



Deep Space Mission System

DSN Hardware Transfer and Delivery Procedures

**DSMS Service Capability Development (SCD) Standard
Practice**

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Document Change Log

Revision	Issue Date	Sections Affected	Change Summary
New Document Issue	03/15/01	All	This is a new document. This document replaces and supersedes DSN 810-025 and 890-228 for hardware.
A	06/20/01	4, 5	Clarifications relative to MESkit procedure (Section 5). Addition of MDCL form (Appendix B). Clarification to EDCL form. Clarification of modkits for assemblies having both SPC & DSS components (Sections 4.2, 4.5).
B	04/18/03	2.1, 2.2, 2.5, 3.1, 3.5, 4.1, 4.5	Added information on MSA process and System Safety Checklist. Clarified modkit packaging options. Eliminated 'obsolete' as a transfer state. Clarified modkit requirements for Temporary ECOs. Made other miscellaneous clarifications.
C	11/26/03	3, 6, Appendix B, Throughout	Change to Lien categories and forms. Change to ETA form: removed IT Security signature. Operations Satisfaction Meeting (OSM) changed to DSCC Satisfaction Assessment Meeting (DSAM); CSOC changed to DSN O&M Contract.

Table of Contents

SECTION 1	INTRODUCTION	1-1
1.1	PURPOSE	1-1
1.2	SCOPE AND APPLICABILITY	1-1
1.3	EFFECTIVITY AND REVISION CONTROL	1-1
1.4	NOTATION AND TERMINOLOGY	1-2
1.5	APPLICABLE DOCUMENTS	1-3
SECTION 2	DSN HARDWARE TRANSFER AND DELIVERY OVERVIEW	2-1
2.1	CONTEXT AND DEFINITIONS	2-1
2.2	SUMMARY OF RULES	2-4
2.3	LEVEL OF TRANSFER RELATIVE TO 820-061 CONFIGURATION ITEMS	2-4
2.4	TRANSFER AND DELIVERY FOR TEMPORARY ECOS	2-5
2.5	RELATIONSHIP OF THE SYSTEM SAFETY CHECKLIST TO ETAs	2-5
2.6	KEY RESPONSIBILITIES	2-5
SECTION 3	TRANSFER AGREEMENT PROCEDURE DESCRIPTION	3-1
3.1	GENERAL	3-1
3.2	TRANSFER AGREEMENT PROCEDURE FLOW	3-1
3.3	USE OF AN ETA ADDENDUM	3-4
3.4	PROCEDURE VARIATION FOR ON-SITE CONTRACTOR INSTALLATIONS	3-4
3.5	DESCRIPTION OF DOCUMENTS REQUIRED FOR TRANSFER	3-6
SECTION 4	MODKIT PROCEDURE	4-1
4.1	GENERAL	4-1
4.2	MODKIT PROCEDURE FLOW	4-2
4.3	TIMELINE CONSIDERATIONS	4-6
4.4	SHIPPING A MODKIT LIEN ITEM	4-8
4.5	DESCRIPTION OF MODKIT ITEMS	4-8
4.6	DESCRIPTION OF MODKIT SHIPMENT MEMOS	4-10
SECTION 5	MESKIT PROCEDURE	5-1
5.1	GENERAL	5-1
5.2	MESKIT PROCEDURE FLOW	5-1
5.3	SHIPPING A MESKIT LIEN ITEM	5-4
5.4	DESCRIPTION OF MESKIT ITEMS	5-5
SECTION 6	LIEN PROCESSING ACTIVITIES	6-1
6.1	LIEN SUBMISSION AND LIEN REPORTS	6-1
6.2	LIEN RESOLUTION AND CLOSURE	6-2
APPENDIX A	ABBREVIATIONS AND ACRONYMS	A-1
APPENDIX B	NUMBERING CONVENTIONS FOR FORMS AND SAMPLE FORMS	B-1
APPENDIX C	GUIDELINES FOR HARDWARE TRANSFER MEETINGS	C-1
APPENDIX D	GUIDELINES FOR CONSENT-TO-SHIP (CTS) MEETINGS	D-1
APPENDIX E	GUIDELINES FOR DSCC SATISFACTION ASSESSMENT MEETINGS	E-1
	DISTRIBUTION LIST	DL-1

List of Figures

Figure 2-1: Context of Hardware Transfer and Delivery Activities	2-2
Figure 2-2: Hardware Transfer and Delivery Activities Overview.....	2-3
Figure 3-1: Basic Transfer Agreement Procedure Flow.....	3-2
Figure 3-2: Transfer Agreement Procedure Flow for On-Site Contractor Installation	3-5
Figure 4-1: Flow of Modkit Procedure	4-3
Figure 4-2: Timeline of Shipping Process	4-7
Figure 5-1: Flow of MESkit Procedure.....	5-3

Section 1 ***Introduction***

1.1 PURPOSE

This document defines the procedures used for delivering hardware (equipment) to the Deep Space Network (DSN), which is part of the Deep Space Mission System (DSMS). These procedures support the DSMS Service Capability Development (SCD) Process, and are an expansion of the “*Assemble and Install Hardware Modkits*” Procedure within SCD.

The purpose of the procedures is to ensure that:

- The operational hardware has been tested by both the implementers and Operations (as defined in the task test plan) and is considered ready for installation and operational use
- The required user documentation, diagnostic software, spares, and test equipment are available
- Sufficient training on the operations and maintenance of the hardware has been conducted
- DSN operations can accept responsibility to maintain the hardware

1.2 SCOPE AND APPLICABILITY

This standard practice applies to the delivery of ‘operational’ hardware to a Deep Space Network (DSN) facility (‘operational’ hardware items are identified in DSMS 820-061). These DSN facilities are:

- Deep Space Communication Complexes (DSCCs) at Goldstone, California; Canberra, Australia; and Madrid, Spain.
- Merritt Island Launch Facility (MIL-71)
- Network Operations Control Center (NOCC)
- Central Communications Terminal (CCT)
- Development Test Facility (DTF-21)
- Compatibility Test Trailer (CTT-22)

Variations from the procedures in this document are sometimes appropriate due to the location of the developer or the testing activities. Any such variations **shall** be documented in an approved task plan or in a documented agreement between DSMS Engineering and DSMS Operations.

This document replaces DSMS 810-025, “*Standard for the DSN Development-to-Operations Transfer Process*” and related memoranda for DSN hardware deliveries. (See 813-126 for software deliveries and for firmware and diagnostic software requirements.)

1.3 EFFECTIVITY AND REVISION CONTROL

This document is effective on the date of issuance. All DSN hardware transfers and deliveries initiated following issuance of this document **shall** conform to the standards herein. Conformance of hardware deliveries already being prepared prior to the issuance **shall** be determined on a case-by-case basis through negotiation between the DSMS Implementation Engineering Manager and the Task Manager.

This document is released and revised in accordance with the DSMS 813-021 and 810-001. Requests for changes or clarification should be addressed in writing to the document owner.

1.4 NOTATION AND TERMINOLOGY

Abbreviations and acronyms used in this document are defined with the first textual use of the term. Appendix A contains a list of abbreviations and acronyms used in this document.

Within this document, the term “**shall**” and “**must**” are used to denote a requirement that is mandatory; the term “**should**” is used to denote a strong recommendation; and the term “**may**” is used to denote an option.

The DSN Operations and Maintenance (O&M) Contract is referred throughout as the O&M Contract.

The following terms and notation are used in this document, with the meaning defined below:

Task: A development effort conducted by the JPL Technical Divisions, contractors, or site personnel. May be referred to as an implementation task, an engineering change order (ECO) modification, a version update, or a sustaining activity, as defined by the DSMS Engineering Program Office.

Task Manager: The person who has lead responsibility for the planning, tracking, and managing of a Task. Service System Managers (SSMs), Project Element Managers (PEMs), and Task Leads are included in this definition if they are actively managing a task.

Task Plan: The task’s primary planning document produced by the Task Manager; this document is sometimes referred to as a Development and Deployment Plan (DDP), a Work Implementation Plan (WIP), an Implementation and Quality Plan (IQP), or Work Agreement for smaller task.

First Article (FA): is the first instance or copy of a hardware configuration item (usually an assembly) delivered to the network for a specific engineering change order (ECO).

Spares: refers to equipment that is **not** permanently installed within operational equipment. They do not include what has commonly been termed as “hot spares, which are really part of the operational hardware. Spares include both site and network spares.

Maintenance Equipment: is equipment used for testing and maintenance of an operational subsystem, but **not** permanently installed within the subsystem (that is, diagnostic equipment that is a physical part of the operational hardware configuration is not considered maintenance equipment).

The following are the DSMS 820-061 definitions for the DSMS configuration items:

Subsystem: The top-level DSMS product, identified in 820-061 with a 3-digit numeric subsystem number (e.g. Uplink Subsystem, 211)

Major Assembly: A functional subset of a subsystem, identified in 820-061 as a configuration item at the nnn.m level (e.g. 101.1, 70m Antenna Structures and Drives). A major assembly is a physically and functionally distinct element of the subsystem, and may be testable as a single entity.

