

**FINAL  
DCN/ICN  
IMPLEMENTATION PLAN**

**for the**

**DOD CALS IDE PROJECT**

**An MVP Joint Venture**

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Submitted by

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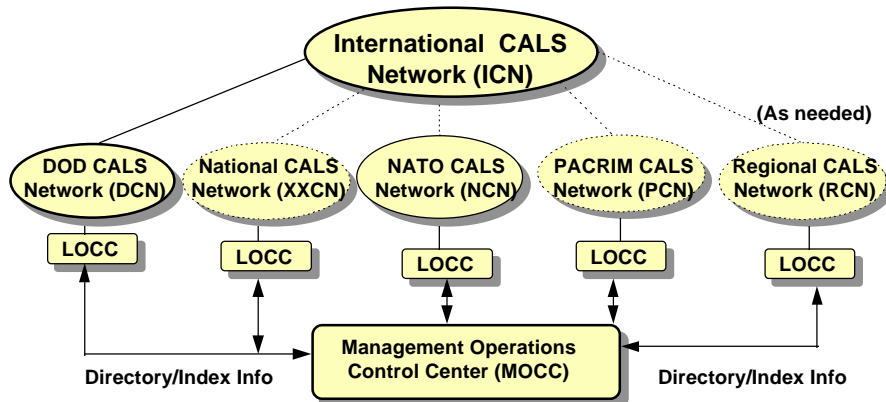
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## EXECUTIVE SUMMARY

The Department of Defense (DoD) Continuous Acquisition and Life-cycle Support (CALs) Network/International CALs Network (DCN/ICN) is a DoD and international electronic network of CALs interested subscribers and organizations that support the DoD initiated CALs Strategy. This Implementation Plan describes the DCN/ICN goals and objectives, the management structure, and the implementation strategy for realizing the participation and collaboration of individuals, organizations, and associations in the DCN/ICN. While the DCN/ICN leverages the existing world-wide Internet and the World Wide Web (WWW) to provide services and CALs specific information to its customers, it does not provide access to the Internet. Access to the Internet is left as a choice for the individual or organization. Similarly, subscriber software and hardware may be acquired through the subscriber's acquisition organization or optionally, the DCN/ICN shall offer this service. This implementation plan identifies the subscriber software and hardware needed to obtain the appropriate level of service. Many potential CALs users have already made this choice through their associated organization or as individuals who subscribe via an Internet Access Provider and obtain basic client software packages such as a web browser, electronic mail package, communication package, and file transfer package. Related DCN/ICN documents that articulate the DCN/ICN concept of operations, the business strategy, security considerations, and service agreements may be found in the reference and notes section of this plan.

The DCN/ICN is a collection of cooperating organizations that includes the International CALs Congress as an advisory board, the DoD CALs Network, the International CALs Network, and other national, regional, or alliance networks that exchange CALs information and provide services to their customers. A top level view of the DCN/ICN relationships and the supporting organizations is provided below.



**Figure E-1 DCN/ICN Organizations and Relationships**

Each organization network is a subset of the Internet that provides CALS related collaboration and information services to its constituents. Supporting each network is a Local Operations Control Center (LOCC) that provides administrative, help-desk, collaboration, and CALS related information services. The Management Operations Control Center (MOCC) provides the same services on a global scale and exchanges global/local directory and information repository index information with each LOCC. The sizes of each of the regional or national networks and the specific services that they may provide depends on the needs of the potential subscribers, the commitments by sponsoring organizations, as well as available resources (equipment, facilities, and personnel).

This DCN/ICN Implementation Plan only addresses the structure, management, and marketing to support the implementation strategy for the DCN and ICN services as well as the logistic and facilities support of the MOCC.

## **1.0 INTRODUCTION**

The DCN/ICN is a DoD and international electronic network of CALS interested subscribers and organizations that support the DoD initiated CALS Strategy. The CALS strategy is a DoD core strategy to share integrated digital product data through a set of standards to achieve efficiencies in business and operational mission areas.<sup>1</sup> The CALS strategy consists of the following elements:

- Business process change,
- Use of leading edge information technology,
- A shared information environment,
- Use of international standards, and
- A structured management approach.

The DCN/ICN supports the CALS strategy for a shared information environment by providing an electronic collaboration and cooperation infrastructure through the integration of information repositories, electronic mail and collaboration tools as well as CALS specific search services and other technologies including the WWW. The DCN/ICN approach leverages the communication network of the world-wide Internet, off-the-shelf computer hardware and software products (commercial, shareware, and freeware) together with a Management Operations Control Center to provide a core capability for information sharing, collaboration, and information retrieval services to individual subscribers and organizations (Government and commercial).

### **1.1 Purpose**

The purpose of this Implementation Plan is to describe the DCN/ICN implementation strategy for providing services to DCN/ICN subscribers, information content providers, and advertisers.

### **1.2 Scope**

The scope of this document includes the following: an overview of the DCN/ICN and its management organization; the implementation strategy for providing the DCN/ICN services including the phased implementation of those services; the specifications for the supporting facilities, personnel, equipment, security, performance, training; and the identification of the associated budgets and schedules to achieve a successful implementation.

### **1.3 Background**

As a result of the CALS initiative by the U.S. Department of Defense, and the U.S. CALS/Industry Steering Group (ISG) over the past eight years, CALS has become international in scope with ISGs in 14 countries and corporate and individual participation in the several thousands. International interest in CALS has been demonstrated by the growing international delegations' attendance at U.S. CALS Expositions over the past three years and the establishment and attendance of CALS conferences in the Pacific and Europe. In addition, during the past three

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<sup>1</sup> The CALS Home Page, Internet URL: <http://www.acq.osd.mil/cals/>

years, countries and organizations outside of the U.S. have held CALS conferences (e.g., CALS Japan, CALS Korea). This past year CALS International was established as the focal point for CALS activities and issues in the international arena. The CALS International initiative is made up of the CALS International Board of Directors (IBOD) and the International CALS Congress (ICC). The CALS IBOD is the executive board of CALS International for establishing priorities, providing guidance, and assisting activities of the ICC. The ICC is the operating organ and consists of formally appointed members of recognized CALS organizations.

The need for collaboration and cooperation of the CALS ICC and CALS interested organizations and individuals has extended beyond the capabilities provided by conferences, telephone, and facsimile. The capability to provide such collaboration and cooperation through electronic digital technologies is available over the Internet. This capability may be achieved through the integration of collaborative tools, information repositories, and agent technologies tailored to focus on CALS specific interest areas including acquisition, engineering, manufacturing, test, operations, and support of common systems. The electronic collaboration and cooperation will be implemented as a DCN/ICN through the integration of information repositories, electronic mail and collaboration, and CALS specific search services and other technologies, like the WWW, for the presentation of multimedia information.

#### **1.4 Document Structure**

Section 1 of this document provides an introduction including the purpose, scope, background, and document structure of the DCN/ICN Implementation Plan. Section 2 provides an overview of the DCN/ICN. Section 3 provides the implementation plan details including products and services, facilities, personnel, equipment for subscribers and the DCN/ICN MOCC. Other topics addressed in Section 3 include security implementation, performance implementation, training, as well as budgets and milestones.

## **2.0 DCN/ICN OVERVIEW**

The DCN/ICN overview highlights the goals and objectives, the management organization, management control, and the measures for assessing the success of the DCN/ICN implementation.

### **2.1 Goals and Objectives**

The DCN/ICN goals and objectives are to support the DoD CALS vision in the development and implementation of an Integrated Data Environment (IDE) for business and technical information and the supporting infrastructure for electronic collaboration, cooperation, and information services in the acquisition, engineering, manufacturing, logistics, test, operations, and support processes.

#### **2.1.1 DoD CALS Vision**

The DoD is committed to incorporating CALS into functional process improvements. As the DoD applies the best technologies, processes, and standards for the development, management, exchange, and use of business and technical information among and within Governmental and industrial enterprises, an IDE will be generated. The IDE is defined as the business environment created by the application of existing national and international standards, practices, and technologies to automate the management and exchange of information. The IDE directly enables integrated product and process development while increasing the agility and decreasing cycle times of the Defense Enterprise. CALS is founded on the recognition that affordable, readily accessible, and timely technical and business information is a critical element of the acquisition process.

#### **2.1.2 DCN/ICN Goals and Objectives**

The DCN/ICN goals and objectives consist of near-term objectives (less than one year) and longer term objectives (more than one year, but less than three years).

##### **2.1.2.1 Near-Term Objectives**

The near-term objectives include the development and implementation of an Initial Operating Capability (IOC), and the inclusion of the DoD, selected military service, and private industry customers.

- Develop and implement an IOC to include:
  1. Common user interface for both graphical and text environments.
  2. Initial collections of CALS organizations and individuals (specialists).
  3. Directories to internal and external CALS related repositories.
  4. CALS special interest newsgroups (via electronic mail and hypertext linked threads).
  5. Initial computer supported collaborative workgroup capabilities including video conferencing, chat, and collaborative web navigation.
  6. Initial information service capability to include agents.

- Market and subscribe the DoD, selected military service, and private industry customers.

### 2.1.2.2 Long-Term Objectives

- Develop and implement a Full Operational Capability (FOC) to include:
  1. The IOC.
  2. Other DCN/ICN services including advertising and web publishing.
- Become self-sufficient within two years of IOC.
- Market and subscribe Government, association, and private industry customers in the United States and world-wide.

## 2.2 DCN/ICN Management Planning and Organization

The CALS DCN/ICN Management Team is composed of Mr. Robert S. Kidwell as General Manager and technical and financial Managers with extensive CALS and information technology backgrounds. The Management Team is shown in Figure 2.2-1.

### DCN/ICN Management Team

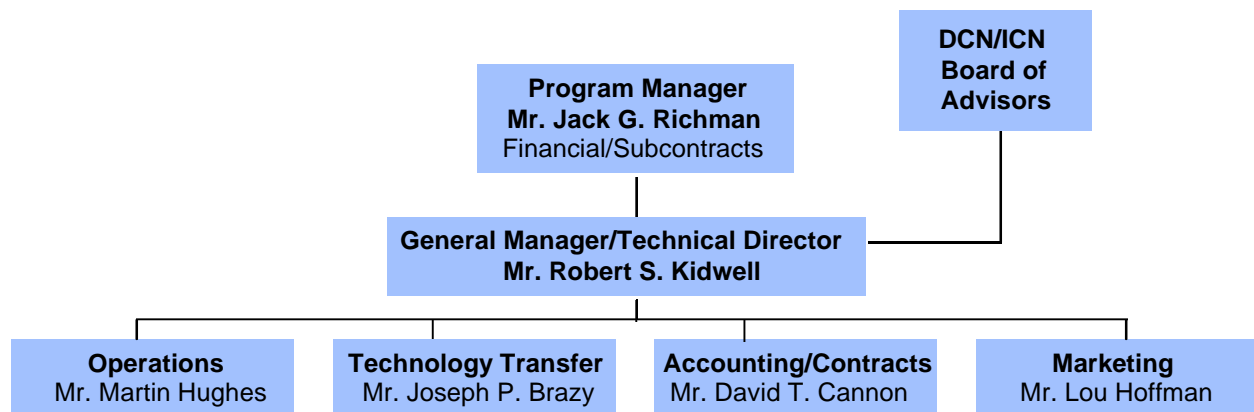


Figure 2.2-1 DCN/ICN Management Team

Mr. Jack G. Richman, the proposed Program Manager, has been the Executive Director and Program Manager of the Office of the Secretary of Defense (OSD) CALS Integrated Weapon System Database (IWSDB) Project and currently serves as the CALS/IDE Project Program Manager. Mr. Richman has extensive logistics management experience serving as the ManTech Advanced Systems Inc. Executive Director from October 1987 through December 1994. Prior to his joining ManTech, Mr. Richman served in a number of logistics management positions with the Air Force, including the Ogden Air Logistics Center, the Air Force Electronic Systems Command, and the Air Force Space and Missile Systems Center. Mr. Richman is a graduate of the Industrial College of the Armed Forces where he earned a Masters Degree equivalent in Public Programs Management.

Mr. Robert S. Kidwell, the proposed DCN/ICN General Manager, has been a key member of the U.S. CALS/ISG since its founding. He currently serves as Chairman of the Information and Process Integration Divisions of the CALS/ISG. He is a senior member of the CALS/ISG Policy Board. He has served as the Chair of the CALS/DoD Directory/Data Dictionary Special Task Force, and Co-Chair of the National Center for Advanced Technologies (NCAT)/DoD Enterprise Integration Task Force. He currently serves as the CALS/IDE Project Technical Director.

The ICN Board of Advisors (BOA) shall provide advice and council to the Management Team concerning services, initiatives, and other policy matters. The BOA shall be appointed by an Executive Committee composed of three members: the Chair of the CALS ISG, the Director of the DoD CALS Office, and the Chair of the International CALS Congress. Candidate members of the Board of Advisors include Mr. James Crawford, Mr. Gary Ellis, Dr. Herve' LeBoeuf and Mr. Frank Brake (CALS Pacific representative and CALS Europe representative).

Supporting Mr. Kidwell is a management team consisting of information technology professionals with extensive experience in CALS, networking, and leading technologies. Mr. Martin Hughes has over 25 years of management experience in Computer Systems Operations with the U.S. House Information Systems. Mr. Joseph Brazy has over 18 years of information technology experience in information technology management and integration. Mr. David T. Cannon has over 18 years of experience in information technology and business management. Mr. Lou Hoffman has over 20 years experience in information technology and military logistics involved with national and international programs.

### **2.3 Progress Metrics**

Implementation metrics shall include types and number of services implemented following the template in Table 2.3-1.

