ADL

- Collaboration
- Learning Technologies
- Shared Problems
- Shared Solutions
“Learning” encompasses:

- Training
- Education
- Performance Mentoring
ADL Vision

- Quality Education and Training
- Tailored to Needs
- Delivered Cost Effectively
- Anytime
- Anywhere

Builds upon the success of the Defense Modeling and Simulation Initiative
Trained and Ready for What?
Future Missions Like the Recent Past – and More

Use of U.S. Forces Since 1990

• Chem / Bio
• Anti-Terrorism
• Counter-Proliferation

Today-2010?
ADL Perspective

- Distributed Learning
- Home
- Field
- Interagency Training Systems
- School
- Armory
- Embedded Training
- Office
- Digital Knowledge Libraries
ADL Strategy

Use learning technologies to modernize DoD training

- Exploit existing **network-based** technologies
- Create **platform neutral, reusable courseware** and **content** to lower costs
- Promote widespread **collaboration** to satisfy common needs
- Enhance performance with **emerging** and **next-generation** learning technologies
- Develop **common framework** that drives COTS product cycle
- Design the “**computer managed**” learning framework
- Establish a coordinated **implementation process**
Key ADL Characteristics

**Accessibility**: the ability to access instructional components from one remote location and deliver them to many other locations.

**Interoperability**: 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.

**Durability**: the ability to operate instructional components when base technology changes, without redesign or recoding.

**Reusability**: the ability to incorporate instructional components into multiple applications.

**Affordability**: the ability to significantly increase learning effectiveness while reducing time and costs.
Common Open Technical Architecture and “Object Oriented” Software Are Keys to Reuse

Simulation Software Components

- **Common Software** (utilities/services consistent across applications)
- **Unique Software** (objects tailored to particular use)

The Old Way: Stove-piped by Service, Mission, Location

The New Way: Shared Core, Re-Used Applications
Next Generation of Learning Technology
Offers Potential for Even Greater Efficiency

Studies suggest that Tutor Learning Achievement Is Better than Classroom Achievement by 2 Standard Deviations

Average tutored student’s achievement Is better than 98% of classroom students

Adapted From: Bloom, B.S. The Two-Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring. Educational Researcher. 13,4-16 (1984)
Some Effect Sizes for Technology-Based Instruction
(Standard Deviations)

- Computer Based Instruction (N=233) 0.39
- Interactive Multimedia Instruction (N=47) 0.50
- "Intelligent" Tutoring Systems (N=11) 0.84
- Recent Intelligent Tutoring Systems (N=5) 1.05
• Average number of questions asked by any student during a classroom hour -- 0.11

• Average number of questions asked by a student during a tutorial hour -- 21.1 (Research methods); 32.2 (Algebra)
Directives and Activities

Develop a **strategy** and **master plans** for using learning technologies on a broad scale

- QDR
- President’s Executive Order / FTTI
- Deputy Secretary’s Direction
- Congressional Reports
  - HASC
  - SASC
- DSB TF on Military Training and Education
Ongoing ADL Activities

Opportunities for DoD to leverage resources within the Department and across the Public and Private Sectors
ADL is focusing on web-based learning system standards

Learning System Standards
- content
- metadata
- LMS data model
- …

Internet Technologies
- HTML
- HTTP
- XML
- JAVA/JavaScript
- …

But not Internet standards
(others are doing that)
Evolution of Web-based Learning Technologies

1998
- Early versions of web-delivered learning content (early stage)

1999
- First robust web-based learning products and capabilities (1st generation)

2000
- Second generation products and services based on industry standards for web-based learning (mature/stable environment)
ADL Approach

- Examine military training learning models
- Develop a common “Shareable Courseware Object Reference Model” (SCOM)
- Map learning models to SCO reference model (to determine standards requirements)
- Submit requirements to appropriate groups
Shareable Courseware Object
Reference Model

A software model that defines the interrelationship of course components, data models, and protocols such that courseware “objects” are shareable across systems that conform with the same model.
Standards Efforts

- IEEE 1484 (meeting June 10, 99 with Chair)
  - *de jure* standards body
- IMS
  - Closer to “consortium” model
- AICC
  - Airline industry-based
- Macromedia/Oracle/Netg/Asymetrix
  - *de facto* standards
- ADL Technical Work Group
  - Catalyst
- President’s Federal Training Technology Task Force
  - Lead agency with NIST for Standards Focus Group
ADL Process

“SCO” Reference Model

Army
Navy
Air Force
Marines
(Joint Staff)

Services
ADL
Federal Agencies

Industry

AICC
IEEE
ADL TWG
VENDORS
IMS
**SCO-RM (0.5.2)**

1. **External Course Metadata**
   - [1a] External Course Metadata

2. **Executable Content**
   - [2] "Executable Content"
   - Metadata [1e]
   - (Internal organization of files, objects, etc.)

