Los Alamos National Laboratories (LANL) Los Alamos, New Mexico 87545
RESA	Naval Command, Control, and Ocean Surveillance Center Research, Development, Test, and Evaluation Division (NRaD) 271 Catalina Boulevard San Diego, California 92152
TACSIM	TACSIM Project Office 7900 Sudley Road, Suite 500 Manassas, Virginia 22110
JECEWSI	Joint C2 Warfare Center 2 Hall Boulevard, Suite 217 San Antonio, Texas 78250
MTWS	VisiCom, Inc. 100052 Mesa Ridge Court San Diego, California 92121
CSSTSS	CASCOM Building 1109 Fort Lee, Virginia 23801

2.3.2 ICDs

CBS-AWSIM Air-Ground ICD and CBS/CSSTSS Sustainment ICD

Written By: JPL
California Institute of Technology
Pasadena, California

ALSP Air-Air Engagement ICD, Maritime ALSP ICD, and ALSP Theater Ballistic Missile and Cruise Missile (TBM/CM) ICD

Written By: Sonalysts, Inc.
5675 Ruffin Road, Suite 210
San Diego, California

JECEWSI ICD for Ground Unit Initialization

Written By: CACI Products Company
Electronic Simulation Department
San Antonio, Texas

2.3.3 ICD Test Plans

CBS 1.5 Functional Test Plan/AWSIM Interface and CSSTSS/CBS Interface Test Plan

Written By: JPL
California Institute of Technology
Pasadena, California

ALSP Test Plan: Combat Interactions (1994)

Written By: Sonalysts, Inc.
5675 Ruffin Road, Suite 210
San Diego, California

JECEWSI Test Plan for Ground Unit Initialization

Written By: CACI Products Company
Electronic Simulation Department
San Antonio, Texas

2.3.4 ALSP Documentation

Several ALSP documents are available from the MITRE Corporation. These documents listed below provide a broad range of information on ALSP from a general overview to detailed technical description of the protocol. The documents can be obtained via anonymous ftp from alsp.arpa.mil. The documents are the ALSP Executive Overview, the ALSP Technical Specification, the ALSP System Test Plan, and the ALSP Management Plan.

2.4 ALSP Confederation Technical Testing

2.4.1 1994 CT

Technical testing was conducted as the first phase of the 1994 ALSP CT from 0800 March 15 through 1215 March 16. The Technical Test was directed by the Technical Test Director according to the ALSP Confederation Management Technical Test Plan[2]. The test was designed to verify that actors in the Confederation demonstrate sufficient technical interoperability to support an exercise. The test also verified the ALSP System Software.

2.4.2 GHQ 94 CT

The technical testing of the ALSP Confederation was performed on 2 - 3 May 1994. The test plan which was executed was the same one conducted at the CT in March 1994.

2.5 Verification Testing

2.5.1 1994 CT

Verification testing was conducted from 1300 March 16 through 1215 March 20. The Verification Test was directed by the Functional Test Director according to the CVVAMP[3]. The test was designed to verify and to validate, to the extent possible, the functional interfaces between the actors in the Confederation.

2.5.2 GHQ 94 CT

Verification testing was performed on the 1994 ALSP Confederation as part of the GHQ 94 pre-exercise confederation testing. Testing was performed on CBS and CSSTSS from 5 - 6 May and on the entire ALSP Confederation from 7 - 13 May. The verification testing was comprised of 36 separate tests from the CVVAMP. Of these tests 13 had either failed or only partially succeeded at 1994 CT in March. The remaining 23 tests covered areas for which it was felt that more detailed test results were required in order to increase our confidence in the previous test results.

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[2] *ALSP Confederation Management Technical Test Plan*, The MITRE Corporation, McLean, VA, January 1994.

