Report to the 106th Congress

Department of Defense
Strategic Plan
for
Advanced Distributed Learning

April 30, 1999

ODUSD(R), Readiness and Training
(703) 614-9524

	Report Documentation Page		*Form Approved* *OMB No. 0704-0188*

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1. REPORT DATE **30 APR 1999**	2. REPORT TYPE		3. DATES COVERED **00-00-1999 to 00-00-1999**
4. TITLE AND SUBTITLE **Report to the 106th Congress Department of Defense Strategic Plan for Advanced Distributed Learning**			5a. CONTRACT NUMBER
			5b. GRANT NUMBER
			5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)			5d. PROJECT NUMBER
			5e. TASK NUMBER
			5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Office of the Under Secretary for Personnel and Readiness,Washington,DC,20301**			8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT **Approved for public release; distribution unlimited**			
13. SUPPLEMENTARY NOTES			
14. ABSTRACT			
15. SUBJECT TERMS			

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**60**	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

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1.0   Overview

Section 378 of Public Law 105-261, the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (hereafter, The Act), requires the Secretary of Defense to develop a strategic plan for guiding and expanding distance learning initiatives within the Department of Defense, to include a provision for the expansion of such initiatives over five consecutive years, beginning in FY 2000 (Appendix A). Section 378 states that the Secretary may take into account the ongoing collaborative effort, between the Department of Defense, other Federal agencies, and private industry, that is known as the Advanced Distribut[ed] Learning Initiative, but that the strategic plan must specifically focus on the education and training goals and objectives of the Department of Defense.

The Strategic Plan (hereafter called the "Plan") will include two parts: a Strategy; and later, an Implementation Plan for carrying out the Strategy. This report provides the Strategy for using distributed learning technologies across the Department of Defense (DoD) on a broad scale and is DoD's initial response to the direction from Congress. It also responds to directions, from the Office of Science and Technology Policy (OSTP) and the National Partnership for Reinventing Government, to develop a strategy for advanced distributed learning.

For purposes of this report, "learning" encompasses the areas of education, training, and performance aiding, and it addresses concepts and methodologies that can be used by the Department, as well as other federal agencies, academia, and the private sector. These concepts and methodologies were developed through collaboration within the Department and with other public-sector, private-sector, academic, industrial, and government organizations.

The Strategy also is responsive to Executive Order 13111, *Using Technology to Improve Training Opportunities for Federal Government Employees*, January 12, 1999 (Appendix B), and to the vision statements provided by the Secretary of Defense (Appendix C) and the Chairman of the Joint Chiefs of Staff (Appendix D). It draws on assemblies of experts on education and training within the Department, who have met in multiple forums, including a landmark assembly hosted in February 1999 by the Commander-in-Chief, U.S. Atlantic Command in Norfolk, Virginia. In addition to addressing the training needs of today's force, this requirements-based Strategy is aimed at the projected training needs of the future force, both military and civilian. It is a dynamic template, which uses the leadership of the Office of the Secretary of Defense (OSD) to guide DoD's learning-related business processes as they evolve from today's models to those required for the future.

The expected outcomes of OSD's leadership include: a coherent Department-wide Implementation Plan; supporting policies, guidelines, and programs that are based on cooperation, collaboration, shared research and development, prototypes, and test beds; and avoidance of unnecessary redundancies. This Strategy provides a framework for developing a DoD Implementation Plan designed to institutionalize advanced distributed learning through the promulgation of advanced distributed learning master plans by each of the DoD Components.

To provide a framework for understanding advanced distributed learning in the Department of Defense, this report uses the following definitions:

- *Learning* is the acquisition of knowledge, skills, and attitudes through the integration of education, training, and performance aiding in a comprehensive, mutually supportive system.

- *Distributed (also referred to as distance) learning* is structured learning that takes place without the physical presence of the instructor. Distributed learning is enhanced with technology. It may draw upon resources which are physically distant from the location where learning is taking place and may include the use of one or more of the following media -- correspondence course materials, audio/videotapes, CD ROMs, audio/videoteletraining, interactive television, and video conferencing -- to provide *right-time, right-place* learning.

- *Advanced distributed learning* leverages the full power of computer, information, and communication technologies through the use of common standards in order to provide learning that can be tailored to individual needs and delivered *anytime-anywhere*. Advanced distributed learning also includes establishing an interoperable "computer-managed instruction" environment that supports the needs of developers, learners, instructors, administrators, managers, and family. Advanced distributed learning encompasses all the methodologies mentioned above, and in addition, includes ongoing and expected improvements in learning methodologies.

1.1 Introduction. Following the Persian Gulf War of 1991, Congress reviewed the readiness of Reserve component (RC) forces. General Accounting Office (GAO) studies and Service testimony added to a perception that RC units required additional access to education and training opportunities to achieve a greater degree of readiness than was judged available when they were called to Operation Desert Storm. The OSD Readiness and Training Office initiated the (then) Total Force Distance Learning Action Team to focus on Reserve component training needs. In the early 1990's, Congress authorized and appropriated significant funds for National Guard use in building prototype electronic classrooms and learning networks to provide increased access to learning opportunities by the National Guard. Congress continues to fund the expansion of distributed learning programs for the National Guard.

In 1998, motivated principally by the progress made by the Department of Defense Advanced Distributed Learning (ADL) Initiative, by the Army National Guard, and by other federal agencies (e.g., the Department of Labor), the OSTP moved to consolidate federal efforts via a Federal Training Technology Initiative (FTTI). The FTTI's learning technology vision encompasses a number of national electronic learning initiatives geared toward using the power of learning technologies to broaden the reach of educators and trainers who are faced with the daunting challenge of moving America's work force into the Information Age. Following the Lifelong Learning Summit hosted by the Vice President on January 12, 1999, the President signed

Executive Order 13111, *Using Technology to Improve Training Opportunities for Federal Government Employees*. Among other things, the Executive Order directed the Department of Defense to take the federal lead in developing learning technology standards in collaboration with academia, industry, and other government agencies.

In 1998, Congress again reviewed the status of military readiness, following concerns expressed by the Commanders in Chief (CINCs), the Services, and the Joint Staff about troubling indicators within the Active components. Recognizing today's broad Internet usage and the progress that had already been made incorporating the power of learning technologies -- by the Army National Guard, academia, industry, and Congress -- Congress directed the Department of Defense to draft a Strategic Plan for bringing advanced distributed learning to the Total Force.

1.2 Objective. The objective of the *DoD Strategic Plan for Advanced Distributed Learning* is to meet the learning needs of the U.S. Armed Forces in the future and to provide direction and focus to programs that respond to their requirements. This Strategy portion of the Plan:

- Places the DoD's "training vision" in perspective;
- Describes the ADL Initiative, including its conceptual underpinnings, management structure, and status;
- Identifies and explains selected DoD and supporting distributed learning programs already under way; and
- Highlights "next steps" that will be integral to the Implementation Plan.

The framework for the Strategy is shaped in large part by the Secretary's and Chairman's vision statements, Executive Order 13111, and several congressional taskings. They provide the "*why*." This Strategy and its companion Implementation Plan provide the "*who*, *what*, *how,* and *when*."

2.0   Vision of the Future Learning Environment.

Training and learning models developed for the 21st century revolve around two new concepts: the learning organization and advanced delivery systems.

A learning organization continuously enhances and expands its collective capabilities to create better results in order to meet mission requirements. It includes several notions: learning is the bridge from information to understanding; learning is most effective when coupled to experience; learning leads to changes in thinking and behavior; and learning requires time for reflection and integration.

Effective delivery of learning using new network-based, modular content and modern telecommunications tools must take into account what we have discovered about human learning. The future capabilities needed in our Armed Forces are most clearly defined in the Secretary of Defense's *Training Technology Vision* (Appendix C) and the Chairman of the Joint Chiefs of Staff *Joint Vision 2010 (JV 2010)* (Appendix D).

2.1   Joint Vision 2010 / Future Operational Environment. JV 2010 provides the conceptual template for how we will channel the vitality of our people and leverage technological opportunities to achieve new levels of effectiveness in joint warfighting. Future forces must be capable of providing:

- *precision engagement* of highly complex targets, anywhere and anytime;
- *dominant maneuver* of agile forces against any adversary or any terrain;
- *focused logistics* for delivery of just-in-time support, anywhere and anytime; and,
- *full-dimensional protection* against any threat, at all times.

The Armed Forces of the future must be able to fight in joint, combined, and interagency environments enabled by *information superiority* -- the gathering, processing, fusion, and dissemination of more accurate and timely information and knowledge, anywhere, anytime, every time.

In tomorrow's dynamic threat environment, America's forces may have to deploy on a moment's notice, often to conduct operations that cannot be adequately predicted and for which they have not planned or practiced. Future forces must be highly adaptive, learning forces that organize to meet threats effectively and rapidly. They must continuously learn, simulate, and rehearse, whether they are in school, at home station, at home, en route to, or in the theater of operations.

America's military forces have a long tradition and a well-deserved reputation of providing world-class education and training. For example, having highly educated and trained service members was a key to our overwhelming success in Operation Desert Storm. It is noteworthy that many of these warriors trained in the same classrooms which prepared their grandfathers for World

War II. These venerable facilities were in the right place at the right time to support all of the nation's major mobilizations throughout the industrial age.

While yesterday's *right-time, right-place* learning paradigm met yesterday's military requirements, it can not meet future requirements based on more demanding deployment criteria and other time-sensitive constraints. Providing *anytime-anywhere* instruction is a key to maintaining military readiness in the information age and one of our foremost priorities. While U.S. Armed Forces are the most capable in the world today, meeting the more complex readiness needs of the future will require the Department of Defense to re-engineer its ability to deliver learning to an *anytime-anywhere* objective.

2.2   Secretary of Defense's Training Technology Vision. To meet the learning requirements of the future force, the Secretary of Defense issued his training technology vision, "to ensure that DoD personnel have access to the highest quality education and training that can be tailored to their needs and delivered cost effectively, anytime and anywhere" (Appendix C). To achieve the vision, *anytime-anywhere* learning must be distributed, just-in-time and on-demand, and enabled with resourced development and exploitation of learning technologies.

The strategic shift from learning solely in the central classroom to learning in the unit, where and when required -- while maintaining quality -- can ensure higher readiness and improve the mission availability of personnel. The indicators of success for the distributed learning investment are measurable, in terms of improved unit cohesion, increased availability for operations, and increased operational readiness stemming from unit management of learning assets throughout the Department.

2.3   DoD Advanced Distributed Learning (ADL) Initiative. The Department, in the Quadrennial Defense Review (QDR) of 1996, decided to develop a Department-wide strategy to harness the power of learning and information technologies to modernize education and training. The strategy is called the Advanced Distributed Learning (ADL) Initiative. The ADL Initiative sets forth a new paradigm intended to implement the Secretary's training vision -- to provide access to the highest quality education and training that can be tailored to individual needs and delivered cost-effectively, whenever and wherever it is required. Importantly, the Initiative's underpinnings and applications are germane not only to the Department of Defense, but to other government organizations, academia, and the private sector, as well. The ADL Initiative, therefore, is a structured, adaptive, collaborative effort between the public and private sectors to develop the standards, tools, and learning content for the future learning environment.

The Department of Defense's vision is to harness the power of the Internet and other virtual or private wide-area networks (WANs) to deliver high-quality learning. It brings together intelligent tutors, distributed subject matter experts, real-time in-depth learning management, and a diverse array of support tools to ensure a responsive, high-quality "learner-centric" system. As stated earlier, advanced distributed learning does not exclude any existing delivery method. In some cases, it may expand and complement legacy delivery systems.

One of the concerns expressed by Combatant Commands is the challenge of having to send their service members away from their units to satisfy education and training requirements. The accelerating pace of technological change in weapons systems further complicates this challenge. These concerns, and the ever-growing complexity of modern weapon systems, demand that we re-engineer our military education and training systems to take advantage of information-age technologies. The advanced distributed learning strategy provides a means of meeting the readiness requirements of the JV 2010 environment. It will support enhanced readiness, help offset strains caused by high operational (OPTEMPO) and personnel (PERSTEMPO) rates, compensate for the complexity of future systems and operations, and extend the availability and augment the effectiveness of present education and training systems for the entire Department. The advanced distributed learning strategy is also appropriate in delivering learning opportunities for civilian personnel, as well as for kindergarten through high school programs for military dependents being educated in DoD schools.

The nature of the advanced distributed learning strategy recognizes the existence of traditional impediments and barriers to change. Independent systems, proprietary processes, and lack of interoperability can delay implementation and reduce return on investment. One of the biggest issues in the cost-benefit analysis of advanced distributed learning is that, under current accounting systems, organizations making the investment in learning often are not the organizations which are reaping the benefits. Unless the Department removes such structural counter-incentives, they will be certain to impede progress.

The advanced distributed learning strategy requires re-engineering the learning paradigm from a "classroom-centric" model to an increasingly "learner-centric" model, and re-engineering the learning business process from a "factory model" (involving mainly large education and training institutions) to a more network-centric "information-age model" which incorporates *anytime-anywhere* learning.

The purpose is not to replace the entire classroom model of training and education within the Department of Defense. There will always be a place for such instruction. The aim is to provide for the distribution of as much learning as possible while maintaining the Service-directed standards for quantity and quality of instruction.

Academia, industry, and some elements of government have already begun the process and are experiencing promising results. The ADL Initiative proposes to leverage commercial off-the-shelf (COTS) software and successful public, private, academic, and industrial initiatives for the benefit of the Department. Department of Defense organizations and doctrines for learning will co-evolve along with a robust DoD Advanced Distributed Learning System to meet the requirements of our future military forces. Many current systems and approaches, such as centralized basic training, will continue as they are taught today, which is appropriate. Furthermore, advanced distributed learning is highly adaptable and can be applied to a great variety of situations after initial-entry training.

2.4   DoD Advanced Distributed Learning System (ADLS). This *DoD Strategic Plan for Advanced Distributed Learning* describes how DoD will go about building and implementing the DoD Advanced Distributed Learning System (ADLS). As mentioned at the outset, the Strategic Plan has two elements – a "strategy," as described in this report, and an "implementation plan" which is being developed and will be provided in the future.

