Military Training Technology

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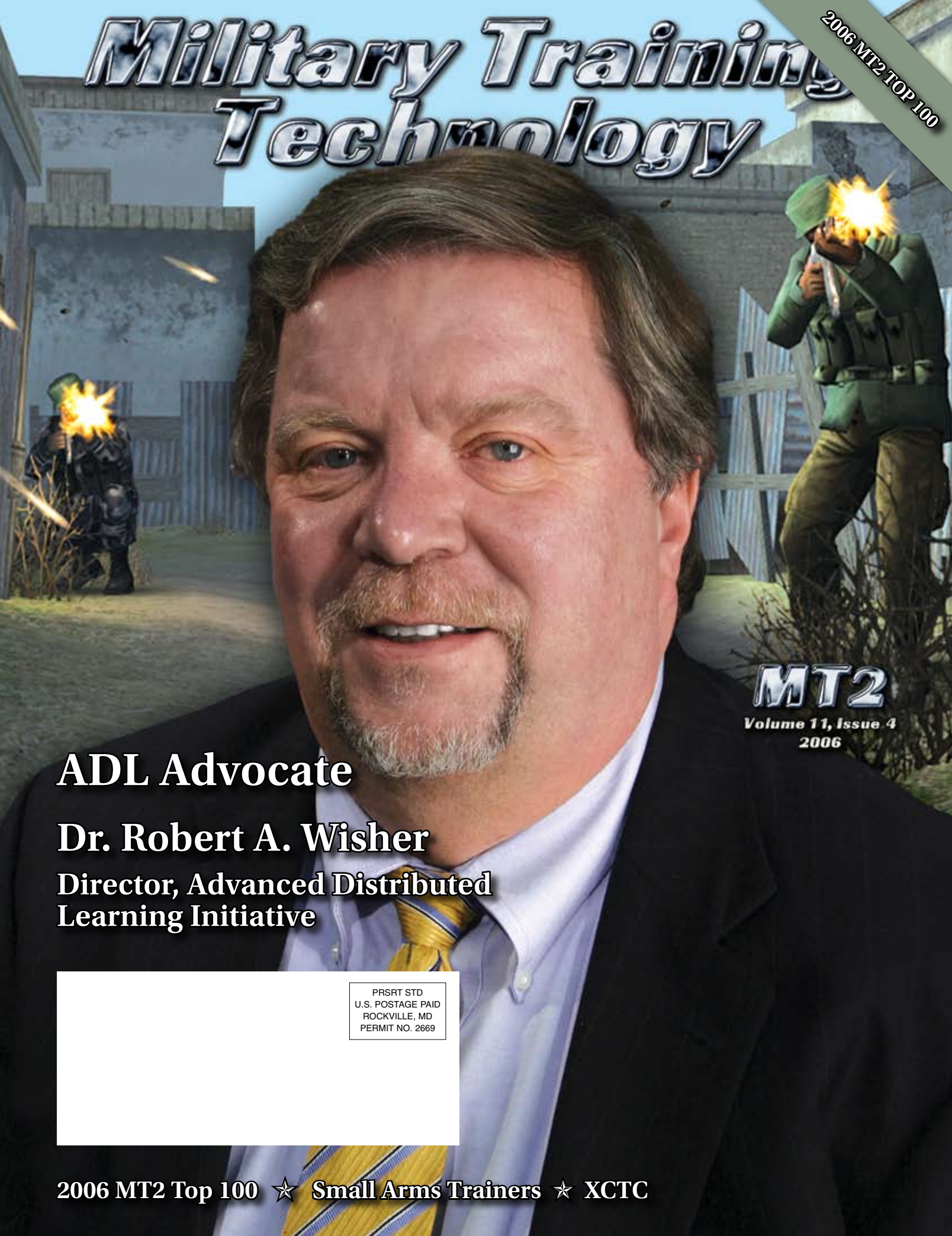