[3] *Confederation Verification, Validation, and Accreditation Master Plan (CVVAMP), Part III, Confederation '94 Integrated Test Plan*, U. S. Army National Simulation Center, Ft. Leavenworth, KS, March 1994. (Part III of the CVVAMP is the integrated product of all developer test plans for the functional interfaces).

2.6 Validation Testing

The services and agencies involved in the ALSP community were unable to come to a consensus on the proper methods to employ in the validation testing and assessment processes for the ALSP Confederation. Because of this, validation testing of the Confederation was not performed for 1994.

Part III

1994 ALSP Confederation Test Plans

3.1 General

This section provides a listing and overview of the test plans generated for 1994 ALSP Confederation to include technical, functional, and load test plans.

3.2 ICD Test Plans

The ICD Test Plans were written by the model developers in order to test the technical aspects of the ALSP interfaces. These test plans were used at the Developer's IT.

3.2.1 CBS 1.5 ALSP Functional Test Plan - AWSIM Interface

This test plan written by JPL is intended to test the Confederation's implementation of the CBS-AWSIM air-ground interface. Although the latest draft of this ICD is titled CBS-AWSIM Interface Control Document, it is in actuality the ICD detailing the Air-Ground interface for the Confederation (CBS, AWSIM, RESA, and MTWS).

3.2.2 CBS and CSSTSS Interface Test Plan

This test plan written by JPL will verify the confederation's sustainment functionalities included in the CBS/CSSTSS ICD.

3.2.3 ALSP Test Plan: Combat Interactions (1994)

The above titled test plan was written by Sonalysts, Inc. for NRaD. This test plan covers the functional areas making up three ICDs: the Air-Air Engagement ICD; the Maritime ICD; and the TBM/CM ICD. As shown in the crosswalk below, this test plan also covers combat interaction functionalities listed in the CBS-AWSIM ICD.

3.2.4 JECEWSI Test Plan for Ground Unit Initialization

The Test Plan for Ground Unit Initialization via ALSP connection was written for the Joint C2 Warfare Center by CACI Products Company. The plan will be used to test the ability of JECEWSI to join the confederation and receive ground order of battle information as covered in the JECEWSI ICD for Ground Unit Initialization.

3.3 1994 ALSP Confederation Technical Test Plan

This technical test plan for 1994 ALSP Confederation was written by the MITRE Corporation. The test was designed to verify that actors in the Confederation demonstrate sufficient technical interoperability to support an exercise. The test also verifies the ALSP System Software. This test plan is included in this document as Enclosure 1.

3.4 1994 ALSP Confederation Integrated Test Plan

The IT Plan for 1994 ALSP Confederation was use during the functional test phase of the 1994 CT. It was designed to ensure that all functionalities listed within the ICDs operated correctly. The test was developed by compiling the individual ICD test plans and modifying them to redirecting their focus to the functional aspects of the interfaces. In addition, the tests were fitted into a common format, and test steps and functionalities were broken into discrete steps required by each actor. This test plan is included in this document as Enclosure 2.

3.5 1994 ALSP Confederation Load Test Plan

The 1994 ALSP Confederation Load Test Plan was written by the MITRE Corporation using inputs provided by the ALSP Community at the 1994 CT. Its purpose is to provide the ALSP community with a plan for testing the overall performance of the Confederation. Key parameters for each model were exercised, and measurements of system and model performance taken to determine the Confederation's ability to function properly under the load conditions expected during confederation exercises in 1994. This plan is included in this document as Enclosure 3.

3.6 GHQ 94 CT Plan

Functional testing was performed on ALSP Confederation as part of the GHQ 94 pre-exercise confederation testing. The functional test was comprised of 36 separate tests from the CVVAMP. Of these tests 13 had either failed or only partially succeeded at 1994 CT in March. The remaining 23 tests covered areas for which it was felt that more detailed test results were required in order to increase our confidence in the previous test results. This test plan is included in this document as Enclosure 4.