Functional Group: A functional subset of a subsystem, identified in 820-061 as a configuration item at the nnn.m level (e.g. 321.2, Station Transmission Group). A functional group is a distributed group of products within the subsystem that relate to a specific functional area, and may not be testable as a single entity.

Assembly: A configuration item at the lowest tier of DSMS 820-061, having a 6-digit identification (e.g. 102.301 Antenna Control Console, or 211.102 Uplink Control Software). It may be a hardware device, a software program, or firmware.

The notation in the procedure flowcharts is:

- The top third of box contains step number and name;
- The middle third summarizes activities with the actor (responsible person); and
- The bottom third lists the products of the step.

1.5 APPLICABLE DOCUMENTS

Note: all released DSMS 8xx-series documents can be found in JPL's Product Data Management System (PDMS) (URL: <https://www-pdms.jpl.nasa.gov/titlepage.html>), under DSMS project. Most JPL forms can be found at URL: <http://eforms.jpl.nasa.gov/>. DSMS-specific transfer forms can be found at URL <http://csocjplonline.jpl.nasa.gov/ecmweb/newforms.htm>.

DSMS Controlled Records are stored and accessed via <http://ind-lib.jpl.nasa.gov/tmot-lib/dscgi/ds.py/View/Collection-726>

1.5.1 Controlling Documents

DSMS 813-010, *Service Capability Development (SCD) Process Policies*

1.5.2 Referenced Documents

For referenced documents, refer to most current version.

1. Form 6255-1, *DSN ECO Bill Of Materials*, URL: <http://eforms.jpl.nasa.gov/>
2. Form 1063, *Request for Shipping Receiving Memo*, URL: <http://eforms.jpl.nasa.gov/>
3. JPL International Affairs Office, URL: <http://eis.jpl.nasa.gov/international/intro.htm>
4. JPL Property Policies and Practices, URLs: <http://property.jpl.nasa.gov/>,
<http://dmie.jpl.nasa.gov/cgi/doc-gw.pl?DocID=28832>,
<http://dmie.jpl.nasa.gov/cgi/doc-gw.pl?DocID=40072>
5. DSMS 810-001, *DSMS Documentation Structure, Standards, and Definitions*
6. DSMS 810-050, *DSMS Waiver Policy and Procedure*
7. DSMS 813-011, *DSMS Service Capability Development (SCD) Process Definition*
8. DSMS 813-021, *DSMS Document Process Procedures*
9. DSMS 813-022, *DSMS Drawing Process and Procedures*
10. DSMS 813-023, *DSMS Configuration Management Procedure*
11. DSMS 813-101, *Guidelines for SCD Reviews*
12. DSMS 813-106, *Preparation Guide for Implementation and Quality Plan*” (soon to be released as *Preparation Guide for Development and Deployment Plans*)
13. DSMS 813-112, *DSMS Test Process, Standards, and Guidelines*
14. DSMS 813-126, *DSN Software Transfer and Delivery Procedures*
15. DSMS 813-205, *Spares and Maintenance Equipment for Deep Space Network Subsystems*
16. DSMS 820-061, *DSMS Subsystem, Configuration Item, And Responsibility Definitions*
17. DSMS 820-062, *DSMS Abbreviations and Acronyms*
18. DSN Transfer Agreement Forms: <http://csocjplonline.jpl.nasa.gov/ecmweb/newforms.htm>

Section 2

DSN Hardware Transfer and Delivery Overview

2.1 CONTEXT AND DEFINITIONS

DSN Hardware Transfer and Delivery is part of the DSMS Service Capability Development (SCD) process. See Figure 2-1 for the context and relationship with other aspects of the SCD process.

An approved Engineering Change Request (ECR) and associated Engineering Change Order (ECO) are required to deliver 'operational' hardware to the DSN, or to connect non-operational hardware to operational equipment. Once the deliveries, transfer, and DSMS Delivery Review related to an ECO have been completed, a new ECR/ECO/transfer is required for any additional changes. See DSMS 813-023 for information on the ECR/ECO process.

DSN Hardware Transfer and Delivery involves three procedures:

- Transfer Agreement Procedure
- Modkit Procedure
- MESkit Procedure

The Transfer Agreement Procedure (see Section 3 for details) defines the steps and criteria for preparing and completing the Equipment Transfer Agreement (ETA). The ETA is the agreement between the implementing organization and the DSN Operations organization concerning the use and maintenance of a hardware configuration item. For each ECO against a specific hardware configuration item, a single ETA applies to all deliveries (and associated modkits) for that specific product change. Key supporting documents for the ETA are the:

- MSA (Maintenance and Sparing Agreement). The MSA is prepared and approved in conjunction with the Critical Design Review (CDR) for the equipment, and is attached to the ETA
- SSCL (System Safety Checklist). The SSCL is developed during the product design stages, is signed prior to the ETA initiation, and is referenced on the ETA

The Modkit Procedure (see Section 4) relates to a hardware modification kit (modkit), which is a collection of new or modified hardware (and supporting documentation/tools) that is delivered from the Cognizant Development Engineer (CDE) to a specific DSN facility. The modkit enables the engineering-maintenance organization at the facility to install and test the hardware with minimal assistance from the CDE or the Operations Engineer (OE). A hardware modkit may also include commercial software that is preinstalled within the hardware item. An Equipment Delivery Checklist (EDCL) form is used to validate and approve the contents of each modkit.

The MESkit Procedure (see Section 5) relates to a hardware **Maintenance Equipment and Spares kit** (MESkit) that consists of spares, test equipment, and other hardware maintenance items. MESkits are delivered to the OE, who in turn determines the appropriate distribution of the items to DSN facilities (e.g., Complex Maintenance Facilities (CMFs) or network spares). The contents of a single MESkit may be split into multiple shipments from the OE to different DSN sites. A MESkit Delivery Checklist (MDCL) form is used to validate and approve the contents of each MESkit delivery to the OE.

Deficiencies relative to an ETA, modkit, or MESkit are documented as liens. Section 6 describes the lien processing activities, which support the procedures.

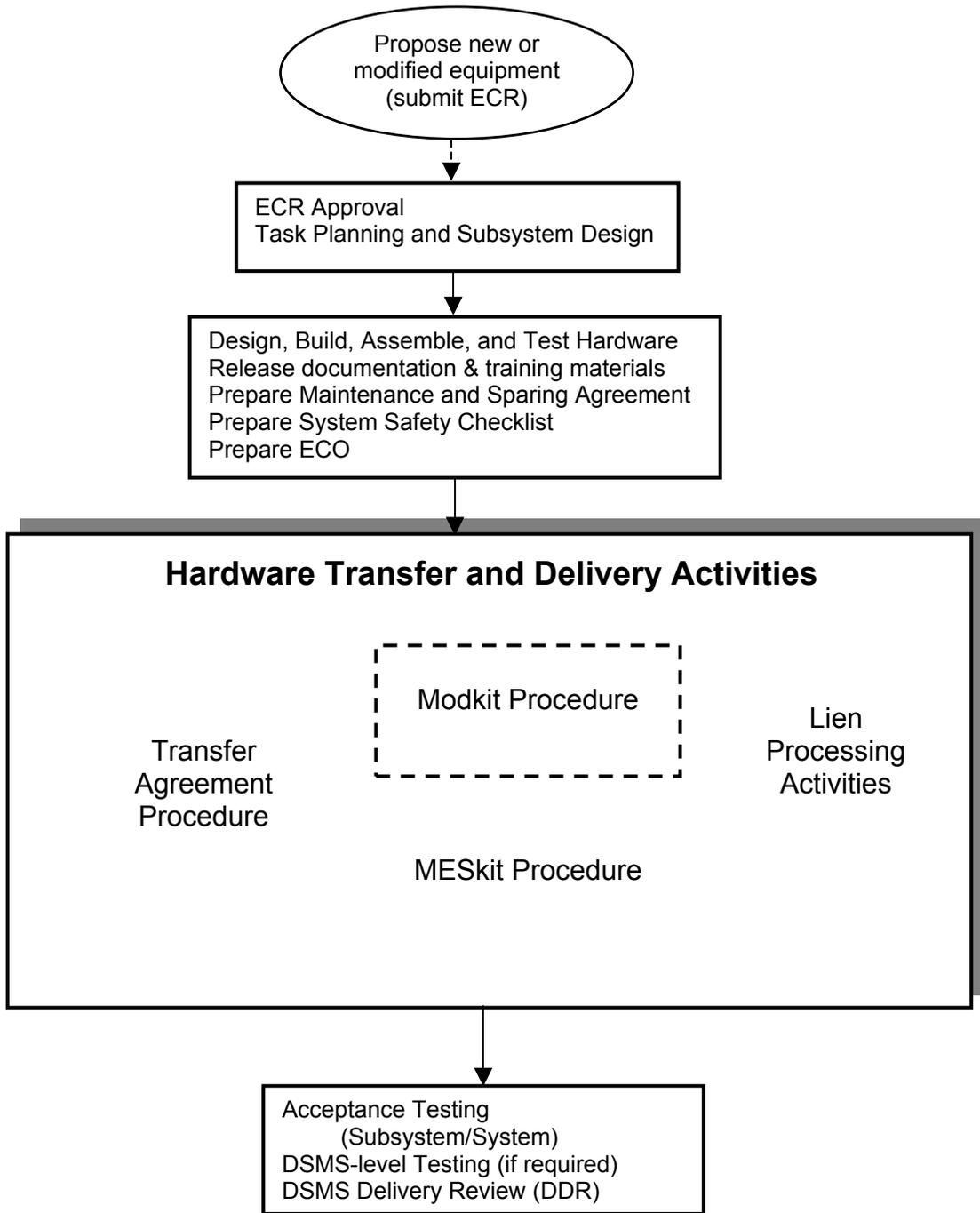


Figure 2-1: Context of Hardware Transfer and Delivery Activities

Figure 2-2 depicts the interactions among the procedures. Key relationship factors are: The Transfer Agreement Procedure activities occur after the CDE has completed the development and testing of the hardware, and has released user documentation (see Section 3 for details):

