

504-EMD-001

LP DAAC M&O Equipment

Technical Paper

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Abstract

This document supplies a basic overview of the maintenance and operations office environment provided at the LP DAAC.

Keywords: EDC, M&O, Hardware, COTS, Software.

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1. Introduction

1.1 Purpose

The purpose of this document is to present an overview description of the maintenance and operations HW used by the LPDAAC staff to monitor, analyze, report, and manage the operational HW and SW. This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

Appendix A contains a description of DAAC supplied, non-EMD procured, HW that has been added to the EMD M&O network. This HW is not covered by this specification but is provided for reference purposes.

1.2 Organization

The remainder of the document is organized as follows:

- Section 2: Related Documents
- Section 3: LPDAAC M&O Equipment Requirements
- Section 4: LPDAAC M&O Equipment
- Section 5: LPDAAC M&O Equipment Test Results
- Appendix A: Non-EMD Hardware
- Abbreviations and Acronyms

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2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which this document's scope and content are derived.

423-46-01 Goddard Space Flight Center, EOSDIS Core System (EMD) Statement of Work

2.2 Applicable Documents

Documents referenced in this document are listed below.

921-series General Documents

921-TDE-002 LP DAAC Hardware Network Diagram

2.3 Reference Documents

A Service Level Agreement (SLA) between USGS LP DAAC Operations and Raytheon EMD Contractor. This agreement is filed in the EMD reference library.

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3. LP DAAC M&O Equipment Requirements

Section 4 describes the functions performed using the LP DAAC M&O equipment. The following comprise the requirements for this equipment.

3.1 General

EDCMO0100	Number of staff. The LP DAAC M&O Equipment shall provide, at a minimum, the tools for the following numbers of DAAC staff: a. Management and Administration: 1 b. Engineering 8
EDCMO0110	System administration. The capability to backup and restore files from each component shall be provided.
EDCMO0120	Status and performance reports. The LP DAAC M&O Equipment shall provide the tools to review and analyze system status and performance reports.
EDCMO0130	Management and technical reports. The LP DAAC M&O Equipment shall provide the tools to review and/or develop management and technical reports on EMD performance.
EDCMO0140	DAAC internal coordination. The LP DAAC M&O Equipment shall provide the tools in support of coordination within the DAAC.
EDCMO0150	DAAC external coordination. The LP DAAC M&O Equipment shall provide the tools in support of coordination with other organizations including, at a minimum, other DAACs, the SMC, and other EMD organizations.
EDCMO0160	EMD documentation. The LP DAAC M&O Equipment shall provide the tools to access, create, and maintain EMD documentation.

3.2 Management and Administration

EDCMO0200	Management planning resources. The LP DAAC M&O Equipment shall provide tools to support planning, budgeting, accounting, resource management, scheduling and other contract management activities.
EDCMO0210	Management policies and procedures. The LP DAAC M&O Equipment shall provide the tools to develop and maintain EMD, DAAC and/or building policies and procedures.

EDCMO0220 Management documents. The LP DAAC M&O Equipment shall provide tools for production and maintenance of memos, reports, and expense reports.

3.3 Engineering

EDCMO0300 Operations data. The LP DAAC M&O Equipment shall provide the tools to allow for retrieval, storage, analysis, and distribution of operations data.

EDCMO0310 DAAC analysis software. The LP DAAC M&O Equipment shall provide the tools to create and maintain DAAC-unique software.

3.4 Operations

EDCMO0400 Operations policies and procedures. The LP DAAC M&O Equipment shall provide the tools to develop and administer policies, directives, and guidance to implement both EMD and DAAC operations tasking, procedures, practices, and priorities.

4. LP DAAC M&O Equipment

The HW and SW provided for personnel to use for data collection, reduction, analysis, reporting and internal and external coordination and communications (as distinct from performance of the EMD mission using the operational resources, e.g., Data Server Subsystem, Communications Subsystem, Systems Management Subsystem, etc.).

Table 4-1 partitions these resources into three functional areas.