Appendix A - 1994 ALSP Confederation Agencies and POCs

STRICOM	LTC Paul Izzo	(407) 381-8821
	Dr. Mary C. Fischer	(407) 381-8836
MITRE	Ms. Anita Adams	(703) 883-1389
	Mr. Gordon Miller	(703) 883-5946
AF XOMW	COL Michael Upson	(202) 504-4441
	MAJ Jack L. Jordan	(703) 593-5745
ENWGS	LCDR John Antonelli	DSN 332-3125
	Ms. Mona Freilich (CSC)	(609) 234-1100
WPC	COL Patrick Webb	011-49-631-535-6605
	MAJ Chris Shultz	
	Mr. Dave Perme (LANL)	(505) 655-6610
JECEWSI	Ms. Carol Oakes	(310) 977-2579
	MAJ James R. Robertson	
	LT Kevin J. Stever (USN)	(310) 977-4728
DMSO	LTC David Bartlett	(703) 998-0660
RESA (NRaD)	Dr. Fitzgerald	(519) 553-3620
	Mr. Chris Burns	
CSSTSS (CASCOM)	Mr. Thomas A. Miller	(804) 765-1788
	Mr. Joseph J. Riley	
TACSIM	MAJ Gary Allen	(703) 830-7607
CBS/JPL	MAJ Tim Metivier	(913) 584-8150
	Mr. John Weidner	(818) 397-9953
	Mr. Trey Thorton	(818) 397-9953
JWFC	LTC Ross Dickinson	(904) 884-3644
MTWS	CPT Charles Peabody	(703) 640-3276
	Mr. Joe Nerdad	
J-8	CAPT Tony Kopacz USN	(703) 695-9165
CECOM	Ms. Jackie Bogner	(913) 651-2043
	Mr. Hoi Ta	DSN 552-2043
LAM	LTC Stuart	(913) 684-4042
		DSN 552-4042
USAREUR	MAJ Steve Hicks	011-49-314-475-6460/8344
OPNAV/ N8	Mr. George Phillips	(703) 697-3642

Appendix A - 1994 ALSP Confederation Agencies and POCs
(Continued)

KOREA BSC	Mr. Jude Shea Mr. Wayne Hansom	011-822-7915-8020
TRAC	Ms. Annette Ratzenberger	(913) 684-2522
BCTP	LTC Nicholson Mr. Sid Linver	(913) 684-5907 (913) 651-8311
NSC	Dr. Robert La Rocque COL Walter Sharp LTC R. Howard Taylor	(913) 684-8101 (913) 684-8135 (913) 684-8614 DSN 552
DCSINT	COL Gary McMillan Ms. Marilyn Macklin	(703) 697-7103 (703) 692-4644
21ST TAACOM	Dr. Michael Baranick	DSN 403-8698

Appendix B - ALSP Calendar of Events

Unless otherwise noted, all documents to be delivered to STRICOM for distribution to all participants.

Date	Task	Organization	Status
1993			
ASAP	COMSEC POCs to Mr. Spencer at NSC	Actor Model developers	Complete
Nov 12	Actor Load Parameters	Actor SW developers	Complete
Nov 19	Integrated List of Actor Load Parameters	MITRE	Complete
Nov 30	IT Host MOI published	NSC	Complete
Dec 1	Actor required enumerations	Actor Model Proponents	Complete
Dec 1	Draft for ALSP air-ground test plan	NSC	Complete
Dec 1	Draft for ALSP air-air test plan	NRaD	Complete
Dec 1	Draft for ALSP TBM/CM test plan	NRaD	Complete
Dec 1	Draft for ALSP surface-ground test plan	NRaD	Complete
Dec 1	Draft for ALSP surface-air test plan	WPC	Ongoing
Dec 9	IT IPR #1 at NSC	NSC	Complete
Dec 15	Integrated Enumeration List	MITRE	Complete
Dec 15	ALSP confederation management technical test plan - v7.0	MITRE	Complete
Dec 15	Draft for ALSP sustainment test plan	NSC	Ongoing
Dec 15	Actor Load Parameter Estimates	Users	Ongoing
1994			
Jan 1	ALSP air-ground test plan	NSC	
Jan 1	ALSP air-air test plan	NRaD	