2.4.1   Strategy. In short, the strategy is to: pursue emerging network-based technologies; create common standards that will enable reuse and interoperability of learning content; lower development costs; promote widespread collaboration that can satisfy common needs; enhance performance with next-generation learning technologies; work closely with industry to influence the COTS product development cycle; and establish a coordinated implementation process. It is designed to deliver efficient and effective high-quality learning continuously to Department of Defense personnel *anytime-anywhere*. As shown in Figure 1, implementation will yield the desired end-state, the DoD Advanced Distributed Learning System (ADLS).

ADL INITIATIVE

Classroom	Distance/Distributed Learning	Advanced Distributed Learning
Instructor led Technology insertion	Videoteletraining Embedded training Computer conferencing Interactive television Electronic classrooms Interactive Multimedia Computer-based training Audiographics Audio-tapes/Video-tapes Correspondence courses **+ Legacy Systems**	Integrated networked systems Interoperable platforms Reusable learning objects Widespread collaboration Global knowledge databases Intelligent tutoring systems Performance aiding Digital knowledge repositories Internet-based instruction Virtual libraries Simulations Virtual classrooms **+Legacy Systems**

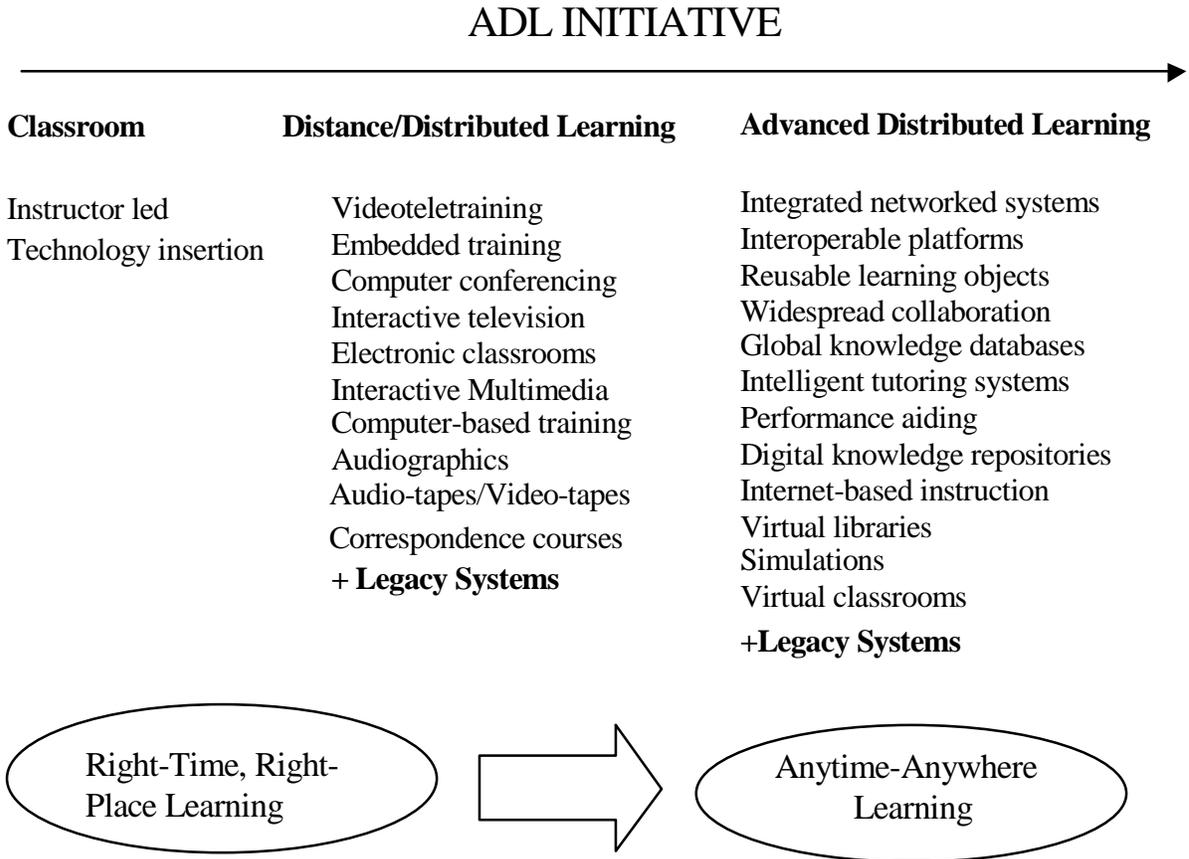Right-Time, Right-Place Learning → Anytime-Anywhere Learning

Figure 1. The DoD Advanced Distributed Learning System Continuum/ Architecture

2.4.2   End State. The ADLS end-state envisions universal use of instructional components that are characterized by:

- *accessibility* from any location, remote or local;
- *interoperability* between all advanced distributed learning instructional platforms, media, and tools;
- *durability* to withstand base technology changes without significant recoding or redesign;
- *reusability* between applications, platforms, and tools; and,
- *cost effectiveness* to provide significant increases in learning and readiness per net increment in time or cost.

ADLS will provide a unified "system of systems" for use by all DoD personnel. ADLS will enable the Department to move the appropriate DoD learning from the present paradigm (predominantly classroom-based learning) into truly *anytime-anywhere* learning as called for in various taskings. Up to this point, Service plans have emphasized a *right-time, right-place* approach to learning which exploits electronic classrooms, computer-based training, and videoteletraining. State-of-the-art communications now allows the Services to evolve their training programs to exploit network-based training to meet multi-Service, joint, interagency, and coalition needs.

The DoD ADLS will address the needs of the Total Force, and will incorporate distributed or virtual Service Centers of Excellence, Joint Centers of Excellence, geographically-dispersed or mobile learners, interoperable platforms and software, integrated adaptive networks, distributed management and support sub-systems, and a positive "learner-centric" culture. Joint and Service Centers of Excellence include existing classrooms, which will continue to be used, as they evolve their capabilities to develop, launch, support, and archive advanced distributed courseware.

Integrated adaptive networks, interoperable platforms, databases, and related software will be developed and configured to ensure transparent access and use of appropriate and authorized courseware *anytime-anywhere*. ADLS management and support sub-systems will be decentralized and, because they will be interoperable, will ensure continuous global access to registration, testing, record keeping, business-process, and expert-help functions. The DoD ADLS will help change the way in which learning is viewed. It will lead to a "learner-centric" culture and will help ensure that officially required learning is an acceptable and flexibly scheduled portion of the duty day, without penalizing quality of life or long-term health, fitness, and well-being.

2.5   DoD Advanced Distributed Learning System Elements. There are five elements needed to develop and successfully implement the ADLS:

- common industry standards;
- interoperable tools and content;
- a robust and dynamic network infrastructure for distribution;
- supporting resources; and,
- cultural change at all levels of command, recognizing that learning is an official requirement of the duty day.

These elements will be addressed at the policy level in this Strategy and at the operational level in the Implementation Plan.

2.5.1   Standards and Interoperable Content. The Department of Defense is a pioneer in advanced distributed learning. DoD's influence and willingness to collaborate with industry and academia have contributed to making the market place for courseware-development software both prolific and competitive. This may help mitigate problems traditionally caused by software packages predating the development of industry standards. As potentially one of the largest users of courseware-development, delivery, storage, and management systems, the Department of Defense can influence industry trends. To meet Department-wide needs, there must be standards for courseware interoperability, that are compatible among tool vendors and that do not sacrifice quality, transparency of operations, or efficiency of storage, manipulation, and management.

2.5.2   Network Infrastructure. A fully operational ADLS will require a robust data and video network infrastructure between the decentralized databases and repositories for digital courseware and geographically-dispersed or mobile learners. That network infrastructure must be interoperable between force components, echelons, delivery platforms, and user terminals. The network infrastructure must be compliant with the Department's Joint Technical Architecture (JTA), should be transparent to courseware developers, administrators, users, and managers, and should build on the existing infrastructure.

2.5.3   Supporting Resources. Resources required to achieve the ADLS end-state include not only network demands, but also individual access to the World-Wide Web and to an Internet-capable computer for every DoD user. Greater emphasis must be placed on the conversion of traditional classroom courseware to a form that is consistent with emerging standards of interoperability and reuse. Infrastructure at existing Joint and Service education and training centers may need to be re-engineered to support a migration to Centers of Excellence for advanced distributed learning.

2.5.4   Cultural Change. A successful ADLS will require a change of culture. The challenge for DoD leadership will be to provide appropriate learning opportunities throughout the duty day. For Reserve components, including both individuals and units, sufficient training time must be made available during normal unit training time or during additional periods of training in a paid status. Having recognized the importance of this, the Assistant Secretary of Defense for Reserve Affairs has established a team to examine existing policy and law relating to training time utilization and, if necessary, recommend changes. The intent is to clearly identify the acceptability of completion of collective and individual training and/or educational requirements via advanced distributed learning methodologies and to authorize awarding credit and/or compensation, when appropriate. Learning that enhances the readiness of Department personnel must not be viewed as an additional or a personal-time responsibility for DoD employees. A similar change of culture will be required of the trainers, instructors, and administrators of traditional classroom-based institutions. Adapting to the new advanced distributed learning environment will require new knowledge and skills. In the final analysis, the strength of the Department of Defense is its people. It is DoD's responsibility to

ensure that learning enhances their professional and collective readiness and individual quality of life.

When implemented, the ADLS will provide a comprehensive learning environment appropriate to meet existing and emerging national security challenges. Furthermore, ADLS presents an opportunity to strengthen learning in interagency and coalition contexts.

2.6   DoD Advanced Distributed Learning Implementation Plan (ADLIP).   The companion to this Strategy is the DoD Advanced Distributed Learning Implementation Plan (ADLIP). It will be developed by July 30, 1999, as directed by Section 8104 of the FY 1999 National Defense Appropriations Act.

3.0 Status of the ADL Initiative

In a memorandum dated November 23, 1998 (Appendix E), the Deputy Secretary of Defense directed the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) to lead the Department's ADL Initiative by working with the Services, Joint Staff, and other DoD Components to produce a policy for developing and implementing advanced distributed learning technologies across the Department. He also tasked USD(P&R), in coordination with the Services, Joint Staff, and DoD Components, to develop an advanced distributed learning "master plan" that addresses the plans, programs, and procedures necessary to carry out the policy, and to work with the Under Secretaries of Defense for Acquisition and Technology (USD(A&T)) and the Comptroller (USD(C)), to ensure that sufficient programs and resources are made available to implement that plan. The Deputy Under Secretary of Defense for Readiness (DUSD(R)) was given authority and responsibility to coordinate policy oversight of these efforts.

3.1 Advanced Distributed Learning Management Structure. DUSD(R) is working with the Office of the Secretary of Defense, Services, Joint Staff, and DoD Components to establish a management forum for coordination of advanced distributed learning programs within the Department. Figure 2 depicts a three-tier structure to organize and coordinate technical,
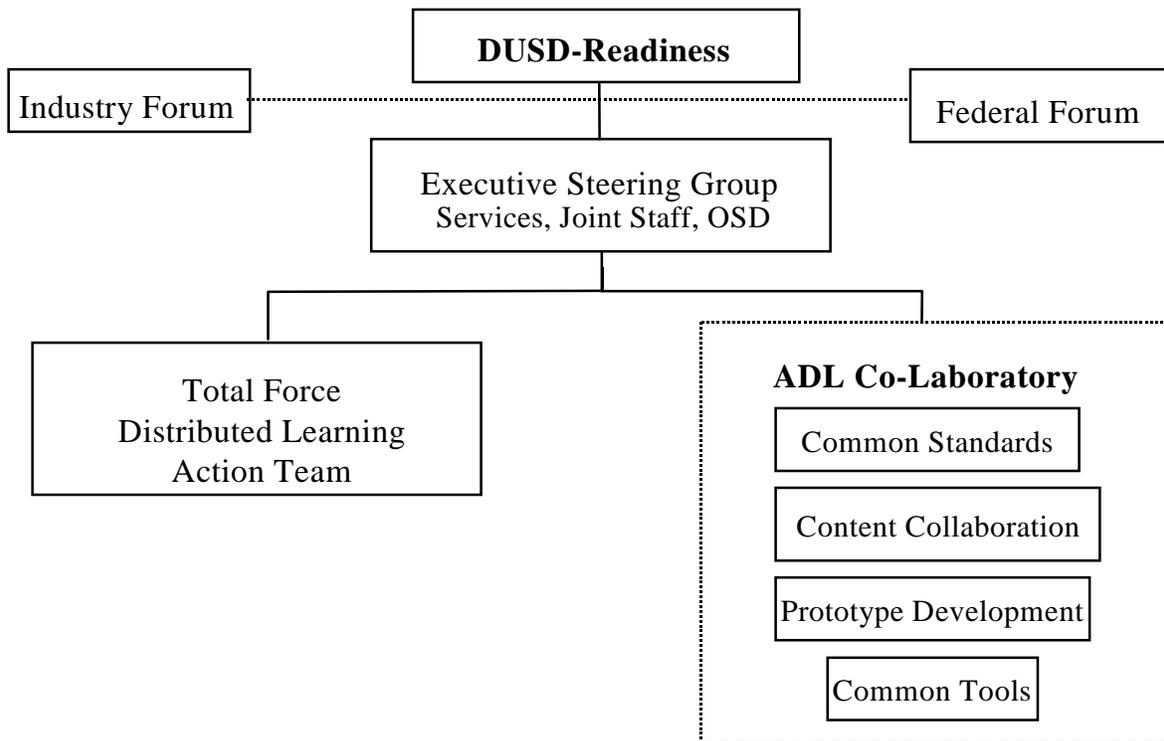
Figure 2. Advanced Distributed Learning Management Structure

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programmatic, and policy considerations associated with the use of advanced distributed learning technologies in the Department. This structure will guide the development and implementation of advanced distributed learning policies and programs.

3.1.1   Executive Steering Group (ESG). The ESG will be chaired by DUSD(R) and will be composed of a General/Flag Officer or Senior Executive Service representative from:

- Each Service, who represents both Active and Reserve components;
- Joint Staff (J7); the Office of the Secretary of Defense (with representatives from the Offices of the Comptroller, Chief Information Officer, Acquisition and Technology (Director Defense Research and Engineering, and Logistics), Reserve Affairs, Command, Control and Communications, Civilian Personnel Policy, and others, as appropriate).