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Dr. Robert A. Wisher

Director, Advanced Distributed Learning Initiative

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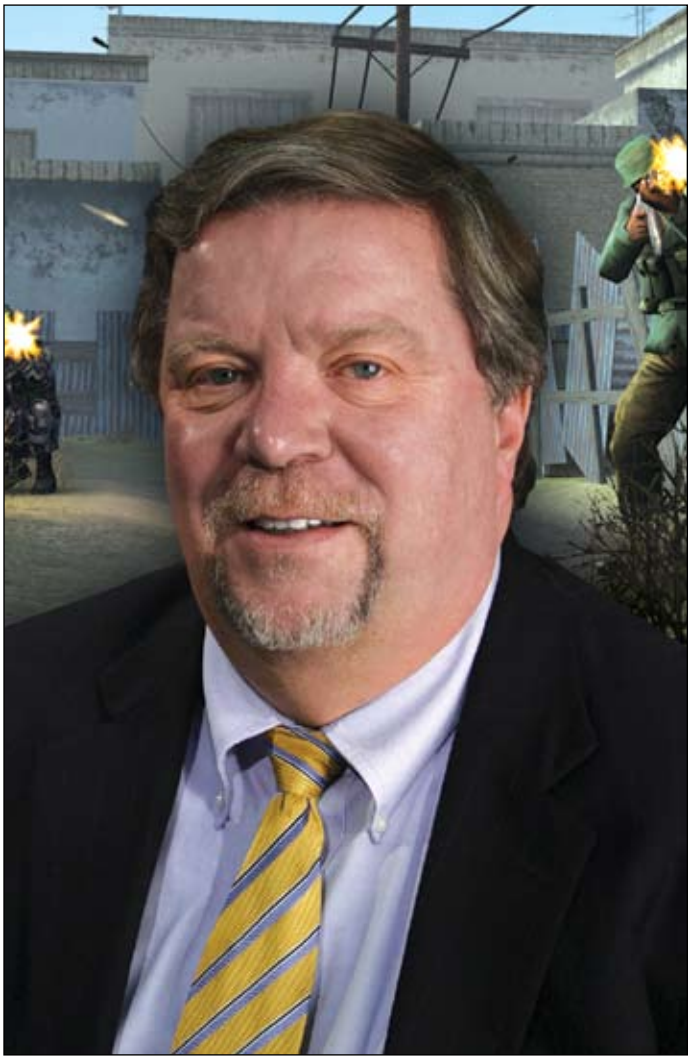
Q&A

Making the Vision of Learning Anytime, Anywhere, a Reality

Robert A. Wisher, Ph.D., Director, Advanced Distributed Learning Initiative (ADL)



Dr. Wisher is responsible for directing and implementing the ADL Initiative within the Department of Defense (DoD), as well as other government organizations, academia and industry on an international basis. Wisher provides direction for the development and refinement of the Sharable Content Object Reference Model (SCORM) and for the continued expansion of the ADL Initiative.

Wisher has more than 25 years of experience in research and development for education and training technologies. As a research psychologist in the service laboratories, Wisher conducted experiments on the training effectiveness of computer-mediated multimedia learning technology. Later, he directed research on the acquisition of military skills and their long-term retention, and more recently on the training effectiveness of various distributed learning technologies.

Wisher previously served as a scientific officer at the Office of Naval Research (ONR) in the psychological sciences program, supporting basic research on the fundamental characteristics of learning and memory in technology-based environments. In 2000, he was a visiting scholar at the Center for Research on Learning and Technology at Indiana University. He has published numerous articles, chapters and technical reports concerning the use of technology in training, and serves on the editorial advisory boards of several professional journals. In 2003, Wisher was elected to the board of directors for the IMS Global Learning Consortium.

Wisher received his Ph.D. in cognitive psychology from the University of California, San Diego. He graduated from Purdue University with a B.S. in mathematics.

Q: What is the Advanced Distributed Learning initiative and what do you do as the director for ADL?

A: The Department of Defense launched the Advanced Distributed Learning [ADL] initiative in November 1997. ADL is intended to accelerate large-scale development of dynamic and cost-effective learning software and to stimulate a vigorous market for these products. Under Executive Order 13111, ADL is to develop and demonstrate capabilities that can be adopted by all federal agencies.

The initiative is establishing a common technical framework for computer and Web-based learning that fosters the creation of reusable learning content as "learning objects." The vision of the ADL initiative is to ensure access to high-quality education and training, tailored to individual needs, developed and delivered cost-effectively, available anytime and anywhere. ADL is an enabling technology in the DoD Training Transformation program.