**Table 2.3-1 Metrics for DCN/ICN Services**

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Description</b>	<b>Metrics</b>
<b>SVC100</b>	<b>General</b>	<p>Develop a common Graphical User Interface (GUI) for providing the following user services and capable of launching local applications and remote applications to which execution has been authorized.</p> <p>Incorporate selected security capability into the common GUI and selected subservices.</p>	<p>Number of Subscribers by Subscription Class.</p>
<b>SVC200</b>	<b>Organizations</b>	<p>Provide and maintain an International CALS White Pages Directory of CALS and CALS related organizations, with brief mission statements, and links to technical and program points of contact.</p>	<p>Number of Organizations. Date of Last Update. Number of Hits by External Domains.</p>
<b>SVC300</b>	<b>CALS Initiatives</b>	<p>Provide and maintain a directory of CALS project initiatives with on-line project descriptions and hyperlinks to initiative home pages. Initial CALS Initiatives include Joint Continuous Acquisition and Life-Cycle Support (JCALS), and Joint Engineering Data Management Information and Control System (JEDMICS).</p> <p>CALS initiative home pages will contain a publications directory, project staff directory, upcoming events, and recent accomplishments.</p>	<p>Number of Initiatives. Date of Last Update. Number of Hits by External Domains.</p>
<b>SVC400</b>	<b>Calendar of Events</b>	<p>Provide and maintain a calendar of CALS events noting upcoming world-wide conferences, workshops, expositions, along with contact information for programmatic or technical information.</p>	<p>Number of Events. Date of Last Update. Number of Hits by External Domains.</p>

Service Identifier	User Service Category	Description	Metrics
SVC500	Electronic Mail	<p>Provide and maintain the capability to send electronic mail with file attachments to any CALS user world-wide.</p> <p>Provide world-wide electronic mail directory services to find any CALS industry or Government person given the person's name or CALS related person's E-Mail address.</p> <p>Provide a world-wide E-Mail directory look-up to identify a person from his E-Mail address to authorized users.</p> <p>Provide a voice -mail box capability to those users with mail box capable configurations.</p>	<p>Number of Entries in E-Mail Directory.</p> <p>Date of Last Update.</p> <p>Number of Hits by External Domains.</p>
SVC600	Technologies	<p>Provide and maintain hyperlinks to sites with electronic technology research, commercial products, and technical information (e.g., Frequently Asked Questions [FAQ]).</p> <p>Provide access to Electronic Commerce Research Centers (ECRC) and other Research and Development (R&amp;D) Organizations.</p> <p>Provide access to Advanced Research Projects Agency (ARPA) based research project summaries.</p> <p>Provide access to Digital Libraries.</p>	<p>Number of Links to External Sites.</p> <p>Date of Last Update.</p> <p>Number of Hits by External Domains.</p>
SVC700	Training	<p>Provide end-user training to set up and use the DCN/ICN services.</p>	<p>Number of Subscribers Requesting Training.</p> <p>Number of Subscribers Trained.</p>
SVC800	Information Services	<p>Provide and maintain a variety of text search tools to locate information entities anywhere on the Internet.</p> <p>Provide information exchange services to exchange text and graphics files in a variety of formats.</p> <p>Provide and maintain electronic mail discussion groups for any CALS topic.</p> <p>Provide access to CALS repositories for acquisition information.</p>	<p>Number of Available Search Tools.</p> <p>List of Exchange Services Available.</p> <p>Number of Links to CALS Repositories.</p> <p>Number of Active Forums/Discussion Groups.</p>
SVC900	Collection of Comments	<p>Provide and maintain the capability to collaborate on compound documents containing text and graphics by annotation and comments.</p>	<p>Number of Documents on Which Comments Submitted.</p> <p>Number of Comments Per Document.</p>

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Description</b>	<b>Metrics</b>
<b>SVC1000</b>	<b>Standards</b>	Provide on-line full text and abstracts for all CALS and CALS related standards and specifications as well as hyperlinks to other repositories containing specifications and standards (e.g., International Organization for Standardization [ISO] Repository).	Number of Links to Standards Repositories. Number of Accessions in Local Repository. Number of New Accessions in Local Repository.
<b>SVC1100</b>	<b>Publications</b>	Provide directories and hyperlinks to CALS and other repositories containing standards, technical information, reusable software.	Number of Links to Other Repositories. Date of Last Update.
<b>SVC1200</b>	<b>Implementation</b>	Provide hyperlinks to CALS infrastructure implementations for public events, points of contact and other publicly available information about the implementation.	Number of Links to Implementations. Date of Last Update. Number of Hits by External Domains.
<b>SVC1300</b>	<b>Specialists</b>	Provide and maintain a registration system and searchable directory of CALS, weapon system acquisition, engineering, manufacturing, logistics, management, operations and maintenance, training, and CALS technology specialists.	Number of Entries in Specialists Directory. Date of Last Update. Number of New Entries. Number of Hits by External Domains.
<b>SVC1400</b>	<b>Partnership Search</b>	Provide a method for a user to discover a business's capabilities and interest to team for a specific weapon system request for proposal or development. Provide an index and search capability of current virtual corporations working on a specified weapon system development program. Provide an index of current weapon system development programs.	Number of Entries in Weapon System Development Program. Number of Entries in Partnership Search Directory. Number of Hits by External Domains.
<b>SVC1500</b>	<b>Test and Certification</b>	Provide and maintain test and certification software for compliance testing to CALS and international standards used by CALS.	Number of Entries (e.g., Links) in Test and Certification (T&C) Directory. Number of Hits by External Domains.
<b>SVC1600</b>	<b>Computer Supported Collaboration</b>	Provide video conferencing capability. Provide Internet audio conferencing and voice mail capability. Provide document sharing capability with annotation and comments.	Number of Subscribers with Video Conference Capability.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Description</b>	<b>Metrics</b>
<b>SVC1700</b>	<b>Dissemination Service</b>	Provide a user-selectable information filtering service that filters information according to a user-defined profile.	Number of Users Registered for Service. Number of Entities Disseminated.
<b>SVC1800</b>	<b>Advertising Services</b>	Provide electronic mail for CALS industry, association, or other organization advertising of CALS products and services.	Number of Advertisements by Advertising Class. Number of New Advertisements by Advertising Class. Number of Hits by External Domain.
<b>SVC1900</b>	<b>Electronic (Web) Publishing</b>	Provide an electronic publishing service for organizations or individuals that do not have organic electronic publishing capabilities.	Number of Documents and Number of Pages Published.
<b>SVC2000</b>	<b>Internet Hardware/ Software Acquisition and Installation</b>	Provide a one-stop shop for the acquisition and/or installation of hardware and software to use the Internet and the DCN/ICN services.	Number of Orders. Dollar Value of Orders.

## 2.4 Management Reporting

The DCN/ICN shall use a variety of means for reporting results. Technical progress and financial status shall be provided in both hardcopy and electronic media to the Contracting Office and the Contracting Officer's Technical Representatives. Implementation of service will be reported through electronic implementation reports (HyperText Markup Language Documents).

## 2.5 Assumptions

The assumptions underlying the DCN/ICN implementation strategy include the following:

- a) The Internet and the WWW shall remain a viable world-wide communication network and collaboration medium.
- b) Access to the Internet is left as a choice for the individual subscriber or organization.
- c) Subscriber software and hardware may be acquired through the subscriber's acquisition organization or optionally, the DCN/ICN shall offer this service.
- d) The minimum subscriber software shall include an E-Mail package, a web browser, a File Transfer Protocol (FTP) package, and a communication package obtained through the subscriber's Internet Access Provider (IAP) or organization.
- e) The DoD CALS Integration and Evaluation Office shall provide funding to support the development, test, and initial implementation of the DCN/ICN for a period up to 24 months.



### 3.0 IMPLEMENTATION STRATEGY

The overall implementation strategy consists of a building block approach. It first provides core services such as E-Mail, E-Mail directory services, electronic discussion groups, document conferencing/annotations, and repository directories. The types and levels of services to be provided are shown in Figure 3.0-1.



Figure 3.0-1 DCN/ICN Types and Levels of Service

### 3.1 Services

The services provided by the DCN/ICN include services for subscribers, information content providers, and advertisers. These services are summarized in implementation priority for each type of market.

#### 3.1.1 Subscriber Services

The priority ranks for the implementation of DCN/ICN Subscriber services are summarized in Table 3.1.1-1.

**Table 3.1.1-1 DCN/ICN Subscriber Services Implementation Priority**

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Priority</b>	<b>Description</b>	<b>Rationale</b>
<b>SVC100</b>	<b>General</b>	1	Develop a common GUI for providing the following user services and launching local applications and remote applications to which execution has been authorized. Incorporate selected security capability into the common GUI and selected subservices.	MOCC infrastructure needed first to export support to other nodes. Build DCN/ICN home page first to provide CALS embarkation point.
<b>SVC1800</b>	<b>Advertising Services</b>	1	Provide an electronic mall for CALS industry, association, or other organization advertising of CALS products and services.	Source of revenue.
<b>SVC700</b>	<b>Training</b>	1	Provide end-user training to set up and use the DCN/ICN services.	User training needed to access DCN/ICN home page and register for E-Mail discussion groups.
<b>SVC400</b>	<b>Calendar of Events</b>	2	Provide and maintain a calendar of CALS events noting upcoming world-wide conferences, workshops, expositions, along with contact information for programmatic or technical information.	In addition to local calendar of events, one site must be the collector of events for global view. The Calendar of Events site may be mirrored to provide better performance to regional users.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Priority</b>	<b>Description</b>	<b>Rationale</b>
<b>SVC500</b>	<b>Electronic Mail</b>	2	<p>Provide and maintain the capability to send electronic mail with file attachments to any CALS user world-wide.</p> <p>Provide a world-wide electronic mail directory service to find any CALS industry or Government person given the person's name or CALS related person's E-Mail address.</p> <p>Provide a world-wide E-Mail directory look-up to identify a person from his E-Mail address to authorized users.</p> <p>Provide a voice mail box capability to those users with mail box capable configurations.</p>	E-Mail registry of CALS users.
<b>SVC1900</b>	<b>Electronic (Web) Publishing</b>	2	Provide an electronic publishing service for organizations or individuals that do not have organic electronic publishing capabilities.	Source of revenue.
<b>SVC2000</b>	<b>Internet Hardware/ Software Acquisition and Installation</b>	2	Provide a one-stop shop for the acquisition and/or installation of hardware and software to use the Internet and the DCN/ICN services.	Source of revenue.
<b>SVC200</b>	<b>Organizations</b>	3	Provide and maintain an International CALS White Pages Directory of CALS and CALS related organizations, with brief mission statements, and links to technical and program points of contact.	Registry of CALS organizations needed including points of contact and Internet addresses.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Priority</b>	<b>Description</b>	<b>Rationale</b>
<b>SVC800</b>	<b>Information Services</b>	3	<p>Provide and maintain a variety of text search tools to locate information entities anywhere on the Internet.</p> <p>Provide information exchange services to exchange text and graphics files in a variety of formats.</p> <p>Provide and maintain electronic mail discussion groups for any CALS topic.</p> <p>Provide access to CALS repositories for acquisition information.</p>	Basic information services such as a search capability for standards and repositories needed.
<b>SVC900</b>	<b>Collection of Comments</b>	3	Provide and maintain the capability to collaborate on compound documents containing text and graphics by annotation, comments, and collection integration and resolution of issues.	Collection of comments is one small part for workgroup collaboration in a distributed environment.
<b>SVC1300</b>	<b>Specialists</b>	3	Provide and maintain a registration system and searchable directory of CALS, weapon system acquisition, engineering, manufacturing, logistics, management, operations and maintenance, training, and CALS technology specialists.	Registry of specialists must be created. Develop on-line registration form (Common Gateway Interface [CGI] script).
<b>SVC300</b>	<b>CALS Initiatives</b>	4	<p>Provide and maintain a directory of CALS project initiatives with on-line project descriptions and hyperlinks to initiative home pages. Initial CALS initiatives include JCALS and JEDMICS.</p> <p>CALS initiative home pages will contain a publications directory, project staff directory, upcoming events, and recent accomplishments.</p>	JCALs and JEDMICS. Common Management Information Services (CMIS); others as available.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Priority</b>	<b>Description</b>	<b>Rationale</b>
<b>SVC1000</b>	<b>Standards</b>	4	Provide on-line full text and abstracts for all CALS and CALS related standards and specifications as well as hyperlinks to other repositories containing specifications and standards (e.g., ISO Repository).	Directory services to standards repositories needed as well as abstracts and indexes.
<b>SVC1600</b>	<b>Computer Supported Collaboration</b>	4	Provide video conferencing capability. Provide Internet audio conferencing and voice mail capability. Provide document sharing capability with annotation and comments.	Large field of technology with multiple specialties and capabilities including multi-media. Segments of computer supported collaboration may be implemented earlier by some nodes and users.
<b>SVC600</b>	<b>Technologies</b>	5	Provide and maintain hyperlinks to sites with electronic technology research, commercial products, and technical information (e.g., Frequently Asked Questions). Provide access to ECRC and other R&D organizations. Provide access to ARPA based research project summaries. Provide access to digital libraries.	Technology Transfer Center for test and evaluation and dissemination of new DCN/ICN technologies.
<b>SVC1100</b>	<b>Publications</b>	5	Provide directories and hyperlinks to CALS and other repositories containing standards, technical information, reusable software.	Directory services to standards repositories needed as well as abstracts and indexes.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Priority</b>	<b>Description</b>	<b>Rationale</b>
<b>SVC1200</b>	<b>Implementation</b>	5	Provide hyperlinks to CALS infrastructure implementations for public events, points of contact, and other publicly available information about the implementation.	Each CALS implementation will have a web home page. Work may begin in parallel at earlier phase if local information technologists are available.
<b>SVC1400</b>	<b>Partnership Search</b>	5	Provide a method for a user to discover a business's capabilities and interest to team for a specific weapon system request for proposal or development. Provide an index and search capability of current virtual corporations working on a specified weapon system development program. Provide an index of current weapon system development programs.	E-Mail may facilitate partnership search in conjunction with organization profiles highlighting organization capabilities.
<b>SVC1700</b>	<b>Dissemination Service</b>	5	Provide a user-selectable information filtering service that filters information according to a user-defined profile.	More work on smart agents and prototypes is needed to profile user interests and search for new objects satisfying profile criteria.
<b>SVC1500</b>	<b>Test and Certification</b>	6	Provide and maintain test and certification software for compliance testing to CALS and international standards used by CALS.	The DCN/ICN can provide access to test and certification organizations. What is needed is the development of compliance tests for many standards.

### 3.1.2 Information Content Provider Services

The priority ranks for the implementation of DCN/ICN Information Content Provider services are summarized in Table 3.1.2-1.

**Table 3.1.2-1 DCN/ICN Information Content Provider Services Implementation Priority**

Service Identifier	User Service Category	Priority	Description
SVC100	General	1	Develop a common GUI for providing the following user services and capable of launching local applications and remote applications to which execution has been authorized. Incorporate selected security capability into the common GUI and selected subservices.
SVC1900	Electronic (Web) Publishing	2	Provide an electronic publishing service for organizations or individuals that do not have organic electronic publishing capabilities.
SVC2100	Circulation Reporting	2	Provide periodic circulation reporting including, but not limited to, number of accesses, and domain of viewer.
SVC1700	Dissemination Service	3	Provide a user-selectable information filtering service that filters information according to a user-defined profile.

### 3.1.3 Advertiser Services

The priority ranks for the implementation of DCN/ICN advertiser services are summarized in Table 3.1.3-1.

**Table 3.1.3-1 DCN/ICN Advertiser Services Implementation Priority**

Service Identifier	User Service Category	Priority	Description
SVC100	General	1	Develop a common GUI for providing the following user services and capable of launching local applications and remote applications to which execution has been authorized. Incorporate selected security capability into the common GUI and selected subservices.
SVC1800	Advertising Services	1	Provide an electronic mall for CALS industry, association, or other organization advertising of CALS products and services.
SVC1900	Electronic (Web) Publishing	2	Provide an electronic publishing service for organizations or individuals that do not have organic electronic publishing capabilities.

Service Identifier	User Service Category	Priority	Description
SVC2100	Circulation Reporting	2	Provide periodic circulation reporting including, but not limited to, number of accesses, and domain of viewer.
SVC1700	Dissemination Service	3	Provide a user-selectable information filtering service that filters information according to a user-defined profile.

### 3.2 Facilities

The facilities for the DCN/ICN include facilities for local operations control centers at subscriber organization sites (multiple users) as well as the MOCC facility. A brief description of the MOCC facility is provided in this Implementation Plan. Local facilities are dictated by subscriber organization needs. Single subscribers do not need a local operations control center since that is handled by the subscriber's IAP.

#### 3.2.1 Subscriber Facilities

Subscriber will need computer and local communication facilities to connect to the Internet though an Enterprise connection or through a third party IAP.