Table 4-1. LP DAAC M&O Equipment Component Descriptions

Functional Area	Class/Type	Specifics
Management and Administration	PC	Personal computers
Engineering	X-Term	NCD HMX X-Terminals
	Printer	HP printers*
	PC	Personal computers
	Workstations	Sun workstations
	Servers	Sun servers*
	Storage	Sun disk arrays*
	Tape Drives	8 mm *
Operations	PC	Personal computers

4.1 LP DAAC Functions

4.1.1 Management and Administration

The Management and Administration (MA) elements allow the management and supervisory staff at the DAAC to effectively communicate with other members of the DAAC staff as well as with external parties. Primary tasks performed on these resources include:

- EMD performance analysis - review and analyze system status and performance reports;
- EMD performance reporting - review and/or development of management and technical reports on EMD performance;
- DAAC Manager liaison - provide a point of contact to the DAAC Manager and staff on all EMD On-Site M&O organization activities;

* Also supports Management and Administration, and Operations

- EMD Office liaison - provide management liaison to EMD staff including EMD staff at other DAACs, the SMC, the EOC, the SEO, the parent EMD organization, and development and support organizations;
- EMD personnel supervision - manage EMD training, certification;
- EMD planning, budgeting, accounting, resource management, scheduling and subcontract management - provide financial management and reporting on the EMD On-Site M&O organization;
- EMD policies and priorities - ensure that EMD On-Site personnel are tasked in accordance with EMD policies and priorities as driven by DAAC needs; ensure that company, EMD, DAAC and/or building, procedures and policies;
- Administrative support - support planning, budgeting, accounting, resource management, scheduling and contract management activities;
- Secretarial support - provide typing, filing, expense reports, mail distribution, meeting scheduling, etc.

4.1.2 Engineering

The engineering staff at the DAAC provides the primary set of skills to monitor current performance, monitor and develop short and long term trending data, analyses and reports, and develop configuration changes/tunings. These tasks are required so that the operational resources provide reliable, high performance support to the DAAC's customers.

The primary tasks are performed in whole or in part by this staff are:

- EMD algorithm development support - provide support to scientists in the development of algorithms that are executed by the EMD system;
- EMD algorithm I&T support - provide support to scientists in the test and integration of updated and new algorithms that are executed by the EMD system;
- EMD configuration management - coordinate usage of approved configuration management (CM) procedures; ensure that changes to the hardware, software, and procedures are properly documented and coordinated; if requested by Customer, provide recording secretarial tasks for the Customer Configuration Change Board (CCB); generate CCB monthly reports; prepare agendas for CCB meetings;
- EMD database administration - maintain the data bases and structure of the integrated system at the DAAC; provide the operations interface to perform data base administration utilities such as data base backup and recovery, performance monitoring, and tuning; administer user access control and daily data base synchronization;
- EMD development organization liaison - provide feedback on the performance of installed systems; coordinate future installations; support development activities such as design and document reviews; coordinate trouble tickets (TTs) and Configuration Change Requests (CCRs);

- EMD hardware maintenance - support the EMD availability requirements by replacement of LRUs; act as coordination point with the various vendors at the DAAC including preventative maintenance support; support the isolation of equipment problems; report on maintenance activities to the EMD ILS function;
- EMD integrated logistics support - interface with EMD ILS function in coordination of delivery of COTS hardware or software; handle EMD center shipping and receiving; act as local ILS representative;
- EMD performance analysis - analyze soft and hard copy reports on system effectiveness, productivity, capacity, and performance for EMD hardware and software resources and processes; monitor performance for trends and prepare reports on analyses;
- EMD planned upgrades - support and participate in planning and implementation of upgrades to the EMD;
- EMD property management - provide control of Government property; provide continuous audit trail from receipt of EMD procured or developed items until transfer of accountability;
- EMD quality assurance - perform Quality Assurance (QA) audits on a periodic basis to ensure adherence to established standards and procedures for hardware, software and operations; produce audit;
- EMD resource control - maintain and modify hardware and software system configurations, perform COTS administration (including operating system administration); support property management; support system anomaly tracking and analysis;
- EMD software maintenance - produce, deliver, and document corrections, modifications, and enhancements made to EMD software (including COTS), and/or adapt or incorporate COTS software for EMD use;
- EMD sustaining engineering - analyze and identify ways to accommodate needed improvements, new technologies and new concepts; manage system upgrades and evolution; control and maintain EMD updates; perform the activities necessary to assure EMD reliability, maintainability, and availability; support/provide evaluation of user inputs and monitor system performance to tune the system for optimum response and support; support operational readiness and performance assurance;
- EMD test and integration - feature test (i.e., ensure a new requirement and/or design is properly implemented) and regression test (i.e., ensure that previously provided capabilities continue to be properly provided) all system upgrades in DAAC environment; maintain and update test procedures and data bases; provide test statistics, analyses and reports.