The development of reusable, sharable learning objects is a necessary first step in achieving the ADL long-term vision. Among other things, content must be separated from run-time constraints and proprietary systems so that it can be incorporated into other applications, such as job performance aids. Content objects must, therefore, be durable, interoperable, accessible and reusable. As director of ADL, my job is to orchestrate the efforts of a very talented technical team and Co-Laboratory network as they progress toward achieving the ADL vision. Within the Office of the Secretary of Defense, I develop training policy that serves as a pull for the implementation of ADL products and processes. My job also involves funding ADL prototypes that serve as a push for the advancement of interoperable technologies. This is accomplished through our Joint ADL Co-Lab in Orlando. I am further engaged in forming partnerships with other federal agencies, with academia and industry, and with foreign governments who

express an interest in ADL.

Q: What is the significance of ADL celebrating its ninth anniversary in November 2006? How has the process changed over the years from when it was first instituted?

A: For the past nine years, much of the ADL effort has been devoted to the specification of reusable, sharable instructional objects in collaboration with numerous specification and standards bodies. Nine years ago, it was not possible, or at least very difficult, to exchange content from one learning management system to another. It was also not possible to render the learning experience through a Web browser in an interoperable manner. With the release of SCORM 2004 this is not only possible, but in current use in DoD, in other agencies and sectors, and in other nations.

The ADL business model has not changed over the years. We continue to develop and refine open specifications and standards for interoperability of online instruction through collaborative development with organizations such as the IMS Global Learning Consortium, the Institute of Electrical and Electronics Engineers (IEEE), and the International Organization for Standards, or ISO. What has changed is we are now in a position to implement these through the SCORM model.

The significance of the ninth anniversary of ADL is that we are at a threshold of achievement with SCORM, the first decisive piece towards the ADL vision. We are now focusing on the question of where are all the learning objects and how can one obtain them.

Q: Where are all the learning objects?

A: Within the DoD, all learning content will be centrally registered in the ADL-Registry, hosted by the Defense Technical Information Center (DTIC). This centralized registration is now required through a DoD Instruction (1322.26) "Development, Management and Delivery of Distributed Learning." Precisely what is registered are the metadata that describe the learning object in a structured way. This is accomplished through a component of SCORM, the Learning Object Metadata standard, now designated as IEEE 1484.12.1. In this way, the author, creation date, version number, keywords and other vital information for this individual object is available to the developer, instructor or student with a single search.

It is instructive to note that the content itself resides in repositories that are under the control of the military services and defense components, not in the ADL-Registry. This allows for visibility of objects while ensuring local control over access. For example, access to the complete object may be available only to 'dot mil' users or only to those from a specific service. Other content may be accessible to the general public. Access is a local decision that will be refined over time. The ADL Registry, then, is a federated registry of metadata from a collection of content repositories.

Q: How does this impact those outside of DoD?

A: The ADL-Registry is the first working instance of a much larger concept that goes by the name CORDRA. This stands for Content Object Repository Discovery and Registration Architecture. It is a model of how to enable the next step toward the ADL vision, which is how to find and reuse learning content.

As described by a thought leader in this area, Dr. Dan Rehak from the Learning Systems Architecture Lab and the ADL Workforce Co-Lab in Memphis, the goal of CORDRA is to develop a model for how to find and reuse content, using existing technology from the worlds of learning content delivery and management, content repositories, and digital libraries. CORDRA aims to identify and specify [not develop] appropriate technologies and existing interoperability standards that can be combined into a reference model that will enable learning content to be found, retrieved and re-used.

ADL is working in partnership with the Corporation of National Research Initiatives, the Learning Systems Architecture Laboratory, and DTIC to enable the ADL-Registry. Other federal agencies and parties external to the federal government are pursuing their own instance of CORDRA. In the longer term, ADL and leaders in the field envision a federation of registries on a global scale. The CORDRA system will provide a way to search for learning content via the catalogs of authored metadata in the registries. Unlike other search engines, it can provide content specifically authored for learning.

Q: What impact has ADL had on distance learning for the DOD, as well as other government organizations, academia and industry on an international basis?