Appendix B - ALSP Calendar of Events
(continued)

Date	Task	Organization	Status
Jan 1	ALSP TBM/CM test plan	NRaD	
Jan 1	ALSP surface-ground test plan	NRaD	
Jan 1	ALSP surface-air test plan	WPC	
Jan 1	Draft for ALSP confederation management technical test plan (v7.1)	MITRE	Complete
Jan 1	Load Test Data Collection plan	MITRE	Complete
Jan 1	Actor save/restore and recovery procedures	WPC NRAD JEWC CASCOM VisiCom JPL	
Jan 1	Hardware and personnel requirements to WPC	Everyone	
Jan 7	Names of personnel attending IT to Drew Turinski at NSC	Everyone	
Jan 7	IT Enumerations	NRaD	
Jan 7	IT Host MOI published	NSC	
Jan 14	CT Enumerations	NSC	
Jan 14	Visit requests to NSC	All contractor personnel	
Jan 15	CASCOM/JPL/NSC Comms Link Test	NSC	
Jan 15	ALSP sustainment test plan	NSC	
Jan 15	MTWS test plan	MSTP	
Jan 15	JECEWSI test plan	JEWC	
Jan 15	TACSIM/TAT test plan	TPO	
Jan 15	Comms link tested	NSC JPL CASCOM	

Appendix B - ALSP Calendar of Events
(continued)

Date	Task	Organization	Status
Jan 15	Draft for integrated air-ground, air-air, surface-ground, surface-air, sustainment, and TBM/CM fv test plan	NSC	
Jan 19 -20	IT IPR #2 at STRICOM	NSC	
Jan 19 -20	IT Plan distributed	MITRE	
Jan 21	IT Enumerations	JPL CASCOM	
Jan 26 -28	IT Phase I Set-up	CASCOM NSC MITRE	
Jan 28	CT Enumerations	NRaD WPC	
Jan 28	IT Enumerations Finalization Meeting	WPC NRaD MITRE JPL CASCOM	
Jan 31	IT Phase I Comms and hardware checks	CASCOM NSC MITRE	
Feb 1	Database mapping for IT	MITRE	
Feb 1	Actor Load Test Plans	Actor Model Proponents	
Feb 1	ALSP confederation management technical test plan - v7.1	MITRE	
Feb 1	Integrated save and restore and crash recovery procedures	MITRE	
Feb 1	Integrated schedule	WPC	
Feb 1	Start Phase I of IT	STRICOM JPL MITRE CASCOM	

Appendix B - ALSP Calendar of Events
(continued)

Date	Task	Organization	Status
Feb 4 -6	IT Phase II Set-up	NSC NRaD WPC/LANL MITRE VisiCom CACI	
Feb 7	IT Phase II Comms and hardware checks	All IT participants	
Feb 8	Start Phase II of IT	All IT participants	
Feb 8	CT Enumerations	NSC	
Feb 11	CT Enumerations Finalization Meeting	NSC NRaD WPC MITRE CASCOM	
Feb 15	Integrated air-ground, air-air, surface-ground, surface-air, sustainment, and TBM/CM fv test plan	NSC	
Feb 18	IT Complete	All IT participants	
Mar 1	Individual Actor Mapping for RESA, AWSIM, CSSTSS, and CBS	NRaD WPC JPL CASCOM	
Mar 1	Integrated Load Test Plan	NSC	
Mar 1	Non-Actor Software Test Plans	Non-Actor Software Proponents	
Mar 14	Start CT	All CT participants	
Mar 23	Begin Sustainment portion of CT	All CT participants	
Mar 25	CT Complete	All CT participants	