4.1.3 Operations

The operations staff at the DAAC primarily performs its tasks using the deployed operational components. The following tasks, however, are performed in whole or in part using M&O resources.

- EMD operations personnel supervision - provide first line supervision of EMD operations, conflict resolution, policy enforcement, time keeping, productivity monitoring, shift worker scheduling, hiring, termination, promotions, performance appraisals, salary adjustments, discipline, etc., and
- EMD operations policy - develop and administer policies, directives, and guidance to implement both EMD and DAAC operations tasking, procedures, practices, and priorities.
- EMD operations readiness - ensure elements are in a state of operational readiness at all times including launch preparations; conduct Operational Readiness Reviews and monitor M&O activities, provide visibility to DAAC, ESDIS and EMD management on operations readiness;
- EMD operations training and certification - develop and maintain center specific initial and refresher operations training and certification packages; maintain training and certification records; report on staff training; coordinate with SEO system-level training and certification requirements;
- EMD performance assurance - provide coverage of operational phase activities in PAIP ; continue the tasks of the RMA program throughout the operational phase;
- EMD production scheduling - schedule system updates and maintenance schedules; coordinate user requests.
- EMD operations coordination - exchange operations information between and among DAAC operators and with personnel at other locations.

4.2 Design Components

The components that comprise the LP DAAC M&O equipment are shown in Figures 4.2-1 through 4.2-3. Additional DAAC supplied equipment is listed in Appendix A.

Tables 4.2-1 and 4.2-2 show the HW/SW mappings for the PCs and Sun equipment. Network information is shown in Table 4.2-3.

The M&O LAN network topology is on pages 9 and 10 of the SLA between USGS LP DAAC Operations and Raytheon EMD support contractor.

The location of the M&O equipment in the facility is under the management of the DAAC and is documented in the property management database administered by the DAAC.

Disk configurations for the M&O equipment are under the control of the DAAC administrator.

