

MARINE CORPS DISTANCE LEARNING

DEPLOYABLE LEARNING RESOURCE CENTER
(DLRC) CONCEPT OF OPERATIONS (CONOPS)



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1.0 INTRODUCTION

The United States Marine Corps Distance Learning Program (MCDLP) was established to provide distributed training and distance learning solutions to Marines anytime and anywhere. The Deployable Learning Resource Center (DLRC) is the hardware component of the MCDLP that provides Marines with access to electronic multimedia courseware while deployed onboard ship and from remote ashore locations as depicted in Figure 1. The DLRC provides the same functionality as the fixed site Learning Resource Centers (LRCs) aboard Marine Corps bases and stations, providing a common access point for on-line learning.

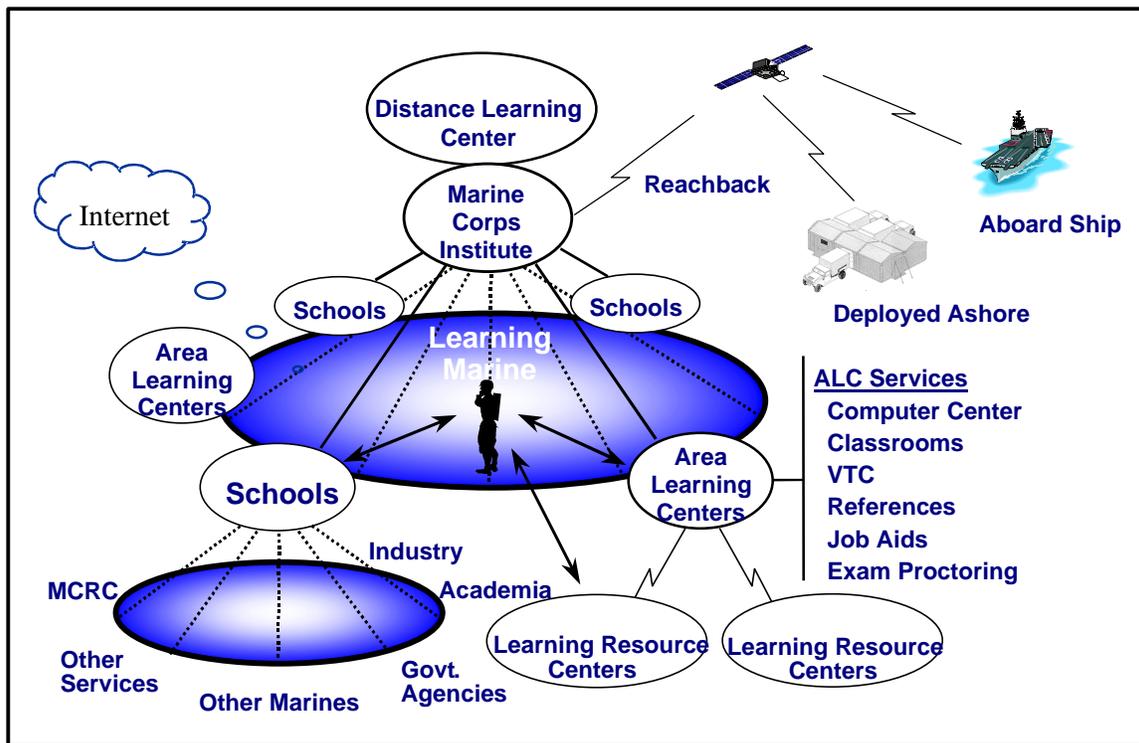


Figure 1. Distance Learning Architecture Overview

The DLRC connects to external network resources, including Marine Corps Enterprise Network (MCEN) hardware and software. This connectivity provides access to the other components of the Marine Corps Distance Learning Network (MarineNet), such as the student registration database at the Marine Corps Institute (MCI) in Washington, DC. The DLRC is configured to operate in three operational environments: deployed shipboard, deployed land-based, and deployed fixed-base sites. Additionally, the DLRC operates in four connectivity configurations: stand-alone Local Area Network (LAN), Metropolitan Area Network (MAN) connected, Wide Area Network (WAN) connected, and remote user workstations. This document describes the concept of operations for the system.

2.0 DLRC OPERATIONAL ENVIRONMENTS

The DLRC is designed to be modular and easily re-configurable to provide maximum flexibility for the deploying unit. The DLRC can be used in any of three operational environments, as described in paragraphs 2.1 through 2.3.

2.1 Deployed Shipboard

The DLRC may be deployed onboard various Navy ships such as the Multi-purpose Aircraft Carrier (nuclear) (CVN), Amphibious Assault Ship (multi-purpose) (LHD), Amphibious Assault Ship (general purpose) (LHA), Dock Landing Ship (LSD), and Amphibious Transport Dock (LPD). The DLRC normally will be set up in USMC spaces on the ship. Where available, the DLRC will interface with the ship's LAN providing approved users with access to the DLRC courseware. When bandwidth is available, the DLRC may access the NIPRNET and reach back to MCI for student training record updates. A typical DLRC configuration is depicted in Figure 2.