Each of these representatives should be able to represent the education, training, funding, and operational requirements of his or her organization, and each should be vested with the authority to represent the policies and programs of their organizations.

3.1.2   Total Force Distributed Learning Action Team (TFDLAT). The TFDLAT is the working body supporting the ESG. A DUSD(R) representative chairs the TFDLAT, which has membership from each Service, Reserve component, the Joint Staff, OSD, and Defense Agencies. The TFDLAT advises and assists the Secretary of Defense, Joint Staff, Services, and Defense Agencies on all aspects of advanced distributed learning. Again, the goal is to ensure that DoD personnel have access to highest quality education and training that can be tailored to their needs and delivered cost effectively, *anytime, anywhere*. The TFDLAT:

- Serves as the DoD focal point for advanced distributed learning practices and procedures;
- Provides oversight of advanced distributed learning courseware development and implementation;
- Provides a forum for discussion and resolution of practical issues in advanced distributed learning;
- Drafts, reviews, researches, evaluates, coordinates, and recommends polices for the ESG;
- Recommends funding and research and development priorities; and,
- Promotes collaboration.

3.1.3   Technical Working Groups. The TFDLAT has established several Technical Working Groups to coordinate consistent policies and procedures in key areas, such as technical and administrative standards, collaborative development, content sharing, interoperable computer-management systems, and prototype development and assessments. While showing promise, work in each of these areas is at a very early stage of development.

3.2   ADL Initiative Co-Laboratory. DUSD(R) is establishing an ADL Co-Laboratory that will provide an open forum for collaborative development and assessment of technical standards, prototypes, and associated tools in support of Defense needs. It will foster the development,

dissemination, and maintenance of guidelines, tools, methodologies, and policies for cost-effective use of advanced distributed learning and will facilitate resource sharing across the Department, other Federal agencies, and the private sector. It will also support research and documentation of the capabilities, limitations, costs, benefits, and effectiveness of advanced distributed learning.

3.3   Federal Forum. DUSD(R) serves as the focal point for DoD participation on the Federal Training Technology Task Force established by Executive Order 13111 (Appendix B). Under Section 4.(c) of the Executive Order, the Department is directed to:

- In consultation with the National Institute of Standards and Technology, lead Federal participation in business and academic organizations charged with developing consensus standards for training software and associated services;
- Lead the Federal review of standards; and,
- Provide guidance to Defense Agencies and advise the civilian agencies, as appropriate, on how best to use these standards for large-scale development and implementation of efficient and effective advanced distributed learning technologies.

3.4   Industry Forum. DUSD(R) personnel are collaborating with the private sector through the EDUCAUSE Forum -- a consortium of over 500 academia, industry, and government members. This forum is developing common specifications that will provide a capability to achieve interoperability and reuse of learning content across industry, academia, and government.

3.5   Measurable Goals and Objectives. The identification and selection of specific goals, objectives and guidelines, with metrics to monitor advanced distributed learning program accomplishments, will be key elements addressed in developing the Implementation Plan.

3.5.1   Near-Term. The near-term goals of the ADL Initiative are to develop and assess advanced distributed learning prototypes that exploit existing technologies in order to demonstrate the capability to provide learning on demand (*anytime, anywhere*) that is consistent with stated functional requirements and that supports the Joint Warfighters' evolution to the operational environment of JV 2010.

3.5.2   Mid-Term. The mid-term goals are to research and develop more powerful tools and techniques that significantly improve the cost and learning effectiveness of current learning methodologies.

3.5.3   Long-Term. Longer range goals are to implement a fully functioning ADLS that supports the full-range of JV 2010 learning needs, while reducing OPTEMPO/PERSTEMPO and increasing the readiness of the force as reflected in the Commands' Joint Military Readiness Report submissions to the CJCS and the Secretary of Defense.   Assessments of advanced distributed learning prototypes will conform with widely accepted scientific techniques for determining cost and learning effectiveness, relative to traditional education and training techniques. These

assessments will be organized and coordinated by the ADL Co-Laboratory, working closely with the Joint Staff, Services, Combatant Commands, and Defense Agencies. Where appropriate, results of evaluations will be shared with the public and private sectors.

3.6   ADL Initiative Prototypes. There are four ADL Initiative prototype models currently under development and several others in the early planning stages.

3.6.1   Performance Mentoring Model. The Naval Aviation community is collaborating with General Motors to adapt and re-purpose, for military use in DoD aviation diagnostics and repair, a performance mentoring technology tool which was developed by General Motors for use in its Cadillac division. The objective of this prototype is to demonstrate how COTS technology can be used to provide low-cost, yet highly effective, on-the-job learning and performance mentoring for H-1 Helicopter maintenance technicians. The Deputy Under Secretary of Defense for Logistics (DUSD(L)) is providing funds (from the commercial technology for maintenance activities area) to encourage collaborative development and reuse of common technology, software, and methodology by the Navy, Army, and Marine Corps. Initial assessment of this prototype commenced in March of 1999. If successful, it is anticipated that the Services will fund expansion of this prototype to other DoD weapon systems.

3.6.2   On-line School Model. The Defense Acquisition University (DAU) has launched a major initiative to modernize its classroom-based acquisition training by converting to Web-based training using best business practices and industry benchmarks. Currently, five courses are available online. Using one course as an example (Acquisition 101, Simplified Acquisition Procedures (SAP)), the DAU's modernization efforts reduced instructor-student ratios, annually eliminating $3 million in travel costs and returning 92 workyears back to the Defense Acquisition Workforce Improvement Act (DAWIA) workforce. This customer-centered initiative provides the DAWIA workforce with just-in-time education opportunities distributed through various learning technologies.

3.6.3   Joint Doctrine Training Model. The Joint Staff developed an ADL Initiative Prototype that provides joint doctrine education and training via the Internet. The objective is to provide high quality joint doctrine to the Total Force – *anytime, anywhere*. This prototype has been used by military personnel in Bosnia in order to gain an understanding of Joint Task Force operations. Additional modules are currently under development, including a Crisis Action Planning Course that uses web-based intelligent tutor technology to train staffs in Joint Task Force (JTF) Operations.

3.6.4   Combatant Command Training Model. The U.S. Atlantic Command's Joint Warfighting Center (JWFC) has developed an ADL Initiative prototype in its Joint Distributed Learning Center (JDLC) that can provide JTF Commander and Staff training via the Internet. The objective of the JDLC is to provide a comprehensive source of joint web-based training and review opportunities for command staff members preparing to participate in joint training exercises and real-world operations, in accordance with the joint mission essential tasks of the

supported Commander in Chief (CINC). The prototype was developed using real-world events and joint exercises conducted at USACOM's Joint Training, Analysis and Simulation Center (JTASC). JWFC Observer/Trainer personnel have also used this prototype during Mobile Training Team visits to Kuwait; Naples, Italy; and Stuttgart, Germany at the request of the U.S. Central Command and U.S. European Command. The JDLC prototype will be developed to include emerging learning technologies, techniques, methodologies, and standards.

3.7   Estimated Costs. DUSD(R) personnel are working with DoD Components and the DoD Comptroller to build a comprehensive estimate of the investment needed to develop and maintain advanced distributed learning programs and systems within the Department. Initial indications are that the Services are programming funds to develop and deliver learning via multiple technology means. The ADLIP will provide a detailed assessment of requirements and investments by each DoD Component.

3.8   Research Needs. DUSD(R) personnel are working with the Director of Defense Research and Engineering and other DoD Components to develop a robust research and development program (R&D) that supports the goals and objectives of the ADL Initiative. Overall reductions to the Defense Science and Technology base over the last ten years have reduced the total amount of funding available for learning technology research (i.e., "training and education") to less than one percent of the Science and Technology component of the total R&D budget. Additional emphasis on collaborative research across the Department and across the public and private sectors will be required to develop, assess, and implement the tools, techniques, and systems needed to support the JV 2010 Vision of *anytime-anywhere* learning.

3.9   International Military Sales Program. America has an opportunity and obligation to export its curricula for democratic use of military and political power to the emerging democracies of the world. Presidential Decision Directives and the National Military Strategy also call for the Department of Defense to export its expertise in nation building, national security, military strategy, tactics, and operational art. The ADLS can contribute to this obligation while simultaneously developing a revenue stream to assist in further ADLS development.

The ADLS represents a unique opportunity to supplement Military Assistance and multinational initiatives, including the Partnership for Peace (PfP), North Atlantic Treaty Organization (NATO), the Technical Cooperation Program, and others, to export appropriate military learning while recouping a reasonable fee for use. The revenues generated by this portion of the ADLS should be returned to support learning technology programs, which will provide further savings in development, conversion, and updating of the backlog of courseware required, but unfunded, for use by the deployed warfighter.

The standards and protocols being established through the ADL Initiative embody existing international standards for training technologies, such as the ISO 9000 standard, now required in most European communities.

4.0   Department of Defense Distributed Learning Programs

4.1   Joint Distributed Learning Programs. The Joint Staff oversees the Joint Professional Military Education (JPME) System. Policy for JPME and interfaces to Service Professional Military Education (PME) Systems are contained in Chairman of the Joint Chiefs of Staff (CJCS) Instruction CJCSI 1800.01, the "OPMEP." The Joint Staff also oversees the Joint Training System via CJSCI 3500-01A, Joint Training System Policy for the Armed Forces of the United States. Finally, the Joint Staff oversees the Joint Command, Control, Communications, Computers, and Intelligence (C^{4}I) Education and Training System, which includes special programs at the Naval Postgraduate School, the Armed Forces Staff College, and the National Defense University. All programs are designed to support integration of learning for JV 2010 and warfighter requirements.

4.1.1   Current Initiatives.   A number of Joint initiatives are relative to the ADLS. Among these are the Distributed Joint Training Initiative (DJTI) and the Joint Virtual Learning Environment (JVLE). These two architectures are designed to integrate joint training (DJTI) and joint education (JVLE) across the learning spectrum, providing DoD Components transparent, efficient, and timely global access to knowledge.

4.1.1.1 Distributed Joint Training Initiative (DJTI). The CJCS has directed U.S. Atlantic Command (ACOM) to lead the development of a distributed training architecture that will enhance the training of U.S. forces in joint and Service tactics, techniques, and procedures while reducing the OPTEMPO/PERSTEMPO related to training globally distributed forces. The architectural framework includes all information technology services supporting training and various training enabling strategies, such as the ADL Initiative, and follows the guidelines used by the C^{4}I community. The foundation of DJTI is a robust communications infrastructure, digital libraries, training management tools, modeling and simulation tools, and collaboration and planning tools. The vision of distributed joint training is to integrate and shape related DoD initiatives, programs, and operational requirements in order to link Service and joint programs for worldwide warfighter participation in joint training--on demand. The importance of DJTI to the advanced distributed learning effort cannot be overemphasized, since the Department must first establish the infrastructure that will allow it to deliver training applications, tools, and products.

USACOM's JWFC uses the JTASC to conduct major JTF Commander and Staff exercises, as well as to host other technical initiatives which have a variety of applications. The Joint Digital Library System (JDLS) uses COTS technologies to capture (in a digital data base), index, and distribute materials via the World-Wide Web (WWW). These include but are not limited to documents, publications, lessons learned, exercise data, and C^{4}I content from ACOM exercises and real-world activities. Applications which use the JDLS for training, exercises, future rehearsals, and analysis include the JDLC, the Joint Exercise Management Program, and the Joint Center for Lessons Learned, as well as other JWFC initiatives.

4.1.1.2 Joint Virtual Learning Environment (JVLE). This initiative flows from the ongoing CJCS-directed JPME 2010 study. The National Defense University (NDU) and the Joint Staff are exploring prototype development of an education architecture which integrates all joint and Service Professional Military Education (PME) institutions (e.g., National Defense University, National War College, Army War College, etc.). JVLE extends the power of knowledge from a campus to the operational commander. The JVLE will provide an architecture to push information to and pull information from PME sources, push operational simulations to the PME institutions for near-real time student/faculty analysis, meet operational reach-back needs, and support continuous updating of PME instruction.

4.1.2   Joint Doctrine Initiatives

4.1.2.1 Joint Electronic Library. The Joint Staff has developed a Joint Electronic Library (JEL) which is available through the Internet. The JEL contains over 10,000 digital files, including all joint doctrine publications, CJCS Instructions, key Service publications, and a host of other reference documents. The JEL web site is among the most popular and often-used joint sites in the Department of Defense, with over six million visitors per year.

The next evolution of the JEL is the Joint Doctrine Electronic Information System (JDEIS), which is currently under development. The JDEIS is envisioned as an organized multimedia interactive information system containing a database of doctrine, which is linked electronically to the Universal Joint Task List, selected CJCS instructions and manuals, lessons learned, historical collections, future concepts, the DoD dictionary, and other related doctrinal materials and references, such as USACOM's JDLS. It will also include a sizable amount of complementary research, audio, video, and other multimedia material. JDEIS will be rapidly accessible by the entire military community from the Internet and other selected Defense information networks. The JDEIS is intended to be a joint doctrinal information and awareness tool to provide information to members of all Services and to other government agencies.

The central core of JDEIS will be the joint doctrine database to which all other system materials will be linked. The JDEIS is intended to have attributes that will improve our ability to organize, locate, and reference joint doctrine with minimal impact on the Services and allied doctrine hierarchies. Its overall goal is to provide the members of the joint community rapid, ready access to doctrinal information required for the myriad tasks they face.

4.1.2.2 Interactive On-Line Courses. The Joint Staff (J-7) recently put into initial operation the Doctrine Networked Education and Training (DOCNET) System. This on-line service consists of interactive multimedia presentations of key joint doctrine concepts. The content for each module is drawn directly from doctrine without interpretation and is, therefore, an authoritative information source for use by the U.S. Armed Forces. The goal of DOCNET is to "bring joint doctrine to life" by presenting the information in a convenient format, employing varied instructional techniques, and taking advantage of the latest interactive multimedia

technologies. The Internet-based system will initially include approximately 30 modules of instruction on joint issues related to joint doctrine.

