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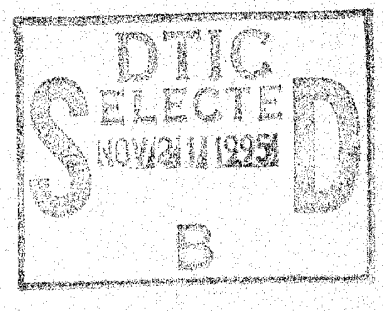
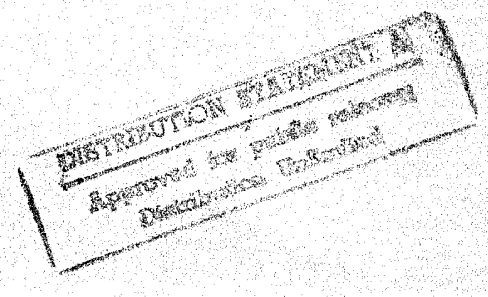
Report to Congressional Committees

November 1995

MILITARY TRAINING

Cost-Effective Development of Simulations Presents Significant Challenges





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Nov 95

Military Training: Cost-Effective Development of Simulations Presents Significant Challenges

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-262250

November 8, 1995

The Honorable John McCain
Chairman
The Honorable John Glenn
Ranking Minority Member
Subcommittee on Readiness
Committee on Armed Services
United States Senate

The Honorable Herbert H. Bateman
Chairman
The Honorable Norman Sisisky
Ranking Minority Member
Subcommittee on Military Readiness
Committee on National Security
House of Representatives

Since 1988, the Department of Defense (DOD) has been grappling with how to provide simulations that realistically portray joint warfare operations for training. To help meet this training need, the Defense Advanced Research Project Agency developed the Aggregate Level Simulation Protocol (ALSP). The ALSP technique provides a means for multiple service and agency models to communicate with each other. Although ALSP is a technological achievement, the existing warfare capabilities of the individual models is limited, and therefore, the problem of providing a valid joint training environment remains. Overcoming these limitations would require extensive improvements to the ALSP Confederation.[1]

Because of these limitations and the cost and complexity of the ALSP Confederation, the military services; the Joint Staff; and the Office of the Secretary of Defense's Director, Defense Research and Engineering, initiated the development of a comprehensive system that would take the place of the ALSP Confederation. The new system—the Joint Simulation System (JSIMS)—is scheduled to reach initial operational capability by 1999 and full operational capability by 2003.

Until JSIMS is operational, DOD plans to continue making improvements to the ALSP Confederation. Because DOD has repeatedly acknowledged a need to improve joint training through cost-effective simulations, we initiated a

[1]For the purposes of this report, references to the ALSP Confederation include the communication link and the group of models operating through the ALSP interface for training.

review to determine whether (1) DOD is progressing with its development of JSIMS and (2) DOD's decisions to improve the ALSP Confederation are cost-effective. We conducted this review under our basic legislative responsibilities and are addressing this report to you because we believe it will be of interest to your committees.

Results in Brief

The JSIMS initiative has not progressed beyond the conceptual stage since a memorandum of agreement was signed in June 1994. The services and the Joint Staff have disagreed about the definition of JSIMS and a plan of action. The Under Secretary for Acquisition and Technology has decided to let the services and the Joint Staff resolve their differences over time rather than take conclusive actions. Further, the estimated $416 million in funding needed to develop JSIMS will be dependent upon agreement by multiple sources—the services and other agencies.

DOD is uncertain about how much it will spend to improve the ALSP Confederation before replacing it with JSIMS. This uncertainty raises questions as to whether DOD is making cost-effective decisions. We identified about $40 million that DOD plans to spend through fiscal year 1999 for ALSP Confederation improvements; however, additional monies may be spent, depending upon the individual service and Commander in Chief (CINC) priorities.

Many of the improvements to the ALSP Confederation are likely to be completed at about the same time that it is scheduled to be replaced by JSIMS. The longer it takes to make JSIMS operational, the more money DOD is likely to spend on a system that will ultimately be discarded. Moreover, because the services are already developing their next generation of training models without a clear vision of their relationship to JSIMS, the services could duplicate costs by unnecessarily building capabilities that will already be included in JSIMS.