Figure 2. Typical DLRC Configuration

2.2 Deployed Land-based

The DLRC may also be deployed with MEF units and MEUs to land-based remote deployment sites. The DLRC may be set up in fixed base facilities or at remote sites in tents. Where available, the DLRC will interface to existing MANs providing all approved users with access to the DLRC courseware. When bandwidth is available, the DLRC may access the NIPRNET and reach-back to MCI for student training record updates.

2.3 Deployed Fixed-based Sites

The DLRC may also be deployed with units to fixed-based site deployment areas. The DLRC may be set up in rooms or tent with suitable electrical power and HVAC. Where available, the DLRC will interface with a MAN providing all approved users with access to the DLRC courseware. When bandwidth is available, the DLRC will access the NIPRNET and reach back to MCI for student training record updates.

3.0 SYSTEM DESCRIPTION

Each DLRC consists of a server, LAN switch, router, printer, and laptop workstations. The server stores and distributes all electronic training courseware and hosts the necessary management tools to monitor student progress. The multimedia laptop workstations provide individual Marines access to the Distance Learning Courseware. The DLRC system is housed in transit cases as depicted in Figure 3. A Marine Corps unit may deploy with 10 or 20 laptop workstations.

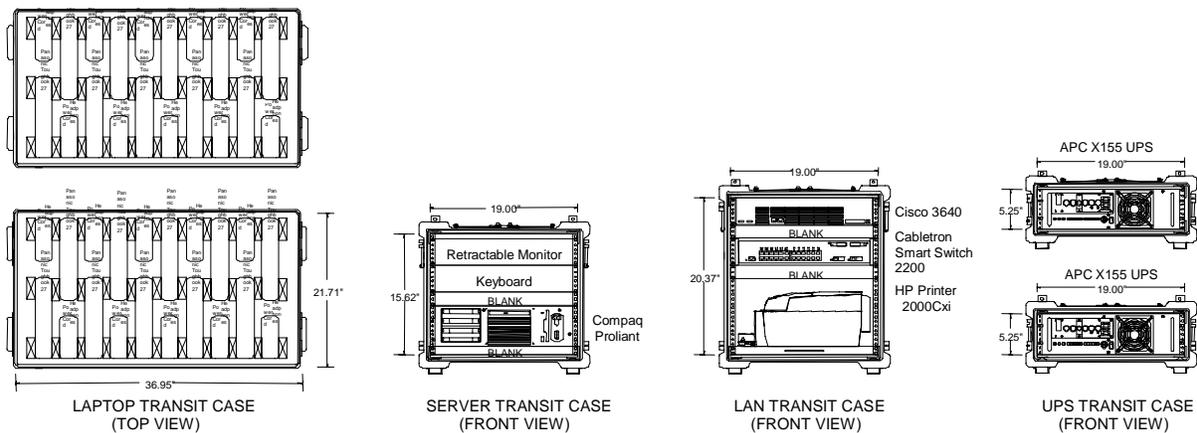


Figure 3. DLRC Transit Cases

The DLRC will be configured as shown in Figure 4. Ruggedized laptop computers connect to a Cabletron Smartswitch 2200, which is also connected to a Compaq server and a printer. When possible the DLRC will connect into a locally provided network and use reach-back capabilities provided by the ship, Marine Expeditionary Unit (MEU), or higher headquarters.

The Learning Management System (LMS) software is responsible for administering electronic courseware and student records. The LMS will be a customizable commercial off-the-shelf (COTS) product based on Marine Corps standard databases. The LMS will be selected in FY01 to meet Marine Corps Distance Learning requirements currently under development. When in reach-back mode, the DLRC will connect to the Marine Corps Institute Automated Information System (MCIAIS) server allowing students to review enrollment status and enroll in Distance Learning courses. Upon course completion, student training records are updated in the Marine Corps Total Force System (MCTFS) by MCI.