- The ETA is initiated prior to the modkit shipment for the First Article of a hardware item
- The ETA is approved following a successful first installation
- The ETA is completed after Operations has been provided adequate maintenance tools/training

The Modkit Procedure is used for each modkit delivery (i.e., for articles 1 through N). The MESkit Procedure is used whenever a set of spares and/or maintenance equipment is ready for delivery.

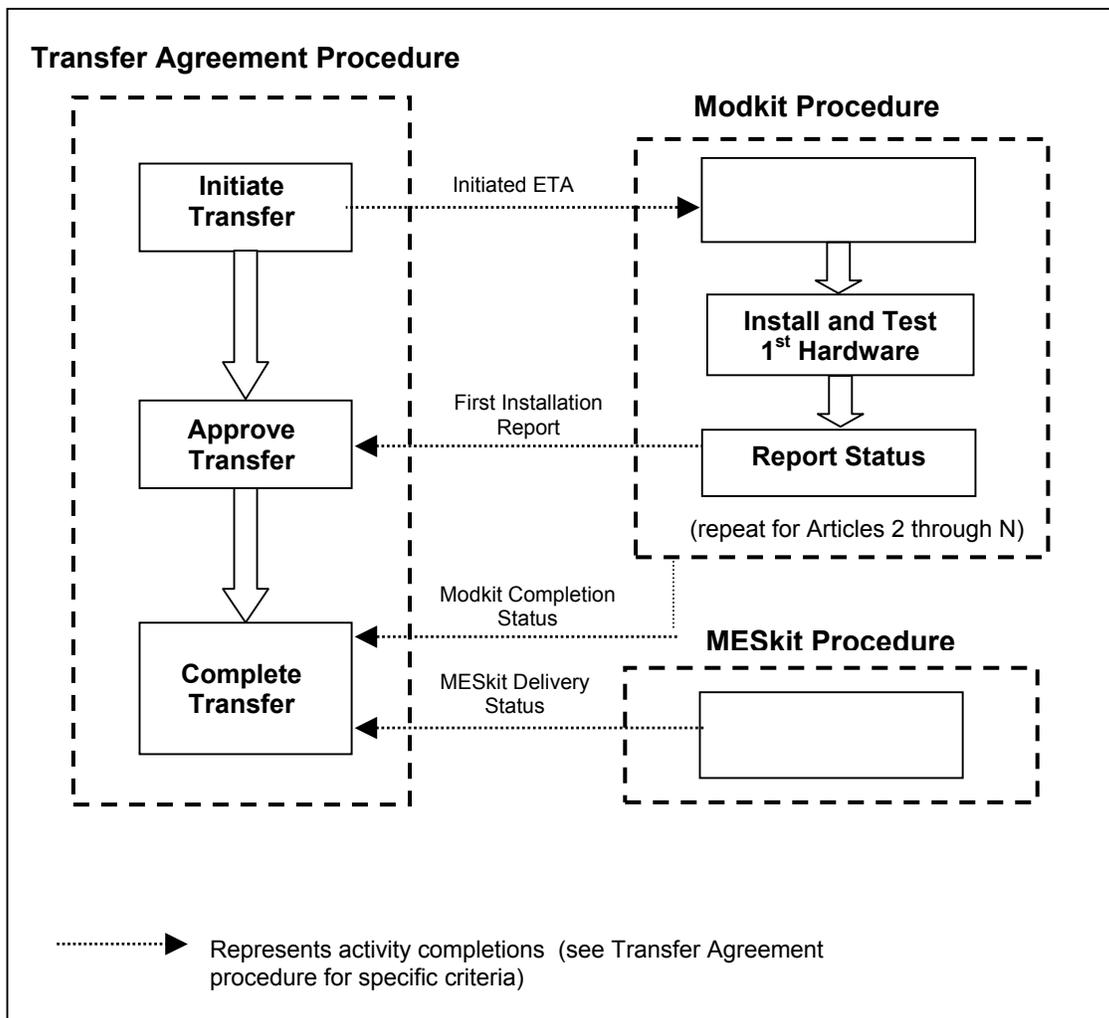


Figure 2-2: Hardware Transfer and Delivery Activities Overview

2.2 SUMMARY OF RULES

1. Hardware configuration items designated as ‘operational’ in DSMS 820-061 **shall** be transferred and delivered using the procedures in this document, and the associated forms (ETA or ETA Addendum, and Equipment Delivery Checklist (EDCL)).
2. A signed Maintenance and Sparing Agreement (MSA) (negotiated between the implementation Task and Operations prior to the Critical Design Review) **shall** be attached to the ETA. The MSA defines the repair approach and sources, sparing levels, and version restrictions. Guidelines for the preparation and contents of the MSA are contained in DSMS document 813-205.
3. Each ETA **shall** reference an approved DSMS System Safety Checklist that applies to the equipment being transferred. See <http://csocjplonline.jpl.nasa.gov/ecmweb/FORMS/Safety.doc> for forms and preparation guidelines.
4. Transfer and Consent-To-Ship (CTS) meetings (not teleconferences) **shall** be conducted for the first article of each hardware configuration item. Guidelines for the Transfer meeting are provided in Appendix C, and for the CTS meeting in Appendix D.
5. An ETA Addendum **shall** only be used for minor modifications to an existing hardware configuration item with an existing, approved ETA (see Section 3.3 for details).
6. A single ETA **shall** be prepared to cover all modkits for an ECO against a specific hardware configuration item (i.e., a separate ETA for each site or facility is not allowed).
7. All liens identified at a Transfer or CTS meeting **shall** be recorded on DSN Lien Submission Worksheets (LSWs). Liens constitute a CDE/OE agreement for the CDE to correct a deficiency by a specific date; any liens that impact the task’s plan (regarding schedule, budget, or deliverables) **shall** be acceptable to the DSN Operations Manager and the Task Manager before they are finalized.
8. For major implementation tasks, the Task Manager **shall** conduct a DSCC Satisfaction Assessment Meeting (DSAM) with each site. For smaller tasks, a DSAM should be held after the first installation at a site. Any issues identified at the meeting that relate to the adequacy of the delivery may be documented as liens or as action items from the Task Manager.
9. An ETA is not required if an ECO/modkit is used only to remove equipment from the DSN or to relocate equipment within a control room.
10. Any variation from the required procedures in this standard **shall** be documented in an approved DSMS Waiver Request (see DSMS document 810-050 for waiver approval process).

2.3 LEVEL OF TRANSFER RELATIVE TO 820-061 CONFIGURATION ITEMS

DSMS configuration items are identified in DSMS 820-061. DSN hardware designated as ‘operational’ in 820-061 may be transferred at the assembly, functional group, or major assembly level, provided that all testing and maintenance can be defined/accomplished at the selected level (including first article acceptance testing). The transfer level selected should also be compatible with the nature of the maintenance, modification, and upgrade anticipated for the hardware.

2.4 TRANSFER AND DELIVERY FOR TEMPORARY ECOs

A ‘Temporary ECO’ modifies the DSN configuration for a limited period of time. The rationale for a temporary configuration change may include support of special mission conditions; temporary support of a research activity; or support of on-site engineering tests/analyses. Temporary ECOs require an ETA only if the change is necessary for mission support. The maintenance of the equipment installed under a Temporary ECO is negotiated and documented during development of the hardware; the responsibility for maintenance varies depending on the situation.

Deliveries for a Temporary ECO are handled via the standard Modkit Procedure (certain modkit items are not required; see Section 4.5 for details). If a Temporary ECO is converted to a permanent ECO by the Change Board, the process then proceeds as with any new change (a new or revised ECO is prepared and the Transfer Agreement Procedure is completed).