Background

Because the models that comprise the ALSP Confederation were built in the early 1980s to meet service-specific needs, they lack the ability to simulate many aspects of joint warfare, including operations other than war, strategic mobility, space, intelligence, and logistics capabilities. These models also lack the capability to represent many combat interactions, such as ground to ship. Because of the existing shortfalls of the services' individual models, the ALSP Confederation can only fully support 2 of 25 identified CINC and service joint training requirements. This also may be

the result of the fact that requirements for application of the ALSP technology were solicited from the CINCs and services only after development of the technology.

The services have long recognized the technical and training shortfalls of their respective models for accurately portraying joint operations. The Army's Corps Battle Simulation is a ground maneuver training simulation used in exercises for commanders and battle staffs. The Army model lacks the capability to simulate weather information, the terrain of the battlefield, and ground-to-ground combat interactions with the Marine Corps model. The Air Force's Air Warfare Simulation used to support air operations has limited capability to simulate electronic warfare, reconnaissance and surveillance play, and space capabilities. The Navy's sanctioned training model, the Enhanced Naval Wargaming System, operates on a hardware system that cannot interface with ALSP. The Navy has been modifying this model for acceptance into the confederation since 1993. Navy officials were unable to elaborate on the joint training benefits that would be achieved from these modifications. According to service modeling and simulation officials and after-action reports, the Research, Evaluation, and Systems Analysis Simulation—a naval analytical model—has been used successfully in the current ALSP Confederation. In 1994, the Marine Corps introduced a new amphibious operations simulation, the Marine Air Ground Task Force Tactical Warfare Simulation, into the ALSP Confederation.

The Office of the Secretary of Defense created the Defense Modeling and Simulation Office to serve as the focal point for modeling and simulation under the Director, Defense Research and Engineering. The DOD Executive Council for Modeling and Simulation, chaired by the Director, Defense Research and Engineering, advises and assists the Under Secretary of Defense for Acquisition and Technology in modeling and acquisition decisions. The JSIMS program is a jointly managed DOD program with the Air Force providing acquisition oversight. The JSIMS Joint Program Office, under the Air Force Program Executive Officer for Combat Support Systems, has been designated as an acquisition activity for JSIMS. The Army's Simulation, Training and Instrumentation Command is the executive agent for the day-to-day management of the ALSP Confederation.

JSIMS Proceeds at a Deliberate Pace

The development of JSIMS is already a year behind schedule and a clear, consistent definition of JSIMS is still evolving. According to the June 1994 joint memorandum of agreement, a clear definition was due of what

constitutes JSIMS within 4 months of the signing of the memorandum. Also due was a detailed plan of action in the form of a JSIMS Joint Program Office charter and JSIMS master plan delineating duties, responsibilities, mission, scope, and strategies for implementing JSIMS. However, lack of agreement among the services as to what JSIMS entails has delayed approval of the charter and the plan. The services have different interpretations of the memorandum of agreement. The low end of expectations is a set of standards and protocols that would allow interoperability for the services' next generation of simulations. The high end of expectations is a "super model" in which JSIMS would describe all of the objects, such as aircraft, for all of the services and determine all warfare functions.

During July 1995, the Acting Assistant Secretary of the Air Force for Acquisition approved milestone 0 for the JSIMS program, which authorizes proceeding into the concept exploration and definition phase of the acquisition cycle. At that time, the JSIMS Joint Program Office stated that JSIMS would comprise (1) a core element of common functions, such as terrain and weather effects and (2) warfare functions, such as air, ground, and naval combat, and logistics. Common core development would be the responsibility of the JSIMS Joint Program Office while warfare function development will be the responsibility of designated executive agents. The executive agents will develop a joint representation of their warfare area that would then be integrated with the JSIMS core. The Army is the executive agent for land warfare, the Air Force for air and space warfare, and the Navy for sea warfare. The Marine Corps' missions will be included throughout these executive agents' warfare representations.

Further, the 1994 memorandum of agreement stated that JSIMS should also be adaptable to other modeling and simulation applications, such as analysis and testing. However, in February 1995, the Deputy Secretary of Defense directed the Director, Program Analysis and Evaluation, to initiate and lead development of a new joint analysis model called the Joint Warfare System (JWARS). Program Analysis and Evaluation officials informed us that they believed improvements to DOD's analytical capability needed to be made now and they could not afford to wait for JSIMS to become a reality. The JSIMS' focus is now solely on providing a simulation environment for joint task force training. Coordination between the JSIMS and JWARS programs is being worked out.