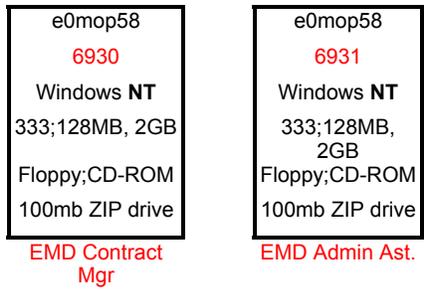


Figure 4.2-1. LP DAAC EMD M&O Administrative HW

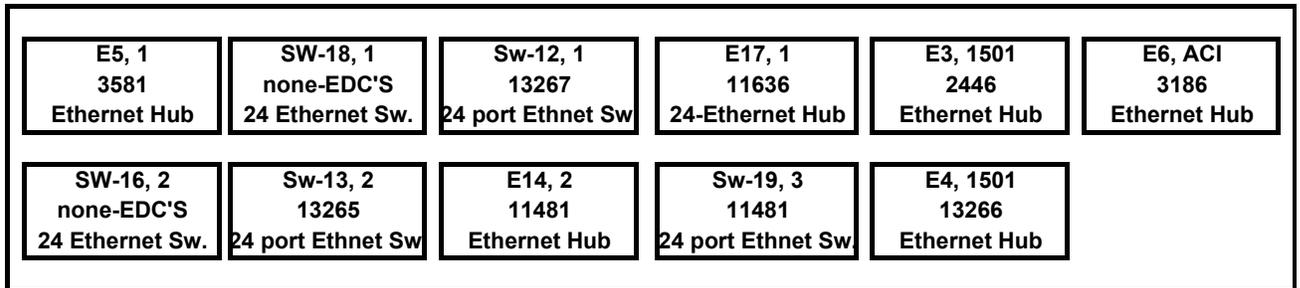


Figure 4.2-2. LP DAAC EMD M&O Communications HW

e0mog91 690 IRIX	e0mop07 2316 Windows 95 200;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux	e0mos08 3634 SUN Ultra 1 6GB, 256MB System Admin.	e0mos09 3635 SUN Ultra 1 6GB, 256MB System Admin.	e0mox10 2051 X-Terminal NCD HMX Pro 16MB System Admin.	e0mox13 2350 X-Terminal NCD HMX Pro 16MB SSI&T	
	e0mop18 2318 Windows 95 200;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux/Sybase		e2mop02 3587 Windows 95 266;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux	e0mop21 3599 Windows 95 266;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive Linux security	e0mos23 14760 BLADE 500MHz 2- 15GB drives System Admin.	
e0mox24 2072 X-Terminal NCD HMX Pro 16MB System Admin.	e0mop25 3603 Windows NT 266;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mos26 14761 BLADE 500MHz 2- 15GB drives System Admin.	e0mos28 14762 BLADE 500MHz 2- 15GB drives SSI&T	e0mox30 2088 X-Terminal NCD HMX Pro 16MB spare	e0moh32 2243 HP Printer 5Si 8MB RAM HP Duplexer Printer	e0mop33 3601 Windows 95 266;64MB, 2GB Scanner-6921 100mb ZIP drive Visitor
e0mop35 3596 Windows NT 266;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop36 3605 Windows 95 266;64MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mox37 3043 X-Terminal NCD HMX Pro 16MB Operations	e0mox38 4788 X-Terminal NCD HMX Pro 16MB SSI&T	e0mox40 653 X-Terminal NCD HMX Pro 16MB SSI&T	e0mox41 4808 X-Terminal NCD HMX Pro 16MB Ops	e0mox42 4802 X-Terminal NCD HMX Pro 16MB SW. Maint. Engr
	e0mox46 4806 X-Terminal NCD HMX Pro 16MB Sys. Engr.	e0mop47 6060 Windows NT 300; 96MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop48 6062 Windows 95 300; 96MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop49 6064 Windows NT 300;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Operations	e0mop50 6733 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive SSI&T Engineer	e0mop51 6924 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive ECS Contract Mgr
e0mop52 6925 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Resource Planner	e0mop53 6926 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive SSIT	e0mop54 6927 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive spare	e0mop55 6928 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive System Engineer	e0mop56 6929 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Facility Engr.	e0mop57 6930 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive ECS Admin Ast.	e0mop58 6931 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive
e0mop59 6932 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive S.W. Maint. Engr.	e0mop60 6731 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive S.W. Maint. Engr.	e0mop61 6732 Windows NT 333;128MB, 2GB Floppy;CD-ROM 100mb ZIP drive Sys Test Engineer	e0moh69 1261 HP Printer 4 16mb ram User Services	e0mop70 8737 Windows NT 500; 256MB, 8GB Floppy;CD-ROM 100mb ZIP drive System Admin.	e0mop71 8737 Windows NT 500; 256MB, 8GB Floppy;CD-ROM 100mb ZIP drive System Engineer	e0mop72 8741 Windows NT 500; 256MB, 8GB Floppy;CD-ROM 100mb ZIP drive Maint. Coordinator

Figure 4.2-3. LP DAAC EMD M&O Engineering and Operations HW (1 of 2)