A: Each service has procured one or in some cases several learning management systems. The requirement from our policy instruction is that the learning management systems be SCORM conformant, which most are, and that the content be centrally registered, which has just begun. For the online distributed learning component of distance learning, the tide has shifted to the SCORM framework. One of our largest surprises in ADL is the pace of international adoption. There are 29 learning management systems that have been independently certified as SCORM conformant—nearly half are from outside the United States. It is interesting to note that the largest user of SCORM 2004 is the K-12 Cyber Home Learning System in Korea, with more than 1 million students using this system with 185,000 daily users. A company from the People's Republic of China recently had a learning management system (LMS) certified to SCORM 2004. A NATO working group recently published a set of guidelines for using SCORM in NATO and Partnership for Peace countries. Our office has numerous requests to create ADL Partnership Labs from in other nations. Our most recent addition is in Australia with that nation's Department of Education, Science, and Training.

Q: Tell us more about SCORM and describe the impact it has had on ADL?

A: SCORM at a high-level is a collection of specifications and standards. The collection includes an overview and three books, Content Aggregation Model, Sequencing and Navigation, and Run-time Environment, along with supplemental materials. It applies the current developments in training technology through use of a specific content model to ensure consistent implementation of training across the e-learning community.

SCORM is built upon the work of the Aviation Industry Computer-Based Training Committee, the IMS Global Learning Consortium, Inc., the IEEE, the Alliance for Remote Instructional Authoring and Distribution Networks for Europe, and others to create one unified "reference model" of interrelated technical specifications and guidelines that meet high-level requirements for Web-based learning content and systems. The latest version of SCORM is called "SCORM 2004 3rd Edition. It continues to build upon a common Web-based "Content Aggregation Model" and a "Run-Time Environment" for learning content. SCORM continues to solidify its collection of specifications and standards adapted from multiple sources to provide a comprehensive suite of e-learning capabilities that enable interoperability, accessibility and reusability of Web-based learning content. SCORM 2004 3rd Edition introduces changes from past SCORM 2004 editions. These changes fall into several categories: clarification of concepts, clarification of requirements, changes due to standardization/specification efforts, best practices from the ADL Community, enhancements and bug fixes.

Q: What are Plugfest and Implementation Fest conference and what are their purposes?

A: The ADL Co-Lab sponsors Plugfests to bring together adopters of SCORM. Plugfest events provide ADL partners with the opportunity to synchronize the evolution and convergence of commercial authoring tools, learning management systems and Web-based courses with the evolving open-architecture specification. There have been nine Plugfests held in the United States and two International Plugfests. International Plugfest 1 was held February, 2004 at the Swiss Federal Institute of Technology in Zurich. The International Relations and Security Network co-hosted this event. A Global e-Learning Summit was hosted for participating international organizations to brief the community on the current status of their adoption and implementation of e-Learning standards in general and the SCORM in particular. International Plugfest II was held, in conjunction with the 2006 International Conference on SCORM 2004, January, 2006 at Tamkang University in Taipei, Taiwan. International Plugfest II focused on content, tools and LMSs that are implementing SCORM 2004. In addition, ADL participated in an ADL Forum in Mexico City this past May hosted by the Latin American Institute of Educational Communications, a consortium of 13 Latin American countries. The Implementation Fest represents a unique gathering of military, industry, and academic education and training professionals focused on learning about and discussing new distributed learning capabilities that support the total force. The educational and networking opportunities this conference provides make it the premier event for Department of Defense distributed learning. The Joint ADL Co-Lab hosted the fourth such event in Orlando this August. We had 350 attendees—a great success.

Q: What are the greatest current challenges to successfully implementing ADL and what are some of the steps that OSD has taken to help overcome them?

A: A Government Accountability Office (GAO) report in 2003 (GAO-03-393) on the Advanced Distributed Learning program identified that DoD has set high expectations for ADL. The challenges identified included cultural, technological and policy issues. I believe we have made excellent progress on the technological front, with the maturation of the SCORM model. What is needed next is for the DoD components to take full advantage of the power of SCORM, in particular the sequencing capability that allows learners to progress through a course or other learning experience that is individualized to their needs and to their learning preferences. Widespread access to sufficient bandwidth remains a concern, so we are working with the Assistant Secretary of Defense Networks and Information Integration office to become an early application on the Global Information Grid. Concerning policy challenges, Dr. David Chu, the Under Secretary of Defense for Personnel and Readiness, recently signed an Instruction (DoDI 1322.26) requiring conformance to SCORM and the central registration of content. We anticipate the services to issue regulations defining how they will implement this instruction. In the past three years, the services have moved forward with similar initiatives, such as the Navy's Integrated Learning Environment or the Army's Distributed Learning Program. The cultural issues identified by the GAO remain a challenge. The organizational culture has been resistant to change and the commitment by senior leadership has varied, but overall, the ADL approach is gaining acceptance as mentioned earlier. The efforts of the Defense Acquisition University provide a shining example of how to apply ADL to the 135,000 members of the acquisition workforce. Since the GAO report was issued, I see clear signs that senior leadership is recognizing and embracing the value of ADL. The Training Transformation program was initiated about the time the GAO report was released. T2, as we call it, identified ADL as an enabling technology. Now, the Joint Knowledge Development and Distribution Capability, which delivers online instruction related to joint audiences, is a leading proponent of the ADL approach.