DOCNET modules are currently accessible worldwide, seven days per week, 24 hours per day (*anytime, anywhere*) and include interactive animation, case studies, video supplements, and examinations. The modules are accessible from a password-protected section of the Joint Doctrine Web site (www.dtic.mil/doctrine). Six modules are currently available: *Operational Art, Joint Force Employment Considerations, Military Operations Other Than War, Joint Task Force from the Commanders Perspective*, *Joint Fire Support, and Unified Action Armed Forces*. Dozens of additional modules are planned and will be added as they are developed. The DOCNET system is designed to enhance the joint doctrine learning experience through on-line modules providing doctrine-based information in an interactive and multimedia environment.

As part of its efforts to develop distributed learning courseware, the Joint Staff (J-7) is also supporting OSD-sponsored ADL Initiative research efforts to develop course content that is Internet-based, is interoperable, and employs the latest developments in cognitive science. Specifically, Air Force Research Laboratory (AFRL), in partnership with the Joint Doctrine Division, is developing a new intelligent computer-managed course of instruction on Crisis Action Planning for use by the Joint Staff as part of the DOCNET program. The project, entitled *Crisis Action Planning Tutored On-line Resource* (CAPTOR), will serve as a prototype test-bed that meets joint warfighting requirements. The course content will be drawn directly from approved joint doctrine and other official publications and, as such, will be authoritative in nature.

CAPTOR will incorporate the latest instructional technology and cognitive science methodologies researched by AFRL, such as tutored learning and Intelligent Computer-Assisted Instruction. These teaching methodologies are designed to enhance learning and reduce instruction time over traditional methods of classroom instruction. Instruction will include interactive animation, asynchronous and synchronous conferencing, student-to-student interface, student-to-instructor interface, laboratories, and practical exercises.

4.1.2.3.1 Realistic Practical Exercises (Opposing Force Simulations). To enhance learning of joint doctrine, with practical experience, the Joint Doctrine Division is developing a Joint Operations Simulation (JOS) which leverages leading-edge technologies employed by the video gaming industry. This intelligent-interactive CD ROM-based simulation will enable users to test their knowledge of joint doctrine and actually conduct a "virtual" joint operation employing doctrinal principles learned from DOCNET. This realistic training tool incorporates a number of different basic scenarios that span the entire range of joint military operations. The simulation includes a tuner to modify the numbers and types of forces so that an unlimited number of operational conditions can be created.

The future generation of the JOS is the Joint Doctrine Operations Laboratory (JDOL), which is an Internet-based, cooperative, interactive, multi-player, opposing-force simulator designed to facilitate operational exercises, experimentation, and rehearsals in myriad

environments and situations. Key leaders and their subordinates will be able to participate in focused operations regardless of their locations throughout the world. The JDOL will include both a tuner and an editor, enabling users not only to modify the forces and increase the OPTEMPO, but also to change the physical location and terrain of the operation using realistic maps and intelligence input.

4.1.3 Joint Command and Control Research Program (JC^{2}RP). This Joint Staff (J-6) initiative provides for joint instruction, research, and collaboration within the C^{4}I arena for the dual purpose of answering warfighter C^{4}I needs and keeping C^{4}I faculty and students engaged in leading-edge learning. It is intended to produce distributed learning technical courseware as part of the research.

4.1.4 Joint Deployment Training Center (JDTC). This is a Joint Staff (J-4) and U.S. Transportation Command (TRANSCOM) initiative to provide just-in-time distributed learning to DoD Components preparing for or engaged in joint operational planning for deployment.

4.2 Military Service Distributed Learning Programs

4.2.1 Army. Army distributed learning initiatives are centered on Army Training XXI, the Total Army Distance Learning Program (TADLP), Classroom XXI, the Distributive Training Technology Project (DTTP), and the Reserve Education and Learning (REAL) program efforts.

The first critical component to this program is access to technology. The establishment of over 841 technology-based and interconnected Learning Centers provides both "continental United States" (CONUS) and "outside the continental United States" (OCONUS) locations to support students. Mobile distance learning centers will connect with communications infrastructure for delivery of training to support student surge requirements, provide access to training events occurring in areas of low population density, and support contingency operations.

The second critical component is courseware. The Army Training and Doctrine Command (TRADOC) maintains over 1,600 "resident" courses of instruction, ranging from a few days to about one year in length. A total of 525 courses are slated for redesign to distributed learning format between FY 98 and FY10. Additionally, task-based training and other courseware, such as COTS courses, are being provided to soldiers in the field through the TADLP learning centers. Unit readiness is the key factor in the courseware selection and the prioritization process.

Key to the Army effort is delivering courseware and providing access to knowledge at the *right time and right place*. The Army plans to provide a springboard for continued expansion to *anytime-anywhere* learning capabilities. This will be best exhibited by the University After Next effort now underway at the Center for Army Lessons Learned (CALL).

To manage change, the Army has developed a Total Army Distance Learning Plan (TADLP). An objective of this plan is to establish an Army training delivery system by linking

proponents and users through a telecommunications-based common operating environment. This objective supports a fully-networked training delivery, training development, and training management environment.

TADLP is a two-phase program. Phase I establishes an Initial Operating Capability that begins to integrate and modernize courseware and hardware, prepare and equip distance learning facilities, and integrate the facilities with existing satellite and communications infrastructures. Phase II completes full-system implementation, to include: acquisition of the complete communications infrastructure, integration, and implementation of all interfaces needed to satisfy training requirements with joint, national, and international communications infrastructures. Leveraging national governmental and commercial networks (such as the Defense Information Systems Network (DISN), Defense Communications Teleconferencing Network (DCTN), National Guard-sponsored networks (e.g., GuardNet XXI)), and other individual state initiatives will allow up-to-date training, focused on needs, to be provided where and when needed.

The Army has developed a consolidated list of Distance Learning facilities required to support all Army components. The list contains facilities to be fielded and the programmed location and time period for fielding. Distance Learning facility requirements are based on the number of Active and Reserve component soldiers requiring training within specific geographic areas. The Army established and is executing a program, that began in 1998, for redesigning 31 courses a year for distance learning. Plans call for initiation of the process and capability for Internet-deliverable courses in FY99 and FY00, and employment of deployable training capabilities using satellite connectivity for soldiers and units serving in OCONUS locations where training facilities are not available.

To date, the Army has:

- identified approximately 4000 hours of pre-TADLP or legacy courseware that will be useable in the distance learning infrastructure;
- established media standards for distance learning courseware to ensure effective and efficient training, and proper operation on Joint Technical Architecture (JTA) compliant systems;
- chosen standard media authoring tools for developing distance learning materials to ensure a consistent training development effort across all components, as well as establishing courseware with a common touch and feel for the student;
- implemented a Distance Learning infrastructure that allows synchronous training between students at distant locations and an instructor either through Videoteletraining facilities, or collaborative groups -- as well as implementation of asynchronous training using CD ROM-based interactive multimedia, web-based interactive multimedia, and collaboration;
- complies with Joint Technical Architecture–Army Specifications to ensure interoperability within the Army and with sister Services infrastructure; and
- established an Army Doctrine and Training Digital Library (ADTDL) accessible

through the Internet. The Library contains training materials supporting both individual and unit training and is available to personnel of all Services. The Library receives between 600,000 and 1,000,000 hits per week. The library has materials from all Services.

4.2.1.1 Current Initiatives. Sixty-eight Total Army Training System Courses are in various stages of redesign. Courses include enlisted reclassification, officer, non-commissioned officer, and civilian training courses. The Combined Arms Staff Service School (CAS^3) has been selected as a prototype for advanced distributed learning implementation.   Implementation of Phase II of the TADLP fielding program will migrate Distance Learning classrooms to network connectivity using the DISN, GuardNet, and other capable networks. Additionally, the Army is working with OSD to develop reusable training objects to gain efficiency and better support for the training mission.

4.2.1.2 Long-Range Goals. The Army's stated long-range goal is *right-time, right-place* learning-center-based training. Additional long-range goals include:

- Increasing the output of Distance Learning (DL) courses to 47 per year, beginning in 2003.

- Delivering high-quality web-based training to the soldier at his or her home and work place.

- Ensuring that at least 99 percent of the Total Army population will be within 50 miles of a Distance Learning Classroom. Over 50 percent of the force will be covered by the end of FY99.

- Establishing a system of network-based simulations, that can be accessed from the desktop. Simulation is a representation or imitation of reality and includes simulating part of a system, the operation of a system, and the environment in which the system will operate. The Army will use simulation to replace live training, where appropriate, as a means to safely practice an action or activity under varied conditions and to conduct individual and collective training in a virtual/simulated environment.

4.2.2   Navy. The Navy's strategy implements a Navy-wide Distributed Learning System designed to deliver training, education, and information "on demand" as a career-long continuum to support Naval Operational Readiness and personal excellence. Initiatives are centered around the Navy's Strategic Training Vision, which includes Fleet initiatives, such as Operational Maneuver from the Sea and Network-Centric Warfare (NCW), a concept for distributed decision-making in the JV 2010 environment. NCW depends on Copernicus, a robust adaptive-bandwidth network architecture that integrates most deployed naval platforms and permits synchronized engagement.

4.2.2.1 Current Initiatives. The Director of Naval Training (CNO N7) has promulgated the

Navy Distributed Learning Planning Strategy to begin the process that will meet the challenges of getting sailors to the fleet faster, reducing infrastructure costs, decreasing sailors' time away from homeports, and improving readiness. CNO N7 has chartered an integrated effort to develop the Navy distributed learning strategic plan. At this time, CNO N7's vision is that a Navy distributed learning system will support delivery of education and training to shore-based readiness centers, classrooms within schoolhouses, ships at sea, Naval Reserve Activities, and Sailors' homes. The vision provides three-dimensions: learning environments across time and space, decision support through data warehousing and decision support tools, and management of learners and learning to ensure readiness across career continuums. The Navy currently has several distributed learning initiatives under development or test at the Naval Post Graduate School, Navy Schoolhouses, and the Naval Reserve Professional Development Center.

4.2.2.2 Long-Range Goals. The Navy Distributed Learning Planning Strategy articulates development of a long-range plan to make the distributed learning system a career-long "on demand" continuum of learning that begins with accession and initial skills training and continues throughout the Sailor's professional development as a leader and warrior. The system will be designed to provide education and training on demand (*anytime, anywhere*) for Active and Reserve component members on shore, at sea, or at home.

4.2.3 Air Force. The Air Force and its Reserve components primarily conduct *right-time, right-place* distributed (distance) learning via media ranging from paper to interactive courseware (ICW) and interactive satellite-based television. The *right-time, right-place* philosophy meets today's Air Force education and training requirements in a cost-effective manner, taking into consideration the realities of a fiscally constrained environment. However, the Air Force is increasing its capability to deliver *anytime-anywhere* distributed learning with networked simulator training, Internet-based courses, digital libraries, and on-line learning resources.

As a result of trends identified in the *Air Force 2025 Project*, the Air Force expects that education and training programs may be adjusted to meet the individual needs and capabilities of the student in an *anytime-anywhere* environment. Realizing there will be some requirements for group instruction to support social interaction and "aculturalization" of the student, the majority of traditional methods of instruction may be replaced with enhanced interactive sessions, using personal computers, artificial intelligence, virtual reality, and simulators in a seamless advanced distributed learning environment. The process would be aided and abetted by feedback from analysis of the student's cognitive processes so the learning devices could alter strategies to best support individualized learning.

In addition, the goal of training providers in the Air Force Reserve component is to produce and deliver distributed learning through as many delivery systems as possible, including Internet-delivered training. Air Force Reserve components expect to be able to capture training from whatever the source.

4.2.3.1 Current Initiatives. Current plans call for an expansion of both *right-time, right-place* courses, and *anytime-anywhere* instruction. Current initiatives include the creation of the Air Force Institute for Distance Learning to serve as the central focal point for distributed (distance) learning and the evaluation of formal courses, and to expand the number of courses and instructional modules delivered to the field. This contracted evaluation may result in 400 additional courses being converted to a variety of distributed learning media.   Also, the Air Force is leading the joint Service project to develop prototype ADL Initiative concepts in the Train-the-Trainer course.

Additionally, the Air Force is looking for advanced distributed learning solutions to support Air Expeditionary Force (AEF) deployments. The Air Force is building a Distributed Mission Training (DMT) system of linked, high-fidelity simulators that allows combat aircrews to train more effectively. They will be linked with AWACS, JSTARS, and bomber simulators, and an air operations center allowing vital mission training to take place year round, just before AEF deployments. The Air University has proposed enhancing the Air War College (AWC) and Air Command and Staff College (ACSC) nonresident courses with the use of new advanced distributed learning tools. The current ACSC curriculum is a hybrid, using CD ROM, Internet, and paper media with an operational "Virtual Campus" that uses Internet bulletin boards, chat rooms with threaded discussion, streaming media, and e-mail. The American Productivity and Quality Center has recognized ACSC's initiative in its Consortium Benchmarking Study *Using Technology in Education.* The AWC has implemented a portal called "Gateway to the Internet," with access to over 10,000 on-line resources.

The Air Force is also looking at innovative hybrid applications that can accommodate various styles, domains, and levels of learning. For example, the Air Force Trainer's Course, currently under prototype evaluation, uses synchronous interactive television broadcasts via the Air Technology Network and asynchronous interactive modules delivered via the Internet. Also, the Air Force plans to incorporate electronic enhancements in its paper-based correspondence courses to allow for the rapid update of information and to reach higher levels of learning.

The Reserve components are also actively involved in distance learning. The Air Force Reserve Command (AFRC) is in the initial stages of reviewing a proposal to convert its interactive television system (TNET) to the Air Technology Network, which would enhance the compatibility between the Air National Guard and active Air Force systems. The Professional Development Center at AFRC is currently identifying and converting local indoctrination courses, 35 to date, to distance learning. The Air National Guard and AFRC are co-sponsoring an internal Air Force initiative to develop a workable compensation policy for Guardsman/Reservists who take distance learning courses. The Reserve components have a tremendous need for distance learning alternatives to existing resident courses – and they are working to implement new distance learning-based courses as soon as they can be developed.

Distance learning concepts and initiatives are contained in the Air Force Distance Learning Roadmap, which serves as an internal Air Force guide to investment and mission-

essential priorities for the Air Force Distance Learning Program.