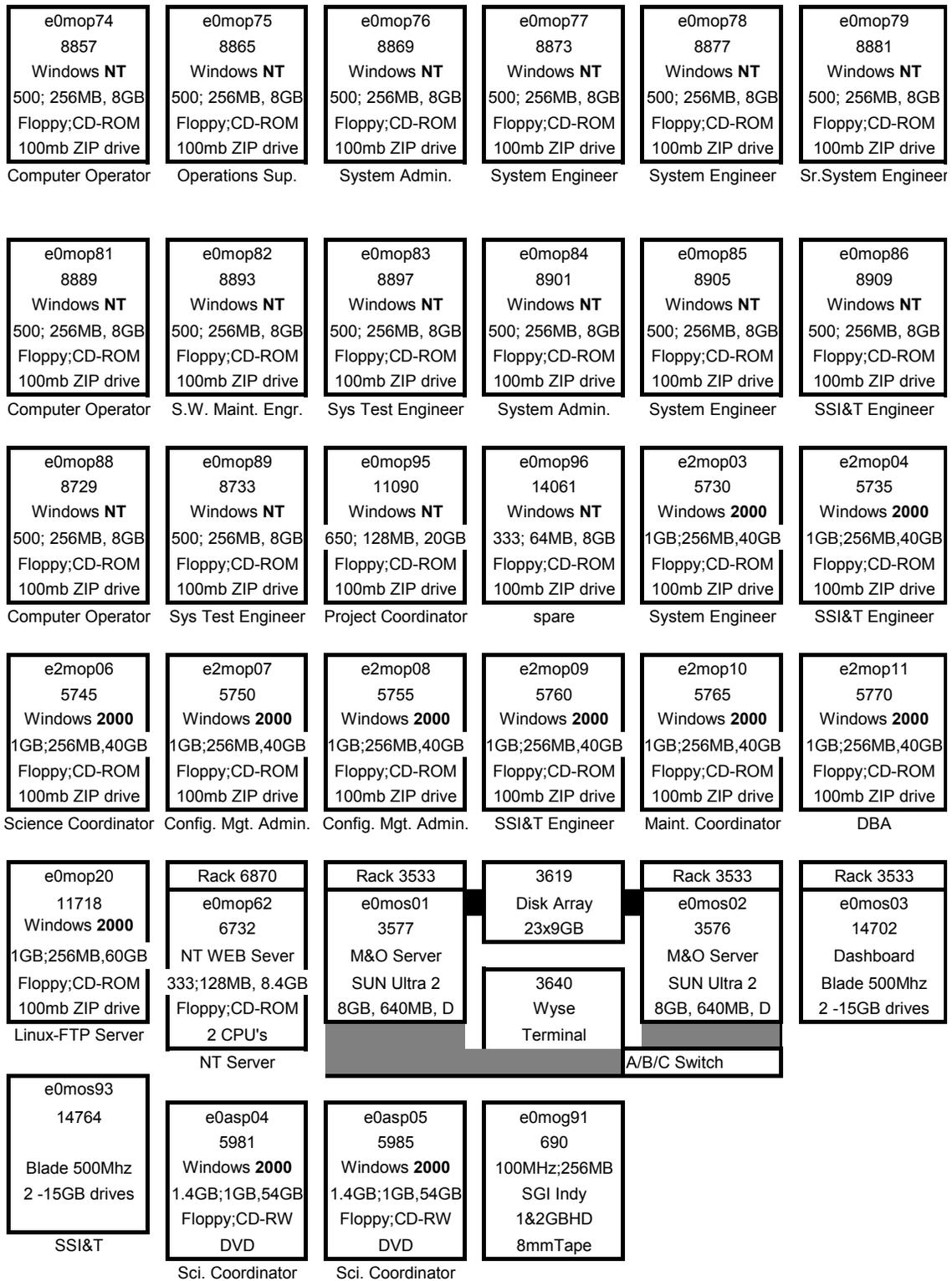


Figure 4.2-3. LP DAAC EMD M&O Engineering and Operations HW (2 of 2)

Table 4.2-1. LP DAAC EMD M&O HW/SW Mapping (1 of 2)

Host Name	Windows 95/Plus	Windows NT 4.0	Microsoft Office 2000	Humngbrd Exceed	Other	Acrobat Distiller
e0mop07	Linux		X		Linux	
e0mop11	X		X			
e0mop17		X	X			
e0mop18	Linux		X		Linux	
e2mop02	Linux		X		Linux	
e0mop21	Linux		X		Linux	
e0mop25		X	X			
e0mop33	X		X			
e0mop35		X	X			
e0mop47		X	X		X	
e0mop48	X		X			
e0mop49		X	X	X	Easy Cad X	
e0mop50		X	X	X		
e0mop51		X	X			
e0mop52		X	X			
e0mop53		X	X	X		
e0mop54		X	X	X		
e0mop55		X	X	X		
e0mop56		X	X			X
e0mop57		X	X	X		X
e0mop58		X	X	X		
e0mop59		X	X	X		
e0mop60		X	X	X		
e0mop61		X	X	X		
e0mop62		XX	X		NT SERVER	

Table 4.2-1. LP DAAC EMD M&O HW/SW Mapping (2 of 2)

Host Name	Windows 95/Plus	Windows NT 4.0	Microsoft Office 2000	Humngbrd Exceed	Other	Acrobat Distiller
e0mop67		X	X			
e0mop70		X	X			
e0mop71		X	X			
e0mop72		X	X			
e0mop73		X	X			
e0mop74		X	X			
e0mop75		X	X			
e0mop76		X	X			
e0mop77		X	X		X	
e0mop78		X	X		X	
e0mop79		X	X	X	Easy Cad X	
e0mop80		X	X	X		
e0mop81		X	X			
e0mop82		X	X			
e0mop83		X	X	X		
e0mop84		X	X	X		
e0mop85		X	X	X		
e0mop86		X	X		Visio Prof.	
e0mop87		X	X	X		
e0mop88		X	X	X		
e0mop89		X	X	X		
e0mop95		X	X	X		X
e0mop96		X	X	X		
e2mop01	2000 SVR		X			
e0mop20	Linux		X			
e2mop03	2000		X			
e2mop04	2000		X			
e2mop05	2000		X			
e2mop06	2000		X			
e2mop07	2000		X			
e2mop08	2000		X			X
e2mop09	2000		X	X		
e2mop10	2000		X		Visio Prof.	
e2mop11		X	X	X		
e2mop14		X	X			
e2mop15		X	X			
e2mop16		X	X			