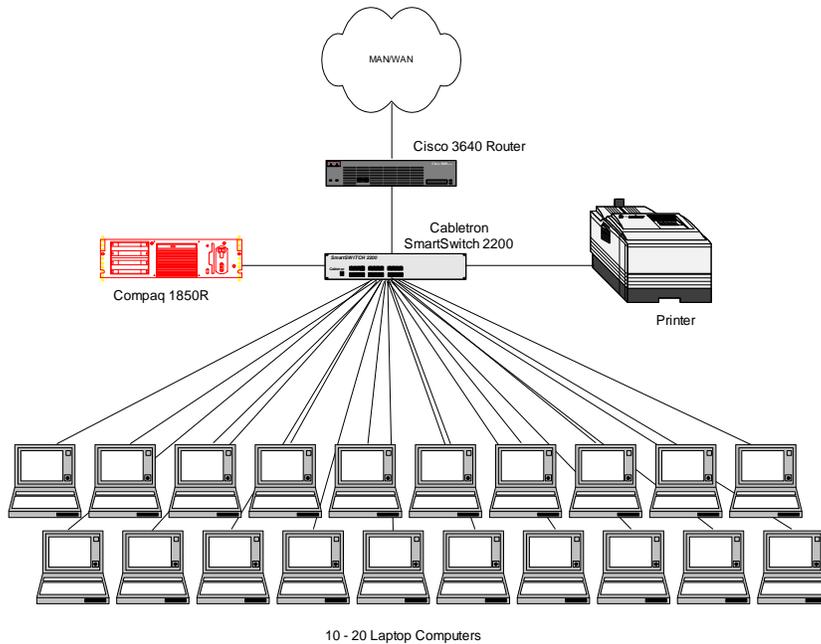


Figure 4. DLRC Configuration

3.1 Functionality

The DLRC supports the following system functions.

3.1.1 Distance Learning Users

A Marine using a client workstation that is connected to the DLRC LAN (i.e., content server) has the following capabilities:

- Access to distance learning courseware and other multimedia training materials.
- Interactive playback of multimedia content (e.g., audio, video, imagery, and text in various industry standard formats), including standard streaming media.
- Register for and track progress in Marine Corps courses and lessons (e.g., course registration).
- Record individual performance in Marine Corps courses and lessons (e.g., performance assessment).
- Access and use electronic mail via Marine On-line (MOL) where connectivity to external network resources is available.
- Access and use general productivity tools (i.e., Microsoft Office, Internet Explorer).

3.1.2 Training System Administrator

The Training System Administrator is either a unit Training Officer or Training NCO that has received special pre-deployment training on the DLRC system. The Training System Administrator has the following capabilities:

- Track and produce reports of trainees' course registrations.
- Track and produce reports of trainees' performance assessments.
- Set up and reconfigure the DLRC hardware and software on user workstations and the content server.
- Administer user access to the system (e.g., login ID and passwords).
- Access and use electronic mail via Marine On-line (MOL) where connectivity to external network resources is available.
- Access and use general productivity tools (i.e., Microsoft Office, Internet Explorer).

3.2 Equipment Components

The DLRC components were chosen based on the requirements to meet or exceed the Marine Corps Common Hardware Suite (MCHS) standards and the size and weight of the equipment. The DLRC is designed to accommodate a variety of adverse conditions, but it is limited to the specifications of the equipment components. The components were chosen based on their environmental constraints. In some deployment environments, the operating unit may be required to provide supplemental environmental protection and conditioning.

3.2.1 Laptops

The Panasonic Toughbook 27 is fully ruggedized with a full magnesium case, shock-mounted hard drive, and spill-resistant keyboard, LCD, and touch pad.

3.2.2 Server

The DLRC will use the Compaq Proliant DL380 with four hard drives and a DLT tape drive. The Compaq 1850R is a space-saving, rack-mounted server. It will provide 72.8 GB for storage. The server can deliver to all LAN-connected workstations any locally stored multimedia content, with consistent and satisfactory media playback performance across all connected workstations.

3.2.3 LAN Switch

The Cabletron Smart Switch 2200 is a 10/100 Fast Ethernet switch that provides 24 10/100 BaseT Fast Ethernet ports and one VHSIM slot with a Fast Ethernet, 100BaseT, uplink module to the Cisco Router.

3.2.4 Printer

The HP 2000Cxi Professional Series Color Printer is an integrated network printer solution that includes the HP JetDirect 300X print server, a 250-sheet accessory paper tray, the HP JetDirect Cable Kit, and the HP JetAdmin network software.

3.2.5 Router

The Cisco 3640 is a modular, multi-service access platform. The Cisco 3640 has four network module slots. The DLRC router will contain the following network modules.

One 4-port serial network module (NM-4T).

- Two 1-port Fast Ethernet network module 100-Base-TX (RJ-45)(NM-1FE-TX).
- One 1-port 155-Mbps OC-3 ATM multi-mode network module (NM-1A-OC3MM).

3.2.6 Uninterruptible Power Supply (UPS)

The APC X155 ruggedized rackmount UPS delivers up to 2,000 VA of clean, uninterruptible power. One UPS is required to support the server. The UPS provides time to shut down the server “gracefully” if a power outage occurs. A second UPS is available to condition the power to the LAN switch and the router. The laptop workstations have internal batteries for backup power.

3.3 Software

The software consists of the operating system software, the LMS, and multimedia courseware. The on-line student assessment (testing) capability currently supported by MARTest will be replaced by the LMS software, which will store the testing database locally on the DLRC server.

3.3.1 System Software

The DLRC will use Microsoft Windows NT Server as the operating system on the server and Windows NT workstation on the laptops. Microsoft Internet Information Server (IIS) will be installed on the server to provide a World Wide Web (WWW) server for the DLRC. ARCServe will be installed on the server to back up information to the DLT tape drive.