4.2.3.2 Long-Range Goals. The Air Force plans to exploit future advanced distributed learning technologies to increase AEF readiness and to reduce education and training costs. The long-term goal is to implement concepts in *PME 2020, Spacecast 2020,* and *Air Force 2025*.

4.2.4   United States Marine Corps. The Marine Corps has a fully-funded service-wide advanced distributed learning program. It has developed a robust infrastructure to develop, deliver, and track network-centric training and educational materials. The USMC plan calls for the installation of a Training and Education Point of Presence (TEPOP) at each Marine Corps base and station. Every networked workstation in the Marine Corps will have access to digital training materials. Marines without a workstation will gain access through the Learning Resources Centers that are being installed at each base and station. Forward-deployed Marines will be serviced by a robust deployable system that is designed to operate in expeditionary environments. The Marine Corps is also making wide use of videoteletraining (VTT) systems. They have established a standards-based system that is interoperable with the other Services VTT systems. The Marine Corps is in the process of converting its first series of courses for delivery in the network-centric environment.

4.2.4.1 Current Initiatives. Currently, the Marine Corps is in the pilot phase of its advanced distributed learning program. During this phase it has established a sub-set of the greater Marine Corps Learning Network (MarineNet). Infrastructure has been installed at three geographically dispersed Marine Corps bases. A systems integration test of the Marine Corps' advanced distributed learning initiative is scheduled for early summer 1999. The Marine Corps goal is to test the following on-line system functionality to: log on to the system; register for a course; take a course; take the on-line exam; and to receive course credit.

The Marine Corps remains fully engaged with the ADL Initiative, DoD working groups, and other collaborative efforts. Current efforts also include bridging the MarineNet infrastructure with the Marine Reserve Network (R-Net) to provide the Reserve component with access to the same on-line course material.

4.2.4.2 Long-Range Goals. The Marine Corps views distributed learning as a supporting arm to the greater training modernization effort occurring within the Corps. The combined efforts of training modernization and distributed learning will enable the Marine Corps to shorten the time a Marine spends in a resident school setting. The overarching goal of Marine Corps advanced distributed learning is to shorten the "street to fleet" process and provide Marines, regardless of location, access to world-class training and education materials (*anytime, anywhere*).

4.3 Other Distributed Learning Programs.

4.3.1 Defense Acquisition University (DAU). DAU's technology-based education and training vision is to provide an educational program that fully supports a culture of continuous learning. It

provides for convenient, cost-effective access to education, training, performance support, and expert advice to all members of the DoD acquisition community.

4.3.1.1 Current Initiatives. DAU has identified the following requirements for expanding the use of technology-based instruction: certification training, career advancement training, and cross training. Using data from the Defense Acquisition Workforce Improvement Act (DAWIA), DAU has determined that the annual demand for certification training, to meet current job requirements, exceeds 36,000 training events. Approximately half that number of individuals currently attend DAU certification courses each year. Approximately 15 percent of individuals enrolled in DAU courses prepare themselves for career advancement by taking advanced courses in their career fields. In addition to certification and career advancement, DAWIA personnel also enroll in courses for cross training and continuing education outside their career fields. Presently, 22 percent of those who enroll in DAU courses are DAWIA personnel who are outside the career field(s) for which the course is required for certification.

In 1995, DAU developed a technology road map that charted its migration from a traditional classroom environment to a virtual educational enterprise. In 1997, DAU designed, built, and implemented an on-line system that provides: curriculum and career program administration; on-line registration; course delivery and management; test administration; student assessment and tracking; survey development and delivery; reports; and student and instructor collaboration tools. This environment enables students to check their knowledge, assess their learning, and engage in highly interactive exercises.

To accommodate the new skill sets required by instructors, DAU has a professional development program in place that uses performance support tools to manage students and curriculum on-line. By mid-2000, the entire DAU curriculum will have been modernized through technology infusion. All courses will use a mixed media approach to optimize the educational experience. Industry benchmarks and best practices will be integrated throughout DAU's entire management process. For example, the software engineering rapid prototyping model has been effective in reducing the time for design and on-line implementation of courses. DAU's goal from its 1995 plan is being executed to form a modern, technology-driven education and training, continuous-learning enterprise.

4.3.1.2 Long-Range Goals. DAU's goal is to provide high-quality acquisition educational opportunities to ensure the competency and readiness of the DAWIA workforce. Efficiencies realized through process re-engineering will be used to support ongoing curriculum modernization.

4.3.2 Defense Logistics Agency (DLA). DLA plans to conduct *right-time, right-place* distributed learning via a variety of technologies. These include, but are not limited to, audio/video teleconferencing via the DLA Network and Internet (commercial, government, and agency-developed). The DLA Network will consist of approximately six origination sites and 35 satellite downlinks. It will be interoperable with all affiliates of the Government Education and Training Network and able to receive the Public Broadcasting System (The Business Channel)

and the National Technological University programming.

4.3.2.1 Current Initiatives. Current initiatives include: on-going identification of courses/programs within the DLA inventory which will be converted to a distributed learning format, ongoing development of those previously identified for conversion, continued expansion of the satellite and terrestrial infrastructure (scheduled for completion in June 1999), and continued movement toward computer and Internet access for all personnel.

4.3.2.2 Long-Range Goals. DLA's long-range goal is to ensure that each training event is the most effective and efficient it can be while providing *right-time, right-place* learning for all DLA personnel.

4.3.3 Defense Intelligence Agency (DIA). Under the leadership of DIA, many future training requirements of the DoD General Intelligence Training System (GITS) community will be met through the establishment of a classified on-line "Virtual University" within the *right-time, right-place* constraints of selected national security facilities. The purpose of the Virtual University project is to make available to the GITS community a comprehensive and integrated on-line learning applications system capable of providing advanced distributed learning via Intelink and the Joint Intelligence Virtual Architecture (JIVA) environment.

4.3.3.1 Current Initiatives. Phase I of the Virtual University initiative will begin this fiscal year (1999) with the selection of a contractor to analyze, design, deliver, install, maintain, and manage the Virtual University project in support of the JIVA Integration Management Office and the GITS community. The contractor will assist in the development of an architecture, including hardware and/or software, that can be implemented in stages, to provide a comprehensive on-line learning applications system for an estimated 10,000 Defense Intelligence Community users operating within the Intelink classified intelligence Intranet.

4.3.3.2 Long-Range Goals. Future phases of the Virtual University project will expand the implementation of the architecture to provide robust synchronous and asynchronous links among the DIA Joint Military Intelligence Training Center, the four-Service intelligence schools, and the Unified Commands' Regional Joint Intelligence Training Facilities. The Virtual University will incorporate the JIVA Collaborative Environment (JCE) into its structure and maximize the use of the JCE in the delivery of worldwide training to desktops located within selected national security facilities. Another DIA long-range goal is to explore collaborative efforts and partnerships with other DoD intelligence agencies, USACOM, and the Joint Staff (J-7) as they continue to advance the DJTI.

4.3.4 The Department of Defense Education Activity (DoDEA). DoDEA is a Department of Defense field activity providing education to eligible Department of Defense military and civilian dependents, from kindergarten through high school, at sites overseas and in the United States.

Overseas. The system of overseas schools, known as the Department of Defense

Dependents Schools (DoDDS) serves an estimated 85,000 students in 170 schools and one community college. The DoDDS staff numbers 12,500 employees, located in 14 countries.

United States. The U.S. system of schools, the Department of Defense Domestic Dependent Elementary and Secondary Schools, is comprised of a staff of 5,300 employees and serves an estimated 33,000 students in 65 schools located in seven states, Guam, and the Commonwealth of Puerto Rico.

4.3.4.1 Current Initiatives. The current distributed learning program in DoDEA served close to 1,000 students in School Year 1997-1998 through credit-bearing high school courses. The program, known as the DoDEA Electronic School, offered high school courses using Lotus Notes software. It has allowed DoDEA to operate a learning program across eight time zones with minimum scheduling difficulties by offering scheduled asynchronous courses (*anytime, anywhere*). An additional 2,000 students were served through distributed learning activities such as Writer's Workshop and National Geographic Kidset. The DoDEA is the first kindergarten-through-high school school system to use asynchronous distributed learning technologies to provide high school courses. DoDEA has provided distributed learning courses to its students since 1986.

In March 1998, an evaluation of the distributed learning program identified strengths and challenges in the program. The first on-line train-the-trainer course was provided to DoDEA staff during School Year 1998-1999. As a result, new high school courses and staff development courses are planned for school year 1999-2000.

4.3.4.2 Long-Range Goals. At the request of the Director, DoDEA, a Distributed Learning Steering Committee was established. The committee has proposed the following five overarching goals, each with measurable implementing benchmarks and objectives, involving critical aspects of providing and managing life-long learning opportunities for all DoDEA stakeholders.

1. Institutionalize the DoDEA Electronic School. Plan, develop, deliver, and evaluate kindergarten-through-high school core and elective courses that can leverage emerging distributed learning technologies.
2. Establish the DoDEA Electronic Campus. Plan, develop, deliver, and evaluate professional development and training for the DoDEA workforce.
3. Leverage Technologies. Develop innovative technological and methodological approaches for lesson and course development.
4. Establish Best Business Practices. Ensure that DoDEA distributed learning programs are developed and maintained according to Government Performance and Results Act criteria and programs sponsored by the National Partnership for Reinventing Government.
5. Establish Outreach Programs. Establish formal affiliations with public and private institutions pursuing lifelong learning initiatives.

4.3.5 Director of Central Intelligence (DCI). DCI's Intelligence Community (IC) Management Staff has a strategic plan intended to move the IC toward a cooperative and consolidated training/education mission of improving employee performance and using the most appropriate methodologies, including technology-assisted training, classroom-based training, and outsourced training.

4.3.5.1 Current Initiatives. Three initiatives are moving the IC forward in learning: implementation of lead agencies for collaborative training across the IC; establishment of standard training data and metrics; and leveraging of appropriately applied technology to all aspects of learning in the IC.

4.3.5.2 Long-Range Goals. The lead agency concept will direct the IC to the reduction of unwarranted duplication and to the expansion of workforce expertise.

4.3.6 National Security Agency (NSA). NSA distributed learning initiatives are centered on the National Cryptologic Strategy for the 21st Century (NCS-21) and, specifically, Goal 5 of that strategy, which states: "Transform the Cryptologic Workforce, Processes and Infrastructure to Meet the Emerging Challenges." This has led to an aggressive effort to provide a distributed learning system that particularly emphasizes learning in the Information Technology (IT) area. NSA's initiatives use web-based and network technologies to deliver this training, thus reinforcing learning by using IT to teach IT. Today, nearly 25 percent of all training courses offered by NSA use distributed learning technologies. In the process of bringing this vision to reality, NSA has developed a wide range of partnerships across government. Most of NSA's current and future initiatives are available to, or developed in concert with, other Defense organizations, non-Defense IC agencies, and U.S. government civil agencies.

4.3.6.1 Current Initiatives. NSA currently has two web-based distributed learning initiatives -- Project FasTrac and Project WebTrain.

FasTrac offers a library of over 300 COTS courses, rich in IT subject matter. FasTrac courses are accessible over the NSA intranet, over Intelink, or over the Internet. Government partners participating in FasTrac include the Navy, the Defense Intelligence Agency, the Central Intelligence Agency, the National Imagery and Mapping Agency, the Federal Bureau of Investigation, the National Park Service, and the National Aeronautics and Space Administration. The FasTrac curriculum includes all courses required for Microsoft and Novell certification.

WebTrain provides government-owned and developed courses, many with classified content, to NSA headquarters and worldwide field activities and is available only over secure networks. NSA also operates the Secure Distance Learning Network (SDLN) - a dedicated, videoteletraining system connecting selected Army, Navy, Air Force, and DoD training and academic institutions to operating locations around the globe. The SDLN provides classified training and education. NSA is also heavily engaged in the use of embedded learning initiatives and maintains a staff of experts in Electronic Performance Support Systems (EPSS). These

experts consult with systems acquisition authorities and systems developers to ensure that learning is designed into new systems when they are deployed. NSA's government partner in the EPSS arena is the Defense Intelligence Agency. Finally, NSA has an initiative to explore the use of modeling, simulation, and virtual classrooms and laboratories in a distributed learning environment. In partnership with the Chief of Naval Education and Training (CNET), NSA is developing a virtual signals analysis and processing laboratory for a CNET school. Designed using Virtual Reality Mark-up Language (VRML) to functionally simulate suites of equipment hardware and software, this virtual laboratory will be operational in early 2000.

4.3.6.2 Long-Range Goals. NSA intends to deliver 50 percent of all its courses via distributed learning by the year 2005. NSA's philosophy is that "The future of learning is virtual." As the workforce is increasingly populated with men and women who grew up using the World-Wide Web and who are as comfortable in virtual environments as real ones, the learning system must adapt to their needs. Realistic simulations and virtual environments, accessible through a distributed network, will train this 21st Century workforce. NSA is also committed to developing a totally modular, reusable curriculum. To achieve this end, NSA will develop an extensive library of learning modules, known as the Object Training Library (OTL). The OTL will be an on-line resource for trainers and students. It will consist of a wide variety of "training objects," including reference materials, video clips, and access to subject-matter experts and coaches, as well as course module outlines and materials, all available on-demand.

4.3.7 Director of Military Support (DOMS): The Consequence Management Program Integration Office (CoMPIO) of DOMS, was established by Defense Reform Initiative Directive Number 25 to improve DoD support for civil response to terrorist attacks involving the use of Weapons of Mass Destruction (WMD). CoMPIO has developed an advanced distributed learning strategy as part of an overall training program (known as "Utmost Confidence") to meet the training needs of military WMD response elements. In order to meet those training needs and respond effectively to operational requirements, CoMPIO plans to rapidly develop and deliver quality advanced distributed learning tools that are in consonance with their strategic objectives. These objectives include sharing state-of-the-art development techniques, avoiding duplication of efforts (and funding), speeding development and reducing costs by identifying and leveraging existing infrastructure and courseware products, and achieving economies of scale by identifying multiple-agency user requirements for interagency collaborative development efforts and shared funding.