Appendix C - Acronyms & Glossary

ABE	**ALSP** Broadcast Emulator.
ACM	**ALSP** Common Module.
Actor	A Confederation member with its respective ALSP interface module.
AF	Air Force.
ALSP	Aggregate Level Simulation Protocol.
AWSIM	Air Warfare Simulation. A simulation developed and used by **WPC** and **Blue Flag**.
BCTP	Battle Command Training Program.
BSC	Battle Simulation Center
C2	Command and Control.
C3	Command, Control, and Communications.
CASCOM	Combined Arms Support Command. A logistics support organization located Fort Lee, Virginia.
CBS	Corps Battle Simulation. A corps level simulation (formerly known as **JESS**) developed by **JPL** for the US Readiness Command. Now under US Army control.
CCM	Configuration Control Manager.
CM	Cruise missile.
Confederation	The composite of all simulations in an **ALSP** exercise.
CT	Confederation Test.
CSSTSS	Combat Service Support Training Simulation System. A rear area model maintained and used by **CASCOM**.
CPX	Command Post Exercise. An exercise in which commanders operate from their command post using simulated entities for their subordinates.
CVVA	Confederation **VV&A**. **VV&A** of the Confederation as a composite entity.
CVVAMP	**CVVA** Master Plan.

DARPA	Defense Advanced Research Projects Agency. The original sponsor of **ALSP**.
DoD	Department of Defense.
ENWGS	Enhanced Naval Wargaming System.
FAMSIM	Army Family of Simulations.
GHQ	General Headquarter.
HQ	Headquarter.
ICD	Interface Control Document. This document describes the operational requirements supporting each facet of the interface, the implementation concept to support each requirement, **ALSP** messages that will be generated, and actions that will be taken by each simulation in response to the messages.
IEW	Intelligence and Electronic Warfare.
IT	Integration Test. Test of the joint operation of component modules already tested separately.
IVT	Interface Validation Test
JECEWSI	Joint Electronic Combat Electronic Warfare Simulation.
JPL	Jet Propulsion Laboratory. Developer of **CBS**.
JTLS	Joint Theater Level Simulation.
JWFC	Joint Warfare Center. An exercise support facility located at Hurlburt Field, Florida.
LANL	Los Alamos National Laboratory.
M&S	Models & Simulations.
MTWS	Marine Air Ground Task Force Tactical Warfare Simulation.
NATO	North Atlantic Treaty Organization.
NRaD	Naval Command, Control and Ocean Surveillance Center Research, Development, Test and Evaluation Division. Developer of **RESA**. Located in San Diego, California.

NSC	National Simulation Center. US Army exercise support facility located in Fort Leavenworth, Kansas.
POC	Point of Contact. Official agent of communication for a specific agency or activity.
Proponent Agency VV&A	An agency proposing to use an **M&S** for a particular purpose, and wishing to have it for that use.
REFORGER	An exercise conducted by the **WPC**.
RESA	Research, Evaluation and Systems Analysis. A US Navy model maintained by **NRaD**.
SME	Subject Matter Expert. Person with specialized knowledge. Employed first to develop requirements and algorithms for models, and later to validate them.
STARTEX	Start of exercise.
STRICOM	US Army Simulation, Training and Instrumentation Command. Executive agent for **ALSP**.
TACSIM	A US Army Intelligence simulation.
TBM	Theater Ballistic Missile.
UFL	Ulchi Focus Lens. An exercise conducted by the Korean **BSC**.
US	United States.
USA	**US** Army.
USAREUR	**USA** in Europe.
V&V	Verification is the testing of software's compliance with requirements and specifications; Validation is the evaluation of its validity as a model of 'reality'.
VV&A	**V&V** and Accreditation. Accreditation is the official acceptance of the software for a particular purpose.
WPC	Warrior Preparation Center. A wargaming facility located in Einsiedlerhof, Germany.