3.3.2 LMS

A Marine student will be able to enroll in a course via the LMS software. The LMS software also will track student progress and assess student performance through electronic testing. The precise capabilities of the LMS software will be determined when the commercial product is chosen. This document was written assuming the LMS product would meet all the USMC Distance Learning requirements.

The LMS will interface with the MCI Automated Information System (MCIAIS) database. The MCIAIS Database is used to verify that the student is an authorized Marine Corps Distance Learning user and stores and forwards the student’s official MCI training and educational data to the Marine Corps Total Force System (MCTFS).

To accommodate the deployed conditions of the DLRC, the LMS will include an "off-line" capability. This “off-line” capability will allow a student to enroll and study the courseware when the DLRC cannot connect to the MCIAIS over a wide area network (WAN) connection.

3.3.3 Multimedia Courseware

The multimedia courseware will be stored on the DLRC server. An off-line CD library will also be maintained. The local student database stored on the DLRC server

will track the daily progress of the individual students who have officially enrolled in a course from the DLRC and are studying courseware while attached to the DLRC LAN.

3.4 Network Interfaces

The DLRC will use Fast Ethernet as the primary LAN/MAN connection. According to the functional specification, 100 Base-T Ethernet connectivity will be used for the connection to most shipboard and land-based deployed infrastructures. The router also will support a connection to an ATM backbone via Multi-Mode (MM) fiber.

4.0 OPERATING STATES

The DLRC will be used in the following five states:

- Storage – Packed in a transit type case.
- Pre-deployment – Set up in the maintenance lab, tested, and then repacked for shipping, in the transit cases.
- Deployment - In use for training.
- Post-deployment – Set up in the maintenance lab, tested, and then repacked for storage.
- Maintenance – Set up in the maintenance lab for system upgrades.

4.1 Storage

All DLRC assets assigned to a Marine Corps Base (MCB) will be owned and controlled by the base T&E/O&T. The base will store the equipment in a storage/work area that is equipped with lights, power, and HVAC. The Distance Learning Contracted Logistics Support (CLS) contractor will use this area for maintaining, as well as storing, the DLRC equipment.

4.2 Predeployment

Prior to a deployment, the deploying unit will coordinate with the Base T&E/O&T to reserve DLRC systems. The standard DLRC consists of five to six transit cases, one server, one printer, network devices, and one to two UPS cases. The deploying unit must also identify the number of user workstations required (10 or 20).

Upon deployment notification, the CLS contractor will power up the system, test each equipment component, and ensure the latest complement of courseware is loaded on the server. If faulty equipment components are found, the CLS contractor will have the equipment repaired following the USMC Distance Learning Integrated Logistics Support Plan. Once an operational DLRC system has been tested and approved by the CLS contractor, it will be re-packed in the transit cases for transport.

The deploying unit will coordinate the training facility (i.e., tent, training room, or space aboard ship) with the appropriate organizations at the deployment location. Facility support requirements are presented in Appendix A.

The deploying unit will coordinate with the appropriate organization for IP addresses. The CLS contractor will preconfigure the TCP/IP settings and system setup based on information provided by the deploying unit.

4.3 Deployment

The deploying unit is responsible for the system setup and return of the DLRC to the Base T&E/O&T office from which it was checked out.

The server, UPS, and LAN equipment in the transit cases will remain installed in the cases. These cases will have removable panels on the front and back of the cases to allow air to flow through and cool the equipment. No environmental conditioning will be provided for the individual cases. It is assumed the equipment will be set up in an environmentally controlled room or tent when deployed. The laptop case is only a storage case. When the DLRC is set up, the laptops will be removed from the case and connected to the LAN or used remotely.

4.3.1 DLRC Connectivity Configurations

According to the specification, the DLRC equipment will be used in one of four connectivity configurations. Every DLRC is configured to facilitate transformation of a stand-alone DLRC to either a MAN-connected or WAN-connected DLRC, or vice-versa. The configurations are described in the following paragraphs.

4.3.1.1 WAN-Connected

WAN-connected or reach-back is defined herein as intermittent (as opposed to continuous), secure, TCP/IP access to external network resources (Figure 5). When in reach-back mode, the DLRC will operate similar to an LRC and TEPOP at a Marine Corps Base. The design of the DLRC external connection does not supply any in-line network encryption devices. All reach-back capability will be accomplished via the MAN interface and will be configured by the operating unit.