4.3.7.1 Current Initiatives. The CoMPIO advanced distributed learning strategy includes:

> **a. Partnering**. CoMPIO is actively collaborating with a number of Defense activities, Federal agencies, and various national and international associations with interests in the WMD area. Among its activities are developmental efforts with the Department of Justice's Office of State and Local Domestic Preparedness Support, National Institute of Justice, and National Domestic Preparedness Office, the OSTP, the Department of Energy, and the Environmental Protection Association. Extensive collaboration occurs with the National Fire Academy (NFA),

the International Association of Fire Chiefs, the National Fire Protection Association and other affected associations.   Additionally, internal Defense Department initiatives are under way with the National Guard Bureau, the Office of the Chief of the Army Reserve, the Air Force National Security Program, the Marine Corps Systems Command, the Naval Air Warfare Center-Training Support Division, the U.S. Army Chemical School (USACMLS), U.S. Army Transportation School, the Army Medical Department, the Soldier Biological and Chemical Command (SBCCOM), the Army Reserve Readiness Training Center, and the National Guard Professional Education Center.

       b. Major Development Initiatives. CoMPIO advanced distributed learning efforts are focused on several projects that offer the potential to deliver high training value directly aimed at program training requirements. The emphasis is on rapidly delivering quality products to users to provide initial or sustainment training opportunities that can reduce travel costs, allow *anytime-anywhere* learning, and provide operational performance-aiding support. The following is a summary of the projects for FY 1999-2000:

       1. Courseware Survey. WMD-response courseware development tends to be done through ad hoc and independent efforts. Future developmental efforts must include collaboration among various Defense and interagency partners. CoMPIO has surveyed existing and in-development courseware and created an archive of over 20 courseware projects that provide training and education on WMD response. These products are predominantly delivered via CD ROM, but also include web-based instruction, satellite-delivery, video-teleconferencing, and correspondence courses.

       2. Courseware Development. CoMPIO has provided both direct and indirect support of courseware development to meet the training needs of DoD WMD response elements. It has directly sponsored development of a Nuclear, Biological, Chemical (NBC) Awareness course called "ABC Plus."   The target audience for this course includes several hundred members of Reserve component WMD response units. CoMPIO has also provided indirect, but not insubstantial, support to increased development of courseware for training and maintenance of NBC detection and protection equipment. Over 20 CD ROMs have already been developed under this SBCCOM and the USACMLS co-sponsored effort. CoMPIO also provided support to the effort by the U.S. Army Reserve Command, which funded the development of an Incident Command System CD ROM for the NFA.

       3. Infrastructure Testing and Development. CoMPIO is funding a major test and evaluation of the existing Reserve components advanced distributed learning infrastructure. The backbone of this infrastructure is the Army National Guard network known as GuardNet and the Air National Guard network known as WarriorNet. GuardNet, WarriorNet, and the Army's Reserve Component Automation System allow distribution of many training opportunities to Guard and Reserve soldiers and airmen. An additional advantage of the National Guard system is the capability to offer advanced distributed learning training opportunities to millions of additional students, such as emergency first responders and state and local civil leaders, through

the "shared usage" arrangement authorized by Congress.

4.3.7.2 Long-Range Goals. CoMPIO intends to fund and/or otherwise support migration of WMD-response-related courseware to web-based applications and also seeks to harness the improved interactivity and learning opportunities associated with artificial intelligence applications. CoMPIO received initial approval from the NFA to collaborate in the development of four NFA advanced distributed learning courses including: Emergency Response to Terrorism (Incident Management), a 40-hour course; Emergency Response to Terrorism (Tactical Considerations) (Command), a 16-hour course; Emergency Response to Terrorism (Tactical Considerations) (HAZMAT), a 16-hour course; and Emergency Response to Terrorism (Tactical Considerations) (EMS), a 16-hour course. Additionally, CoMPIO is planning significant involvement in distributed simulation capabilities such as:

      a. Virtual Environment (VE) Simulations Training. CoMPIO is researching the feasibility of placing virtual training suites in each of the ten states which host National Guard Rapid Assessment and Initial Detection (RAID) teams. These states also host the Federal Emergency Management Agency regional headquarters and include: Massachusetts, New York, Pennsylvania, Georgia, Illinois, Missouri, Texas, Colorado, California, and Washington. The purpose of this virtual training initiative is to provide each RAID team with a virtual environment capability with immersive and interactive virtual environments. A major feature under consideration is the partial digitization of maps and physical features for ten of America's largest cities. Washington, D.C. has already been digitized in a prototype effort. The ten cities under consideration for digitization include: Boston, MA; New York City, NY (lower Manhattan); Philadelphia, PA; Atlanta, GA; Chicago, IL; St. Louis, MO; Dallas, TX; Denver, CO; Los Angeles, CA; and Seattle, WA. This digitization includes high-fidelity renderings of selected building interiors, using CAD/CAM drawings. The White House has been rendered in high fidelity for the Washington, D.C. prototype. The existence of such a virtual environment training capability affords certain significant advantages, including terrain/buildings association, rehearsal of response efforts in buildings where live training is impossible, and enhanced operational security by moving training to the confines of a secure facility from live sites where adversary/threat surveillance is possible. Vehicle models (such as emergency first-responder vehicles) and digital people (avatars) which can replicate the effects of NBC agent exposures may be developed. Stealth capability and automated after-action reporting systems may be included.

      b. Constructive Environment (CE) Simulations Training. CoMPIO is involved in assessing the training value of a number of CE simulations for use by Defense and emergency first-response organizations. This analysis effort is specifically looking at the following simulations: Janus-based applications, Spectrum, and Emergency Information Systems (EIS). Two major factors in the decision on which system(s) to select will be interoperability among various users (e.g., what systems are other organizations using?) and interoperability with other training environments (e.g., live-virtual interfaces known as Synthetic Theater of War and compliance with system standards such as the High-Level Architecture).

4.3.8 DoD Civilian Education, Training, and Operations. Defense Components use an ever-increasing array of technology-assisted means to develop and deliver training and education to their civilian personnel. These include CD ROMs, video courses, Internet-based tutorials and presentations, and interactive video-teleconferencing. The Army has converted a number of its civilian leader development core courses and personnel management classes to on-line programs. The Total Army Distance Learning Plan integrates selected Army Civilian Training, Education, and Development System (ACTEDS) and American Continuing Education System (ACES) programs. Navy field activities are pursing distributed learning initiatives, including accessing a distance-based MBA program and other university courses, and network-distributed computer-based training (CBT) for such mandatory training as prevention of sexual harassment and ethics training. The Air Force has established a Distance Learning Training Section at the Air Force Personnel Center. Their approach to distance training will normally take the form of live television-type training broadcasts via satellite, computer-based training modules, web-based training modules deployed over the Internet, or some combination of all the methods. In addition, civilian personnel in various components participate in and benefit from the distributed learning initiatives developed for military personnel.

4.3.8.1 Current Initiatives. The Civilian Personnel Management Service (CPMS) is developing a modernized Defense Civilian Personnel Data System (DCPDS) that will include an Oracle-based system of training administration that will migrate to a web application. Its purpose is to speed overall accessibility to learning opportunities and reduce administrative costs, while ensuring compliance with statutory and regulatory requirements. The Department of Defense is also pursuing the possibility of electronic commerce for purposes of enrolling in and purchasing training. CPMS is deploying a Knowledge-Based System (KBS) that will serve as an expert electronic adviser on training administration matters. In addition, the Department-wide Defense Leadership and Management Program (DLAMP) provides web-based tutorials to review, refresh, and enhance the knowledge of students before taking two-week graduate-level courses sponsored by DLAMP. Beyond these initiatives, the Civilian Personnel Policy Office is working with the DUSD(R) to determine applications of the ADL Initiative for civilian purposes in the Department.

4.3.8.2 Long-Range Goals. The goal is to prepare people and systems to meet changing national security challenges and opportunities in accordance with DoD's training technology vision. Learning strategy drives the technology strategy, whether that technology is a classroom or web-based tutorial, for educational or training purposes.

4.3.9 George C. Marshall European Center for Security Studies and the Partnership for Peace (PfP) Consortium of Defense Academies and Security Studies Institutes. The Marshall Center has a unique student body, drawing military and civilian officials from 37 countries throughout Europe, Eurasia, and North America. The PfP Consortium of Defense Academies and Security Studies Institutes was formed to strengthen defense civilian and military professionalism through enhanced national and institutional cooperation among the 44 Euro-Atlantic Partnership Council countries. The goal of both institutions is to promote an atmosphere

conducive to cooperation on defense and security studies issues. Since infrastructure development varies widely within these target countries, the Marshall Center and the PfP Consortium will rely primarily on the Partnership for Peace Information Management System (PIMS) network to support their advanced distributed learning efforts.

4.3.9.1 Current Initiatives. The Marshall Center and the PfP Consortium are fully committed to remaining engaged with the ADL Initiative and other collaborative approaches to defense military and civilian education and training. The Marshall Center is currently examining its Advanced Seminar Program to make it available on-line to users on the PIMS Intranet. Language training modules in English, German, and Russian are being developed to improve interoperability by making these terminology courses available in a read-ahead mode prior to students arriving at the Marshall Center. On-line computer training modules will be made available to allow PIMS users in the Partner countries to increase their computer proficiency prior to arriving at the Marshall Center resident courses.

4.3.9.2 Long-Range Goals. The Marshall Center wants to provide a system of continuous learning opportunities for its past, present, and future course participants. To accommodate the new skill sets required by teachers in Classroom XXI, our professors will be exposed to multimedia teaching concepts from programs such as the one at MIT's Hypermedia Teaching Facility. The Continuing Education Program of the Marshall Center looks to take advantage of moderated discussion groups so course participants can maintain direct contacts with their professors and fellow participants. The Marshall Center also intends to make course materials available on-line for resident participants and those involved with distance learning. As these and other technological innovations contribute to the learning environment, the Marshall Center believes that participants and professors alike will become more comfortable with the use of computers in education, thus promoting interoperability in the security studies environment of tomorrow.

5.0 Next Steps – Implementation Plan

As addressed in this Strategy, the Department of Defense has a broad range of distributed learning plans, programs, and initiatives under way, each in various stages of development and implementation. The Military Services (Active and Reserve components), the Joint Staff, and Defense Components are embracing the use of distributed learning as a way to increase access to learning content and increase efficiency. The Office of the Under Secretary of Defense for Personnel and Readiness established the ADL Initiative to coordinate these programs and develop the common architecture and standards that will ensure interoperability and reuse of distributed learning tools and resources across the Department. Furthermore, rather than create a Defense-unique solution, the ADL Initiative leverages collaborative efforts -- involving other public-sector organizations, academia, and the private sector -- to develop a common open-architecture framework in support of Defense and National advanced distributed learning needs.

The ADL Initiative has been recognized by the Executive Branch in a January 30, 1998 memorandum, "*Enhancing Learning and Education Through Technology*," as a model for Federal agencies and others to follow (Appendix F). Given its experience and leadership in the ADL Initiative, the Department of Defense has been designated in Executive Order 13111 (Appendix B) as the lead Federal agency for developing open-architecture standards. In addition, there are a number of "next steps" under way.

For example, to provide the capability to assess ADL Initiative prototypes against the open-architecture standards that are now emerging, the Department is establishing an ADL "Co-laboratory" that will serve as a technical and analytical resource for use by the Services and other DoD participants. The DUSD(R) staff is working with the Office of the Director, Defense Research and Engineering to establish a DoD science and technology program that provides near-, mid-, and long-range research and development support to the ADL Initiative. The staff is also working with the DoD Comptroller to clearly identify and coordinate the funds associated with DoD distributed learning programs and initiatives. DUSD(R) is also working closely with the Services, Joint Staff, and Defense Components to develop learning content and prototype delivery systems that demonstrate the utility and effectiveness of distributed learning technologies.

This report provides the *DoD Strategic Plan for Advanced Distributed Learning* to achieve the Secretary's vision that the Department of Defense provide its Total Force access to the highest quality education and training that can be tailored to individual needs, and delivered cost effectively, anywhere and anytime it is required. While the Department makes a concerted effort to move from today's classroom-centric learning model to the advanced distributed learning paradigm, a learner-centric model, it will apply a DoD-wide learning modernization strategy to:

- Exploit existing network-based technologies;
- Create platform neutral and reusable content;
- Promote widespread collaboration to satisfy common needs;
- Enhance performance with next-generation learning technologies;

- Develop a common framework that drives COTS product cycles; and
- Establish a coordinated implementation process.

A detailed Implementation Plan, which identifies specific advanced distributed learning prototypes, program milestones, and associated resources, will be developed and provided to Congress by July 30, 1999. The Implementation Plan will also detail: how this Department-wide effort will share state-of-the-art development techniques; how Defense Components will avoid duplication of effort (and funding); how DoD can speed development of learning technologies and reduce costs by identifying and leveraging existing infrastructure and courseware products; and how advanced distributed learning collaborative partners can achieve economies of scale by identifying multiple-agency user requirements for interagency collaborative development efforts and shared funding. The plan will be a roadmap to achieve the advanced distributed learning end-state that is:

- Accessible -- the ability to access instructional components from one remote location and deliver it to many other locations;
- Interoperable -- the ability to use instructional components developed in one location with one set of tools or platform in another location with a different set of tools or platform;
- Durable -- instructional components do not require redesign or recoding to operate when base technology changes; and
- Cost-effective -- significantly increase learning effectiveness while reducing time and costs.

In the future, U.S. Armed Forces will, in all likelihood, continue to deploy to missions that are unlike those we have faced in the Cold War era. They will have to deploy on a moment's notice, to unfamiliar regions of the world, to conduct operations for which they may not have planned or practiced. Their readiness and capability to conduct such operations requires the Department of Defense to re-engineer its education, training, and performance mentoring processes so it can distribute knowledge to the force when and where it needs it -- at home, at home station, while deploying, or in the theater of operations.

6.0   Appendices

Attached

Appendix A: Congressional Strategic Plan Requirement Language taken from the Strom Thurmond National Defense Authorization Act for FY 1999.

SEC. 378. STRATEGIC PLAN FOR EXPANSION OF DISTANCE LEARNING INITIATIVES.

(a) Plan Required--The Secretary of Defense shall develop a strategic plan for guiding and expanding distance learning initiatives within the Department of Defense. The plan shall provide for an expansion of such initiatives over five consecutive fiscal years beginning with fiscal year 2000.