Q: What is the Co-Lab Network and how does it help ADL achieve its mission?

A: The Department of Defense established the ADL Co-Laboratory [ADL Co-Lab] in 1999 at the Institute for Defense Analyses to foster the collaborative research, development and assessment of the common tools, standards, content and guidelines for the ADL Initiative. Since then three additional ADL Co-Labs [Academic, Joint and Workforce]; three ADL Partnership Labs [U.K., Canada and Australia] and two ADL Centers [ADL Technology Center and the ADL Job Performance Technology Center] have been created to form the ADL Co-Lab Network. We anticipate the number of Partnership Labs to increase in the near future. The Alexandria ADL Co-Lab is ADL's central organization for guiding, coordinating and integrating the operations of the ADL Co-Lab Network and operates under the direction of the Office of the Secretary of Defense. Located just outside Washington, D.C., the Alexandria ADL Co-Lab serves as a clearinghouse across organizational boundaries to coordinate and lead the systematic development and refinement of the future learning environment. The Alexandria ADL Co-Lab operates to stimulate development of technologies that enhance learning and performance across the DoD and other federal agencies. The Co-Lab Network helps the ADL achieve its mission by providing an open collaborative environment that shares best practices

in distributed learning technologies and applies them across government, industry, and academia.

Q: What are the technology challenges going forward in making ADL more of a success? What can industry do to better help ADL accomplish its mission?

A: The install base must expand before ADL can truly achieve its vision. This is especially true for learning content. Content must be plentiful, well-marked, and visible for others to discover and reuse. My office is currently sponsoring a study by the RAND Corporation which is examining the economics of reuse, searching for the inflection point when it is more likely that you will reuse or repurpose existing content rather than develop it from scratch. We are well along with SCORM and its acceptance is clearly heartening for all those who have given so much to its development over the years. The International Organization of Standards in Geneva, through a Joint Technical Committee, recently invited ADL and the National Body of the United Kingdom to submit SCORM under a fast-track procedure for consideration as a global standard. Where industry can help is in the development of tools that can ease the effort of creating content, tagging it with metadata, recording it in a repository, etc. We have identified 24 tools, both commercial and open source, that support the creation of SCORM content, but this is just a start. Specifically the marketplace within DoD needs better search tools and techniques for the ADL Registry, automatic synchronization of repositories with the ADL Registry, version control and user notification of changes, collaborative filtering or tagging of learning content with user ratings or recommendations and others.

We are also seeking ways to link SCORM environments to related environments, such as simulations and online games. In collaboration with the IEEE and the Simulation Interoperability Standards Organization, a SCORM-Simulation Interface Standards Study Group has been formed to determine how best to integrate simulation or game-based learning experiences with SCORM environments. This problem has many aspects, both pedagogical and technical. The potential is clearly substantial if SCORM content or runtime environments can invoke and communicate with simulations and games in a standardized and interoperable fashion.

Q: Any concluding comments?

A: Before 1997, and largely still true today, a disappointing consequence of the fragmented market for online instruction was the multiplicity of courses and course materials and services that were delivered by the thousands of independent providers. These products are usually very similar, but because of underinvestment they often fell short of good quality. In collaboration with the hundreds of organizations that we count as partners, ADL is seeking to change this landscape, beginning with DoD training. Many others have joined in. For further information on ADL, consult our website www.adlnet.gov. I would like to thank *MT2* for its past editorial coverage of our overarching Training Transformation program, and ADL in particular. We appreciate being able to share our successes and challenges with your distinguished readers. ☆