#### 3.2.2 Management Operations Control Center Facility

Facilities for the MOCC will include office space (approximately 6,500 square feet), office furniture (workstation furniture for 17 personnel in the first year and 29 personnel in the second year), telephone system (voice mail, call forwarding, call waiting) for management, technical and Hot Line Service Desks personnel. The proposed design layout for the MOCC is shown in Figure 3.2.2-1.

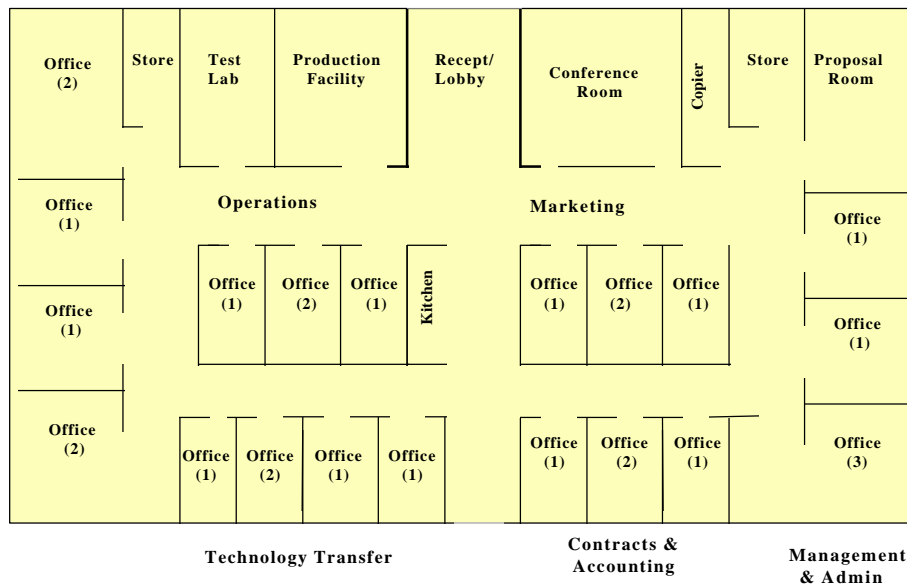


Figure 3.2.2-1 Proposed Facility Layout for the MOCC

### 3.3 Personnel

Personnel requirements for the Local Operations Control Center are dictated by the local organization needs. Personnel for the MOCC for the first two years of operations are highlighted in the tables “Manpower Staffing Plan (Year 1)” and “Manpower Staffing Plan (Year 2).”

#### 3.3.1 Subscriber Personnel

Personnel include local system administration and optionally, network security personnel at each node that depend on the size and complexity of the subscriber’s information infrastructure. A rule of thumb is one system administrator per 25 end-users.

#### 3.3.2 Management Operations Control Center Personnel

The estimated staffing requirements for the MOCC for the first two years are summarized in Tables 3.3.2-1 and 3.3.2-2.

**Table 3.3.2-1 Manpower Staffing Plan (Year 1)**

<i>Manpower Staffing</i>	<i>MONTH (Year 1)</i>												<i>Year-End Total</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>		
Management	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Administration	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Operations	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Tech Transfer	1	1	1	2	2	2	2	2	2	3	3	3	3	3
Acctng & Contracts	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marketing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Monthly Totals</b>	6	6	6	7	7	7	7	7	7	8	8	8	8	8

**Table 3.3.2-2 Manpower Staffing Plan (Year 2)**

<i>Manpower Staffing</i>	<i>MONTH (Year 2)</i>												<i>Year-End Total</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>		
Management	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Administration	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Operations	3	3	3	4	4	4	5	5	5	6	6	6	6	6
Tech Transfer	3	3	3	4	4	4	4	4	4	4	4	4	4	4
Acctng & Contracts	1	1	1	1	1	1	2	2	2	2	2	2	2	2
Marketing	1	1	1	2	2	2	2	2	2	2	2	2	2	2
<b>Monthly Totals</b>	10	10	10	13	13	13	15	15	15	16	16	16	16	16

### 3.4 Equipment

The equipment for the implementation of the DCN/ICN includes end-user terminals or workstations, Internet servers, and related Internet communications equipment, including automated facsimile servers and voice mail systems. In addition, equipment for the MOCC is needed to provide DCN/ICN wide help desk and system administration services.

#### 3.4.1 Subscriber ASCII Terminal Minimum Requirements

Depending on the services required, Table 3.4.1-1 shows the minimum support requirements to be provided by a host computer for an end-user ASCII terminal.

**Table 3.4.1-1 ASCII Terminal Configuration Requirements**

Service Identifier	User Service Category	ASCII Terminal Minimum Support Requirements
SVC100	General	<b>Web Browser</b> VT 100 ASCII terminal or better with Lynx Web text browser on a host computer. <b>Communication</b> Dependent on host computer. <b>Security</b> Dependent on host computer.
SVC200	Organizations	See Web Browser requirements.
SVC300	CALS Initiatives	See Web Browser requirements.
SVC400	Calendar of Events	See Web Browser requirements.
SVC500	Electronic Mail	Host system E-Mail package with Simple Mail Transfer Protocol (SMTP) gateway to the Internet.
SVC600	Technologies	See Web Browser requirements.
SVC700	Training	Training modules on video tape, CD-ROM, or laser-disc are not available; user will be able to download text-based FAQs.
SVC800	Information Services	See Web Browser requirements.
SVC900	Collection of Comments	See Web Browser requirements. Use Host E-Mail Package.
SVC1000	Standards	See Web Browser requirements.
SVC1100	Publications	See Web Browser requirements.
SVC1200	Implementation	See Web Browser requirements.
SVC1300	Specialists	See Web Browser requirements.
SVC1400	Partnership Search	See Web Browser requirements.
SVC1500	Test and Certification	See Web Browser requirements.
SVC1600	Computer Supported Collaboration	Textual Mode Chat.
SVC1700	Dissemination Service	May receive files via File Transfer Protocol from Host Computer. May receive notices of events via E-Mail.
SVC1800	Advertising Services	Text View Only of advertisements.
SVC1900	Electronic (Web) Publishing	Text View Only of web documents.

Service Identifier	User Service Category	ASCII Terminal Minimum Support Requirements
SVC2000	Internet Hardware/ Software Acquisition and Installation	Depends on host computer.

### 3.4.2 Subscriber Workstation Minimum Requirements

Depending on the services required by the end-user, Table 3.4.2-1 identifies the minimum client workstation configuration to support each service.

**Table 3.4.2-1 Workstation Configuration Requirements**

Service Identifier	User Service Category	Workstation Minimum Requirements																
SVC100	General	<p><b>Windows Workstation:</b> DCN/ICN Minimum Workstation Recommendation: 486 DX 66 PC; 16MB RAM, 320MB Hard Disk</p> <p><b>Web Browser (e.g., Netscape Navigator 2.0)<sup>2</sup></b></p> <table> <thead> <tr> <th>Platform:</th> <th>Disk Space:</th> <th>RAM (Min.):</th> <th>RAM (Rec.):</th> </tr> </thead> <tbody> <tr> <td>Windows 386SX</td> <td>1MB</td> <td>4MB</td> <td>8MB</td> </tr> <tr> <td>Macintosh 68030</td> <td>2MB</td> <td>4MB</td> <td>8MB</td> </tr> <tr> <td>UNIX: N/A</td> <td>3MB</td> <td>16MB</td> <td>16MB</td> </tr> </tbody> </table> <p><b>MODEM:</b> 14.4 Kbps (or faster) modem for a workstation not connected to a Local Area Network (LAN).</p> <p><b>WEB Browser Helper Applications:</b> <b>Macintosh</b> StuffitExpander, Joint Photographic Experts Group (JPEG) View, SoundMachine, SoundApp, MacBinaryII+, Mactar, MacGzip, and Sparkle.<sup>3</sup></p>	Platform:	Disk Space:	RAM (Min.):	RAM (Rec.):	Windows 386SX	1MB	4MB	8MB	Macintosh 68030	2MB	4MB	8MB	UNIX: N/A	3MB	16MB	16MB
Platform:	Disk Space:	RAM (Min.):	RAM (Rec.):															
Windows 386SX	1MB	4MB	8MB															
Macintosh 68030	2MB	4MB	8MB															
UNIX: N/A	3MB	16MB	16MB															

<sup>2</sup> Netscape Navigator Frequently Asked Questions; Internet URL:  
[http://www.netscape.com/eng/mozilla/1.2/faq\\_navsr.html#sr1](http://www.netscape.com/eng/mozilla/1.2/faq_navsr.html#sr1).

<sup>3</sup> Available from Internet URL: <ftp://sumex-aim.stanford.edu>.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Workstation Minimum Requirements</b>
<b>SVC100</b> <i>(continued)</i>	<b>General</b>	<p><b>Windows</b> LVIEW31.EXE (for JPEG images), MPEGPLAY.EXE (for Moving Picture Expert Group [MPEG] movies), and MPLAYER.EXE (for audio files).<sup>4</sup></p> <p><b>UNIX</b> mm.tar.Z (for multi-media files), mpeg_play-2.0.tar.Z (for MPEG movies), xdvi.tar.Z (for digital video interactive files), xplaygizmo (for local sound and movie files), and xv-3.00.tar.Z (for X-Window video files).</p>
<b>SVC200</b>	<b>Organizations</b>	See Web Browser requirements.
<b>SVC300</b>	<b>CALS Initiatives</b>	See Web Browser requirements.
<b>SVC400</b>	<b>Calendar of Events</b>	See Web Browser requirements.
	<b>Electronic Mail</b>	<p>Windows 3.1 or later; DOS 5.0 or later; COTS mail package with SMTP gateway such as Microsoft Mail, Lotus cc:Mail.</p> <p><b>Lotus cc:Mail Desktop for Windows Release 2.2 Requirements<sup>5</sup></b> 386 or higher PC. 4MB of RAM. MS-DOS 3.1 and compatible network operating system. Windows 3.1 or higher.</p>
<b>SVC600</b>	<b>Technologies</b>	See Web Browser requirements.
<b>SVC700</b>	<b>Training</b>	See Web Browser requirements; video player and sound-card.
<b>SVC800</b>	<b>Information Services</b>	See Web Browser requirements.
<b>SVC900</b>	<b>Collection of Comments</b>	<p><b>Prospero Systems GlobalChat Client<sup>6</sup></b> Windows 3.1 or later -or- See Web Browser requirements. 1 Mbyte of free disk space.</p>
<b>SVC1000</b>	<b>Standards</b>	See Web Browser requirements.
<b>SVC1100</b>	<b>Publications</b>	<p>See Web Browser requirements + requirements to support HyperText Markup Language (HTML) editor or word processor.</p> <p><b>Softquad Hot Metal Pro HTML Editor Requirements</b> MS- Windows 3.1 or later.</p>
<b>SVC1200</b>	<b>Implementation</b>	See Web Browser requirements.
<b>SVC1300</b>	<b>Specialists</b>	See Web Browser requirements.
<b>SVC1400</b>	<b>Partnership Search</b>	See Web Browser requirements.

<sup>4</sup> Available from Internet URL: <ftp://ftp.cica.indiana.edu>.

<sup>5</sup> cc:Mail Desktop for Windows Release 2.2; Internet URL: <http://www.lotus.com/ccmail/2162.htm>.

<sup>6</sup> Available from Prospero Systems, Inc. Internet URL: <http://www.prospero.com/globalchat/help/>.

Service Identifier	User Service Category	Workstation Minimum Requirements
SVC1500	Test and Certification	See Web Browser requirements.
SVC1600	Computer Supported Collaboration - Audio Conferencing	<p><b>Audio-Conferencing (RealAudio 2.0 Software)<sup>7</sup></b>  Windows 95/NT      486/66 CPU.  Windows 3.1x      Pentium CPU.  Mac OS              Macintosh Power PC.  UNIX                Irix 5.3 Solaris 2.4/2.5 SunOS.  4.1.x, Linux 1.2.x or later.</p> <p>Multi-Media Kit if not already integral to system:  Sound card, microphone, and speakers.</p>
	Computer Supported Collaboration - Document Conferencing	<p><b>Document Conferencing<sup>8</sup></b></p> <p><b>PC Platform</b>  386 SX or above, 4 MB RAM.  5 MB Hard Disk.  OS/GUI: DOS 5.0 or later or Windows 3.1 or later.</p> <p><b>Mac Platform</b>  Any Macintosh except SE, Plus, or Classic.  4 MB RAM.  5 MB Hard Disk.  OS/GUI: Version 7.0 or later.</p>
	Computer Supported Collaboration - Video Conferencing: Mac Platforms	<p><b>Video Conferencing</b></p> <p><b>Mac Platform</b>  Specifications to RECEIVE video:</p> <p>Macintosh platform with a 68020 processor or higher.  System 7 or higher operating system (it "may" run on system 6.0.7 and above).  Ability to display 16-level-grayscale (e.g., any color Mac).  An Internet Protocol (IP) network connection.  Mac TCP.</p>

<sup>7</sup> Available from RealAudio, the RealAudio Player 2.0,  
Internet URL: <http://www.realaudio.com/products/player/beta2.0form.html>.

<sup>8</sup> FacetoFace Document Conferencing Software for Macintosh and Windows; Crosswise Inc. Santa Cruz, CA.

Service Identifier	User Service Category	Workstation Minimum Requirements
<b>SVC1600</b> <i>(continued)</i>	<b>Computer Supported Collaboration - Video Conferencing: Mac Platforms</b> <i>(continued)</i>	<b>Mac Platform</b> <i>(continued)</i> Specifications to RECEIVE video: Current CU-SeeMe application. Apple's QuickTime, to receive slides with SlideWindow.  Specifications to SEND video: The specifications to receive video mentioned above. QuickTime installed. A video digitizer (VDIG) (with VDIG software) and camera.  PLUS- Camera with National Television Standards Committee (NTSC) type output (like a camcorder) and RCA cable.  -OR- Connectix QuickCam serial port digitizer (with camera).  *****NOTICE: NO OTHER DIGITIZERS WILL WORK UNTIL FURTHER NOTICE*****
	<b>Computer Supported Collaboration - Video Conferencing: PC Platforms</b>	<b>Video Conferencing (CUSeeMe V 2.0 for Windows Software)<sup>9</sup></b>  <b>PC Platform</b> <i>General Requirements:</i> Transmission Control Protocol (TCP)/IP network and node address. 10MB hard disk space. Modem bandwidth of 28.8k or better; 14.4k or better for audio only. Serial Link Internet Protocol (SLIP)/Point-to-Point Protocol (PPP) compatible. Camera with composite or S-video output. Recommendation - separate microphone or headset for better "phone like" use. 486 or Pentium processor. 8MB RAM minimum. Windows 3.1 or greater, or Windows 95. TCP/IP - WinSock compliant.