(b) Content of Plan--The strategic plan shall contain, at a minimum, the following:

   (1) A statement of measurable goals and objectives and outcome-related performance indicators (consistent with section 1115 of title 31, United States Code, relating to agency performance plans) for the development and execution of distance learning initiatives throughout the Department of Defense.
   (2) A detailed description of how distance learning initiatives are to be developed and managed within the Department of Defense.
   (3) An assessment of the estimated costs and the benefits associated with developing and maintaining an appropriate infrastructure for distance learning.
   (4) A statement of planned expenditures for the investments necessary to build and maintain that infrastructure.
   (5) A description of the mechanisms that are to be used to supervise the development and coordination of the distance learning initiatives of the Department of Defense.

(c) Relationship to Existing Initiative--In developing the strategic plan, the Secretary may take into account the ongoing collaborative effort among the Department of Defense, other Federal agencies, and private industry that is known as the Advanced Distribution Learning initiative. However, the Secretary shall ensure that the strategic plan is specifically focused on the training and education goals and objectives of the Department of Defense.

(d) Submission to Congress--The Secretary of Defense shall submit the strategic plan to Congress not later than March 1, 1999.

Appendix B: Presidential Executive Order 13111, January 12, 1999, Subject: Using Technology To Improve Training Opportunities For Federal Government Employees.

THE WHITE HOUSE

Office of the Press Secretary
For Immediate Release   January 12, 1999
EXECUTIVE ORDER
USING TECHNOLOGY TO IMPROVE TRAINING OPPORTUNITIES
FOR FEDERAL GOVERNMENT EMPLOYEES

Advances in technology and increased skills needs are changing the workplace at an ever increasing rate. These advances can make Federal employees more productive and provide improved service to our customers, the American taxpayers. We need to ensure that we continue to train Federal employees to take full advantage of these technological advances and to acquire the skills and learning needed to succeed in a changing workplace. A coordinated Federal effort is needed to provide flexible training opportunities to employees and to explore how Federal training programs, initiatives, and policies can better support lifelong learning through the use of learning technology.

To help us meet these goals, I am creating a task force on Federal training technology, directing Federal agencies to take certain steps to enhance employees' training opportunities through the use of training technology, and an advisory committee on the use of training technology, which also will explore options for financing the training and post-secondary education needed to upgrade skills and gain new knowledge.

Therefore, by the authority vested in me as President by the Constitution and the laws of the United States of America, including the Federal Advisory Committee Act, as amended (5 U.S.C. App.), and in furtherance of the purposes of Chapter 41 of title 5, United States Code, the Government Employees Training Act of 1958 (Public Law 85-507), as amended, and Executive Order 11348, "Providing for the Further Training of Government Employees," and in order to make effective use of technology to improve training opportunities for Federal Government employees, it is ordered as follows:

Section 1. Establishment of the President's Task Force on Federal Training Technology.

(a) The "President's Task Force on Federal Training Technology" (Task Force) is established. The Task Force shall provide leadership regarding the effective use of technology in training and education; make training opportunities an integral part of continuing employment in the Federal Government; and facilitate the ongoing coordination of Federal activities concerning the use of technology in training. The Task Force shall consist of the heads of the following departments and agencies or their representatives: the Departments of State, the Treasury, Defense, Justice, Interior, Agriculture, Commerce, Labor, Health and Human Services, Housing and Urban

Development, Transportation, Energy, and Education; the Office of Personnel Management, General Services Administration, Environmental Protection Agency, National Aeronautics and Space and Administration, Small Business Administration, and Social Security Administration; a representative from the Small Agency Council; and representatives from other relevant agencies and related Federal councils, as determined by the Chair and Vice Chair of the Task Force.

(b) Within 30 days of the date of this order, the head of each agency or council shall designate a senior official to serve as a representative to the Task Force. The representative shall report directly to the agency head or the President's Management Council member on the agency's or council's activities under this order.

(c) The Director of the Office of Personnel Management (OPM) shall be the Chair and the representative from the Department of Labor shall be the Vice Chair of the Task Force.

(d) The Chair and Vice Chair shall appoint an Executive Director.

(e) The Task Force member agencies shall provide any required staffing and funding, as appropriate.

Sec. 2. Duties of the Task Force.

(a) Within 18 months of the date of this order, the Task Force shall develop and recommend to the President, through the Assistant to the President for Economic Policy and the Assistant to the President for Science and Technology, a policy to make effective use of technology to improve training opportunities for Federal Government employees. The policy should promote and integrate the effective use of training technologies to create affordable and convenient training opportunities to improve Federal employee performance. The Task Force shall seek the views of experts from industry, academia, and State and local governments as the Task Force proceeds, as appropriate. Specifically, the Task Force shall:

(1) develop strategies to improve the efficiency and availability of training opportunities for Federal Government employees;

(2) form partnerships among key Federal agencies, State and local governments, businesses, universities, and other appropriate entities to promote the development and use of high-quality training opportunities;

(3) analyze the use of technology in existing training programs and policies of the Task Force member agencies to determine what changes, modifications, and innovations may be necessary to advance training opportunities;

(4) in consultation with the Department of Defense and the National Institute of Standards and Technology, recommend standards for training software and associated services purchased by

Federal agencies and contractors. These standards should be consistent with voluntary industry consensus-based commercial standards. Agencies, where appropriate, should use these standards in procurements to promote reusable training component software and thereby reduce duplication in the development of courseware;

(5) evaluate and, where appropriate, coordinate and collaborate on, research and demonstration activities of Task Force member agencies related to Federal training technology;

(6) identify and support cross-agency training areas that would particularly benefit from new instructional technologies and facilitate multi-agency procurement and use of training materials, where appropriate;

(7) in consultation with the General Services Administration, the Office of Personnel Management, and the Office of Federal Procurement Policy of the Office of Management and Budget (OFPP), promote existing and new procurement vehicles that allow agencies to provide innovative training opportunities for Federal employees;

(8) recommend changes that may be needed to existing procurement laws to further the objectives of this order and forward the recommendations to the Administrator of OFPP; and

(b) develop options and recommendations for establishing a Federal Individual Training Account for each Federal worker for training relevant to his or her Federal employment. To the extent permitted by law, such accounts may be established with the funds allocated to the agency for employee training. Approval for training would be within the discretion of the individual employee's manager. Options and recommendations shall be reported no later than 6 months from the date of this order.

Sec. 3. Duties of All Federal Agencies. (a) Each Federal agency shall, to the extent permitted by law:

(1) include as part of its annual budget process a set of goals to provide the highest quality and most efficient training opportunities possible to its employees, and a set of performance measures of the quality and availability of training opportunities possible to its employees. Such measures should be, where appropriate, based on outcomes related to performance rather than time allocation;

(2) identify the resources necessary to achieve the aforementioned goals and performance measures articulated in its annual performance plan;

(3) and, where practicable, use the standards recommended by the Task Force and published by the Office of Personnel Management for purchasing training software and associated services; and

(4) subject to the availability of appropriations, post training courses, information, and other learning opportunities on the Department of Labor's America's Learning Exchange (ALX), or other appropriate information dissemination vehicles as determined by the Task Force, to make information about Federal training courses, information, and other learning opportunities widely available to Federal employees.

(b) Each Federal agency, to the extent permitted by law, is encouraged to consider how savings achieved through the efficient use of training technology can be reinvested in improved training for their employees.

Sec. 4. Duties of Specific Federal Agencies.

(a) In light of the Office of Personnel Management's responsibility for developing Government-wide training policy, coordinating and managing training policy programs, and providing technical assistance to Federal agencies, the Office of Personnel Management or other appropriate agency as determined by the Task Force shall:

    (1) in consultation with the Task Force, the Department of Defense, the National Institute of Standards and Technology, the Department of Labor, and other appropriate agencies as determined by OPM, publish the standards for training software and associated services recommended by the Task Force; and

    (2) ensure that qualification standards for civil service positions, where appropriate, reflect standard industry certification practices.

(b) The Department of Labor or other appropriate agency as determined by the Task Force shall, subject to the availability of appropriations:

    (1) establish a specialized database for Federal training within the framework of the Department of Labor's ALX, or other appropriate information dissemination vehicles determined by the Task Force, to make information about Federal training courses, information, and other learning opportunities widely available to Federal employees;

    (2) establish and maintain a training technology Website for agencies to post training needs and to foster communication among the agencies and between public and private sector organizations to identify and meet common needs; and

    (3) establish a staffed help desk and technology resource center to support Federal agencies using training technology and to facilitate the development of online training courses.

(c) The Department of Defense or other appropriate agency as determined by the Task Force shall:

(1) in consultation with the National Institute of Standards and Technology, lead Federal participation in business and university organizations charged with developing consensus standards for training software and associated services and lead the Federal review of the standards; and

(2) provide guidance to Defense agencies and advise the civilian agencies, as appropriate, on how best to use these standards for large-scale development and implementation of efficient and effective distributed learning technologies.

(d) Each Executive department shall designate at least one subject area of training that it will use to demonstrate opportunities in technology-based training and assign an agency leader in the designated area. Leaders in these training technology experiments shall work closely with other agencies with similar training interests. Each Executive department shall develop a plan for measuring and evaluating the effectiveness, cost-effectiveness, and benefits to employees and the agency for each designated subject area.

Sec. 5. Establishment of Advisory Committee on Expanding Training Opportunities.

The Advisory Committee on Expanding Training Opportunities (Committee) is established. The Committee shall consist of not more that 20 members appointed by the President from outside the Federal Government, including representatives of the research, education, labor, and training communities, information technology sector, and representatives from other critical sectors. The President shall designate Co-Chairs from among the members of the Committee.

Sec. 6. Functions of the Advisory Committee.

The Committee shall provide the President, through the Assistant to the President for Economic Policy and the Assistant to the President for Science and Technology (Assistants to the President), with:

(a) an independent assessment of:

(1) progress made by the Federal Government in its use and integration of technology in training programs, particularly in the use of voluntary industry consensus-based commercial standards for training software and associated services;

(2) how Federal Government programs, initiatives, and policies can encourage or accelerate training technology to provide more accessible, more timely, and more cost-effective training opportunities for all Americans;

(3) mechanisms for the Federal Government to encourage private sector investment in the development of high-quality instructional software and wider deployment and utilization of technology-mediated instruction so that all Americans may take advantage of the opportunities

provided by learning technology; and

(4) the appropriate Federal Government role in research and development for learning technologies and their applications in order to develop high-quality training and education opportunities for all Americans;

(b) an analysis of options for helping adult Americans finance the training and post-secondary education needed to upgrade skills and gain new knowledge. Options for financial mechanisms may include grants, tax incentives, low-interest loans, or other vehicles to make training and post-secondary education accessible to adults throughout their lifetimes; and

(c) advice on other issues regarding emerging technologies in government training and financing training and post-secondary education for adult Americans as specified by the Assistants to the President.

Sec. 7. Administration of the Advisory Committee.

(a) To the extent permitted by law and subject to the availability of appropriations, the Office of Personnel Management shall provide the financial and administrative support for the Committee.

(b) The heads of Executive agencies shall, to the extent permitted by law, provide to the Committee such information as it may require for the purpose of carrying out its functions.

(c) The Committee Co-Chairs may, from time to time, invite experts to submit information to the Committee and may form subcommittees or working groups within the Committee to review specific issues.

(d) Members of the Committee shall serve without compensation but shall be allowed travel expenses, including per diem instead of subsistence, as authorized by law for persons serving intermittently in the Government service (5 U.S.C. 5701-5707).

(e) Notwithstanding any other Executive order, the functions of the President under the Federal Advisory Committee Act, as amended, that are applicable to the Committee, except that of reporting to the Congress, shall be performed by the Office of Personnel Management in accordance with guidelines that have been issued by the Administrator of General Services.

(f) The Committee shall terminate 2 years from the date of this order unless extended by the President prior to such date.

Sec. 8. Definitions.

(a) As used in this order, the terms "agency," "employee," "Government," and "training" have the meaning given to those terms, respectively, by section 4101 of title 5, United States Code.

(b) The term "technology," means any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information, including computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources. For purposes of the preceding sentence, equipment is used by an Executive agency if the equipment is used by the Executive agency directly or is used by a contractor under a contract with the Executive agency that requires the use of such equipment. The term "technology" does not include any equipment that is acquired by a Federal contractor incidental to a Federal contract.

Sec. 9. Judicial Review. This order does not create any enforceable rights against the United States, its agencies, its officers, or any person.

WILLIAM J. CLINTON
THE WHITE HOUSE
January 12, 1999

Appendix C: Secretary of Defense DoD Training Technology Vision, January 6, 1999

President's Federal Training Technology Initiative
Department of Defense "Training Technology Vision"

Leadership and Vision -- America's military Services have a long tradition and a well-deserved reputation of world-class training. For example, having highly trained service members was a key to our overwhelming success in Operation Desert Storm. We recognize that, as in the past, training will be the key to our success in future military operations. That is why training remains a high priority for the U.S. Armed Forces. It is the key to their readiness. It is the reason why our servicemen and servicewomen are the most capable in the world today. As good as we are at training, however, we are always vigilant in seeking opportunities to become better.

The Department of Defense's vision is to "ensure that DoD personnel have access to the highest quality education and training that can be tailored to their needs and delivered cost effectively, anytime and anywhere."

In tomorrow's dynamic threat environment, we may have to deploy our forces on a moment's notice, often to conduct operations that we cannot predict beforehand. We must be able to train our forces effectively and rapidly, whether they are at home station, en route, or in the theater of operations. This is a lofty goal.

Technology Goals -- Our education and training programs must prepare the total force to meet national security challenges and opportunities. Training technologies, those today as well as those on the horizon, provide an opportunity to help us achieve that goal. We must take advantage of this opportunity if we are to maintain our competitive edge.

At the same time that training technologies hold the promise for future military success, their rapid evolution poses a tough challenge. The rapid rate of technological change has made it necessary to update learning materials continually to keep pace with changes in the underlying software and hardware. Keeping up with technological change is expensive, sometimes prohibitively so.

Fortunately, technology also provides a means to meet this challenge. We have been successful in developing a common architecture to ensure interoperability of models and simulations in collective training. Building upon this success, we have kicked off a new DoD initiative in learning technologies - the Advanced Distributed Learning Initiative (ADL). The ADL is a collaborative effort to expedite production of learning materials and tools that are reusable, can run on a broad range of hardware platforms, and can be accessed and modified over a communications network.