2.5 RELATIONSHIP OF THE SYSTEM SAFETY CHECKLIST TO ETAs

Each implementation task prepares an SSCL for each subsystem being delivered or modified by the task. It is therefore possible that one SSCL may be applicable to more than one ETA. Each ETA must reference the appropriate approved SSCL; the approved SSCLs are available online in the DSN ECM system at <http://csocjplonline.jpl.nasa.gov/ecmweb/FORMS/Safety.doc>.

2.6 KEY RESPONSIBILITIES

Role	Responsibilities in Hardware Transfer and Delivery Activities
Task Manager	<ul style="list-style-type: none"> • Develops and maintains the task plan and the Maintenance and Sparing Agreement (MSA) • Approves System Safety Checklist prior to initiation of ETA • Ensures that all agreements between the CDE and OE (e.g., lien closure deliverables and dates) are acceptable • Participates in the Transfer meeting and conducts the DSCC Satisfaction Assessment Meetings (DSAMs)
DSN Operations Manager	<ul style="list-style-type: none"> • Ensures that all agreements between the CDE and OE (e.g., lien closure deliverables and dates) are acceptable • Approves the MSA • Participates in the Transfer meeting and DSAMs, as requested • Approves Transfer Agreements and administrative lien closures
Cognizant Development Engineer (CDE)	<ul style="list-style-type: none"> • Designs, implements, and tests the hardware and related documentation • Supports the Task Manager in negotiating and preparing the Maintenance and Sparing Agreement (MSA). • Develops the test procedures for first article acceptance testing (FAAT); conducts or witnesses tests per the test plan • Ensures that the NASA property numbers are attached for fabricated or purchased items • Prepares the Equipment Transfer Agreement (ETA) form • Prepares the hardware modkits and MESkits including related delivery forms. • Conducts the Transfer and Consent-to-Ship (CTS) meetings. • Participates in the DSCC Satisfaction Assessment Meetings (DSAMs); for smaller modifications, conducts the DSAMs • Completes liened items and submits Lien Closure Agreements to close liens • May be JPL, contractor, site, or O&M Contract personnel

Role	Responsibilities in Hardware Transfer and Delivery Activities
Operations Engineer (OE)	<ul style="list-style-type: none"> • Reviews various aspects of the hardware and its documentation during development • Supports the negotiation and preparation of the Maintenance and Sparing Agreement (MSA) • Conducts or witnesses the first article acceptance testing (FAAT) prepared by the CDE per the test plan • Participates in the Transfer and CTS meetings and ensures that documentation and any special equipment are complete and that the hardware is ready to be shipped for first installation • Signs the ETA and EDCLs to concur that the hardware is ready for the installation • Determines the stock numbers (federal or pseudo) and incorporates into operations Equipment Tracking System (ETS) • "Accepts" the hardware for transfer and prepares the Cover Memo and the Network Delivery Memos • Generates the First Installation Report. • Participates in the DSCC Satisfaction Assessment Meetings (DSAMs) • Reviews and accepts the hardware MESKits and coordinates the shipments to the appropriate DSN maintenance facilities. • Coordinates with the Transfer and Lien Coordinator (TLC)
Transfer and Lien Coordinator (TLC)	<ul style="list-style-type: none"> • Maintains a database of all liens against the hardware assemblies and associated modkits/MESKits • Generates a Lien List Report for any hardware configuration item upon request • Logs the ETAs submitted by the OE and assigns ETA identification numbers • Assigns an identification number to each EDCL and maintains a file of EDCLs • Routes and tracks the ETA; maintains a file of all ETAs • Sends out open lien advisory notifications • Prepares reports on past-due liens and other transfer-related statistics • Supports the sign-off procedure for Lien Closure Agreements; updates the lien database based on Lien Closure Agreements (LCAs)
Quality Assurance (QA) Representative	<ul style="list-style-type: none"> • Conducts final inspection of modkits and MESKits at the CDE location prior to shipment to the DSN Logistics Facility (DLF) and stamps EDCL and LCA (if required) • Performs any required re-inspection of modkits or any required packing inspections at the DLF • Participates in the Transfer and CTS meetings and, if requested, the DSAMs
DSN Logistics Facility (DLF)	<ul style="list-style-type: none"> • Checks for consistency and completeness of shipment • Applies appropriate numbers (such as, DSN control and property tags) • Obtains export approval and authorizations • Packs, ships, and tracks equipment shipments to DSN locations
Site Personnel	<ul style="list-style-type: none"> • Perform pre-installation inspections • Install equipment and conduct installation tests • Report status relative to modkit receipt and installation • Participate in the DSCC Satisfaction Assessment Meetings (DSAMs)
DSMS Safety Engineer	<ul style="list-style-type: none"> • Evaluate the hardware for readiness to transfer • Participate in the Transfer meetings and sign the ETA • Approve System Safety Checklist prior to initiation of the ETA

Section 3

Transfer Agreement Procedure Description

3.1 GENERAL

The Transfer Agreement Procedure is used to ensure that hardware delivered to the DSN operational environment has been fully tested, and that all necessary items have been provided for DSMS Operations Office to assume responsibility for operation and maintenance. The procedure is initiated after the CDE has completed development and test of the first article hardware, and prior to the delivery of the first hardware modkit. An ETA progresses through the following states:

- **Initiated:** The hardware is ready for a first-article delivery; liens have been generated for any incomplete items.
- **Approved:** DSMS engineering and DSN operations agree that the hardware is ready for operational use.
- **Completed:** DSN Operations assumes maintenance responsibility for all installed equipment (unless otherwise specified in the Maintenance and Sparing Agreement).

A single ETA covers all modkits and MESkits for a hardware configuration item (for specific ECOs).

An ETA Addendum is a shortened form of the ETA that may be used for minor modifications (see Section 3.3). The procedure for an ETA Addendum is generally the same as for an ETA; the primary difference is that the DSMS Safety signature is not required.

If an ECO revision is required for a minor modification before a task is complete and before the ETA has been completed, then a new ETA is not required.

An ETA becomes obsolete when the hardware item it pertains to is retired from the Network.

3.2 TRANSFER AGREEMENT PROCEDURE FLOW

Figure 3-1 depicts the normal equipment transfer agreement procedure flow. In this flow, the First Article Acceptance Test (FAAT) is conducted at the CDE's location prior to the Transfer meeting, or may be conducted on-site immediately after installation. Section 3.4 presents a procedure for on-site contractor installations. The task plan **shall** define the specific transfer flows for its hardware configuration items (i.e., assemblies) in conformance with this standard.

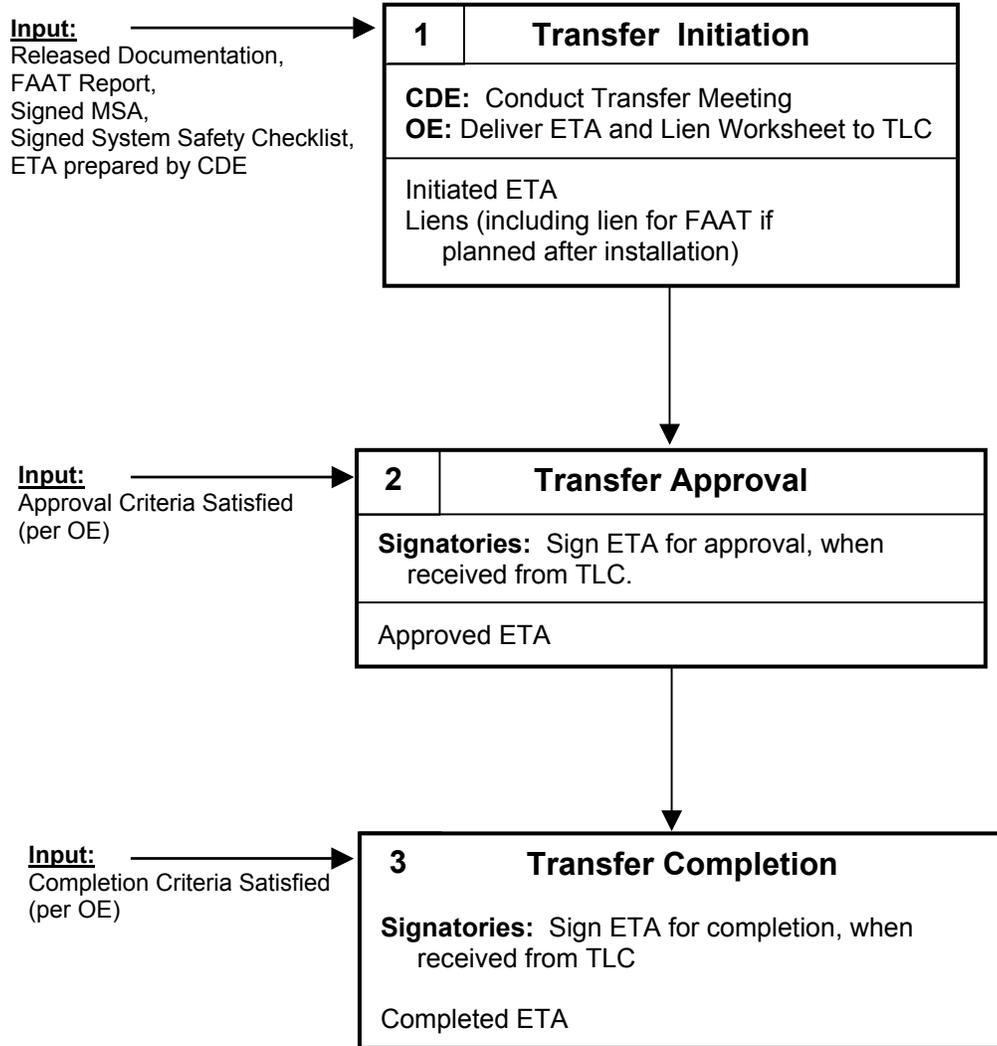


Figure 3-1: Basic Transfer Agreement Procedure Flow

3.2.1 Step 1: Transfer Initiation

The CDE initiates the transfer agreement procedure when

- The hardware's first article development and acceptance testing are complete (except if done on-site, see Section 3.4)
- The user documentation items listed on the ETA have been released
- The modkit for the first installation is ready for delivery