Currently, the major stumbling block for JSIMS is how to fund the $416 million program since there is no central funding line for the

program. Some military service officials have expressed concerns about the piecemeal approach of funding JSIMS. As of July 1995, the JSIMS's core element was estimated to cost about $154 million. Under the provisions of the joint memorandum of agreement, the Army, the Air Force, and the Navy have each agreed to provide 30 percent of this cost. The Marine Corps will provide 10 percent of the cost. In addition to the $154 million, the executive agents will incur additional costs, currently estimated at a total of $262 million, to develop simulations for their specific warfare functions.

The problem with this approach is that if a service believes that improving its own core competencies has a higher priority to fund than its responsibilities for JSIMS, that function for JSIMS may not be developed in concert with the other required components. The military services are proceeding to develop the next generation of simulations that will better address their specific mission or core requirements. The services are also responsible for ensuring that these simulations are able to function within the JSIMS' domain. The Army's program, Warfighters' Simulation 2000, is estimated to cost about $200 million and be operational by 2000. The Air Force is developing the National Air and Space Warfare Model that is estimated to cost about $103 million and be fully operational by 2003. The Navy is developing an analytical simulation, the Naval Simulation System, at an initial estimated cost between $15 million and $25 million that could be enhanced at an additional cost of about $47 million to function in a training capacity. Unless decisive management is exercised, these service efforts may outpace JSIMS' core development and require additional modifications to operate in the JSIMS' domain.

According to DOD officials, several recent events have occurred that demonstrate the JSIMS program is moving forward. First, on July 14, 1995, the Director, Defense Research and Engineering, chaired the first JSIMS Senior Review Board at which the members agreed to provide their share of the JSIMS Joint Program Office permanent staff. Second, the Under Secretary of Defense for Acquisition and Technology signed a memorandum on August 8, 1995, calling on DOD components to formally adopt a proposed division of funding and personnel requirements. Third, the Deputy Secretary of Defense endorsed the establishment of a joint core funding line with the services providing both their share of core funding and personnel to staff the JSIMS Joint Program Office. In addition, the Director, Defense Research and Engineering, and the Joint Staff are to provide a share of funding for the JSIMS core program. However, we note that these actions have not been formalized.

DOD's Expenditures on the ALSP Confederation May Not Be Cost-Effective

Concurrent with the development of JSIMS, DOD has decided to make improvements to the ALSP Confederation, the last of which is expected to be in place in 1999—at the same time that JSIMS should reach initial operational capability.[2] According to the ALSP Master Plan, the improvements are intended to respond to the identified CINC and service training requirements and include additional capabilities such as strategic mobility and ground-to-ground combat interactions between models. Even though officials from the Office of the Secretary of Defense's Director, Defense Research and Engineering, the Defense Modeling and Simulation Office, and the Army Simulation, Training, and Instrumentation Command told us that the total cost of these improvements will not be significantly high, none of these offices was able to provide comprehensive cost estimates. We identified about $40 million that DOD plans to spend for ALSP Confederation improvements through fiscal year 1999. However, because this money may be directed toward service-specific improvements rather than joint improvements, the cost could be higher.

As is the case with JSIMS, there is no central funding line for the ALSP Confederation improvements. Consequently, DOD's ability to achieve all of the improvements that it seeks is dependent on funding from the individual military services, agencies, or CINCs. However, to date the Office of the Under Secretary for Acquisition and Technology has not provided the management to ensure that all significant components of the ALSP improvements will be completed. Consequently, management of the improvements has been fragmented and it is questionable whether the improvement plan is cost-effective. For example, the Army has decided not to fund ALSP improvements to its ground warfare model, which is a primary component of the ALSP Confederation.[3] The Army is proceeding to develop its new training model, Warfighters' Simulation 2000. The Army has already awarded contracts for the new model's development. The impact of the Army's decision not to fund ground warfare improvements on other confederation model improvement efforts or future training requirements is unknown.

In contrast, the Air Force is spending about $7 million to consolidate two versions of its air warfare model and plans to enter the combined model into the ALSP Confederation in 1997. The consolidation effort will result in

[2]JSIMS Joint Program Office officials also informed us that JSIMS should be able to take over some of the functions of the ALSP Confederation in the 1997-98 time frame.

[3]While the Army is not planning to fund joint ALSP-related improvements to its ground warfare model, these improvements could be funded by a CINC. The Army is funding changes to this model for Army-specific training purposes.

combining the best features of the two versions, as well as preventing future duplicative efforts. The Navy has been spending nearly $2 million annually to replace its current confederation model by fiscal year 1997. Navy officials, however, could not specify how the replacement model would improve the confederation's joint training capability. The U.S. Transportation Command and the U.S. Space Command are each modifying models for inclusion into future confederations that would expand the ALSP Confederation's capability.