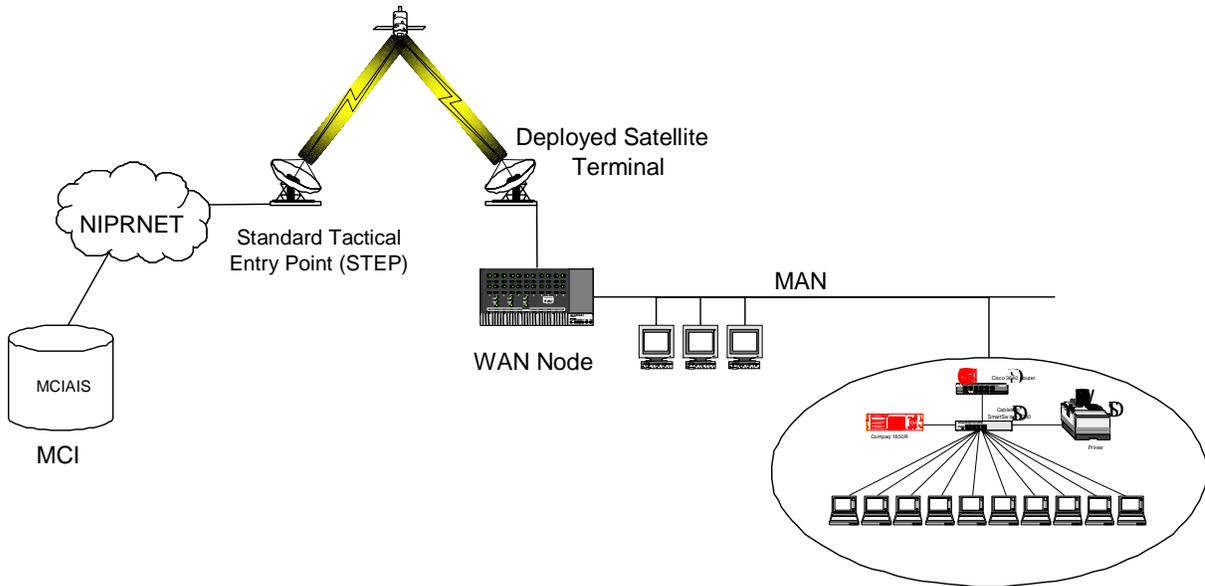


Figure 5. Reach-back Operations

4.3.1.2 MAN-Connected

The DLRC will conduct MAN operations (Figure 6) when it is deployed to a location that prohibits connection to a WAN, but enables MAN users to connect to the DLRC LAN. Connectivity to the MAN will be accomplished by connecting the Cisco router or LAN switch to the MAN. The router provides the ability to connect the DLRC to the MAN via one of two available Fast Ethernet ports, a serial port, or an ATM port. It is anticipated that Fast Ethernet will be the primary interface to the MAN; however, the inclusion of a serial interface will provide the possibility to integrate the system with many existing tactical systems. The LMS will operate off-line when the DLRC is in this configuration.

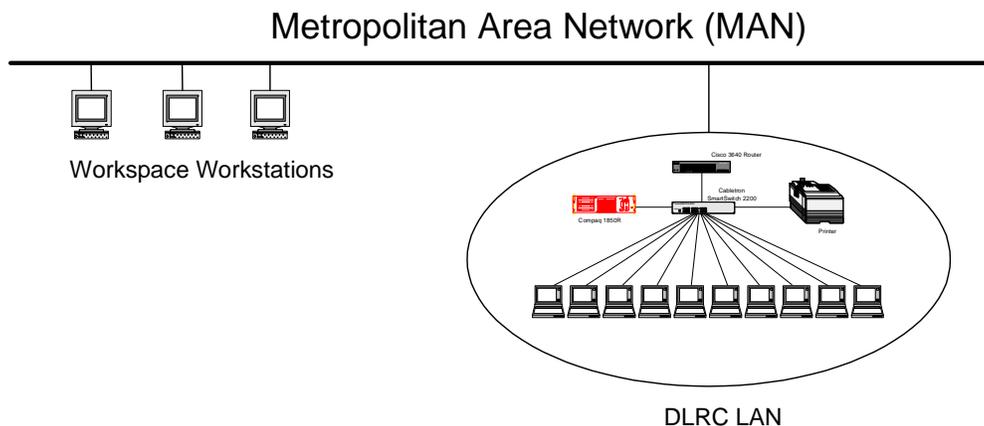


Figure 6. MAN Operations

4.3.1.3 Stand-alone

The DLRC will conduct stand-alone operations (Figure 7) when the laptops are connected to the DLRC LAN and the LAN is not connected to an external network. The LMS will operate off-line in this configuration.