The CDE convenes the Transfer Meeting to confirm that the hardware configuration item is ready. Attendees and guidelines for conducting the meeting are in Appendix C. The Transfer Meeting may be combined with the first article modkit Consent-To-Ship (CTS) meeting, if more efficient to do so.

The CDE prepares page 1 of the ETA form and obtains the required attachments prior to the meeting. The CDE also obtains a copy of the current Lien List Report for the hardware item being transferred (for use at the meeting). All appropriate lien closures should be processed prior to obtaining the report.

The CDE should obtain the Safety signature on the ETA prior to the Transfer meeting (DSN Safety Engineer should have reviewed the hardware during the design phases of the task).

At the Transfer meeting, the ETA and required items identified in Section III of the ETA **shall** be reviewed, and lien(s) **shall** be generated for any incomplete items. If the First Article Acceptance Testing (FAAT) is to be performed on-site, a lien is generated for completion of this test. A lien **must** be generated for any documentation item (document or drawing) that is not officially released. The CDE is responsible for entering the planned closure date for each lien. Both the CDE and OE **must** sign the Lien Submission Worksheet (LSW). If liens are identified at the meeting, the OE sends the Lien Submission Worksheet to the Transfer and Lien Coordinator (TLC), who adds these liens to the lien database. Additional details on the lien processing activities are described in Section 6.

The CDE, DSMS Safety, and OE signatures indicate that the hardware is adequately documented and tested for a first installation. The OE sends the signed ETA to the TLC, who checks it for completeness, assigns it a number, logs it in, and advises the CDE of the number assigned. Incomplete ETAs are returned to the CDE without a number.

3.2.2 Step 2: Transfer Approval

Transfer Approval can occur after the following criteria are met:

- First installation and first article installation testing are complete
- First article acceptance testing is complete
- Open liens are deemed (by the OE) as not critical to operational use
- Initial training has been conducted
- The first DSAM meeting (if required) has been conducted

The OE notifies the TLC via email that the ETA can be routed for approval signatures. The TLC routes the ETA for approval signatures, after attaching a copy of the current Lien List Report and the OE's notification. When all the approval signatures have been obtained, the installed hardware is approved for operational use.

3.2.3 Step 3: Transfer Completion

The transfer completion occurs after the following criteria are satisfied:

- One or more modkits have successfully been installed and are in operational use
- Sufficient maintenance equipment and spares have been delivered to maintain the hardware
- Documentation and training is sufficient to maintain the equipment
- Open liens are deemed not critical by the OE and DSN Operations Manager

The OE notifies the TLC that the ETA can be routed for 'Completed' signatures (note that 'Completed' does not require that all planned modkits have been installed). When the ETA is completed, DSN Operations assumes maintenance responsibility for all successfully installed equipment covered by the ETA.

3.3 USE OF AN ETA ADDENDUM

An ETA Addendum may be used for a minor modification for a hardware configuration item that has a completed ETA. Minor modifications include performance anomaly corrections and circuit board level revisions. An ETA Addendum **shall not** be used if major functional capabilities or features are being added, new subassembly types are being added, or performance upgrades are being provided. The ETA Addendum procedure is the same as for an ETA, except that the DSMS Safety signature is not required.

3.4 PROCEDURE VARIATION FOR ON-SITE CONTRACTOR INSTALLATIONS

Figure 3-2 depicts a variation in transfer agreement procedure flow that accommodates on-site contractor assembly and installation activities. In this variation, the hardware is shipped from a contractor location and is assembled (not just installed) on-site at a DSN facility (an example is antenna structures and drives). The hardware is shipped without a CTS meeting and EDCL. The FAAT is conducted on-site by the implementing contractor; the task may conduct additional testing as specified in the task plan. The ETA is processed after the installation and testing of the equipment.

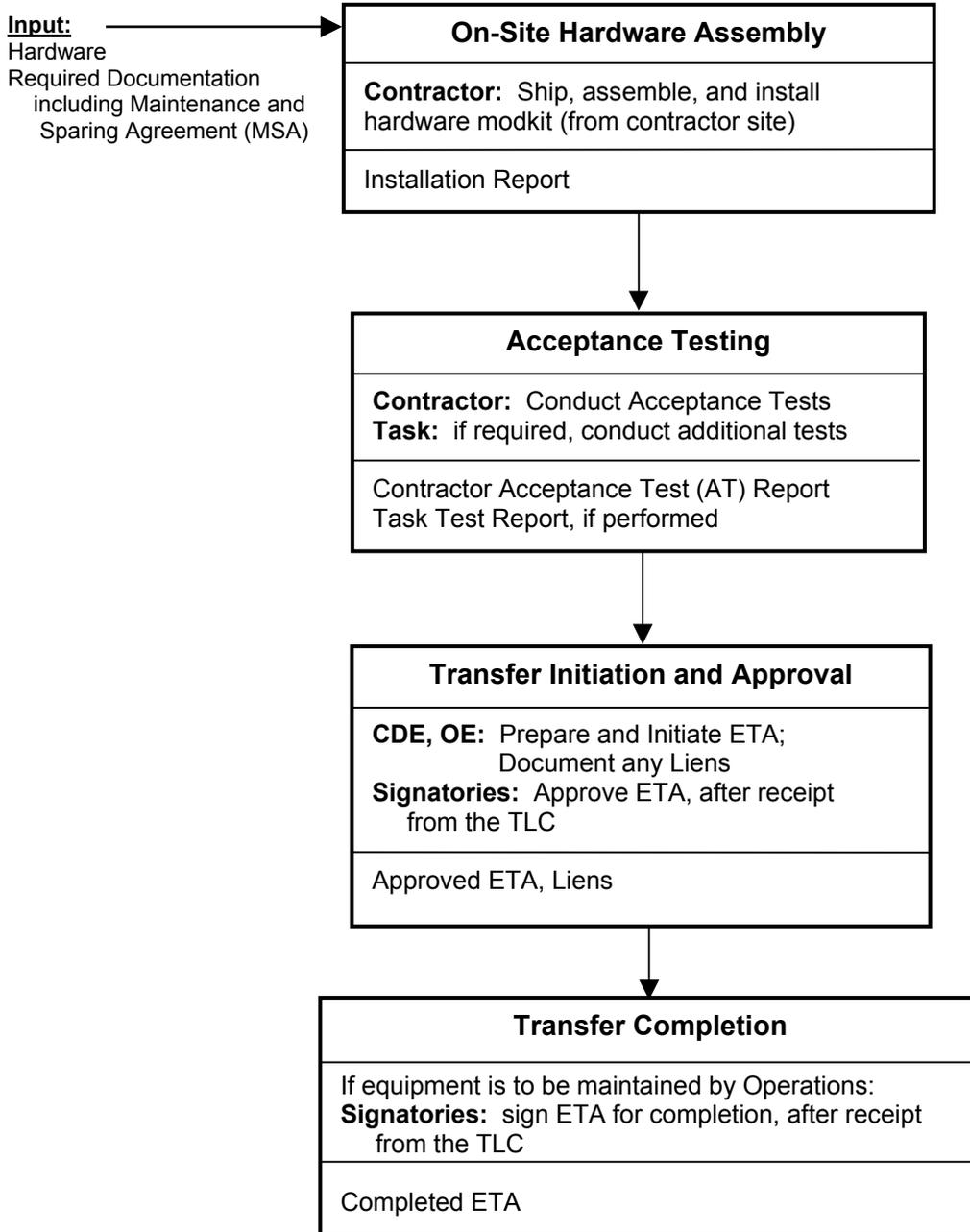


Figure 3-2: Transfer Agreement Procedure Flow for On-Site Contractor Installation

3.5 DESCRIPTION OF DOCUMENTS REQUIRED FOR TRANSFER

Section III of the ETA identifies documentation items and records that are required for transfer. Documentation should be officially released at the time of transfer (see DSMS 813-021 for release procedures). The document number **must** and the release date be entered on the ETA for each documentation item. For any unreleased documents, a lien **must** be generated.