Recommendations

To help ensure the total development of JSIMS, we recommend that the Secretary of Defense establish a joint funding line for the core development of JSIMS and direct the Secretaries of the Army, the Navy, and the Air Force to establish funding lines for their respective executive agent JSIMS responsibilities regarding warfare function development. Further, we recommend that the Secretary of Defense require the Under Secretary for Acquisition and Technology to assume a stronger management role to resolve simulation issues by

- defining JSIMS and developing a definitive plan of action and
- developing a transition strategy to phase out ALSP and phase in JSIMS. This strategy should be based upon cost estimates associated with modifying, expanding, and testing the ALSP Confederation to decide which improvements to the ALSP Confederation provide benefits that are cost-effective.

Agency Comments and Our Evaluation

In written comments on a draft of our report, DOD generally agreed with our findings and recommendations (see app. I). The Department said that it recognizes the shortcomings of today's joint training simulations and is committed to developing more cost-effective capabilities. In response to our recommendations, DOD said that it has taken action to establish a joint funding line for the JSIMS core and to ensure service support for their respective combat representations. DOD stated that a plan to phase out ALSP and phase in JSIMS will be developed based on both technical considerations provided by the Under Secretary of Defense for Acquisition and Technology and operational considerations provided by the services and CINCs.

However, DOD did not agree with our assessment of the status of the JSIMS program. The Department does not believe that the JSIMS program has been stalled. DOD said that (1) it deliberately established ambitious milestones in

the JSIMS memorandum of agreement to serve as an action to move the project along; (2) the JSIMS project has moved from a general consensus agreement, through stand-up of a transitional JSIMS Joint Program Office, to the formation of a permanent Joint Program Office; (3) a systems definition for JSIMS was developed in an April 1995 meeting; (4) the JSIMS Operational Requirements Document is in final review; and (5) the program officially entered the Concept Exploration and Definition phase when it attained milestone 0 status during July 1995.

Our assessment of the status of JSIMS is based upon documentation provided to us during our review. The various management groups responsible for development of JSIMS have conducted numerous meetings in an effort to bring about a consensus of what JSIMS constitutes. However, we believe that JSIMS has been stalled at a fundamental level as evidenced by the minimal progress since the signing of the June 1994 memorandum of agreement. At the conclusion of our review, there were indications that the program might be progressing. However, no actions had been finalized. A permanent charter for the Joint Program Office as called for by October 1994 is still not established. The JSIMS Operational Requirements Document is still not approved. According to documents presented at the July 1995 JSIMS Senior Review Board meeting, the estimated cost to develop JSIMS core and warfare functions is $416 million. The JSIMS core without the warfare functions will not achieve DOD's joint training objectives. Therefore, we believe it is important to identify all development costs.

DOD said that it could not substantiate the $40 million we identified that the services are planning to spend on ALSP improvements. DOD stated that $6.1 million is currently budgeted for ALSP core support through fiscal year 1999. DOD acknowledged that all other funding for modifications in the ALSP models is provided by the services or CINCs but could not substantiate this figure. The $40 million figure was derived from documents and discussions held with service budget officials and is subject to change depending upon the services' priorities for spending.

Scope and Methodology

To determine whether DOD is progressing with its development of JSIMS, we interviewed knowledgeable officials from the Defense Modeling and Simulation Office, Washington, D.C.; the Joint Staff, Washington, D.C.; the Joint Warfighting Center, Fort Monroe, Virginia; the JSIMS Joint Program Office, Orlando, Florida; and the services' modeling and simulation management offices in Washington, D.C. In addition, we interviewed the Director, Defense Research and Engineering, Office of the Secretary of

Defense. We reviewed the draft DOD Modeling and Simulation Master Plan; the Executive Council for Modeling and Simulation meeting minutes; and DOD, Joint Staff, and service modeling and simulation policies. In addition, we reviewed related Defense Science Board and DOD Inspector General reports.

To determine whether DOD's decisions to improve the ALSP Confederation are cost-effective, we interviewed modeling and simulation officials at the Simulation, Training, and Instrumentation Command, Orlando, Florida; the Warrior Preparation Center, Einsiedlerhof Air Station, Germany; the Joint Training Analysis and Simulation Center, Suffolk, Virginia; and the National Simulation Center, Fort Leavenworth, Kansas. We reviewed numerous documents on the ALSP Confederation. We discussed the costs of simulation improvements with each of the service model's proponents.