<sup>9</sup> CuSeeMe Video Conferencing Software Version 2.0 Home Page; Internet URL: <http://goliath.wpine.com/cu-seeme.html>.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Workstation Minimum Requirements</b>
<b>SVC1600</b> <i>(continued)</i>	<b>Computer Supported Collaboration - Video Conferencing: PC Platforms</b> <i>(continued)</i>	<b>Video Conferencing (CUSeeMe V 2.0 for Windows Software(CineVideo/Pro 1.0)<sup>10</sup></b> Windows 3.1x, Windows 95 and Windows NT. 8MB of RAM, 3MB of hard disk space, a mouse, a keyboard, and a microphone, soundboard, speakers.
	<b>Computer Supported Collaboration - Video Conferencing: PC Platforms Camera</b>	<b>Black and White Camera (Connectix QuickCam)</b> 386, 486, or Pentium processor with at least 4 MB RAM. Microsoft Windows 95, Windows 3.1, or Windows for Workgroups 3.11. Standard or Enhanced 25-pin Parallel Port. At least 1 MB hard disk space (more to store movies). Sound Card (e.g., SoundBlaster) with microphone, speakers to play back audio in movies.
<b>SVC1700</b>	<b>Dissemination Service</b>	Use Web Browser or File Transfer Package to download. Alternatively, requested products may be downloaded via electronic mail.
<b>SVC1800</b>	<b>Advertising Services</b>	Use Web Browser to view advertisements.
<b>SVC1900</b>	<b>Electronic (Web) Publishing</b>	See Web Browser requirements.
<b>SVC2000</b>	<b>Internet Hardware/ Software Acquisition and Installation</b>	Not Applicable.

### 3.4.3 Internet Server Requirements

The requirements for an Internet server are summarized in Table 3.4.3-1, Server Configuration Requirements.

<sup>10</sup> CineVideo/Pro Video Conferencing Software Version 1.0 planned for late 2nd qtr 96; Internet URL: <http://www.cinecom.com>. Reference: E-Mail Message from Skip Potter to J. Brazy, March 11, 1996, 10:25 PM.

**Table 3.4.3-1 Server Configuration Requirements**

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Description</b>
<b>SVC100</b>	<b>General</b>	WWW Server such as Netscape Commerce Server (32 Mbytes Main Memory). MOREplus Information Management Tool: (32 MB Main Memory plus 1 GB Disk). <sup>11</sup>
<b>SVC200</b>	<b>Organizations</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC300</b>	<b>CALS Initiatives</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC400</b>	<b>Calendar of Events</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC500</b>	<b>Electronic Mail</b>	Mail List Manager such as majordomo; COTS mail software gateway to SMTP; Perl Interpreter/Compiler 4.035 or later. Mail List Digest: 35K bytes/day for very active; 18K bytes/day for moderately active; 6K bytes/day for semi-active.  <b>Gateway to SMTP (e.g., cc:Mail Link to SMTP)</b> Hardware Requirements: 386 or faster CPU. 3MB RAM. One or two network adapter cards. Network connection hardware appropriate to your cc:Mail post office LAN.  Software Requirements: DOS 5.0 or later. A cc:Mail Post Office at Level 6 or greater.  <b>Post Office Server (e.g., cc:Mail Post Office Server)</b> File Server (e.g., Novell File Server). cc:Admin: 600KBytes of Disk. cc:Mail: 5.5MBytes of Disk. cc:Data: (Domain Specific, e.g., 100MBytes for User mail).
<b>SVC600</b>	<b>Technologies</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC700</b>	<b>Training</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100). Stacked Multiple CD-ROM Server; MPEG Files; Video Conference Hardware and Software.
<b>SVC800</b>	<b>Information Services</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).

<sup>11</sup> MountainNet Corp., Morgantown, WV; Internet URL: <http://rbse.mountain.net/MOREplus/FactSheet.html>.

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Description</b>
<b>SVC900</b>	<b>Collection of Comments</b>	Prospero Systems Global Stage Chat Server
<b>SVC1000</b>	<b>Standards</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1100</b>	<b>Publications</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1200</b>	<b>Implementation</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1300</b>	<b>Specialists</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1400</b>	<b>Partnership Search</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1500</b>	<b>Test and Certification</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1600</b>	<b>Computer Supported Collaboration - Audio Conferencing</b>	RealAudio Server 2.0. <sup>12</sup>
	<b>Computer Supported Collaboration - Document Conferencing</b>	<b>On-line Forums:</b> Quarterdeck Global Stage Chat Server. <sup>13</sup>
	<b>Computer Supported Collaboration - Video Conferencing</b>	CUSeeMe video conferencing Reflector Software available for eleven UNIX platforms including SUN, HP, IBM, Linux, DEC. <sup>14</sup>
<b>SVC1700</b>	<b>Dissemination Service</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1800</b>	<b>Advertising Services</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC1900</b>	<b>Electronic (Web) Publishing</b>	See Netscape Commerce Server Requirements and MOREplus Requirements (SVC100).
<b>SVC2000</b>	<b>Internet Hardware/ Software Acquisition and Installation</b>	Not Applicable.

<sup>12</sup> RealAudio Corp., Internet URL: <http://www.RealAudio.com/products/server.html>.

<sup>13</sup> QuarterDeck Corp., Internet URL: <http://www.qdeck.com/chat/globalstage/servers.html>.

<sup>14</sup> WhitePine Corp., Internet URL: <http://goliath.wpine.com/cuproinfo.htm#anchor4112177>.

### 3.4.3.1 WWW Server (Netscape Commerce Server)

The requirements for a WWW server are summarized in Table 3.4.3.1-1, Netscape Commerce Server Configuration Requirements.

**Table 3.4.3.1-1 Netscape Commerce Server Configuration Requirements<sup>15</sup>**

<b>UNIX</b>			
<b>Vendor</b>	<b>Architecture</b>	<b>Operating System</b>	<b>Memory Requirements</b>
Digital	Alpha	OSF/1 2.0	32 MB
Hewlett-Packard	PA	HP-UX 9.03, 9.04, 10.0	32 MB
IBM	RS/6000	AIX 3.2.5, 4.1	32 MB
Silicon Graphics	MIPS	IRIX 5.2, 5.3	32 MB
Sun	SPARC	SunOS 4.1.3; Solaris 2.3, 2.4	32 MB
Intel	386, 486, Pentium	BSDI 1.1, 2.0	32 MB
<b>Windows NT</b>			
<b>Vendor</b>	<b>Architecture</b>	<b>Operating System</b>	<b>Memory Requirements</b>
Digital	Alpha	NT 3.5	16 MB
Intel	386, 486, Pentium	NT 3.5	16 MB

### 3.4.3.2 Information Management (MOREplus)

The requirements for an information management server are summarized in Table 3.4.3.2-1, MOREplus Configuration Requirements.

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<sup>15</sup> Netscape Commerce Server, Netscape Corp., Internet URL: <http://home.netscape.com/>.

**Table 3.4.3.2-1 MOREplus Configuration Requirements<sup>16</sup>**

Vendor	Architecture	Operating System	Memory Req.	Disk Req.	Tools
Sun	SPARC	SunOS, Solaris	32MB	1 GB	Web Server GNU gcc 2.2.2 Oracle 6.0 or higher with ProC Compiler TCL 7.0 or higher
Hewlett Packard	PA	HP-UX	32 MB	1 GB	Same as for Sun.
IBM	RS/6000	IBM AIX	32 MB	1 GB	Same as for Sun
DEC	Alpha	Ultrix	32 MB	1 GB	Same as for Sun

### 3.4.3.3 Audio Conferencing (RealAudio 2.0 Server)

The requirements for an audio conferencing server are summarized in Table 3.4.3.3-1, RealAudio 2.0 Server Configuration Requirements.

**Table 3.4.3.3-1 RealAudio 2.0 Server Configurations<sup>17</sup>**

Manufacturer	Min. Hardware Configuration	Operating System
Sun Microsystems	SPARC, 24 MB RAM	Solaris 2.x, SunOS 4.1x
IBM/PC Compatibles	486/66 or better, 16 MB of RAM	Windows NT, BSDI 2.0 or later, LINUX 1.x, FreeBSD
Silicon Graphics	Indy, 24 MB RAM	IRIX 5.3 or later
Apple Macintosh	Power Macintosh, 16 MB	System 7.5 (With Open Transport)
Digital Equipment Corporation	Alpha, 24 MB	DEC UNIX V3.2

#### *Memory and Storage Requirements*

Server storage: The RealAudio server requires approximately 2 MB of hard disk space.

Audio storage: Depending upon the level of audio compression, RealAudio files require hard disk space equal to approximately 1.1 - 2.4 Kb per second of audio.

<sup>16</sup> MountainNet Corp., Internet URL: <http://rbse.mountain.net/MOREplus/FactSheet.html>.

<sup>17</sup> Real Audio Corp., Internet URL: <http://www.RealAudio.com/products/server/technical.html>.

Sound requirements: RealAudio will encode most common monaural PC formats. RealAudio 2.0 comes with two audio encoding algorithms. The RealAudio 14.4 algorithm provides AM sound quality, while the 28.8 algorithm offers FM sound quality. Examples of audio file storage requirements are shown in Table 3.4.3.3-2.

**Table 3.4.3.3-2 Examples of Audio File Storage Requirements**

<b>Program length:</b>	<b>RealAudio 14.4 Kbps</b>	<b>RealAudio 28.8 Kbps</b>
1 hour	3.6 MB	8 MB
5 hours	18 MB	40 M

### 3.4.4 Network Communication Requirements

The network communication requirements to support a given number of users with a DCN/ICN level of service are shown in Table 3.4.4-1. Actual communication requirements are dependent on estimates of current and projected workload traffic.

**Table 3.4.4-1 Communication Requirements**

<b>Number of Concurrent Users</b>	<b>DCN/ICN Service Level</b>	<b>Communication Line</b>
<b>1-4</b>	Low <sup>18</sup>	1-4=14.4 modem w/PPP
	Medium <sup>19</sup>	1-4=28.8 modem w/PPP
	High <sup>20</sup>	Integrated Services Digital Network (ISDN) @ 64 Kbps
<b>5-10</b>	Low	ISDN @ 64 Kbps
	Medium	2 = ISDN @ 64 Kbps
	High	2 = ISDN @ 128 Kbps
<b>11-25</b>	Low	2 = ISDN @ 128 Kbps
	Medium	Frame Relay @384 Kbps
	High	2= Frame Relay @ 384 Kbps
<b>26-50</b>	Low	2 = Frame Relay @ 384 Kbps
	Medium	Frame Relay T1 (1.544 Kbps) <sup>21</sup>
	High	2= Frame Relay T1 (1.544 Kbps)
<b>50-100</b>	Low	2= Frame Relay T1 (1.544 Kbps)
	Medium	3 = Frame Relay T1 (1.544 Kbps)
	High	4 = Frame Relay T1 (1.544 Kbps)

<sup>18</sup> Supports electronic mail, limited information services.

<sup>19</sup> Supports document conferencing, Internet phone, information services.

<sup>20</sup> Supports video conferencing.

<sup>21</sup> Interactive-Video On Demand (VOD) using ATM technology, broadband-ISDN bit rates range from 1.5 Mbps to several Mbps ("Interactive Video-On Demand," *IEEE Communications*, vol. 32, no. 5, May, 1994, pp. 82-88.

### 3.4.5 Subscriber/Organization Internet Access Alternatives

Subscribers and organizations may access the Internet via dial-up with a SLIP/PPP connection, or network access with various communication alternatives to an Internet Access Provider or direct connect to an Internet link. Choices of connections are shown in Table 3.4.5-1.

**Table 3.4.5-1 Internet Access Communication Alternatives**

Network Connection	Network Access Service	Description
14.4- 28.8 Kbps	Remote Modem Connection for a Single Workstation	Low cost connection using telephone line (Public Switched Telephone Network). Limited to text and simple images. Low quality video at 1-4 frames/sec.
56 Kbps 384 Kbps 1.544 Kbps	Frame-Relay Service	<p>Frame Relay is a "connection oriented" packet service designed to handle low to medium speed LAN interconnection and facility concentration. Frame Relay protocol is based on a simplified version of the traditional x.25 packet technology and is currently a data service only. Frame Relay is best suited for "bursty" data applications rather than those where a constant data stream is required.<sup>22</sup></p> <p><b>Private Frame-Relay Networks</b> Frame Relay integrates LANs with System Network Architecture (SNA) Environments.<sup>23</sup></p> <p><b>Public Frame Relay Networks</b> Access Speeds from 56 Kbps to 45 Mbps. Virtual Private Network Support. The Look and Feel Of Private Lines. Reduced Network Overhead. Bell Souths EXchange Access Frame Relay Service (XAFRS) does not support real time voice or video.<sup>24</sup></p> <p>Public Frame Relay services are available from any Regional Bell Operating Company (RBOC) and GTE which serves customers in portions of 37 states across the country.<sup>25</sup></p>

<sup>22</sup> Bell South Frame Relay Description, Internet URL: <http://www.atglab.bls.com:80/products-services/frame-relay.html>

<sup>23</sup> Internet URL: [http://frame-relay.indiana.edu/frame-relay/4000/4004/report\\_4.html](http://frame-relay.indiana.edu/frame-relay/4000/4004/report_4.html)

<sup>24</sup> Bell South Exchange Access Frame Relay Service (XAFRS), Internet URL: <http://www.bellsouth.ocn.com/services/frame.html>

Network Connection	Network Access Service	Description
ISDN	On-Demand ISDN Network Connection	The advantage of using a part-time ISDN account is only paying for the time you are on-line without having a high monthly recurring cost. You only pay for the time your connection is up and after a preset idle period, the connection automatically comes down and saves you money. <sup>26</sup> Typical rates are \$0.02/min./channel.
ISDN	Full ISDN w/64 Kbps channel	ISDN Single Line Service can carry any combination of voice, data, image, or video calls. <sup>27</sup> Dedicated line.
ISDN	Full ISDN w/128 Kbps	ISDN single line service can carry any combination of voice, data, image, or video calls; Faster data transfer and better quality video than a single 64 Kbps channel. Dedicated line.
56 Kbps Fractional T1 T1(1.544 Mbps)	Dedicated Line/Bandwidth	Point-to-point connection not shared with other users. Guaranteed bandwidth service. Good for steady high-volume network traffic. Higher cost than ISDN or frame-relay.
Scaleable from Megabits to Gigabits/sec.	ATM	Switched based technology <sup>28</sup> accommodates the simultaneous transmission of data, voice and video. Dedicated bandwidth per connection. Higher aggregate bandwidth. Well defined connection procedures. Flexible access speeds.

### 3.4.6 DCN/ICN Subscriber Software

The DCN/ICN shall maintain a directory pointing to the FTP location or HyperText Transfer Protocol (HTTP) location for client software components for downloading and installation by the subscriber.

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<sup>25</sup> Local Exchange Carrier Public Frame Relay Services, Internet-URL:-<http://frame-relay.indiana.edu/frame-relay/7000/7003/7003c.html>.

<sup>26</sup> Part-Time ISDN Connections, Internet URL: <http://www.brainstorm.net/part-time.html>.

<sup>27</sup> ISDN Overview, Internet URL: <http://www.uswest.com/isdn/overview.html>.

<sup>28</sup> ATM Forum, Internet URL: [http://www.atmforum.com/atmforum/atm\\_basics/notes1.html](http://www.atmforum.com/atmforum/atm_basics/notes1.html).

### 3.4.7 Management Operations Control Center Node

The MOCC node prototype will provide a heterogeneous, interconnected set of servers to support end-user requests including help desk services, as well as system administration of directory services (white pages, yellow pages), accounting, basic DCN/ICN network security and technology refreshment. Figure 3.4.7-1 shows the proposed configuration of the MOCC including a perimeter network with a router to the Internet; a bastion firewall host server. An interior router protects the MOCC internal network from both the Internet and the from the perimeter network.