Table 4.2-2. LP DAAC UNIX Workstations HW/SW Map

Host Name	Solaris	Sparc wrks	Visual Workshop C++ 3.0	Tools H++	F-Secure SSH Server	Legato Networker* Client	Sparc Compiler C++
e0mos01	8		2.0	X	X	X	X
e0mos02	8				X	X	
e0mos03	8				X	X	
e0mos08	8				X	X	
e0mos09	8				X	X	
e0mos23	8				X	X	
e0mos26	8	X			X	X	
e0mos28	8				X	X	
e0mos92	8				X	X	
e0mos93	8				X	X	

5. LP DAAC M&O Equipment Test Results

5.1 LP DAAC Requirements Traceability

Table 5-1 shows the mapping of Section 3 requirements to LP DAAC M&O hardware and software elements described in section 4.

Table 5-1. LP DAAC M&O Requirements Mapping (1 of 2)

Requirement	Description	SW Component(s)
EDCMO0100	Number of staff	PCs: Hummingbird Exceed Windows NT Workstations/Servers: Microsoft Office 2000 Sun Solaris DCE base services for Solaris DCE for Solaris
EDCMO0110	System administration	PCs: Microsoft Office 2000 Norton Utilities 95 Workstations/Servers: Legato Networker
EDCMO0120	Management status and performance reports	PCs: Hummingbird Exceed Windows NT Microsoft Office 2000
EDCMO0130	Management and technical reports	PCs: Hummingbird Exceed Windows NT Microsoft Office 2000
EDCMO0140	DAAC internal coordination	PCs: Hummingbird Exceed Windows NT Microsoft Office 2000 Workstations/Servers: z-Mail
EDCMO0150	DAAC external coordination	PCs: Windows NT Microsoft Office 2000 Workstations/Servers: z-Mail

Table 5-1. LP DAAC M&O Requirements Mapping (2 of 2)

Requirement	Description	SW Component(s)
EDCMO0160	EMD documentation	PCs: Windows 95 or NT Microsoft Office 2000 Hummingbird Exceed
EDCMO0200	Management planning resources	PCs: Windows NT Microsoft Office 2000 Microsoft Project
EDCMO0210	Management policies and procedures	PCs: Windows NT Microsoft Office 2000
EDCMO0300	Operations data	PCs: Windows NT Microsoft Office 2000 Hummingbird Exceed
EDCMO0310	DAAC unique software	Workstations/Servers: Sparcworks Visual Workshop C++ Tools H++ DB Tools H++ Core Library Sybase CT Library Access SW Parts Manager
EDCMO0400	Operations policies and procedures	PCs: Windows NT Microsoft Office 2000

5.2 Test Results

Installation of the LP DAAC M&O Hardware occurred in 1997 and 1998. When the hardware and software was installed, each computer was initialized and the functionality of all HW, SW, and networks verified.

Appendix A. Non-EMD Hardware

DAAC provided hardware has been added to the EMD M&O suite. These resources are not formally part of this document but are provided for reference purposes. Figures A-1 show the additional hardware.

e0mop63 7035 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.163 Sys. Test Eng.	e0mop64 7038 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.164 Operatio ns	e0mop65 7041 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.165 Sys Adm	e0mop66 7044 PC Client Windows NT 4.0 586/400; 64MB, 8.4GB Floppy;CD-ROM 192.102.216.166 Maint. Coordinator		
e0mlp76 7070 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp77 7071 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp78 7072 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp79 7073 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp80 7032 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM	e0mlp81 7033 laptop PC Client 586/166; 32MB, 2GB Floppy;CD-ROM

Figure A-1. LP DAAC Supplied Operations Hardware

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Abbreviations and Acronyms

CCB	Configuration Control Board
CCR	Configuration Change Request
CM	Configuration management
COTS	Commercial Off the Shelf
DAAC	Distributed Active Archive Center
EDC	EROS Data Center, Sioux Falls, SD
EMD	EOSDIS Maintenance and Development
HW	Hardware
ILS	Integrated Logistics Support
LRU	Line Replaceable Unit
M&O	Maintenance and Operations
QA	Quality assurance
RMA	Reliability, Maintainability, Availability
SLA	Service Level Agreement
SMC	System Monitoring Center
SW	Software
TT	Trouble tickets

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