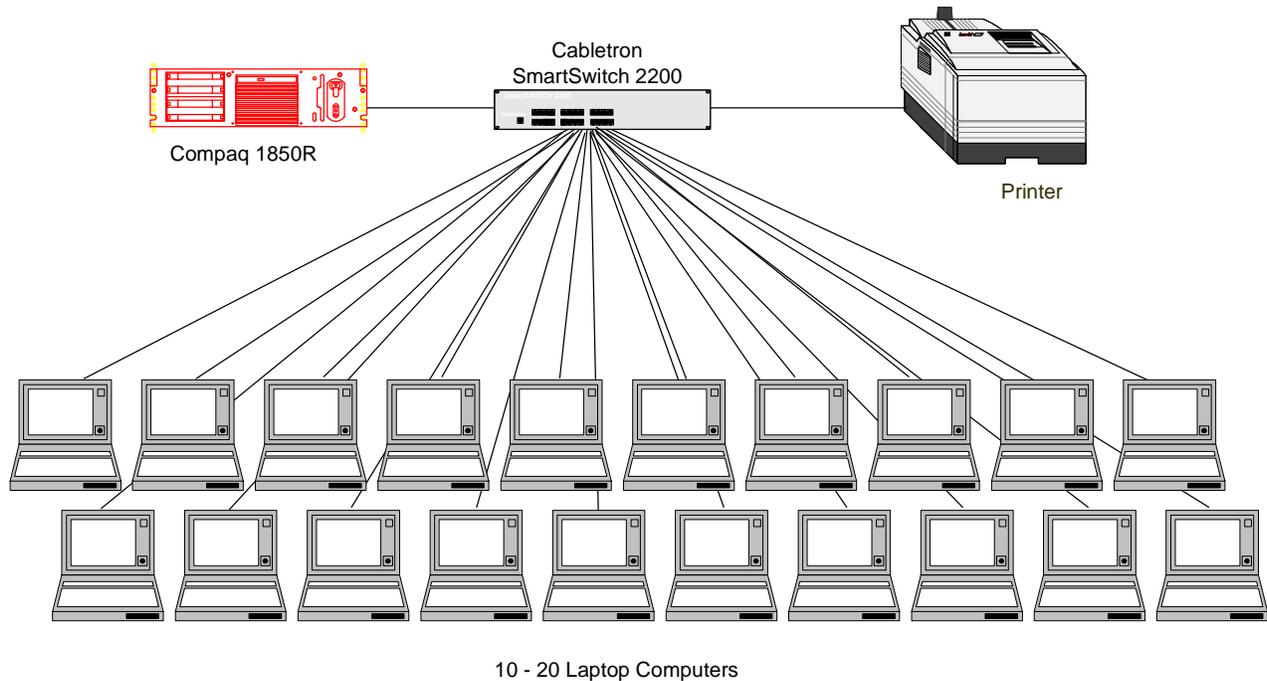


Figure 7. Stand-alone Operations

4.3.1.4 Remote User Workstations

Laptops that are not connected to the DLRC LAN are operating as remote user workstations. A Marine Corps MEU/MEF may choose to allow Marines to load courseware on laptops and study the course at a location other than the DLRC LAN location.

4.4 Post Deployment

The Base T&E/O&T will receive a DLRC system from a MEF returning from a deployment. The CLS contractor will set up and power on the system. Each equipment component will be tested. If faulty equipment components are found, the CLS contractor will take steps to have the equipment repaired as defined in the USMC Distance Learning Integrated Logistics Support Plan. Once an operational DLRC system has been tested and approved by the CLS contractor it will be re-packed in the transit cases and stored.

4.5 Maintenance

The Marine Corps Distance Learning Configuration Control Board (CCB) must approve all hardware and software upgrades. The CCB will direct the CLS contractor to install upgrades in the DLRC systems as changes are approved.

4.5.1 Software

The local CLS personnel will install software upgrades as directed by the CCB. The CLS personnel will also load new courseware, as it becomes available.

4.5.2 Hardware

All failed equipment will be repaired according to the equipment warranty and the procedures outlined in the ILSP.

The DLRC hardware will be upgraded according to the Marine Corps Common Hardware Suite refresh cycle.

5.0 FIELDING PLAN

The current fielding plan describes the number of DLRC systems to be fielded to each base location and the associated MEF or MARFORRES that will access the DLRCs at that base location. Table 1 provides a summary of the fielding plan by fiscal year.

Table 1. Fielding Plan

Unit	Base	Fiscal Year	Quantity
I MEF	Camp Pendleton	FY02	18
II MEF	Camp Lejeune	FY02	18
III MEF	Okinawa	FY03	5
III MEF	Hawaii	FY03	4
MARFORRES	New Orleans	FY03	9

6.0 RESPONSIBILITIES

6.1 MARCORSSYSCOM

MARCORSYSCOM is the Program Manager for the Marine Corps Distance Learning infrastructure. MARCORSSYSCOM's responsibilities include the following.

- Procure hardware for the DLRCs.
- Manage software and hardware changes for the DLRC through the Configuration Control Board (CCB).
- Coordinate CLS support for the DLRC with the Base Training and Education (T&E)/Operations and Training (O&T) staff sections.

6.2 Distance Learning Center, Training and Education Command, MCCDC

The Distance Learning Center, Training and Education Command is the sponsor of the USMC Distance Learning Program. DLC responsibilities include the following.

- Determine DLRC functional requirements.
- Prioritize DLRC fielding.
- Determine DL and DLRC courseware development priorities.

- Coordinate DLRC shipboard certification.