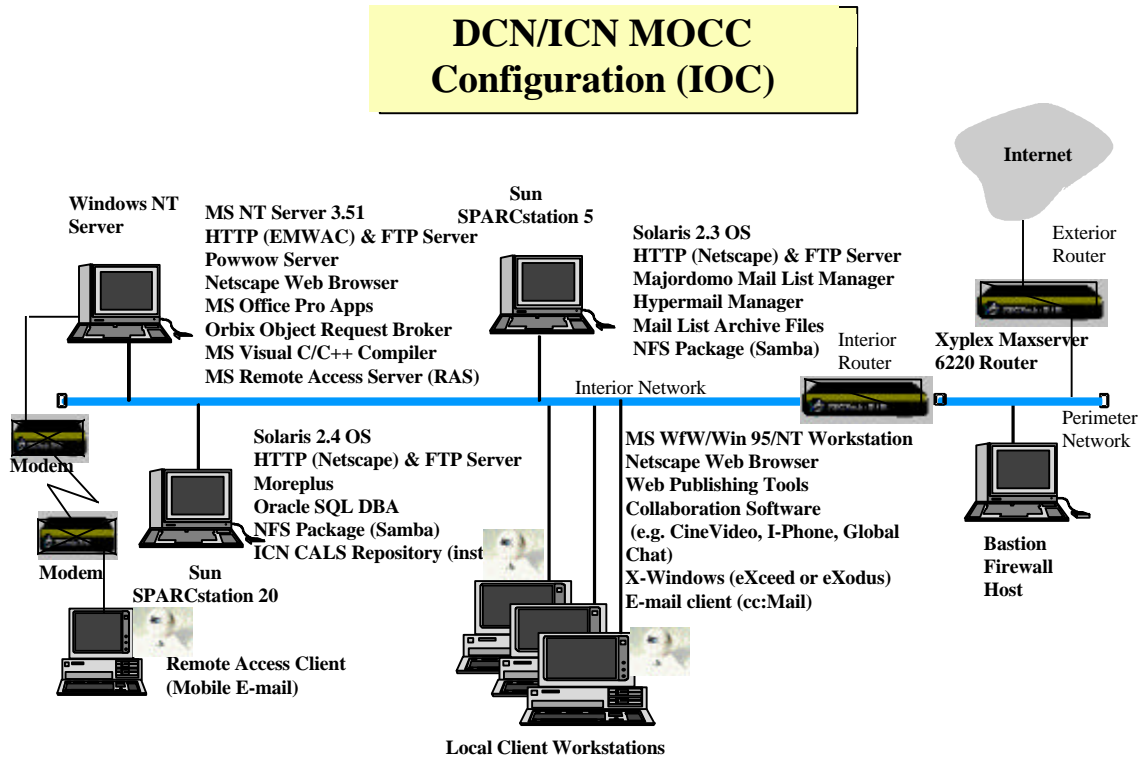


Figure 3.4.7-1 CALS DCN/ICN MOCC Network Configuration

### 3.5 Security

Security consists of policies, practices, and the information technology to support policy implementation to protect data, host computer resources, and the reputation of the system owner. While the implementation of security for the DCN/ICN focuses on network security of the MOCC, common sense and security vigilance on the part of subscribers and information content providers are needed to protect both the producers and consumers of CALS information.

### 3.5.1 Subscriber Facility Security

Security for the subscriber's facility is the responsibility of the subscriber or the subscriber's parent organization or enterprise. The DCN/ICN will provide a list of the security products that it uses to protect the MOCC and the information repositories under its control. In addition, the DCN/ICN will provide security alerts to its subscribers should a security threat or incident be discovered.

### 3.5.2 MOCC Security

The DCN/ICN shall provide the following security measures and products to run on the firewalls and/or servers at the Management Operations Control Center. These measures will be used to protect unclassified, sensitive information only from security threats including but not limited to unauthorized intrusion or access, password compromise, and computer viruses. Table 3.5.2-1 provides a proposed set of security measures to protect the computer resources and data located at the MOCC.

**Table 3.5.2-1 MOCC Security Threat and Related Measures and Products**

Threat	Security Measure	Related Product/Service	Reference
<b>Password Compromise</b>	<b>Non-reusable Password Encryption (access to E-Mail)</b>	Power One-Time Pad (POTP) Secure Mail software (Elementrix Co., New York, NY)	URL: <a href="http://draco.centerline.com:8080/~franl/crypto/one-time-pad.html">http://draco.centerline.com:8080/~franl/crypto/one-time-pad.html</a>
<b>Password Compromise</b>	<b>Password Encryption (Access to Web Content, or Oracle databases)</b>	Fortezza Technology (Personal Computer Memory Card International Association (PCMCIA) Cards + App. Software Products with embedded Fortezza APIs, e.g., Netscape, Oracle)	Sikorovsky, 1995h
<b>Unauthorized Access</b>	<b>Bastion Firewall</b>	With Anti-Virus Software, Anti Password Sniffing Software	Sikorovsky, 1995a
<b>Unauthorized Intrusion</b>	<b>Intrusion Detection Notification</b>	COURTNEY software (on the firewall) <sup>29</sup>	<a href="http://ciac.llnl.gov/ciac.ToolsUNIXNetMon.html#Courtney">http://ciac.llnl.gov/ciac.ToolsUNIXNetMon.html#Courtney</a>

<sup>29</sup> Courtney is a software product of the U.S. Department of Energy Computer Incident Advisory Capability (CIAC). It monitors the network and identifies the source machines of SATAN probes/attacks. Courtney receives input from tcpdump counting the number of new services a machine originates within a certain time window. If one machine connects to numerous services within that time window, Courtney identifies that machine as a potential SATAN host. Internet URL: <http://ciac.llnl.gov/ciac/ToolsUNIXNetMon.html#Courtney>.

Threat	Security Measure	Related Product/Service	Reference
Viruses	Virus Detection and Virus Removal	VirusScan	McAfee Associates <a href="http://www.mcafee.com">http://www.mcafee.com</a>
Security Incident	Defense Information Systems Agency (DISA) Automated Systems Security Incident Support Team (ASSIST)	DoD Information Security (INFOSEC) Incident Response and Coordination Center chartered to handle all DoD INFOSEC incidents involving DoD information telecommunication systems.	DISA Center for Information Systems Security <a href="http://www.disa.mil/line/cissmid.html">http://www.disa.mil/line/cissmid.html</a>
Unauthorized Intrusion	Firewall Security Testing and Intrusion Detection	1. COPS V1.04 <sup>30</sup> 2. Tripwire V1.2 <sup>31</sup> 3. Open Market's Security Watch ), and 4. SATAN (System Administration Tool for Analyzing Networks) <sup>32</sup> program	1. ( <a href="ftp://cert.org">ftp://cert.org</a> in /pub/tools/cops) 2. ( <a href="ftp://ftp.cs.purdue.edu">ftp://ftp.cs.purdue.edu</a> in /pub/spaf/COAST/Tripwire) 3. ( <a href="http://www.openmarket.com">http://www.openmarket.com</a> ) 4. <a href="ftp://ftp.win.tue.nl/pub/security/satan_doc.tar.Z">ftp://ftp.win.tue.nl/pub/security/satan_doc.tar.Z</a> ) (commentary on SATAN may be found at: <a href="http://ciac.llnl.gov/ciac/notes/Notes07.html">http://ciac.llnl.gov/ciac/notes/Notes07.html</a> )
Unauthorized Intrusion	Accurate Timing of Messages, Packets	Clock synchronization sites for international time authentication.	McGillivray, 1995b

### 3.6 Performance

The performance of the DCN/ICN can be assessed from both the servers' perspective and the communication network perspective. The combined performances of these two components lead to subscriber response times.

<sup>30</sup> Managed/largely written by Dan Farmer, COPS is a suite of shell scripts that forms an extensive security testing system; there's a rudimentary password cracker, and routines to check the filestore for suspicious changes in setuid programs, others to check permissions of essential system and user files, and still more to see whether any system software behaves in a way that could cause problems. V1.04 is written in Perl and UNIX shell scripts. The latest version is very up-to-date on UNIX Security holes. Internet URL: <http://www.cis.ohio-state.edu/in-line/faq/usenet/security-faq/faq.html>.

<sup>31</sup> Gene H. Kim, Eugene H. Spafford, Tripwire v1.2. Abstract: Tripwire is a highly portable, configurable tool to monitor changes in a UNIX file system. It keeps a database of inode information and message digests of file and directory contents based on a user-designed configuration file. When rerun, Tripwire will compare the stored values against the configuration flags and warn the operator of any deviations (changes, additions, accesses, etc.). Tripwire is extensively documented, has been ported to over 30 varieties of UNIX, and is highly recommended by anyone who uses it. Internet URL: <http://www.cs.purdue.edu/coast/archive/data/categ2.html>.

<sup>32</sup> SATAN tests UNIX host systems to determine which Internet services are present and if those services are misconfigured or contain vulnerabilities that an intruder could exploit. SATAN provides limited information on how to correct the vulnerabilities it identifies as well as a modest tutorial on host system security. SATAN can test individual hosts or entire networks of host systems. SATAN is an analysis and reporting tool only and does not break into systems or exploit new and/or rare vulnerabilities. Internet URL: <http://csrc.nsl.nist.gov/first/satan/satan.html#SATAN>.

### 3.6.1 Server Performance

A list of services and the corresponding server performance measures and target goals are shown in Table 3.6.1-1. All service times (except log-in) assume the user has already accessed the MOCC home page or a local server with similar services.

**Table 3.6.1-1 Server Performance Measures and Target Goals**

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Service Activity</b>	<b>Performance Measure</b>
<b>SVC100</b>	<b>General</b>	<ol style="list-style-type: none"> <li>1. Login to DCN/ICN</li> <li>2. DCN Home Page Access</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 5</li> <li>2. Elapsed Time (Sec): 2</li> </ol>
<b>SVC200</b>	<b>Organizations</b>	<ol style="list-style-type: none"> <li>1. Organization Directory Look-Up (Global)</li> <li>2. Organization Directory Look-Up (by Category or Country)</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 5</li> <li>2. Elapsed Time (Sec): 2</li> </ol>
<b>SVC300</b>	<b>CALS Initiatives</b>	CALS Initiative Look-Up	Elapsed Time (Sec): 2
<b>SVC400</b>	<b>Calendar of Events</b>	Access Calendar of Events Page	Elapsed Time (Sec): 2
<b>SVC500</b>	<b>Electronic Mail</b>	<ol style="list-style-type: none"> <li>1. Send E-Mail to DCN/ICN and Acknowledge Response</li> <li>2. Disseminate Special Interest Group E-Mail Digest</li> </ol>	Elapsed Time (Min.): 5
<b>SVC600</b>	<b>Technologies</b>	<ol style="list-style-type: none"> <li>1. Technology Directory Look-Up (Global)</li> <li>2. Technology Category Look-Up (Category)</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 10</li> <li>2. Elapsed Time (Sec): 5</li> </ol>
<b>SVC700</b>	<b>Training</b>	<ol style="list-style-type: none"> <li>1. Access Training Directory</li> <li>2. Start Play Training Video Clip</li> <li>3. Access Training FAQs</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 2</li> <li>2. Elapsed Time (Sec): 5</li> <li>3. Elapsed Time (Sec): 2</li> </ol>
<b>SVC800</b>	<b>Information Services</b>	<ol style="list-style-type: none"> <li>1. Access Information Service Directory</li> <li>2. Access Global Search Tool</li> <li>3. Access CALS Specific Search Tool</li> <li>4. Access Info Exchange Tool</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 2</li> <li>2. Elapsed Time (Sec): 2</li> <li>3. Elapsed Time (Sec): 2</li> <li>4. Elapsed Time (Sec): 5</li> </ol>

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Service Activity</b>	<b>Performance Measure</b>
<b>SVC900</b>	<b>Collection of Comments</b>	<ol style="list-style-type: none"> <li>1. Conduct Synchronous Comment Collection</li> <li>2. Conduct Asynchronous Comment Collection</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 2</li> <li>2. Disseminate once/day</li> </ol>
<b>SVC1000</b>	<b>Standards</b>	<ol style="list-style-type: none"> <li>3. Search for Specified Standard</li> <li>4. Search for Standards by Subject</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 2</li> <li>2. Elapsed Time (Sec): 10</li> </ol>
<b>SVC1100</b>	<b>Publications</b>	<ol style="list-style-type: none"> <li>1. Access Repository via Hypertext Link</li> <li>2. Access Repository Directory</li> <li>3. Retrieve Publication Abstract</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 15</li> <li>2. Elapsed Time (Sec): 2</li> <li>3. Elapsed Time (Sec): 5</li> </ol>
<b>SVC1200</b>	<b>Implementation</b>	DCN/ICN Implementation Status	Daily
<b>SVC1300</b>	<b>Specialists</b>	<ol style="list-style-type: none"> <li>1. Specialist Search by Category</li> <li>2. Specialist Search by Category and Country</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 10</li> <li>2. Elapsed Time (Sec): 5</li> </ol>
<b>SVC1400</b>	<b>Partnership Search</b>	<ol style="list-style-type: none"> <li>1. Partnership Search by Category</li> <li>2. Partnership Search by Category and Country</li> </ol>	<ol style="list-style-type: none"> <li>1. Elapsed Time (Sec): 10</li> <li>2. Elapsed Time (Sec): 5</li> </ol>
<b>SVC1500</b>	<b>Test and Certification</b>	Test and Certification Directory Look-Up	Elapsed Time (Sec): 5
<b>SVC1600</b>	<b>Computer Supported Collaboration - Audio Conferencing</b>	Conduct Real-Time Audio Conference	Real-Time
	<b>Computer Supported Collaboration - Document Conferencing</b>	Conduct Synchronous Document Conference	Synchronous

<b>Service Identifier</b>	<b>User Service Category</b>	<b>Service Activity</b>	<b>Performance Measure</b>
<b>SVC1600</b> <i>(continued)</i>	<b>Computer Supported Collaboration - Video Conferencing</b>	Conduct Video Conference	Depends on Network Connection to Internet: Minimum: 4 fps for Black and Wide at 28.8 Kbps.
<b>SVC1700</b>	<b>Dissemination Service</b>	<ol style="list-style-type: none"> <li>1. Disseminate Specified Announcement</li> <li>2. Disseminate Technical Document</li> <li>3. Disseminate Real-Time Video Clip</li> <li>4. Broadcast Conference Summaries</li> </ol>	<ol style="list-style-type: none"> <li>1. Daily</li> <li>2. Daily</li> <li>3. Daily</li> <li>4. One Week After Receipt of Input</li> </ol>
<b>SVC1800</b>	<b>Advertising Services</b>	<ol style="list-style-type: none"> <li>1. Publish Small Ad</li> <li>2. Publish Medium Ad</li> <li>3. Publish Large Ad</li> <li>4. Publish Small Catalog (10 pages)</li> </ol>	<ol style="list-style-type: none"> <li>1. One Day</li> <li>2. One Day</li> <li>3. Two Days</li> <li>4. Five Days</li> </ol>
<b>SVC1900</b>	<b>Electronic (Web) Publishing</b>	<ol style="list-style-type: none"> <li>1. Publish Small Tech Document (&lt; 10 pages)</li> <li>2. Publish Medium Tech Document (&lt; 50 pages)</li> <li>3. Publish Large Tech. Document (&gt; 50 pages)</li> </ol>	<ol style="list-style-type: none"> <li>1. Two Days</li> <li>2. Four Days</li> <li>3. Number of Days Negotiable</li> </ol>
<b>SVC2000</b>	<b>Internet Hardware/Software Acquisition and Installation</b>	<ol style="list-style-type: none"> <li>1. Hardware/Software Acquisition from Receipt of Order</li> <li>2. Installation</li> </ol>	Acquisition: Continental United States (CONUS): Two Days Hawaii, Alaska: Three Days Europe: Two Days Pacific Rim (PACRIM): Three Days Installation by Appointment

### 3.6.2 Communication Performance

A list of services and the corresponding communication performance measures and target goals are shown in Table 3.6.2-1.