ETA Item	Description
Maintenance and Sparing Agreement (MSA) [record]	The Maintenance and Sparing Agreement (MSA) is negotiated between the developer and DSN Operations prior to the Critical Design Review (CDR). Guidelines and requirements for MSA content/approval are contained in DSMS 813-205. The signed copy of the MSA must be submitted to the TLC, who maintains the official on-line repository for these records.
System Safety Checklist [record]	The System Safety Checklist identifies any hazards that have been identified with the new or modified equipment, and the mitigation of those hazards. It is signed by the applicable Task Manager and the DSMS Safety Engineer. The signed copy must be submitted to the TLC, who maintains the official on-line repository for these records.
Hardware First Article Acceptance Test Report	The Test Report for the First Article Acceptance Tests (FAATs) is a DSMS controlled record.
Installation or Modification Procedures	Installation or Modification Procedures are a required modkit item. These should be released as an 868 series document.
Maintenance Procedures	If Maintenance Procedures are required, they are released as an 868 series document.
Operations and Maintenance (O&M) Manuals, including subsystem manuals	Operations and Maintenance (O&M) Manuals are developed by the CDE for custom hardware. These should be released in the 867 series. If there are any subsystem Operation manuals (837 series), these should also be listed on ETA.
Technical Manuals (TMs)	Technical Manuals (TMs) are commercial manuals from vendors documenting COTS products. These are released as 865 series documents. The CDE must obtain any approvals from the vendor to copy for internal use.
Training Materials	Training materials may include videos, presentation materials, or other media. For documentation items, these should be released in the 867 series. For other media, information on where masters are stored or where materials can be obtained is entered on the ETA.
Drawings: Top Assembly and Subsystem	The Top Assembly drawing number is included on the ETA; it should be released through DSMS CM (see DSMS 813-022). Any subsystem-level drawings relevant to the transfer are also listed.
IDL/NDL	The Indentured drawing List (IDL) and Numeric Data List (NDL) reference information and release dates are entered on the ETA.
Other Documentation	Other documentation related to the hardware delivery, as indicated in the task plan or the MSA as a deliverable, must be identified on the ETA.

Section 4

Modkit Procedure

4.1 GENERAL

The modkit procedure ensures that the hardware has been tested and is ready for installation at DSN facilities; that the modkit contains all the items needed for the installation, and that all missing items or incomplete activities have been documented as liens. This procedure applies to the assembly, shipment, and installation of modkits for operational hardware; it also applies to connections of ‘non-operational’ hardware to the operational system. The procedure for shipping spares and maintenance equipment is discussed in Section 5.

The modkit procedure is used for the first article hardware (after the Equipment Transfer Agreement has been initiated), and is repeated for each modkit shipment as additional units are ready for delivery.

The following rules apply to the packaging and scope of modkits:

- Each modkit **shall** be for one assembly/configuration item within one subsystem (e.g. MCD3)
- Each modkit **shall** be for one facility (i.e., a DSCC, NOCC, CCT, CTT-22, DTF-21, or MIL-71).
- A single modkit may include multiple instances (copies) of a specific hardware modification at a facility (i.e., the same (identical) assembly modification for multiple strings, groups, or antennas)
- If a DSCC hardware assembly has components in both the SPC and a DSS (e.g., the Station Voice Terminal), a single modkit may contain components for both, if the hardware for each area is packaged separately.
- A hardware modkit may exist at the major assembly or subsystem level, but only if a new ETA is going to be generated at that same level. This typically applies only to delivery of new subsystems, new major assemblies, or for a major subsystem reconfiguration.

The modkit is prepared for delivery at the CDE facility. The preparations include CDE, OE, QA, and (possibly) DSN Logistics Facility (DLF) activities. A key objective is to ship from the CDE facility with minimal further paperwork, inspections, etc. required at other locations (such as the DLF).

If a modification responsibility has been assigned to contractor (e.g. O&M Contractor) or site personnel, then they perform the CDE functions in this procedure. In some cases, functions normally performed at the DLF may be performed at the implementer’s site, if more efficient to do so and if so stated in the task plan (e.g., if the equipment is both produced and installed at an overseas site). In cases where the modkit is assembled at a vendor site, the functions that normally occur at the CDE location **shall** occur at that site.

The primary form used in the modkit procedure is the Equipment Delivery Checklist (EDCL). The EDCL is used to identify the contents of the modkit, and to verify the modkit’s completeness; liens are generated for any missing items. Lien closure status is presented at the task’s DSMS Delivery Review (DDR). A modkit **shall** include, at a minimum:

- An Engineering Change Order (ECO)
- A Bill of Materials (BOM)
- An Installation (or Modification) Procedure
- An Equipment Transfer Agreement (ETA), except for certain ECOs (see Section 4.5 for details)

All modkits should be associated with an ECO (the previously used term “non-ECO modkit” should no longer be used). See Section 4.4 for information on the shipment of delayed, liened modkit items.

4.2 MODKIT PROCEDURE FLOW

Figure 4-1 contains the basic flow from preparation of a hardware modkit to its installation and acceptance by DSN Operations. Timing considerations for DLF processing and modkit shipping are presented in Section 4.3. The procedure for delivering delayed or liened items of a modkit is described in Section 4.4. The description of modkit items is presented in Section 4.5. Section 6 describes lien submission and closure activities.

Some modkit deliveries may require variations from the requirements of this procedure (e.g., in the case where a modkit is developed at a vendor or at DSN facility). If such a variation is necessary, it **must** be documented in the approved task plan or in an approved DSMS Waiver request.

4.2.1 Step 1: Modkit Assembly

The CDE assembles the tested hardware configuration item (usually hardware is delivered at the assembly level) and related documentation into a complete modkit. The CDE **shall** ensure that all equipment (whether prepared by CDE or a vendor) has the appropriate NASA property numbers for fabricated or purchased items per NASA/JPL Property practices. For large modkits, the CDE should request that DSN Control numbers (previously referred to as ConAudit numbers) be attached by DLF at the CDE location prior to shipment to DLF; for other modkits, this will be done at DLF prior to shipment to the DSN facility.

The CDE and the OE jointly enter the information into the Equipment Tracking System (ETS) database, which will produce the Bill of Materials (BOM). (Note: if the CDE does not have access to the ETS, then the CDE should prepare the BOM information in an Excel file and transmit it to the OE).

The CDE obtains all required documentation and completes Sections I, II, and III of the EDCL (the specific installation locations (such as SPC or DSCC) **must** be identified).

For overseas shipments, the CDE should prepare a list of vendor contact information (with any export certificates/letters) and include it in the modkit.

With support from their property representative, the CDE prepares a Request for Shipping Receiving Memo (Form 1063) for sending the modkit to the DLF. If the modkit is to be sent to Goldstone (GDSCC) or another O&M Contract location, the “Reason for Shipment” (Box 22) **must** indicate “Permanent Transfer of Equipment, DD1149 Required”. Processing of the DD1149 form increases shipment time from JPL to DLF; the CDEs should allow for this in the schedules.

The CDE schedules the Consent-to Ship (CTS) meeting to occur after the above have been completed. For at least the first article, this should be a “real” meeting (not via teleconference). The CDE should also schedule QA inspection of the modkit (to occur prior to or during the CTS meeting).

4.2.2 Step 2: QA Inspection and CTS Meeting

The CDE and OE must initiate the ETA prior to or at the CTS meeting. If the QA inspection has not been accomplished prior to the CTS meeting, then it must be performed at the meeting.