6.3 Marine Corps Base T&E/O&T

The DLRC systems will be assigned to the T&E/O&T sections at selected Marine Corps Bases (MCB). The Base T&E/O&T responsibilities include the following.

- Receive and account for DLRC systems assigned to their bases.
- Coordinate the use of DLRC systems with deploying units.
- Provide a storage area for the DLRC assets assigned to them. This area should also provide lighting, power, HVAC, and room to perform maintenance on the DLRC equipment.

6.4 MEF

The Marine Expeditionary Force units are the users of the DLRC systems. The MEF's responsibilities include the following.

- Coordinate with Base T&E personnel to reserve DLRC systems for deploying units.
- Coordinate with the deployment area or site for space and power for the DLRC.
- Communicate any problems encountered to the Base T&E/O&T and CLS personnel.

6.5 NAWCAD Patuxent River (Special Communications Requirements Branch)

NAWCAD is the system integrator. NAWCAD responsibilities include the following:

- Provide systems engineering for the design, integration, and testing of the prototype DLRC system.
- Purchase equipment and transit cases for DLRC systems.
- Perform initial integration of equipment into the transit cases.
- Provide CLS personnel as directed by MARCORSSYSCOM.

6.5.1 CLS Contractor

The CLS contractor responsibilities include the following.

- Maintain the DLRC systems assigned to the MCB to which the CLS Contractor is assigned.
- Upgrade courseware as directed by the CCB.
- Upgrade hardware and software as directed by the CCB.
- Install, test, and de-install the DLRC aboard ship where applicable.
- Configure installation and set up instructions for the DLRC based on the deployment scenario.

APPENDIX A. FACILITY SUPPORT REQUIREMENTS

The DLRC will be set up in a facility at the deployed location. A DLRC facility should meet the requirements listed in table A-1.

Table A-1. DLRC Facility Checklist

Feature	Ideal
Size	Roughly 480 sq ft (for 20 students) Roughly 280 sq ft (for 10 students)
Location	Near Marines
External Connectivity	Telecommunications connectivity into the MAN and or WAN. One MAN connection is required for the Cisco router or Cabletron SmartSwitch.
Electrical	The DLRC requires two dedicated 20-amp, 120-volt, 60-Hertz electrical circuits.
HVAC	Heated and air conditioned space.
Lighting	Typical lighting for office environment.
Bandwidth	The bandwidth requirements for the DLRC cannot be determined until the LMS is selected.

Figures A-1 and A-2 depict floor layouts for typical DLRCs with 20 and 10 workstations respectively.