**Table 3.6.2-1 Communication Performance Service Requirements**

<b>DCN/ICN Service Type and Level</b>	<b>Communication Line</b>	<b>Effective File Transfer Rate</b>	<b>Highest Service Bandwidth Requirement</b>
Text, Small Images: Low	14.4 modem w/PPP	1.44 Kbps/channel	Point-to-Point Service only
Text, Small Images, Audio: Medium; Video Image: Low	28.8 modem w/PPP	2.88 Kbps/channel	Point-to-Point Service only
Text, Small Images Audio: High; Video Image: Low-End	ISDN @ 128 Kbps Basic Rate Interface Service consists of two B Channels @ 64 Kbps, and one D channel at 16 Kbps	12.8 Kbps/channel group	Digitized phone quality speech is only 64 Kbps (8-bit samples, 8000 samples per second); FM Stereo
Text, Small Images Audio: High; Video Image: Low-End	Frame Relay @ 256 Kbps	25.6 Kbps/fractional group	FM Stereo
Text, Medium Images Audio: High; Video Image: Medium	Frame Relay T1 (512 Kbps)	51.2 Kbps/fractional group	CD Quality Sound is approximately 706 Kbps; <sup>33</sup> FM Stereo
Large Text Files and Images Audio: High; Video Image: High	ISDN Primary Rate Interface (PRI) has 23 B channels and one beefed-up 64 Kbps D channel (23B+D) for a total of 1544 Kbps	153.6 Kbps/all B channels	CD-Sound; MPEG quality video
Large Text Files and Images Audio: High; Video Image: High	Frame Relay T1 (1.544 Kbps)	153.6 Kbps/T1 line	CD-Sound; MPEG quality video
Large Text Files and Images Audio: High; Real-Time Video	T-1(1544 Kbps) <sup>34</sup>	153.6 Kbps/T1 line	Point-to-Point Service Only CD Sound, Broadcast Quality Video

<sup>33</sup> Byte Cover Story: "Toss Your TV," *Byte Magazine*, February, 1996, Internet URL: <http://www.byte.com/art/9602/sec8/art1.htm#quality>.

<sup>34</sup> 8000 frames per second; the difference is that a T-1 frame is 193 bits long, enough for 24 8-bit samples and one synchronization bit, *Byte Magazine*, *ibid*.

<b>DCN/ICN Service Type and Level</b>	<b>Communication Line</b>	<b>Effective File Transfer Rate</b>	<b>Highest Service Bandwidth Requirement</b>
Very Large Text Files and Images; Audio Files; Real-Time Video I	T-1C (3152 Kbps)	307.2 Kbps/T-1C line	Point-to-Point Service Only CD Sound, Broadcast Quality Video
Very Large Text Files and Images; Audio Files; Real-Time Video I	T-2 (6312 Kbps)	614.4 Kbps/T-2 line	Point-to-Point Service Only CD Sound, Broadcast Quality Video
Very Large Text Files and Images; Audio Files; Real-Time Video I	T-3 (44,736 Kbps)	4300.8 Kbps/T-3 line	Point-to-Point Service Only CD Sound, Broadcast Quality Video
Very Large Text Files and Images; Audio Files; Real-Time Video I	T-4 (274,176 Kbps)	25804.8 Kbps/T-4 line	Point-to-Point Service Only CD Sound, Broadcast Quality Video
CD-Sound, Broadcast Video	ATM (1544 - 622,000 Kbps) <sup>35</sup>	153.6 Kbps - 614.4 MBps	CD Sound, Broadcast Quality Video

### 3.7 Subscriber Registration

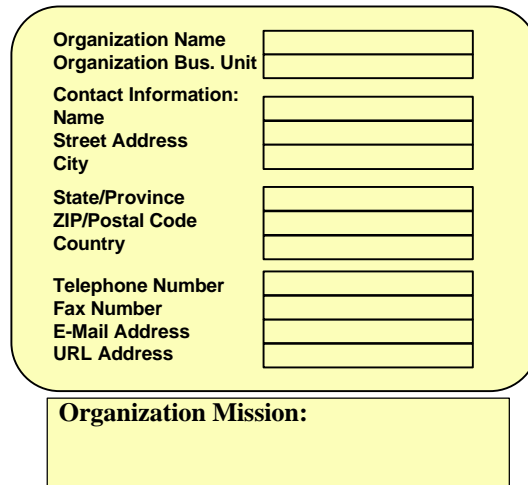
Subscribers (individuals, industry organizations, and associations) shall register their CALS interest electronically or via traditional methods (facsimile, telephone).

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<sup>35</sup> ATM uses small, fixed-length, 53-byte cells (kind of like packets). The 5-byte header contains a CRC code for error control, address information, and priority control codes. The lower 48 bytes contain the data. Byte Magazine, *ibid*.

### 3.7.1 DoD and U.S. Industry Organizations

The CALS Integration and Evaluation Office shall act as a focal point for the coordination and registration of interested DoD, military service organizations. As the focal point, the CALS Integration and Evaluation Office shall coordinate the collection of organization names and points of contact and the dissemination of registration information via the WWW, electronic mail, and facsimile. A designated organization representative shall be responsible for the organization's registration and act as a liaison to the CALS Integration and Evaluation Office and the DCN/ICN. As an alternative, an on-line registration dialog will be available at the MOCC. The dialog shall include the types of information shown in Figure 3.7.1-1, DoD Organization Registration Profile.



The form is a registration profile for DoD organizations. It consists of a large rounded rectangle containing several input fields, and a separate rectangular box below it. The fields are as follows:

- Organization Name: 1 input field
- Organization Bus. Unit: 1 input field
- Contact Information: 1 input field
- Name: 1 input field
- Street Address: 1 input field
- City: 1 input field
- State/Province: 1 input field
- ZIP/Postal Code: 1 input field
- Country: 1 input field
- Telephone Number: 1 input field
- Fax Number: 1 input field
- E-Mail Address: 1 input field
- URL Address: 1 input field

Below the main form is a separate box labeled "Organization Mission:" with a large empty space for text entry.

**Figure 3.7.1-1 DoD Organization Registration Profile**

The CALS/ISG shall act as a focal point for the coordination and registration of interested industry and association organizations. As the focal point, the CALS/ISG shall coordinate the collection of organization names and points of contact and the dissemination of registration information via the WWW, electronic mail, and facsimile. A designated organization representative shall be responsible for the organization's registration and act as a liaison to the CALS/ISG and the DCN/ICN. As an alternative an on-line registration dialog will be available at the MOCC. The dialog shall include the types of information shown in Figure 3.7.1-2, Industry/Association Registration Profile.

Organization Name	<input type="text"/>
Organization Bus. Unit	<input type="text"/>
<b>Contact Information:</b>	
Name	<input type="text"/>
Street Address	<input type="text"/>
City	<input type="text"/>
State/Province	<input type="text"/>
ZIP/Postal Code	<input type="text"/>
Country	<input type="text"/>
Telephone Number	<input type="text"/>
Fax Number	<input type="text"/>
E-Mail Address	<input type="text"/>
URL Address	<input type="text"/>
<b>Organization Product/Service:</b>	
<input type="text"/>	

**Figure 3.7.1-2 Industry/Association Registration Profile**

### 3.7.2 Individual Subscribers

Individuals may subscribe to the DCN/ICN electronically through a forms dialog available at the MOCC. A sample individual subscriber dialog box is shown in Figure 3.7.2-1.

Organization Name	<input type="text"/>
Organization Bus. Unit	<input type="text"/>
<b>Contact Information:</b>	
Name	<input type="text"/>
Street Address	<input type="text"/>
City	<input type="text"/>
State/Province	<input type="text"/>
ZIP/Postal Code	<input type="text"/>
Country	<input type="text"/>
Telephone Number	<input type="text"/>
Fax Number	<input type="text"/>
E-Mail Address	<input type="text"/>
URL Address	<input type="text"/>
<b>CALS Interest Groups:</b>	<input type="text"/> ↓
<b>Specialty Areas:</b>	<input type="text"/> ↓

**Figure 3.7.2-1 Individual Subscriber Registration Profile**

### **3.7.3 Newsgroup Moderators**

CALS Newsgroups follow the tracks and topics presented at the CALS International Expo as well as other CALS subjects in which there exist an interest and a need for individuals to collaborate. The DoD CALS Integration Office in coordination with the CALS/ISG shall identify individuals to act as newsgroup moderators. The moderators shall moderate the on-line newsgroups that discuss and collaborate on CALS issues and topics of common interest. This collaboration includes but is not limited to authoring and review of policies, white papers, proposed standards and specifications, as well as procedural questions on the operation of the CALS/ISG, its working committees, and task forces. The moderator shall identify interested organizations and individuals who will participate in the newsgroup. Registration of these individuals with the specified newsgroup shall follow a dialog similar to the individual subscriber dialog.

### **3.8 Subscriber Training**

The subscriber training consists of introductory training courses to the DCN/ICN subscriber services and advanced training resulting from technology refreshment. The training will be tiered to correspond to the level of subscription service (core, intermediate, and advanced). Delivery of training will be performed through traditional (videotape) as well as computer based training using some of the DCN/ICN collaboration tools such as forums and video-conferencing.

#### **3.8.1 Initial Training**

Initial training shall consist of brief courses on the DCN/ICN Services, CALS Newsgroups, On-line Collaboration, Information Mining, and Integrated Data Environment Building. These courses shall be published as electronic WWW documents and available on-line for web browsers and available via E-Mail to registered subscribers.

##### **3.8.1.1 Introduction to the DCN/ICN Subscriber Services**

**Topics:**

SVC100	General
SVC200	Organizations
SVC300	CALS Initiatives
SVC400	Calendar of Events
SVC500	Electronic Mail
SVC600	Technologies
SVC700	Training
SVC800	Information Services
SVC900	Collection of Comments
SVC1000	Standards
SVC1100	Publications
SVC1200	Implementation
SVC1300	Specialists
SVC1400	Partnership Search

SVC1500	Test and Certification
SVC1600	Computer Supported Collaboration <ul style="list-style-type: none"> <li>- Audio Conferencing</li> <li>- Document Conferencing</li> <li>- Video conferencing</li> </ul>
SVC1700	Dissemination Service
SVC1800	Advertising Services
SVC1900	Electronic (Web) Publishing
SVC2000	Internet Hardware/ Software Acquisition and Installation

**Materials:**

Subscriber Information Packet  
Information Content Provider Packet  
Advertiser Packet

**3.8.1.2 Synopsis of CALS Newsgroups**

**Topics:**

Survey of Newsgroups  
Administration: How to Join and Disconnect  
Archives and Digests  
Indexing and Threading Electronic Mail Messages  
How to Participate  
How to start a new CALS Newsgroup  
Netiquette

**3.8.1.3 On-line Collaboration: Arranging a Newsgroup, Forum, or Other Collaboration Event**

**Topics:**

Survey of Collaboration Methods  
Administration: How to Join and Disconnect  
How to Participate  
How to Start a New Collaboration  
How to Collect Comments

**3.8.1.4 Information Mining**

**Topics:**

General Search Engines  
CALs Specific Search Engines  
Yellow Pages of Organizations, Specialists, Technologies, Publications  
White Pages

### 3.8.1.5 Integrated Data Environment Building

**Topics:**

- Structuring/Adapting the Technical Architecture Framework for Information Management (TAFIM)
- Data Dictionary
- Universal Naming Conventions
- Uniform Resource Locators
- Building an Information Repository
- Web Publishing and linking to the DCN

### 3.8.1.6 Basic Internet Training Resources

Directories to on-line training information and basic Internet information shall be maintained. A directory to Basic Internet On-line Tools is shown in Table 3.8.1.6-1. All of the listed courses may be viewed through a web browser like Netscape.

**Table 3.8.1.6-1 Directory to Basic Internet On-line Training Sources**

<b>Topic</b>	<b>Description</b>	<b>Source Uniform Resource Locators (URL)</b>
<b>Netscape Web Browser</b>	<ol style="list-style-type: none"> <li>1. How to Use the Netscape Web Browser</li> <li>2. Netscape Handbook</li> <li>3. Laura Mengel's Tutorial</li> </ol>	<ol style="list-style-type: none"> <li>1. <a href="http://www-ed.fnal.gov/linc/fall95/netscape/netscape_home.html">http://www-ed.fnal.gov/linc/fall95/netscape/netscape_home.html</a></li> <li>2. <a href="http://home.netscape.com/eng/mozilla/1.1/handbook/">http://home.netscape.com/eng/mozilla/1.1/handbook/</a></li> <li>3. <a href="http://www-ed.fnal.gov/net_train/train_netscape_worksheet.html">http://www-ed.fnal.gov/net_train/train_netscape_worksheet.html</a></li> </ol>
<b>Newsgroups</b>	Communicating with Usenet Newsgroups	<a href="http://www-ed.fnal.gov/linc/fall95/comm_news/comm_news_lesson.html">http://www-ed.fnal.gov/linc/fall95/comm_news/comm_news_lesson.html</a>
<b>Information Hunting</b>	Finding Information on the Internet	<a href="http://www-ed.fnal.gov/linc/fall95/find/find_home.html">http://www-ed.fnal.gov/linc/fall95/find/find_home.html</a>
<b>WWW Publishing</b>	<ol style="list-style-type: none"> <li>1. WWW Publishing: Format, WWW Publishing: Style</li> <li>2. WWW Publishing: Local Hypertext Links</li> <li>3. WWW Publishing: URLs, Hierarchy, WWW Publishing: Graphics (Part 1)</li> <li>4. WWW Publishing: Graphics (Part 2)</li> </ol>	<ol style="list-style-type: none"> <li>1. <a href="http://www-ed.fnal.gov/linc/fall95/write_format/write_format_home.html">http://www-ed.fnal.gov/linc/fall95/write_format/write_format_home.html</a></li> <li>2. <a href="http://www-ed.fnal.gov/linc/fall95/write_local/write_local_home.html">http://www-ed.fnal.gov/linc/fall95/write_local/write_local_home.html</a></li> <li>3. <a href="http://www-ed.fnal.gov/linc/fall95/write_graphics/write_graphics_home.html">http://www-ed.fnal.gov/linc/fall95/write_graphics/write_graphics_home.html</a></li> <li>4. <a href="http://www-ed.fnal.gov/linc/fall95/write_graphics/write_graphics_home.html">http://www-ed.fnal.gov/linc/fall95/write_graphics/write_graphics_home.html</a></li> </ol>
<b>Mailing Lists</b>	Listservs (Mailing Lists)	<a href="http://www-ed.fnal.gov/linc/fall95/comm_lists/comm_list_home.html">http://www-ed.fnal.gov/linc/fall95/comm_lists/comm_list_home.html</a>
<b>Internet (General)</b>	Internet Skills Course Index	<a href="http://www.ola.bc.ca/ou/courses/INTR001/courseindex.html">http://www.ola.bc.ca/ou/courses/INTR001/courseindex.html</a>