Partnership/Collaboration -- While we initially developed the ADL concept as a DoD solution to a DoD problem, we quickly discovered that it offered a common solution for common problems, not only to the military Services and Defense agencies, but to other public-sector organizations,

academic institutions, and private industry. That is why a basic tenet of ADL is to form partnerships within and across all sectors. This will allow us to collaborate on establishing a common framework for developing, administering, and using distributed learning content and tools. Furthermore, ADL products will support education and performance mentoring, as well as training.

Value -- Initial indications are that ADL will provide high-quality education and training faster and at lower costs. Over the next five years we expect ADL to increase dramatically the number of courses that use learning technologies. Our analyses indicate that ADL may help us: reduce classroom time by as much as 30 percent, increase student performance by as much as 20 percent, reduce travel and per diem costs, and reduce development costs by up to 50 percent. Since the Military Services provide over 170,000 student years of training annually in training centers, ADL has the potential for substantial savings.

In summary, the Department of Defense is very enthusiastic about the promise of advanced distributed learning technologies, and encouraged by the broad support we have received for the ADL Initiative. To take full advantage of such learning technologies, we have launched a DoD-wide effort to develop a strategy and plans for learning technology development and widespread application. We are convinced that learning technologies will change the cost of doing business. More importantly, we are convinced that our efforts to build this future learning environment will pay off by continuing the Military Services' status as world-class trainers, by enhancing the readiness of our forces, and by ensuring that our servicemen and servicewomen remain the most capable in the world tomorrow.

Appendix D: Excerpts from Chairman of the Joint Chiefs of Staff *Joint Vision 2010* **and** *Concept for Future Joint Operations - Expanding Joint Vision 2010***:**

To sustain the Armed Forces and instill new operational concepts will require high quality people - the key ingredient for success. The judgment, creativity, and fortitude of our people will remain the key to success in future joint operations. Turning concepts into capabilities requires adapting our leadership, doctrine, education and training, organizations, and materiel to meet the high tempo, high technology demands posed by these new concepts.

Realistic and stressful training has been the primary way to keep readiness high and prepare our men and women to face the challenges of combat. Such training, consisting of carefully balanced programs of individual, crew, and larger organizational training and assessments, is central to training the way we will fight. From individual or crew mission simulators, through full-blown field exercises at home or abroad, realistic, evaluated training is and must remain our best combat multiplier. Joint, coalition, and combined training and exercises have improved our interoperability and understanding of the strengths of each individual Service as well as allies and coalition partners. From the individual warfighter to large multinational forces, this systematic approach has enabled our men and women to hone their skills in practice many times before ever having to perform actual combat missions. These training innovations must be sustained.

How we respond to dynamic changes concerning potential adversaries, technological advances and their implications, and the emerging importance for information superiority will dramatically impact how well our Armed Forces can perform its duties in 2010.

This era will be one of accelerating technological change. Critical advances will have enormous impact on all military forces. Successful adaptation of new and improved technologies may provide great increases in specific capabilities.

… in all operations technological advances and our use of information will give our warfighters at the individual, crew, and small unit levels major qualitative advantages over potential adversaries.

In sum, by 2010 we should be able to enhance the capabilities of our forces through technology. This will, in turn, expand our greatest advantage: the adaptability, initiative, teamwork, and commitment of our people at every level.

Our education and training programs must prepare joint warriors to meet the challenges of the future battlespace. These programs must emphasize employment of new technologies and achieving the operational concepts outlined in this vision.

Enhanced modeling and simulation of the battlespace, when coupled to on the ground

evaluation with real soldiers, sailors, airmen, and marines, can improve the realism of training, upgrade the levels of day-to-day readiness, and increase our opportunities to test innovative concepts and new strategies. Simulations must be interconnected globally—creating a near-real-time interactive simulation superhighway between our forces in every theater.

This global simulation network must include our Reserve and National Guard units, as well as selected multinational partners, to increase their readiness and interoperability.

We will need a responsive research, development, and acquisition process to incorporate new technologies. This process must leverage technology and management innovations originating in the private sector through responsive access to commercial developments.

Today, America's Armed Forces are the world standard for military excellence and joint warfighting. We will further strengthen our military capabilities by taking advantage of improved technology and the vitality and innovation of our people to prepare our forces for the 21st century.

Training and education in the future can leverage information superiority and much more effectively use remote approaches to train large groups of geographically distributed people. This could change how all training, from basic to advanced, is addressed in 2010.

As the active force evolves toward innovative methods of training, including interactive simulation and links to actual planning and information systems, the RC will have to be exposed to the same high-quality training if they are to be interoperable when activated.

New training and simulation capabilities will enable en route training for forces activated or deployed on short notice. This will require reevaluation of routine training programs to ensure that en route training can effectively prepare each of the various elements of the joint force for employment on arrival in theater.

Appendix E: Deputy Secretary of Defense memorandum for DoD components, November 23, 1998, Subject: Developing and Implementing the DoD Advanced Distributed Learning (ADL) Initiative.

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
      CHAIRMAN OF THE JOINT CHIEFS OF STAFF
      UNDER SECRETARIES OF DEFENSE
      DIRECTOR DEFENSE RESEARCH AND ENGINEERING
      ASSISTANT SECRETARIES OF DEFENSE
      GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
      INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
      DIRECTOR OF OPERATIONAL TEST AND EVALUATION
      ASSISTANTS TO THE SECRETARY OF DEFENSE
      DIRECTOR OF ADMINISTRATION AND MANAGEMENT
      DIRECTORS OF DEFENSE AGENCIES
      DIRECTORS OF THE DEPARTMENT OF DEFENSE FIELD ACTIVITIES

SUBJECT: Developing and Implementing the DoD Advanced Distributed Learning (ADL) Initiative

The extraordinary demands that today's dynamic international security environment places on the Department of Defense underscore the urgent need to identify more efficient and effective ways to educate, train, and support DoD personnel. In responding to those demands the Military Departments, Defense Agencies, Joint Staff, and Office of the Secretary of Defense have undertaken impressive actions to develop and apply advanced distributed learning technologies. As a measure of our success, the President has cited DoD's Advanced Distributed Learning (ADL) Initiative as a model for others to follow, and the Congress wants to expand these efforts.

To ensure that we develop and implement such technologies as broadly and cost effectively as possible, I am directing the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) to lead the Department's Advanced Distributed Learning (ADL) Initiative. The USD(P&R) will:

- Work with the Services, Joint Staff, and other DoD Components to produce an ADL policy for developing and implementing advanced distributed learning technologies across the Department;

- Develop, in coordination with the Services, Joint Staff, and DoD Components, an ADL "master plan" that addresses the plans, programs, and procedures necessary to carry out the policy;

- Coordinate with the Services, USD(A&T), and the Comptroller to ensure that sufficient programs and resources are made available to implement the ADL master plan; and

- Provide the DoD ADL strategic report to the Congress and the ADL master plan to me not later than February 23, 1999 and April 9, 1999 respectively.

At a minimum, the ADL master plan will provide a strategy for: using existing and emerging network-based technologies; creating and maintaining reusable learning content; promoting and establishing widespread collaboration within the Department of Defense, as well as with other federal agencies and the private sector; enhancing on-the-job performance through the systematic application of learning technologies; and developing a common technical framework for the distributed learning environment.

I have asked Tom Longstreth, Deputy Under Secretary of Defense for Readiness, to coordinate policy oversight of these efforts. I direct the Military Departments and all concerned to give Tom their full cooperation and provide to him the information that he requests so that I can submit a comprehensive report to the Congress and approve a well-thought-out and feasible master plan.

Information about the ADL Initiative is available on the worldwide Web at www.adlnet.org.

/S/
John J. Hamre

Appendix F: Presidential Executive Memorandum, January 30, 1998, Subject: Enhancing Learning and Education Through Technology.

THE WHITE HOUSE

January 30, 1998

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Enhancing Learning and Education Through Technology

The Federal Government continually invests in training its employees. Federal agencies have an obligation to provide the best training for their employees at the lowest possible cost. Federal agency training programs should be model users of new technologies to enhance learning. Many agencies are already improving training by using new technology effectively, but more can be done. New instructional technologies can also make education, at work and at home, easier and more convenient for all American workers. Federal programs that provide financial support for lifelong learning should adapt to the new opportunities technology provides. A Federal Government-wide effort is needed to explore how Federal programs and initiatives can better support the use of technologies for lifelong learning. Therefore, I hereby direct as follows:

1. The National Economic Council (NEC), in consultation with the Chief Information Officers Council (CIOC) as established by Executive Order 13011 of July 16, 1996, the Office of Personnel Management (OPM) and the Office of Science and Technology Policy (OSTP), shall investigate how to make full use of emerging technologies to improve the cost-effectiveness and the quality of Federal training programs. Specifically, I direct that within 6 months from the date of this memorandum the NEC, in consultation with CIOC, OPM and OSTP, provide me a plan identifying areas in which technology-enhanced training and learning may complement conventional Federal training and learning. The plan should describe how the agencies, when feasible and appropriate, will:

    (a) make full use of best commercial practices when purchasing instructional software;

    (b) work with businesses, universities, and other appropriate entities to foster a competitive market for electronic instruction;

    (c) develop a model technical approach to facilitate electronic instruction building on existing agency efforts, such as the Advanced Distributed Learning Initiative Partnership; and

    (d) develop and support a program of research that will accelerate the development and

adoption of new instructional technologies.

    2. The Secretary of Education and the Secretary of Labor shall work together to promote adoption of the best new ways of using technology to enhance training and education in programs that provide Federal support for education and training.

    3. The NEC, in coordination with the Office of Management and Budget, the OSTP, and other appropriate Federal Government entities, shall develop a national strategy to promote high-quality education and training opportunities that can be offered in a manner that is efficient, affordable, and convenient. Industry, universities, labor unions, and other stakeholders should be consulted in the development of the strategy. The strategy shall be completed within 6 months of the date of this memorandum.

WILLIAM J. CLINTON

Appendix G: **GLOSSARY**

AC	Active Component
ACES	American Continuing Education System
ACTEDS	Army Civilian Training, Education, and Development System
ACOM	Atlantic Command (see also USACOM)
ADLS	Advanced Distributed Learning System
ADLIP	Advanced Distributed Learning Implementation Plan
AEF	Air Expeditionary Force
AFRL	Air Force Research Laboratory
CAPTOR	Crisis Action Planning Tutored On-Line Resource
CAS^3	Combined Arms Services Staff School
C^4I	Command, Control, Communications, Computers, and Intelligence
CD ROM	compact disc - read only memory
CE	constructive environment
CINCs	Commanders in Chief
CJCS	Chairman, Joint Chiefs of Staff
CNET	Chief of Naval Education and Training
CNO N7	Chief Naval Operations, Director of Naval Training
COTS	commercial off-the-shelf
CPMS	Civilian Personnel Management Service
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act

DCI	Director Central Intelligence
DIA	Defense Intelligence Agency
DJTI	Distributed Joint Training Initiative
DOCNET	Doctrine Networked Education and Training
DLA	Defense Logistics Agency
DoD	Department of Defense
DoDEA	Department of Defense Educational Activity
DOMS CoMPIO	Director of Military Support, Consequence Management Program Integration Office
DTTP	Distributive Training Technology Project
DUSD(L)	Deputy Under Secretary of Defense for Logistics
DUSD(R)	Deputy Under Secretary for Defense for Readiness
EMS	emergency medical service
EPSS	Electronic Performance Support Systems
ESG	Executive Steering Group
FTTI	Federal Training Technology Initiative
GAO	Government Accounting Office
GITS	General Intelligence Training System
HAZMAT	hazardous materials
IC	Intelligence Community
ICW	interactive courseware
IT	information technology

JC^{2}RP	Joint Command and Control Research Program
JCE	JIVA Collaborative Environment
JDEIS	Joint Doctrine Electronic Information System
JDOL	Joint Doctrine Operations Laboratory
JDTC	Joint Deployment Training Center
JEL	Joint Electronic Library
J-4	Director for Logistics, Joint Staff
JIVA	Joint Intelligence Virtual Architecture
JDLS	Joint Digital Library System
JOS	Joint Operations Simulation
JPME	Joint Professional Military Education
J-6	Director for Command, Control, Communications, and Computers, Joint Staff
J-7	Director for Operational Plans and Interoperability, Joint Staff
JTA	Joint Technical Architecture
JTASC	Joint Training and Simulation Center
JTF	Joint task force
JVLE	Joint Virtual Learning Environment
JV 2010	Joint Vision 2010
JWFC	Joint Warfighting Center
KBS	knowledge based system
MarineNet	Marine Corps Learning Network

NATO	North Atlantic Treaty Organization
NCS-21	National Cryptologic Strategy for the 21st Century
NCW	network centric warfare
NDU	National Defense University
NSA	National Security Agency
OPMEP	Chairman of the Joint Chiefs of Staff (CJCS) Instruction CJCSI 1800.01 re Joint Staff oversight of JPME
OPTEMPO	operational tempo
OSD	Office of the Secretary of Defense
OSTP	Office of Science and Technology Policy
OTL	Object Training Library
PERSTEMPO	personnel tempo
PfP	Partnership for Peace
PME	Professional Military Education
PTI	Presidential Technology Initiative
QDR	Quadrennial Defense Review
RAID	Rapid Assessment and Initial Detection
RC	Reserve component
R&D	research and development
R-NET	Marine Reserve Network
SAP	Simplified Acquisition Procedure
SDLN	Secure Distance Learning Network

TADLP   Total Army Distance Learning Program

TEPOP   Training and Education Point of Presence

TFDLAT   Total Force Distributed Learning Action Team

TRADOC   U.S. Army Training and Doctrine Command

TRANSCOM   U.S. Transportation Command

USACOM   United States Atlantic Command (see also ACOM)

USD(A&T)   Under Secretary for Defense for Acquisition and Technology

USD(P&R)   Under Secretary of Defense for Personnel and Readiness

USMC   United States Marine Corps

VE   virtual environment

VRML   Virtual Reality Modeling Language

VTT   videoteletraining

WAN   wide area network

WMD   Weapons of Mass Destruction

WWW   World-Wide Web