We conducted our work between January 1995 and August 1995 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Chairmen, Senate and House Committees on Appropriations, Senate Committee on Armed Services, and House Committee on National Security; the Secretary of Defense; the Deputy Secretary of Defense; the Under Secretary of Defense for Acquisition and Technology; the Director, Defense Research and Engineering; and the Secretaries of the Army, the Navy, and the Air Force. We will make copies available to others on request.

Please contact me at (202) 512-5140 if you or your staff have any questions concerning this report. Major contributors to this report were Charles J. Bonanno, Brenda S. Farrell, Raymond G. Bickert, and Colin L. Chambers.

Mark E. Gebicke
Director, Military Operations
and Capabilities Issues

Comments From the Department of Defense

UNDER SECRETARY OF DEFENSE
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PERSONNEL AND
READINESS

31 OCT 1995

Mark E. Gebicke
Director, Military Operations and Capabilities Issues
National Security and International Affairs Division
US General Accounting Office
Washington, DC 20548

Dear Mr. Gebicke:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report entitled, "Military Training: Cost-Effective Development of Simulations Present Significant Challenges," dated August 10, 1995, and revisions dated September 14, 1995 (GAO Code 703092), OSD Case 9997. The Department partially concurs with the report and has implemented or is in the process of implementing most of the recommendations.

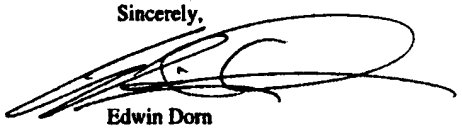
The draft report examines the Aggregate Level Simulation Protocol (ALSP) and the new Joint Simulation System (JSIMS) program, and it raises questions regarding their cost-effectiveness and oversight. The Department recognizes the shortcomings of today's limited set of joint training tools and is committed to developing more robust and cost effective capabilities. The capabilities envisioned for the new JSIMS program are a quantum leap beyond the current generation of modeling and simulation tools. For example, the JSIMS will support training of Joint Task Forces and combatant commands in all phases of military operations, and will provide an interface between training systems and operational command, control, communications, computers, and intelligence systems. This unprecedented capability is essential to maintaining a high state of readiness for the full spectrum of modern and future warfare.

It is important to note that the JSIMS was conceived by the Services and has advanced through their deliberate and collaborative efforts with the Office of the Secretary and the Joint Staff. Their efforts to clarify the scope of the JSIMS and to coordinate responsibilities during the early phases of development have provided a firm foundation, which is expected to save time and money in subsequent phases of development.

The Department is constantly seeking better ways to improve the coordination and management of modeling and simulation programs. In this regard, the organizational structure created by Office of the Under Secretary of Defense for Acquisition and Technology has redoubled its efforts to identify and integrate modeling and simulation requirements, develop comprehensive plans, and prioritize investments. These efforts are consistent with most of the recommendations addressed in the GAO report.

The detailed DoD comments on the report findings and recommendations are enclosed. The DoD appreciates the opportunity to comment on the GAO draft report.

Sincerely,



Edwin Dorn

Enclosure
As stated

GAO DRAFT REPORT--DATED AUGUST 10, 1995
(GAO CODE 703092) OSD CASE 9997

"MILITARY TRAINING: COST-EFFECTIVE DEVELOPMENT OF SIMULATIONS PRESENT SIGNIFICANT CHALLENGES"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

FINDING A: Joint Simulation System (JSIMS) Progress Proceeds At a Deliberate Pace. The GAO found that the development of the JSIMS is almost a year behind schedule and a clear, consistent definition of the JSIMS is still evolving. The GAO noted that a lack of agreement among the Services as to what the JSIMS entails has delayed approval of the charter and plan. The GAO pointed out that the Services have different interpretations of the memorandum of agreement.

The GAO reported that in July 1995 the Acting Assistant of the Air Force for Acquisition approved Milestone 0 for the JSIMS. The GAO stated that the JSIMS Joint Program Office indicated the JSIMS would comprise a core element of common functions, such as terrain and weather effects, and warfare functions, such as air, ground, and naval combat, and logistics. The GAO noted that the common core development would be the responsibility of the JSIMS Joint Program Office, while warfare function development will be the responsibility of designated executive agents.