<b>Topic</b>	<b>Description</b>	<b>Source Uniform Resource Locators (URL)</b>
<b>Roadmap to the Internet</b>	An Internet training workshop that shows you what the Internet is made of. It is a self paced workshop that originally was divided up into 6 weeks, but you can go through the workshop at your own pace. Topics include E-Mail, listservers, telnet, FTP, Usenet, Archie, Gopher, and WWW.	<a href="http://www.csu.ctstateu.edu/internet/roadmap/">http://www.csu.ctstateu.edu/internet/roadmap/</a>
<b>Roadmap to the Internet</b>	Patrick Douglas Crispen's Roadmap of the Internet	<a href="http://physics.wm.edu/roadmap/Road.html">http://physics.wm.edu/roadmap/Road.html</a>
<b>WWW</b>	HARNESSING THE WORLD WIDE WEB Compiled and Maintained by the Library Staff at Edinburg High School. A listing of selected Internet information resources of interest to educators. Last Updated 2/24/96.	<a href="http://www.edinburg.cisd.tenet.edu/misc/ed.html">http://www.edinburg.cisd.tenet.edu/misc/ed.html</a>
<b>Virtual Schoolhouse: The Techie's Corner</b>	Index to Internet Search Tools, Software, Software Archives, Web Stuff, Networking	<a href="http://sunsite.unc.edu/cisco/tech.html">http://sunsite.unc.edu/cisco/tech.html</a>
<b>ATM Basics</b>	Asynchronous Transfer Mode	<a href="http://www.atmforum.com/atmforum/atm_basics/notes1.html">http://www.atmforum.com/atmforum/atm_basics/notes1.html</a>

### 3.8.2 Technology Refreshment Training

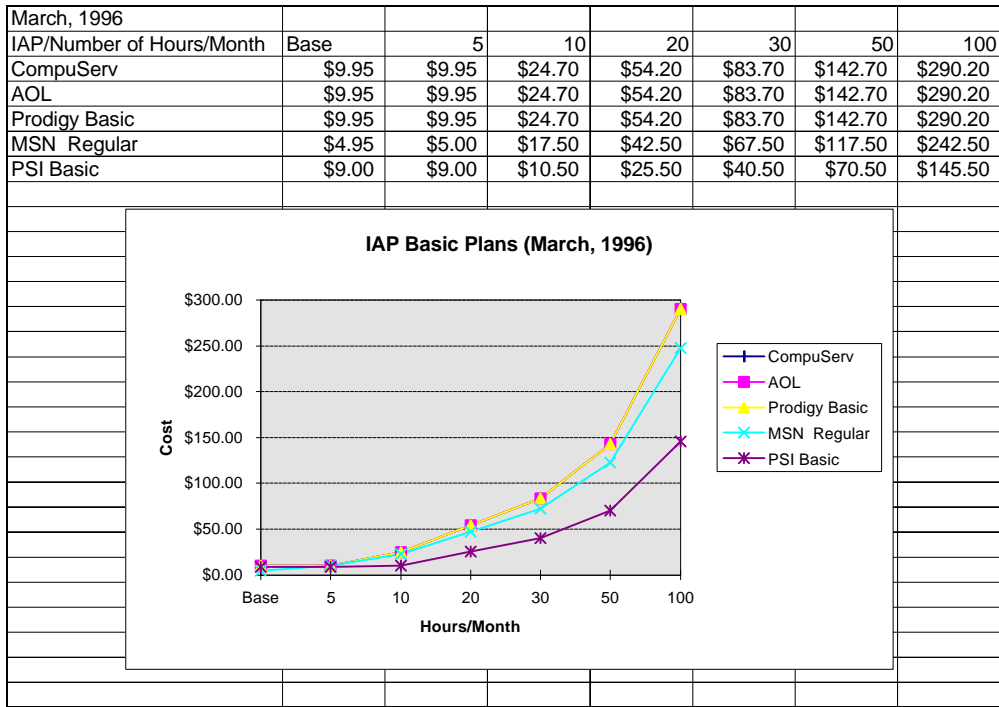
Technology refreshment training shall include updates to the DCN/ICN curriculum as services are modified or added as part of the DCN/ICN Technology Refreshment Program.

### 3.9 DCN/ICN Estimated Budget

The DCN/ICN costs include the costs of connection and monthly recurring charges for use of the connection to the Internet as well as the costs for local site equipment and administration and a primary DCN/ICN management operational control center.

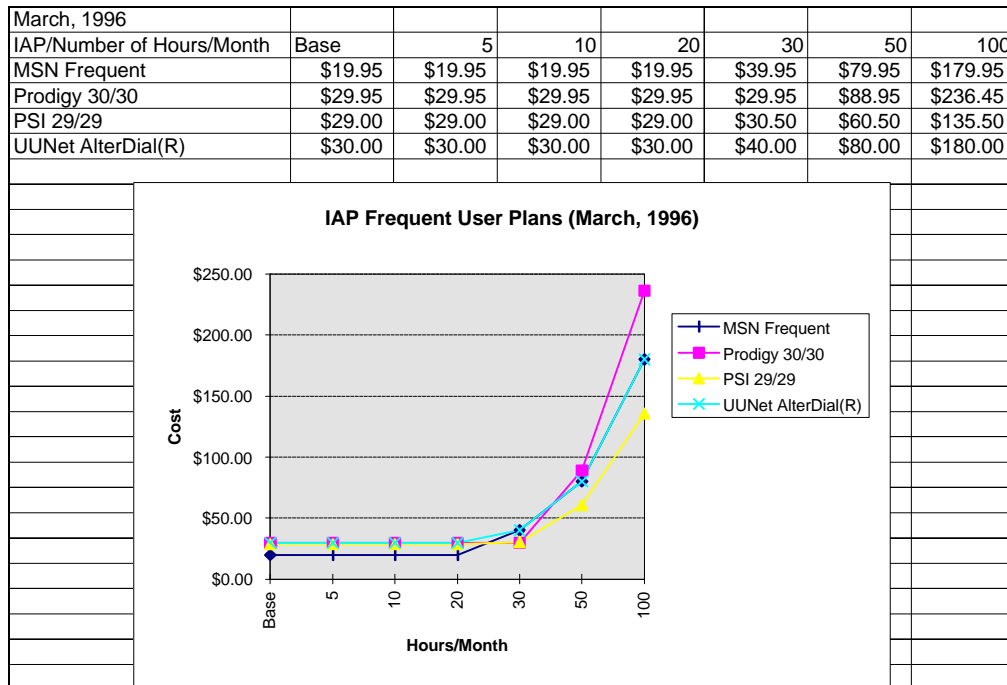
#### 3.9.1 Subscriber/Organization Internet Access Costs

Sample Internet access costs for a single, light duty subscriber using one of the popular IAPs is shown in Figure 3.9.1-1.



**Figure 3.9.1-1 Internet Access Provider Monthly Costs for Light Duty Subscriber**

Sample Internet access costs for a single heavy duty subscriber using one of the popular IAPs are shown in Figure 3.9.1-2. Currently, America On-Line (AOL) does not offer a heavy duty subscriber membership.



**Figure 3.9.1-2 IAP Subscriber Frequent User Monthly Costs**

An estimate of the costs for an organization's connection to the Internet is shown in Table 3.9.1-1. Some entries include communication costs; other entries do not, depending on the services offered by the provider.

**Table 3.9.1-1 Internet Access Provider (Sample Costs)**

Type of Access/ Communication Line	Installation/ Equipment Cost	Recurring Cost
<b>Corporate Network Access to the Internet</b>	Not Separately Priced (NSP)	\$20,000/year + leased line costs <sup>36</sup>
<b>56 Kbps Frame-Relay Service</b>	\$1745 installation	\$360/month <sup>37</sup>
<b>384 Kbps Frame-Relay Service</b>	\$2700 installation	\$1183/month <sup>38</sup>
<b>1.544 Kbps Frame-Relay Service</b>	\$2950 installation	\$1713/month <sup>39</sup>
<b>On-Demand ISDN Network Connection</b>	\$5,000 establishment fee + \$250 Domain Name Registration	~ \$5,000 a year + ISDN line costs <sup>40</sup> ----- ~ \$11,000/year + \$4,000/year bulk traffic charge + <sup>41</sup> -----
<b>On-Demand ISDN Single Node Network Connection</b>		~ \$350 a year + ISDN line costs <sup>42</sup>
<b>Full ISDN w/64 Kbps channel</b>	Installation: \$1,500	\$400/month <sup>43</sup>
<b>Full ISDN w/128 Kbps</b>	Installation: \$1,500	\$1,100/month

<sup>36</sup> 1994, 1995 Zuken-Redac Group Limited, Internet URL: <http://193.132.126.2/presentations/internetAndOurUsers/cost.html>, Last Update June 7, 1995. Mark Ingledew, Information Commerce Manager, Zuken-RedacMark\_Ingledew@redac.co.uk. Zuken-Redac leads the world in the PCB/MCM design CAD/CAM market with sales over \$140M, 24 sales and support offices in 12 countries and a network of 40 distribution partners across 3 continents.

<sup>37</sup> scruz-net, an Internet Access Provider in the greater San Francisco area; 903 Pacific Ave. #203-A Santa Cruz, CA 95060; (800) 319-5555 or (408) 457-5050; (408) 457-1020 fax; Internet URL: <http://www.scruz.net/>.

<sup>38</sup> scruz-net; Prices include Frame Relay line to your location, anywhere in the San Francisco service area, but does not include hardware. We currently recommend the Livingston IRX-111 router (we sell for approximately \$1800) and appropriate CSU/DSU (about \$225 for 56 Kbps, \$1200 for 384 Kbps or 1536 Kbps).

<sup>39</sup> *ibid.*

<sup>40</sup> *ibid.*

<sup>41</sup> Connect Com Ltd., an Australian Internet Access Provider, 129 Hawthorn Road Caulfield Victoria 3161; Phone (03) 9528 2239 Fax (03) 9528 5887; E-Mail [connect@connect.com.au](mailto:connect@connect.com.au); Internet URL: <http://www.connect.com.au/ccprices.html>.

<sup>42</sup> Zuken-Redac Group Limited.

<sup>43</sup> OARnet, 2455 North Star Road, Columbus, OH 43221; Phone: (614) 728-8100; FAX: (614) 728-8110; Internet URL: <http://www.oar.net/Info/ISDN.html>.

Type of Access/ Communication Line	Installation/ Equipment Cost	Recurring Cost
<b>Remote Modem Connection for a Single Workstation</b>		<p>~ \$200 a year + telephone line costs<sup>44</sup></p> <p>~ \$25.00/month for up to 180 connection hours per month, .50 cents each hour after 180 hours, \$25 installation; Unlimited monthly usage, \$99.00 per month, \$125.00 deposit required<sup>45</sup></p> <p>Unlimited: \$90 per month for unlimited Internet access<sup>46</sup></p> <p>Plan "A" \$180/year for 15 hours/month; Plan "B" \$300/year for 30 hours/month; \$1.00/hr for hours 16-29 above Plan "A," \$0.67/hr for hours 31+ each month.<sup>47</sup></p>
<b>56 KB Dedicated Line</b>	Plan "A" \$0.00	Plan "A" \$300.00 per month, \$0.00 install, customer provides equipment
	Plan "B" \$2700.00	Plan "B" \$450.00 per month; Network access company provides all equipment <sup>48</sup>
	Plan "C" \$1200.00	Plan "C" Dedicated 56K Line without router and Data Service Units (DSU) (Class C address, Domain) monthly \$400
	Plan "D" \$3400.00	Plan "D" Dedicated 56K Line with router and DSU (Class C address, Domain); monthly \$400 <sup>49</sup>
	Plan "E" \$0.00	Plan "E" Dedicated 56K Line without router and DSU(Class C address, Domain) \$13,000/year
	Plan "F" \$0.00	Plan "F" Dedicated 56K Line with router and DSU (Class C address, Domain) \$15,000/year <sup>50</sup>
<b>T1 Dedicated Line</b>	Plan "A" \$0.00	Plan "A" \$995.00 per month, \$0.00 install, 384 Committed Information Rate (CIR) <sup>51</sup>

<sup>44</sup> Zuken-Redac Group Limited.

<sup>45</sup> North American Internet Company, 835 North Mountain Road, Newington, CT 06111 U.S.A.; Voice: 800.952.INET Fax: 203.953.5635 E-Mail: info@nai.net Internet URL: [http://www.nai.net/nai\\_price.html](http://www.nai.net/nai_price.html).

<sup>46</sup> Midwest Internet at (618) 529-7271 or (800) 651-1599; Internet URL: <http://www.midwest.net/rates/rates.html>.

<sup>47</sup> Wimsey Information Services Inc., 8523 Commerce Court, Burnaby, BC, Canada V5A 4N3; Voice: 1-604-257-1111, Fax: 1-604-257-1110; Individual Annual account; On-line Services include Via SLIP (Serial Link Interface Protocol) and PPP (Point to Point Protocol) (1) Interactive UNIX shell access via Telnet; (2) Mosaic client access to the WWW; (3) Electronic Internet mail via POP/IMAP; (4) File transfer (FTP) directly to user's machine; (5) Internet Relay Chat (IRC) with Internet users; (6) Chat/Talk with other on-line users; (7) Access to global and local Usenet News; (8) Local mailing lists and Newsgroups. Business Accounts available for Small Business, Commercial, and Corporate levels. High Speed communication-lines not described. Prices effective January 1, 1995. Subject to change without notice. Internet URL: <http://www.wimsey.com/Business/biz/pricing/individual-pricing.html>.

<sup>48</sup> North American Internet Company.

<sup>49</sup> NETCOM On-Line Communications Services, Inc.

<sup>50</sup> OARnet.

Type of Access/ Communication Line	Installation/ Equipment Cost	Recurring Cost
	Plan "B" \$3200.00	Plan "B" Network Access Provider (NAP) provides router and DSU (Class C address, Domain); monthly \$1,000
	Plan "C" \$6000.00	Plan "C" User provides router and DSU (Class C address, Domain); monthly \$1,000 <sup>52</sup>
<b>Fractional T1 Dedicated Line</b>	\$450/installation User Router \$2025; User T1 speed DSU/Channel Service Units (CSU) \$910 Hardware at Access Provider Site \$1125 <sup>53</sup>	128 KBit channel: \$295/month plus \$50/month per add. 64 KBit/sec channel
<b>Fractional T1 Frame Relay</b>	\$450/installation User Router \$2025; User T1 speed DSU/CSU \$910 <sup>54</sup>	128 KBit channel: \$295/month plus \$50/month per add. 64 KBit/sec channel
<b>ATM</b>	\$5000	ATM Cell Relay Network Port: \$4850/month including access costs for Digital Signal level 3 (DS3) (45 Mb/s, electrical interface) <sup>55</sup>
	\$8500	ATM Cell Relay Network Port: \$7,899 per month, including access costs for Optical Carrier level 3c (OC3c) (155 Mb/s, optical interface) <sup>56</sup>

<sup>51</sup> North American Internet Company.