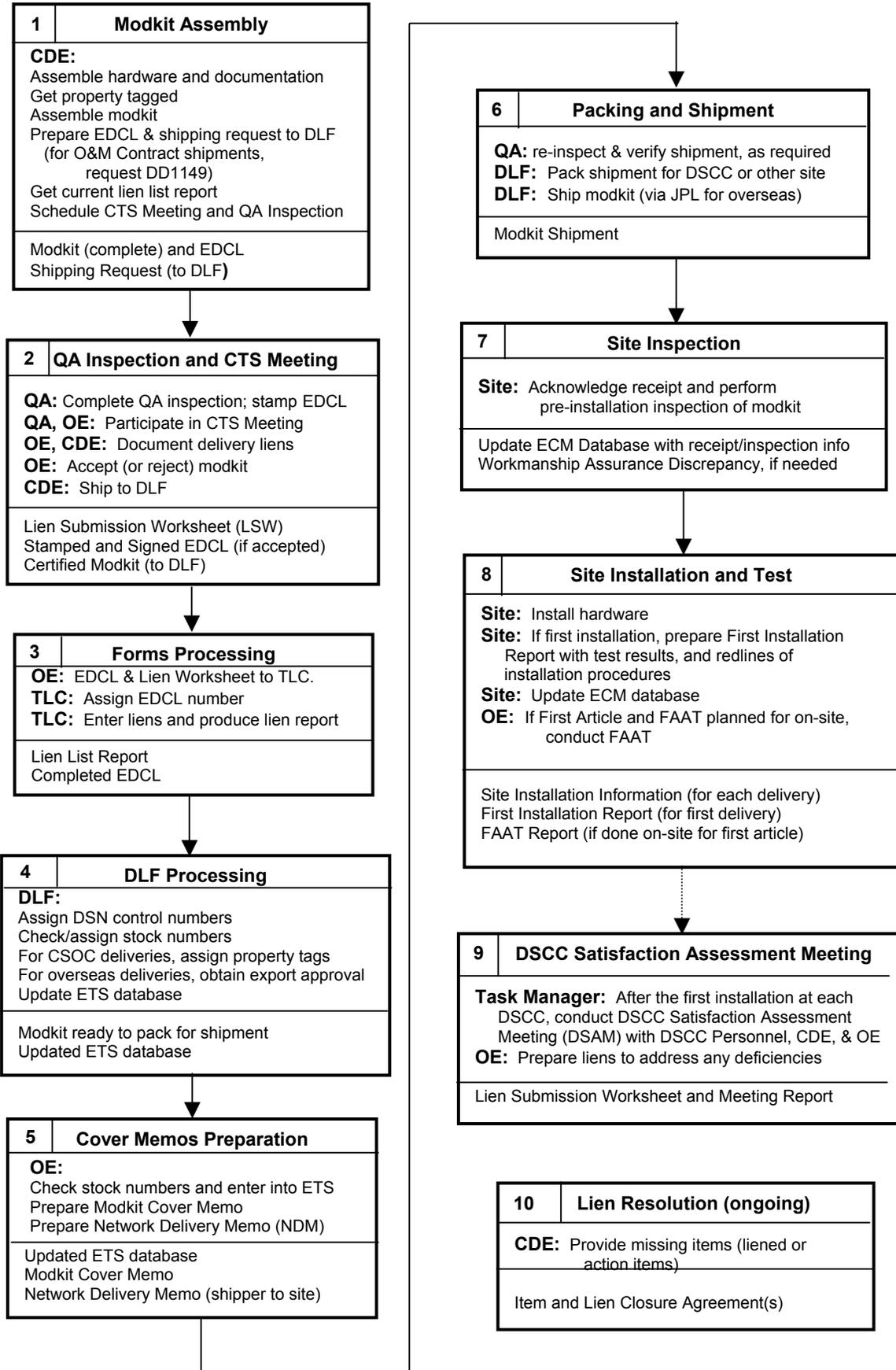


Figure 4-1: Flow of Modkit Procedure

The purpose of the CTS meeting is to verify that the modkit is complete and ready for shipment. If the CTS meeting is not for the first article modkit, then it may be an informal and/or teleconference meeting.

QA **must** always inspect the modkit at the CDE location prior to shipment to DLF (Note: if hardware is supplied by a vendor, this meeting may be conducted and liens documented at the vendor site). See Appendix D for guidelines for and attendees at the CTS meeting.

Liens against the modkit are recorded on a DSN Lien Submission Worksheet (LSW) and processed according to the lien processing activities defined in Section 6. Any modkit documentation item (document or drawing) not officially released, that has not been previously identified as a lien, **must** be entered as a lien. If a modkit contains hardware for multiple installations at a facility, any lien descriptions **must** be location-specific. Liens for spares and maintenance equipment are not written against a modkit (spares are delivered in MESkits).

The CDE **shall not** change the modkit (including any of its contents) after QA inspection (otherwise a re-inspection **must** occur). The CDE **shall not** ship the modkit to DLF until the EDCL is stamped by QA. The OE accepts the modkit by signing the EDCL. If the modkit cannot be accepted, the CTS activity is suspended until problems are resolved.

The CDE contacts JPL Shipping to arrange for the modkit shipment to the DLF, in accordance with the Form 1063 prepared in Step 1.

4.2.3 Step 3: Forms Processing

The OE sends the Lien Submission Worksheet and the fully signed EDCL to the Transfer and Liens Coordinator (TLC).

The TLC assigns a number to the EDCL, files a copy, sends it to the OE for inclusion in the modkit, and advises the CDE and QA of the number assigned to the EDCL. The TLC enters the liens into the database, and produces an updated Lien List Report for inclusion in the modkit.

The OE includes a copy of both the signed EDCL and the Lien List Report in the modkit.

4.2.4 Step 4: DLF Processing

The DLF follows detailed logistics procedures for checking and shipping modkits to the O&M Contract and overseas locations. See Section 4.3 concerning timing considerations.

The DLF tags the hardware with DSN Control numbers. For major modkits, the CDE should work with DLF to have these applied at the CDE location prior to shipment to DLF (see Step 1). The Equipment Tracking Summary (ETS) database is updated by DLF to incorporate these numbers.

All replaceable components within the hardware equipment should have stock numbers. DLF assigns pseudo stock numbers, if required.

For DSN hardware that is being delivered to O&M Contract locations, the property tags are applied at DLF. The DD1149 form authorizes the equipment to become O&M Contract property, and **must** be included in the shipment to DLF (see Step 1). DLF updates the Equipment Tracking System (ETS) database to include the property numbers.

For overseas shipments, the CDE should have included the vendor contact information and any export certificates (if applicable) for hardware parts and any embedded software. DLF obtains an export approval for the modkit before the modkit is shipped (see <http://eis.jpl.nasa.gov/international/intro.htm> for further information).

Note: Although the above activities are generally conducted at DLF, they reflect a “DLF process” that may be conducted at vendor locations as agreed to by the CDE, OE, DLF, and other affected parties. OE and QA may support DLF personnel in conducting these activities at remote CDE/developer site.

4.2.5 Step 5: Cover Memos Preparation

The OE prepares the required “Modkit Cover Memo” (which is a description of the modkit for the site) and includes it in the modkit.

All replaceable components within the hardware equipment should have stock numbers. The OE checks that all items requiring stock numbers (federal or pseudo) are tagged with valid numbers, and then updates the Equipment Tracking Summary (ETS) database to include stock number information.

The OE then prepares the Network Delivery Memo (NDM), using the information in the Equipment Tracking Summary (ETS) database and the Modkit Cover Memo. The NDM is used to ship the hardware to the site and includes all part numbers. In the ‘Special Instructions’ area of the NDM, the OE **must** indicate whether the modification type is an ‘upgrade’ (i.e., provides new capabilities) or ‘sustaining’ (i.e., supports operations and maintenance of current capabilities). The NDM is attached to the modkit (but is not part of it).

4.2.6 Step 6: Packing and Shipment

DLF packs the modkit for shipment to its installation location (DSCC or other site). As needed, QA verifies shipment and packing. Overseas shipments are sent via the JPL Shipping Department to the locations specified on the Network Delivery Memo. See Section 4.3 for timing considerations.

The physical equipment can sometimes be shipped by a vendor directly to the site; such shipments to overseas sites **must** be coordinated through the JPL Shipping Department. This is usually done only when the vendor is performing the on-site assembly and installation.

4.2.7 Step 7: Site Inspection

The site acknowledges receipt of the modkit by updating the ECM (Engineering Change Management) modkit status database with the “Received on Site” date.

The site performs a pre-installation inspection. If any significant problems with the equipment are identified, the OE, CDE, and QA Representative (as listed on EDCL) **shall** be notified via email. The notification should indicate that:

- The modkit is satisfactory, but there are damaged, missing, or unacceptable items. A description is included and, if appropriate, a Workmanship Assurance Discrepancy Report is generated.

OR

- The scope of the problems makes the modkit unacceptable, and authorization from the OE is requested to return the modkit. Note that a modkit **shall not** be returned without written authorization from the OE, who **shall** copy the CDE and JPL QA on this authorization.

4.2.8 Step 8: Site Installation and Testing

Site installation personnel install the modkit (except in cases when it is done by the vendor) and conduct the installation tests. At the completion of **each** installation, the site **shall** enter the completion date in the “Installation Complete at Site” field of the ECM modkit status database along with the following site installation information in the Comments field:

- Specific location where the equipment was installed (string, etc.)
- Time it took to install the modkit hardware
- Any problems with installation or testing

If any significant installation problems occur, the site provides the OE with the details, who in turn notifies appropriate personnel (such as, CDE, QA, task manager).

If the FAAT is conducted on site, the OE conducts the test and provides the test results to the CDE, who produces a test report.

For the first installation of a modkit (as indicated on the Modkit Cover Memo) for a hardware configuration item, the OE (assisted by site personnel) **shall** prepare and send to the CDE a First Installation Report. The First Installation Report includes the installation test report and any redlines to the installation (or modification) procedures or drawings (or states that no redlines were required). The CDE includes a copy of the First Installation Report in subsequent modkit deliveries.

4.2.9 Step 9: DSCC Satisfaction Assessment Meeting

For major Implementation Tasks, the task manager **shall** conduct at least one DSAM per DSCC. The purpose of the DSAM is to discuss Operations’ satisfaction with the modkit and to identify and record any deficiencies as liens or action items. The meeting is usually held as a teleconference meeting. The OE sends any new liens to the TLC for entry into the lien database.