The GAO reported that the 1994 memorandum of agreement stated that the JSIMS should also be adaptable to other modeling and simulation applications, such as analysis and testing. The GAO noted, however, that in February 1995, the Deputy Secretary of Defense initiated an effort to be led by the Director, Program Analysis and Evaluation to develop a new joint analysis model called the Joint Warfare System (JWARS). The GAO stated that Program Analysis and Evaluation officials advised that they believed improvements to the DoD analytical capability needed to be made now and they could not afford to wait for the JSIMS to become a reality. The GAO pointed out that the focus of the JSIMS is now solely on providing a simulation environment for joint task force training. The GAO noted that coordination between the JSIMS and JWARS programs is being worked out.

The GAO stated that the major stumbling block for the JSIMS is how to fund the $416 million program, since there is no central funding line for the program. The GAO noted that some of the Military Service officials have expressed concerns about the piecemeal approach of funding the JSIMS. The GAO reported that the current estimate of the JSIMS core element is about $154 million. The GAO noted that the Services have each agreed to provide 30 percent of the cost and the Marine Corps will provide 10 percent of the cost. The GAO reported that in addition to the $154 million, the executive agents will incur additional costs, currently estimated to total $262 million, to develop simulations for their specific warfare functions.

The GAO concluded the problem with this approach is that if a Service believes that improving its own core competencies has a higher priority to fund than its responsibilities for the JSIMS, that function for the JSIMS may not be developed in concert with the other required components. The GAO noted that the Services are proceeding to develop the next generation of simulations that will better address their specific mission or core requirements. The Services are also responsible for ensuring that these simulations are able to function within the JSIMS's domain. The GAO stated that unless decisive management is exercised, these Service efforts may outpace the JSIMS core development and require additional modifications to operate in the JSIMS domain.

The GAO reported that several recent events have occurred that demonstrate the JSIMS program is moving forward. The GAO noted, however, that these actions have not been formalized. (pp. 2-3, pp. 4-7/GAO Draft Report)

Now on pp. 3-6.

DOD RESPONSE: Partially concur. Milestones established in the JSIMS Memorandum of Agreement (MOA) were deliberately ambitious and intended as an action to move the JSIMS project along. The JSIMS MOA was signed on July 15, 1994, with a tasking to produce a decision brief on what the JSIMS was to constitute, the proposed charter, and master plan in four months. Based on this initial timeline, the program could be viewed as approaching a year behind schedule. Since the JSIMS MOA was signed, the project has moved from a general consensus agreement, through stand-up of a transitional JSIMS Joint Program Office (JPO), to the formation of a permanent JPO. The Services, Joint Staff representatives, and the Defense Modeling and Simulation Office (DMSO) developed a JSIMS system definition in an

April 5-7, 1995, meeting. This is referenced in the JSIMS Operational Requirements Document (ORD) and was used in the Milestone 0 decision process. The ORD has been through multiple reviews during the first year and is now in final coordination. On July 13, 1995, the Air Force Acquisition Executive declared that JSIMS had attained Milestone 0 and was officially in the Concept Exploration and Definition phase of development. On July 14, 1995, the Director, Defense Research and Engineering (DDR&E), chaired the first JSIMS Senior Review Board at which the members agreed to provide their share of the JSIMS Joint Program Office (JPO) permanent staff.

The GAO incorrectly states that the JSIMS core provides: common functions, like weather effects and terrain; air, ground, and naval combat warfare functions; and logistics. The JSIMS core is limited to shared services, interfaces, technical infrastructure, representations of the Joint Community, and a common physical environment. The development of models and databases for representing the physical environment will be provided by the Under Secretary of Defense for Acquisition and Technology (USD(A&T)) through designated DoD Modeling and Simulation Executive Agents (MSEA) for environmental effects representations. The MSEAs are receiving technical, policy, and monetary support from the DMSO for start-up. The Army, Navy, and Air Force are taking on the responsibility to be JSIMS Executive Agents (JEAS) for their primary combat area. These representations, while part of JSIMS, are not part of the core. Each JEA is developing simulations consistent and interoperable with the JSIMS core and the DoD Modeling and Simulation common technical framework.

The GAO is correct in stating that the Deputy Secretary of Defense initiated development of JWARS to obtained improved DoD analytical capabilities. The GAO incorrectly indicates that there has been a change in the focus of JSIMS; its primary focus has always been on joint training with analysis as a secondary capability to be developed later. Both JWAR and JSIMS will comply with the DoD common technical framework being developed through the DoD Modeling and Simulation Master Plan, which will support their interoperability.