<sup>52</sup> NETCOM On-Line Communication Services, Inc.; 3031 Tisch Way San Jose, CA 9512; Voice: 408-983-5950, 800-353-6600, Fax: 408-241-9145 as of June 13, 1995; Internet URL: <http://www.netcom.com/netcom/dedicated.html>.

<sup>53</sup> WASATCH INTERNET ALLIANCE Rates effective June 1, 1995; Internet URL: [http://www.wia.net/wia\\_rates\\_nonenhanced.html](http://www.wia.net/wia_rates_nonenhanced.html).

<sup>54</sup> WASATCH INTERNET ALLIANCE Rates effective June 1, 1995; Internet URL: [http://www.wia.net/wia\\_rates\\_nonenhanced.html](http://www.wia.net/wia_rates_nonenhanced.html).

<sup>55</sup> Pacific Bell ATM Cell Relay Tariffs and Availability; Internet URL: <http://www.pacbell.com/Products/ATM/atm-1.html>.

<sup>56</sup> *ibid.*

### 3.9.2 Communication Costs

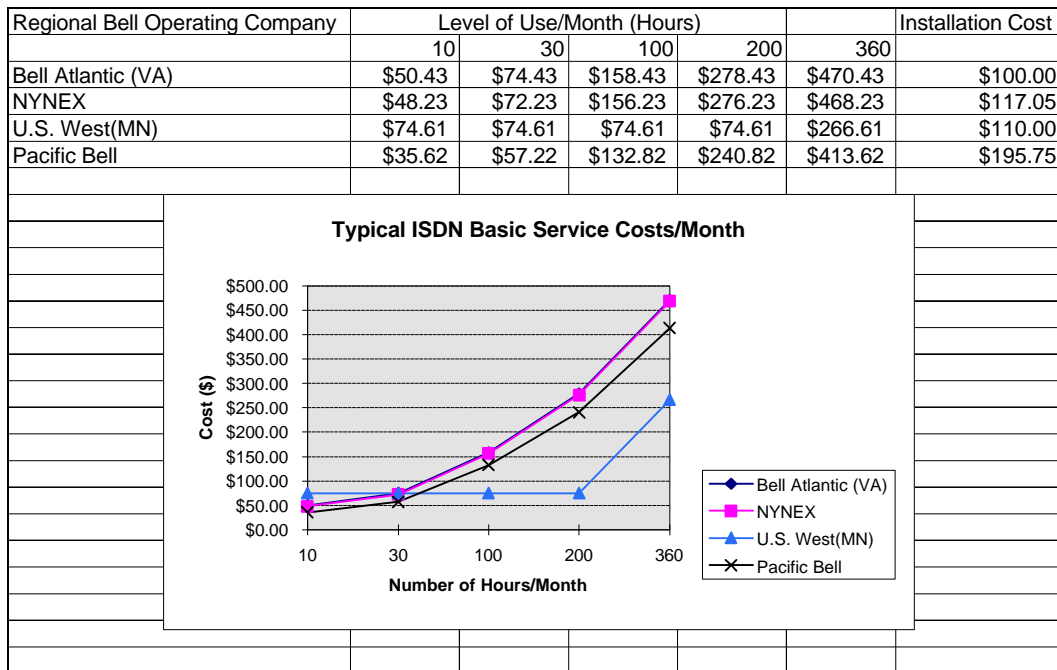
While there are many communication choices to connect an organization, small business, or individual subscriber to the Internet or to an Internet Access Provider, we shall provide only for selected choices, typical costs including a dedicated analog business line and a Basic Service ISDN line.

#### *Single Business Line*

Tariffs vary by locale and type of service: Range of costs is \$50-\$75. This estimate does not include any calls outside of the local calling area.

#### *Typical ISDN Installation and Monthly Costs*

While individual subscribers do not currently have a choice of communication providers,<sup>57</sup> typical costs for an ISDN Basic Service (2 B Channels, 1 D Channel) for some of the Regional Bell Operating Companies are shown in Figure 3.9.2-1. Exact prices depend on the subscriber's location, state tariffs, and the specific services requested. ISDN is not available in all locales, but its availability is becoming more wide-spread. In addition to a fixed monthly rate, the Regional Bells add an ISDN rate charge typically 1 to 2 cents/minute. Currently, U.S. West has a fixed ISDN price of \$74.61 for the first 200 hours/month; other Regional Bells have a lower fixed monthly cost, but start usage charges with the first hour. Costs in the tables do not include the cost of ISDN modems or ISDN network termination devices.



**Figure 3.9.2-1 Typical ISDN Basic Service Monthly Costs**

<sup>57</sup> The Telecommunications Act of 1996 will open competition for local phone service.

### 3.9.3 Local Site Administration Costs

For a site with one or more end-user nodes, the estimate of acquisition and administration of a Local Area Network is summarized in Table 3.9.3-1.

**Table 3.9.3-1 Local Site Equipment and Administration (Sample Costs)**

**Legend:** BOE: Basis Of Estimate  
 FTE: Full-Time Equivalent  
 NSP: Not Separately Priced

Local Site Cost Element	Description
<b>Single Workstation and Software</b>	Workstation P5/120 PC w/8 MB memory, 2 GB Hard Disk Drive (HDD), 3.5 inch Floppy Disk Drive (FDD), 4X CD-ROM, 28.8 Modem; BOE: \$2500 Software Estimated Cost: - Windows 95 - \$180 - MS OFFICE 95 - \$450 - WWW Client (e.g., Mosaic, Netscape): \$NSP <sup>58</sup> - Electronic Mail Software: \$NSP
<b>LAN with File Server, Router, and 5 workstations with Web Server</b>	LAN Hardware including Network Information Centers (NIC), cables, hub: \$500 Router: \$2000 Two 56 KB DSU/CSU Units: (est.) cost = 250/unit 5=P5/75 Workstations @ \$2200 = \$11000 1=586/120 File Server w/4 GB Disk and Tape B/U Unit = \$5000 1 UPS @\$500 1 Five User Pack Windows 95 @ \$900 1 OA Software Package (e.g., MS Office 95 5-pack license and Software) (est.) \$2000 1 Laser Printer w/Network Interface est.: \$1700 5 WWW Clients (e.g., Mosaic, Netscape) \$NSP 1 Commercial Web Server Software @ \$1500
<b>One Site Administrator</b>	Labor Cost estimated @ \$30,000/year + overhead for FTE Level of Effort. Administration Level of Effort is dependent on number of local nodes, range of hardware, and software support needed by end users.

<sup>58</sup> NSP - Not Separately priced. A Web client, E-Mail Client (e.g., Eudora Lite), an FTP client, and telnet client are normally included in a subscription to an Internet Access Provider. Typical subscription rates are \$15-\$25/month.

### 3.9.4 Management Operations Control Center Costs

The estimated costs of the MOCC are outlined in the DCN/ICN Business Plan [ManTech, March, 96]. These costs include estimated operating costs and capital expenditures.

### 3.10 Milestone Schedule

The primary implementation milestones include Pilot Subscriber Service Tests including tests of alternative collaboration tools, an IOC, and a FOC. These milestones and their associated periods of performance are summarized in Table 3.10-1.

**Table 3.10-1 DCN/ICN Milestone Schedule**

<b>Milestone</b>	<b>Period of Performance</b>
<b>Pilot Subscriber Service Tests</b>	5/1/96 - 12/1/96
<b>Initial Operational Capability</b>	12/1/96 - 6/1/97
<b>Full Operational Capability</b>	6/1/97

#### **4.0 REFERENCES AND NOTES**

1. [ManTech, 95a], "International CALS Network Concept of Operations," ManTech International Corp. December, 1995.
2. [ManTech, 96a], "Security Considerations for the Defense CALS Network/International CALS Network," ManTech International Corp. March, 1996.
3. [ManTech, 96b], "Defense CALS Network/International CALS Network Business Plan," ManTech International Corp. March, 1996.
4. [ManTech, 96c] "Defense CALS Network/International CALS Network Services Agreements," ManTech International Corp. March, 1996.

## **APPENDIX A: EQUIPMENT POWER REQUIREMENTS**

## Equipment Power Requirements

Item	Operating Environment	Power Type	Normal Power Consumption	EnergyStar Consumption Mode
<b>SPARCserver 20<sup>59</sup></b>	0 to 40°C (32°F to 104°F) 5% to 95% relative humidity, non-condensing	100-240 Volts (V) Alternating Current (AC); 47-63 Hz,	0.4 Kilo Volt Amp (KVA)	N/A
<b>SPARCStation 5</b>	0 to 40°C (32 to 104°F) 5% to 95% relative humidity, non-condensing	100-240V AC; 50-60 Hz	81 Volt Amp (VA) (80 W maximum)	N/A
<b>MICRON Pentium 120</b>		110-115V AC 50-60 Hz	230 Watts	
<b>MICRON Pentium 100</b>		110-115V AC 50-60 Hz	200 Watts	
<b>Generic 486/33 8MB</b>		110-115V AC 50-60 Hz	145 Watts	N/A
<b>HP Laserjet 4<sup>60</sup></b>	10 to 32.5°C (50 to 91°F) 20% to 80% relative humidity	110-115V AC 50-60 Hz	660 Watts (maximum Print) 90 Watts (Standby)	
<b>HP Deskjet 1200C</b>	Operating: 15 to 35°C (59 to 95°F) Storage: -40 to 65°C (-40 to 149°F) <sup>61</sup> Paper: 20 to 80% relative humidity (15 to 35°C) Film: 20 to 80% relative humidity (15 to 35°C)	100-240V AC, ± 10% 50/60 Hz	250 Watts maximum, 180 Watts normal and 50 Watts normal standby	Power save mode: 45 watts or less
<b>15" Color Monitor (Multisync)<sup>62</sup></b>	50 to 104°F (10-40°C) 90% maximum, non-condensing	Line voltage: 90 to 134V AC and 198 to 260V AC 43 to 63 Hz, single phase	90 Watts maximum	30 watts

<sup>59</sup> Sun SPARCserver Specifications Sheet, Internet URL: <http://www.sun.com/products-n-solutions/hw/servers/product/4-5-20/wg.2.specs.html>.

<sup>60</sup> HP Laserjet 4 User's Manual, Appendix C Environmental Specifications.

<sup>61</sup> Internet URL: <http://www.buds.co.uk/djets/dj1200c.htm>.

<sup>62</sup> Internet URL: <http://www.macworks.com/prices/monitor.html>.

Item	Operating Environment	Power Type	Normal Power Consumption	EnergyStar Consumption Mode
17" Color Monitor (Multisync)	50 to 104°F (10-40°C) 90% maximum, non-condensing	90 to 132V AC and 198 to 264V AC 43 to 63 Hz, single phase	150 Watts (maximum)	11 watts
20" Color Monitor (Multisync)	50 to 104°F (10-40°C) 90% maximum, non-condensing	90 to 132V AC and 198 to 264V AC 43 to 63 Hz, single phase	165 Watts (maximum) when operating	Less than 15 Watts in energy saver mode

## **APPENDIX B: ACRONYMS AND ABBREVIATIONS**

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## ACRONYMS AND ABBREVIATIONS

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<b>AC</b>	Alternating Current
<b>AOL</b>	America On-Line
<b>ARPA</b>	Advanced Research Projects Agency
<b>ASSIST</b>	Automated Systems Security Incident Support Team
<b>BOA</b>	Board of Advisors
<b>BOE</b>	Basis Of Estimate
<b>CALS</b>	Continuous Acquisition and Life-cycle Support
<b>CGI</b>	Common Gateway Interface
<b>CIAC</b>	Computer Incident Advisory Capability (U.S. Department of Energy)
<b>CIR</b>	Committed Information Rate
<b>CMIS</b>	Common Management Information Services
<b>CONUS</b>	Continental United States
<b>CSU</b>	Channel Service Units
<b>DCN</b>	Department of Defense (DoD) Continuous Acquisition and Life-cycle Support (CALS) Network
<b>DISA</b>	Defense Information Systems Agency
<b>DoD</b>	Department of Defense
<b>DS3</b>	Digital Signal level 3 (45 mbps)
<b>DSU</b>	Data Service Units
<b>ECRC</b>	Electronic Commerce Research Center
<b>FAQ</b>	Frequently Asked Questions
<b>FDD</b>	Floppy Disk Drive
<b>FOC</b>	Full Operational Capability
<b>FTE</b>	Full-Time Equivalent
<b>FTP</b>	File Transfer Protocol
<b>GUI</b>	Graphical User Interface
<b>HDD</b>	Hard Disk Drive
<b>HTML</b>	HyperText Markup Language
<b>HTTP</b>	HyperText Transfer Protocol
<b>IAP</b>	Internet Access Provider
<b>IBOD</b>	International Board of Directors
<b>ICC</b>	International CALS Congress
<b>ICN</b>	International CALS Network
<b>IDE</b>	Integrated Data Environment
<b>IOC</b>	Initial Operating Capability
<b>IP</b>	Internet Protocol
<b>IRC</b>	Internet Relay Chat
<b>ISDN</b>	Integrated Services Digital Network
<b>ISG</b>	Industry Steering Group
<b>ISO</b>	International Organization for Standardization
<b>IWSDB</b>	Integrated Weapon System Database

<b>JCALs</b>	Joint Continuous Acquisition and Life-Cycle Support
<b>JEDMICS</b>	Joint Engineering Data Management Information and Control System
<b>JPEG</b>	Joint Photographic Experts Group
<b>KVA</b>	Kilo Volt Amp
<b>LAN</b>	Local Area Network
<b>LOCC</b>	Local Operations Control Center
<b>MOCC</b>	Management Operations Control Center
<b>MPEG</b>	Moving Picture Expert Group
<b>NAP</b>	Network Access Provider
<b>NCAT</b>	National Center for Advanced Technologies
<b>NIC</b>	Network Information Center
<b>NSP</b>	Not Separately Priced
<b>NTSC</b>	National Television Standards Committee (color television video standard used in North America)
<b>OC3c</b>	Optical Carrier level 3c
<b>OSD</b>	Office of the Secretary of Defense
<b>PACRIM</b>	Pacific Rim
<b>PCMCIA</b>	Personal Computer Memory Card International Association
<b>POTP</b>	Power One-Time Pad
<b>PPP</b>	Point-to-Point Protocol
<b>PRI</b>	Primary Rate Interface
<b>R&amp;D</b>	Research and Development
<b>RBOC</b>	Regional Bell Operating Company (e.g., NYNEX, Bell Atlantic, Ameritech, PacBell, etc.)
<b>SLIP</b>	Serial Link Internet Protocol
<b>SMTP</b>	Simple Mail Transfer Protocol
<b>SNA</b>	System Network Architecture
<b>T&amp;C</b>	Test and Certification
<b>TAFIM</b>	Technical Architecture Framework for Information Management
<b>TCP</b>	Transmission Control Protocol
<b>URL</b>	Uniform Resource Locator
<b>V</b>	Volts
<b>VA</b>	Volt Amp
<b>VDIG</b>	Video Digitizer
<b>VOD</b>	Video On Demand
<b>WWW</b>	World Wide Web
<b>XAFRS</b>	EXchange Access Frame Relay Service (Bell South)