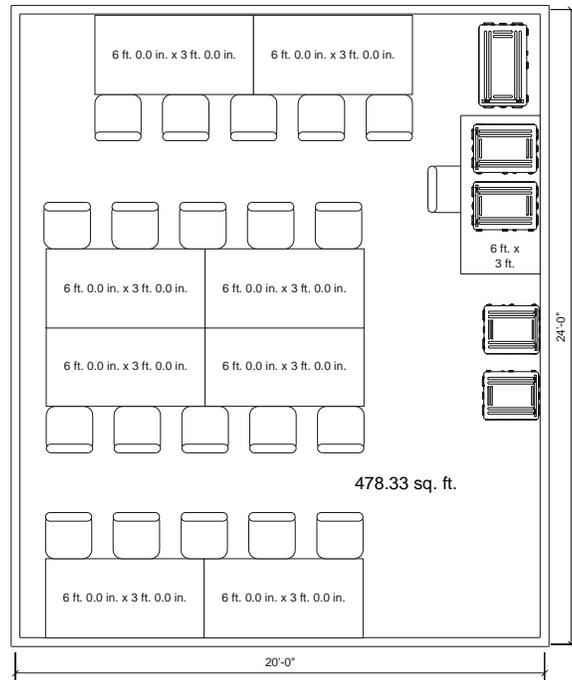


Figure A-1: Typical 20 Student DLRC

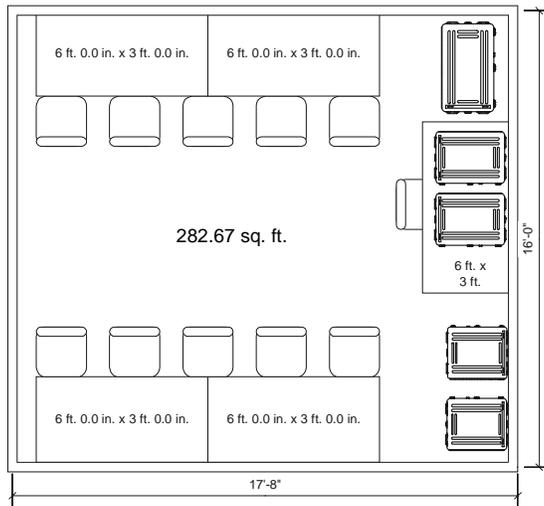


Figure A-2: Typical 10 Student DLRC

APPENDIX B. MATERIAL EQUIPMENT LIST

EQUIPMENT NAME	PART NUMBER	QUANTITY	COMMENTS
Panasonic Toughbook 27	EB5GCAM	10	
CD-ROM Drive (24X)	CF-VCD271	10	
Laptop power cord with AC/DC transformer/converter	N/A	10	Supplied by the vendor with the laptop
Pre-load Microsoft Windows NT	CF27-NT	10	
Battery Pack	CF-VZSU04	5	
Battery Charger	CF-VCB251	5	
Microsoft Office Professional	Enterprise License	10	
NT Server CAL	359-00271	10	
3Com Fast Etherlink XL 10/100	3CXFE575BT-005	2	5 pack; NAWCAD will purchase.
Omniphone Head Sets	ATH-P3	10	NAWCAD will purchase.
Compaq Server 1850R 6/600 512K	153554-001	1	
6/600 Pentium III 512K Processor Option kit	153555-B21	1	
128-MB SDRAM Memory Kit	313615-B21	1	
Compaq 12.2-GB Ultra2 Hot Pluggable 10,000 rpm Hard Drive	128418-B22	4	
35/70-GB DLT Internal Tape Drive	242520-B21	1	
Smart Array 3200 Controller	295643-B21	1	
Redundant Power Supply	DS-BA35X-HH	1	
	DS-BA35X-HE	1	
	DS-SW6XP-AA	1	
Compaq LCD Monitor TFT5000R	120207-001	1	
Compaq Keyboard	185152-406	1	
Compaq Keyboard Drawer	338056-B21	1	
Cabletron Fast Ethernet Workgroup Switch	2H252-25R	1	NAWCAD will purchase.
Cabletron Fast Ethernet high speed interface module (HSIM)	HSIM-FE6	1	NAWCAD will purchase.
Cabletron Fast Ethernet Port Interface Module (FEPIM)	FEPIM-100TX	2	NAWCAD will purchase.

EQUIPMENT NAME	PART NUMBER	QUANTITY	COMMENTS
Cisco Router	CISCO3640	1	NAWCAD will purchase.
Cisco 4-port serial network module	NM-4T	1	NAWCAD will purchase.
Cisco 1-port Fast Ethernet network module 100-Base-TX (FJ-45)	NM-1FE-TX	2	NAWCAD will purchase.
Cisco 1-port OC3 Multimode ATM module	NM-1A-OC3MM	1	NAWCAD will purchase.
HP Deskjet 2000Cxi	C4530A#ABA	1	NAWCAD will purchase.
HP JetDirect External Print Server 300X	J3263A#ABA	1	NAWCAD will purchase.
Accuride slide	C 3607-26D	2	Used for the Compaq server and the printer. NAWCAD will purchase.
APC X155 Ruggedized UPS with ISO X93 and internal battery	SU2000R3X155	1	NAWCAD will purchase.
10 meter long Category 5 cable with RJ-45 connectors on each end		10	Interconnecting cable between Cabletron 2200 and the Laptops. NAWCAD will purchase.
50 meter long Category 5 cable with RJ-45 connectors on each end		10	Interconnecting cable between Cabletron 2200 and the Laptops. NAWCAD will purchase.
Custom length Category 5 cable with RJ-45 connectors on each end		1	Interconnecting cable between Cabletron 2200 and the Cisco 3640. NAWCAD will purchase.
Custom length Category 5 cable with RJ-45 connectors on each end		1	Interconnecting cable between Cabletron 2200 and the HP 2000Cxi printer. NAWCAD will purchase.
10 meter long Category 5 cable with RJ-45 connectors on each end		1	Interconnecting cable between the Cabletron 2200 and the Compaq 1850R server. NAWCAD will purchase.
3 meter Extension cord 16/3	50F1403	14	NAWCAD will purchase.
6 meter Extension cord 16/3	50F1404	14	NAWCAD will purchase.
10 meter Extension cord 14/3	50F1407	2	NAWCAD will purchase.
50 ft Extension cord 14/3	50F1408	4	NAWCAD will purchase.
Multi-outlet power strip		2	NAWCAD will purchase.
Transit Case #1		1	NAWCAD will purchase.
Transit Case #2		1	NAWCAD will purchase.
Transit Case #3		1	NAWCAD will purchase.
Transit Case #4		1	NAWCAD will purchase.

EQUIPMENT NAME	PART NUMBER	QUANTITY	COMMENTS
Window NT Server 4 w/SP6 software		1	
Norton Antivirus software	Enterprise License	11	
Oracle 8I Enterprise Edition for Windows NT 8 Concurrent w/1yr Bronze Support		1	
Diskeeper 5.0 for Windows	Enterprise License	1	
ARCServe 6.61 Enterprise Edition for Windows NT		1	
ARCServe 6.61 Backup Agent for open Files		1	
ARCServe 6.61 Backup Agent for SQL		1	
ARCServe 6.61 Backup Agent for Oracle		1	