3. **Run Time Content Management**
   - [3a] "RawMedia"
   - [3] "RawMedia"
   - Metadata [2a]
   - (Internal organization of files, objects, etc.)

4. **Rules**
   - [1d] Rules

5. **Objectives**
   - [1c] Objectives

6. **SCO Interchange Format (I.F.)**
   - [1] SCO Interchange Format (I.F.)
   - [1b] Assignment Hierarchy
     - Tier 3: Course (Root)
       - Metadata [1e]
   - Tier 2: "Block" (Parent Node)
     - Metadata [1e]
   - Tier 1: "AU" (Leaf Node)
     - Metadata [1e]
     - (Points to)

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**Notes:**
- SCO-RM (0.5.2) stands for SCO Resource Management.
- The diagram illustrates the hierarchical structure of the SCO Interchange Format (I.F.) with assignment and execution hierarchies.
- External Course Metadata is linked to the framework, indicating its role in the overall structure.
- Executable Content is a crucial component, detailing metadata and internal organization.
- Run Time Content Management focuses on "RawMedia" and associated metadata.
- Rules and Objectives are foundational elements ensuring the effectiveness of the content hierarchy.
Summary of ADL Prototypes

- Performance Mentoring Example: Repair and Maintenance / GM
  - **Objective:** Apply GM methodology for training mentoring on demand
  - **Status:** DUSD(L) providing “Dual Use” incentives - multiple proposals

- On-line School Example: DAU’s ADL Prototype
  - **Objective:** Provide equal or better education opportunities to a wider audience
  - **Status:** Course delivery and management system with 5 courses on line today and another 14 courses in FY 99

- Joint Training Example: JCS ADL Prototype “DOCNET”
  - **Objective:** Provide high quality doctrine education to the Total Force, anytime, anywhere
  - **Status:** Initial Prototype on the web - 3 more modules planned

- Interagency Training Example: DoJ - DoD WMD
  - **Objective:** Increase Readiness to respond to WMD situations
  - **Status:** Areas of common interest being discussed
Where we are headed?

- **ADL**
  - Vision
  - Strategy
  - Implementation Plan

- **Federal Training Technology Initiative**
  - Uses ADL as a model
  - Develop technical standards
## Benefits of ADL

Potential to significantly reduce costs by up to 30% while satisfying education and training requirements

- Makes “learning” available to Total Force
- Enables just-in-time, just-enough, performance aiding.
- Leverages private-sector intellectual and financial investments: architecture, industry standards, courseware, etc.
- Creates an “open forum” for broad public and private collaboration: among DOD, federal agencies, technology suppliers, private businesses, national workforce, etc.
DoD must:

- **Fundamentally reengineer** how it does business to educate and train effectively in tomorrow’s knowledge-based environment
- **Provide incentives** for change
- **Collaborate** across DoD as well as with the public and private sectors
- **Develop common architectures** that will allow it to take advantage of rapidly changing technology
- **Experiment**
Backup Charts
1. Identify Performance Requirements

2 a. Develop and refine Technical Guidelines

2 b. Define areas for R&D of new tools

3. Collaboratively develop and test instructional and tools that conform to Technical Guidelines

4. Identify priorities for development and production

ADL Collaboratory Concept

Content Advocates

Technical Solutions

Common Framework

Test Beds

Product Development

Business Market Group

Research Priorities
<table>
<thead>
<tr>
<th>Event</th>
<th>Timeframe</th>
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</thead>
<tbody>
<tr>
<td>Build consensus</td>
<td>Q1 99 - under way</td>
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<tr>
<td>Issue draft ADL SCO Model</td>
<td>June 30, 1999</td>
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<tr>
<td>Refine SCO specifications with industry DoD, and government communities</td>
<td>Q2/3 1999</td>
</tr>
<tr>
<td>Release Version 1 ADL SCO specifications</td>
<td>Sept. 1999</td>
</tr>
<tr>
<td>Industry implementation/adoption</td>
<td>Q3/Q4 1999</td>
</tr>
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Some Terms

- **Distance Learning**: Structured learning that takes place when the instructor is not physically present.

- **Distributed Learning**: Structured learning that takes place anytime, anywhere it is needed or desired.
Some Example ADL Technologies

- Computer-Managed Instruction (CMI)
- Computer-Based Instruction (CBT)
- Interactive Multimedia Instruction (IMI)
- Intelligent Tutoring Systems (ITS)
- Networked Tutorial Simulation (NTS)
- Web-Based Training (WBT)