The Under Secretary of Defense for Acquisition and Technology (USD(A&T)), signed an action memorandum on August 8, 1995, calling on DoD Components to formally adopt a proposed division of funding and personnel requirements. The Deputy Secretary of Defense endorsed the establishment of a joint core funding line with the Services providing

both their share of core funding and personnel to staff the JPO. The Deputy Secretary of Defense endorsed the establishment of a joint core funding line with the Services providing both core funding and personnel to staff the JPO. The DDR&E and the Joint Staff are to provide a portion of the funding for the JSIMS core program. The Program Element Monitor (PEM) is assigned to the Joint Staff J-7, and program development is managed by the JSIMS Joint Program Office.

The GAO incorrectly reported the cost to develop JSIMS through initial Operational Capability (IOC) is $416 million. In fact, this figure includes not only the core funding ($154 million), but also an estimate of the funding required by the JSIMS executive agents (land - Army, sea - Navy, and air - Air Force) to develop representations of DoD missions in their respective areas ($262 million). The Department cannot substantiate the GAO's $262 million estimate. The Army, Navy, and Air Force are now developing, or will develop, new training models to meet their Title 10, United States Code training needs. It is probable that the Services will use these new developments as contracting vehicles to meet their JEA requirements to provide the JSIMS JPO with representations of their respective JEA warfare areas. The Services and the JPO envision significant reuse of the functionality and technical services (Functional Description of the Battlespace, runtime infrastructure, etc.) between and among the Services' new training simulations and JSIMS. As a result, potential exists for savings in the Service Modeling and Simulation programs and the JSIMS total program cost.

The JEAs will not have to fund representations included in their mission areas but required by another Service. For example, the Army would either be provided necessary representations of Marine Corps ground combat elements or the Marine Corps would fund the production of their representations. The same would hold true for the Air Force when including Navy or Army aviation elements. Additionally, by using common elements provided by the JEAs for the various mission areas and the environmental representations from the DoD MSEA denned for environmental representations, all may experience cost avoidance in the long term.

Further, the DDR&E and the Joint Staff are to provide a share of funding for the JSIMS core program. Implementation will be reviewed as the Department finalizes the FY 1997 budget.

FINDING B: The DoD Expenditures On The Aggregate Level Simulation Protocol (ALSP) Confederation May Not Be Cost-Effective. The GAO reported that concurrent with the development of the JSIMS, the DoD has decided to make improvements to the ALSP Confederation, the last of which is expected to be in place in 1999, at the same time that the JSIMS should reach initial operational capability. The GAO stated that the ALSP Master Plan improvements are intended to respond to the identified Commander in Chief (CINC) and Service training requirements and include additional capabilities such as strategic mobility and ground-to-ground combat interactions between models. Although the DoD indicated the total cost of these improvements will not be significantly high, the GAO found no one within the Office of the Secretary of Defense and the Army Simulation, Training, and Instrumentation Command was able to provide comprehensive cost estimates. The GAO identified about $40 million that the DoD has budgeted for the ALSP Confederation improvements through fiscal year 1999. The GAO concluded that because this money may be directed toward Service-specific improvements, rather than joint improvements, the cost could be higher.

The GAO reported that as is the case with the JSIMS, there is no central funding line for the ALSP Confederation improvements. Consequently, the GAO concluded that the DoD ability to achieve all of the improvements that it seeks is dependent on funding from the individual Services, agencies, or the CINCs. The GAO noted that to date the Office of the Under Secretary for Acquisition and Technology has not provided the management to ensure that all significant components of the ALSP improvements will be completed. The GAO reported that management improvements have been fragmented and it is questionable whether the improvement plan is cost effective. For example, the GAO found that the Army has decided not to fund ALSP improvements to its ground warfare model. The GAO pointed that the Army will make changes for Army specific traning purposes or if the changes are funded by a Commander-in-Chief. (pp. 2-3, pp. 7-9/GAO Draft Report)

Now on pp. 6-7.

DOD RESPONSE: Partially concur. Although the GAO identified potential inefficiencies, the draft contains erroneous budget figures and incomplete information concerning the management of the ALSP Core Software. The ALSP software provides a means to link, simulations that were never intended to interoperate, and it provides the only current method linking large scale heterogeneous simulations. While it is correct that ALSP only fully satisfies 2 of the 25 Combatant Command training

requirements, it partially satisfies another 11. Further, this shortfall was a principal driver for the development of JSIMS. The GAO report states that about $40 million is budgeted by the Department of Defense for ALSP Confederation improvements through FY 1999. The Department, however, cannot substantiate this figure. The ALSP Systems Engineering Core Support for FY 1996 is currently budgeted at $1.42 million for FY 1996, $1.49 million for FY 1997, $1.56 million for FY 1998, and $1.64 million for FY 1999.

The DoD agrees that there is no single funding line for ALSP system upgrades. There is, however, a single funding source for ALSP core support comprised of OSD, JCS, and Service shares. Funding for support of and modifications to the ALSP Infrastructure Software (AIS) are transferred to and administered through a single funding line at the Army's Simulation, Training, and Instrumentation Command (STRICOM). Since the ALSP Management Plan was approved in May 1993, a means to address the whole ALSP change process from requirements definition, through technical analysis, to cost effectiveness and affordability has been in place. Decisions concerning prioritization of changes to the AIS, protocols, and the Joint Training Confederation (JTC) are made by an ALSP Review Panel which includes representatives of the funding organizations. The Joint Staff, J-7, Joint Warfighting Center (JWFC) established the Joint Training Group to identify modeling and training improvement initiatives which will also participate in the ALSP improvement process. If participants in the requirements identification and prioritization process are unable to agree, issues are brought to the DoD Executive Council for Modeling and Simulation (EXCIMS) by the ALSP Executive Agent for resolution. To date, this has not been necessary. Joint training requirements are the responsibility of the Chairman of the Joint Chiefs of Staff. The USD(A&T) provides oversight of the Modeling and Simulation technical means to support the training.

The requirements submission process is completely open. Requirements, are submitted through the Requirements Review Panel to the Review Panel for approval. Conflicts are resolved by the ALSP Interface Working Group. If the interactions require a change to the AIS, some of the $1.4 million administered through the ALSP Executive Agent may be applied to the project. All other funding for modifications to the affected simulations is provided by the owning or requesting DoD Component.

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Now on pp. 7-8.

Now on pp. 7-8.

RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommended that the Secretary of Defense establish a joint funding line for the core development of the JSIMS and the Secretaries of the Army, Navy, Air Force establish funding lines for their respective executive agent JSIMS responsibilities regarding warfare function development. (p. 10/GAO Draft Report)

DOD RESPONSE: Concur. The DoD has already taken action on this matter. The DoD is in the process of establishing a joint funding line for the JSIMS core and will ensure Service support for their respective combat representations.

RECOMMENDATION 2: The GAO recommended that the Secretary of Defense require the Under Secretary for Acquisition and Technology to assume a stronger management role by

- defining the JSIMS and developing a definitive plan of action; and
- developing a transition strategy to phase out the ALSP and phase in the JSIMS. This strategy should be based upon cost estimates associated with modifying, expanding, and testing the ALSP Confederation to decide which improvements to the ALSP Confederation provide benefits that are cost-effective. (p. 10/GAO Draft Report)

DOD RESPONSE: Partially concur. As discussed in the Department response to Finding A, JSIMS is progressing at a normal programmatic pace. The USD(A&T) has taken action to define JSIMS and develop a definitive plan of action. The USD(A&T) has been represented at virtually every critical decision point in the JSIMS program. The USD(A&T) was influential in developing the management structure for JSIMS and ensuring that his representatives (DDR&E and DMSO) were involved. The working definition of JSIMS was crafted by Service representatives and representatives from DMSO, JWFC, and the JPO during meetings April 6-7, 1995. On July 14, 1995, the Director, Defense Research and Engineering (DDR&E), chaired the first JSIMS Senior Review Board at which the members agreed to provide their share of the JSIMS Joint Program Office (JPO) permanent staff. The USD(A&T), Modeling and Simulation signed an action memorandum on August 8, 1995, calling on DoD Components to formally adopt a

proposed division of funding and personnel requirements. The JPO continues to pursue development activities such as the definition of the JSIMS Model of the Mission Space, leading the development of the DoD Modeling and Simulation High Level Architecture Proto-Federation for Operational Level Training under DMSO sponsorship, and in close liaison with the JWARS program.

A plan to phase out ALSP and phase in JSIMS will be developed based on both technical considerations provided by the USD(A&T) and operational considerations provided by the Services and CINCS.