After the first installation of a modkit (or set of installations at the same DSCC), an DSCC Satisfaction Assessment Meeting (DSAM) should be conducted (see Appendix E for meeting guidelines).

4.2.10 Step 10: Lien Resolution

The CDE is responsible for closing all liens (and completing any action items from a DSAM) as soon as possible. In general, liens are closed by supplying a missing item or completing an activity. If the CDE and the task manager determine that a lien item cannot be completed, then it should be closed administratively via agreement with DSMS Operations (see Section 6).

4.3 TIMELINE CONSIDERATIONS

For major tasks or installations, the Facility Installation Plan (FIP) (prepared by the Implementation Coordination Engineers) is used to define the timing inter-dependencies for the installation of the multiple modkits. The CDEs and OEs should work with the Implementation Coordination Engineers (ICE) to determine any timing requirements for delivery of their modkits.

Most of the shipments to Goldstone are sent from DLF on a weekly delivery truck. All of the overseas shipments are arranged by the DLF, but are sent through the JPL Shipping Department. Shipments are assigned a priority; but there are numerous factors that influence the time it takes for shipments to get to the complexes, especially the overseas complexes.

After the modkit arrives at DLF, DLF processing takes up to eight days (see diagram below). Variations occur due to both priority of the shipment and the number and size of modkits currently being processed. After the modkit leaves the DLF, overseas shipping times vary depending on the destination, priority, and size. As a guideline:

- A 'Priority-1' shipment usually takes three days.
- A 'Priority-2' shipment takes between three and nine days.
- A 'Priority-3' shipment is not normally used for modkits (is used for MESkits); these are consolidated shipments, and the time varies depending on size of the kit, when the next shipment departs, and means of shipment (air, ground, sea, etc.).

These are typical processing and shipping times; additional delays can occur when modkits are incomplete; when hazardous materials are involved; when the size of the shipment is large; or when traffic is high at the source/destination locations during holiday seasons or special events (e.g., Olympics).

Before a modkit can be shipped from the DLF, a number of activities **must** be performed, including

- Consistency and completeness checks
- Exports approval checks and authorizations
- Application of appropriate numbers (such as, DSN control and property tags)
- Packing

The CDE and task **must** allow adequate time in the delivery schedule for these activities.

There are a number of factors that can delay the shipping process and add time to the schedule. Re-work of due to incomplete or inaccurate information is the primary cause of delayed modkit shipments. Figure 4-2 depicts an estimate of nominal processing time (in days) for a Priority-2 shipment.

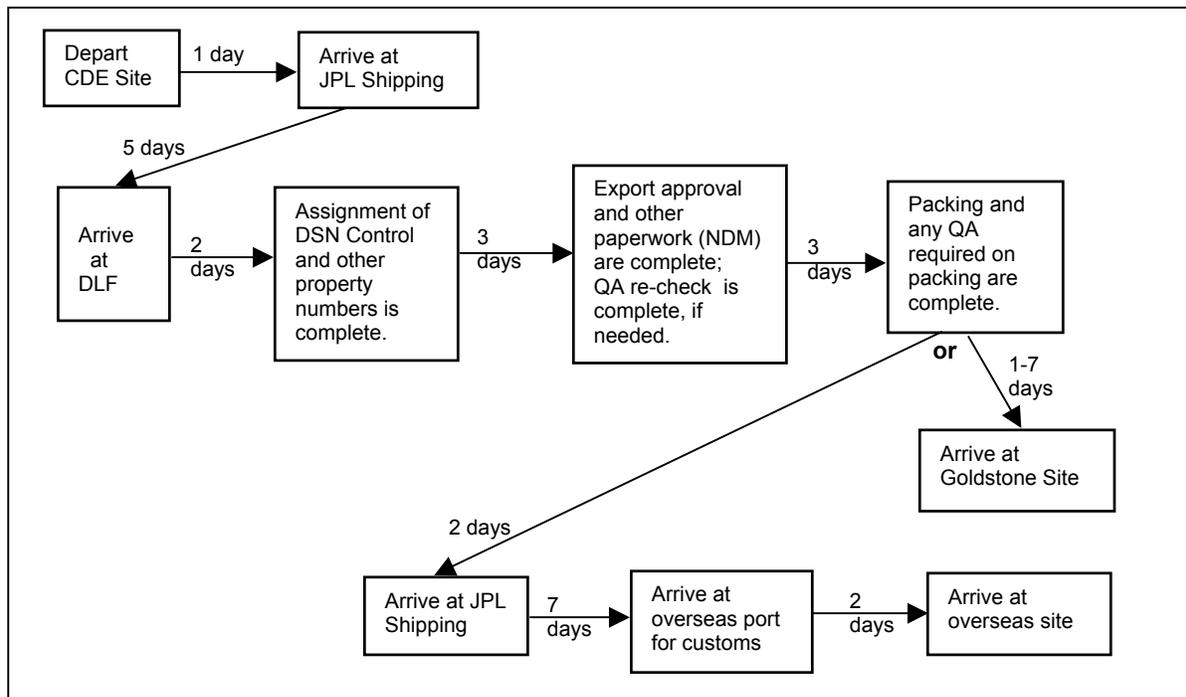


Figure 4-2: Timeline of Shipping Process

4.4 SHIPPING A MODKIT LIEN ITEM

Liened modkit hardware items, including cables, **must** be shipped via the DLF using the same procedure as defined in Section 4.2. For these items, the Lien Closure Agreement is used in place of the ECO and EDCL. A QA inspection and stamp is required on the Lien Closure Agreement before the hardware is sent to DLF. The OE prepares the appropriate Network Delivery Memo and a Cover Memo (if required).

For non-hardware lien items, shipment through DLF is not required. In either case, the OE provides a copy of the Lien Closure Agreement to the TLC, who then closes the lien in the lien database.

4.5 DESCRIPTION OF MODKIT ITEMS

This section provides an expanded description of the modkit items for those unfamiliar with modkit preparation. Modkit items include:

Equipment Delivery Checklist (EDCL) Form: The EDCL is an agreement between the CDE and OE that the modkit can be shipped and installed into the network; it provides a basis for verifying standard contents of all modkit(s) and for identifying liens. The EDCL also lists the number of units being shipped to a facility, identifies the specific installation locations at the facility, and provides a very brief description of what is provided in the delivery. The CDE completes Sections I, II, and III of the form prior to the CTS meeting. QA stamps the EDCL to certify the contents of the modkit. The OE ensures that a copy of the numbered EDCL is included in the modkit.

A sample of the EDCL form is included in Appendix B. The current versions of all forms can be obtained from the TLC or online at URL <http://csocjplonline.jpl.nasa.gov/ecmweb/newforms.htm>.

Engineering Change Order: All hardware modifications to operational hardware are authorized by an approved Engineering Change Request (ECR) and a corresponding Engineering Change Order(s) (ECOs). The 'Affected Location' field on ECOs **shall** indicate only the physical locations of the installation, not the logical association of the hardware (e.g. for an Exciter dedicated to DSS-14 but located in SPC-10, the ECO Affected Location' is the SPC-10 only). A copy of the ECO is included in the modkit.

Equipment Transfer Agreement (ETA) Form: The CDE prepares the applicable ETA as part of the transfer agreement procedure. A copy is included in the modkit, except for those ECOs where no ETA is required (temporary ECOs for non-operational hardware, and ECOs for removing equipment).

Hardware: The hardware portion of the modkit contains the hardware configuration item (assembly) equipment being sent to the site. Subsystem and system cables **must** be included in modkits.

Installation Tools: Special tools required for installation (that have not been previously provided to a DSN site) are provided by the CDE, listed on the BOM, and shipped with the first modkit to each facility. Documentation for these tools (such as instruction sheets, calibration data, and maintenance information) should be included in the modkit and listed on the Documentation List.

Pre-Installed and Diagnostic Software:

If commercial software (diagnostic or operational) is preinstalled on the hardware, or is supplied on media to support the installation, the software and related documentation **shall** be listed on the BOM and on the 'Other' line of the EDCL. A Third-Party-Software Delivery Form (TDF) for this software **must** also be included in the modkit. The software **must** be identified and archived per SPMC procedures (see 813-126 for details on the TDF form).

Hardware Documentation: Hardware documentation includes the following:

- Installation or Modification Procedures, including test procedures necessary to verify a successful installation.
- Drawings with applicable Engineering Change Instructions (ECIs)
- Operations & Maintenance (O&M) Manuals, Technical Manuals, and Maintenance Procedures

Authorization to use redlined or unreleased drawings **shall** have a stamp on the drawing that includes the CDE signature, the OE signature, and the time period during which use of the drawing is valid (i.e., expiration date). Documentation for temporary ECOs may be unreleased.

Two hardcopies of every documentation item **must** be included in the modkit, unless the OE obtains concurrence from the recipient site for an alternate document delivery approach.

Bill of Materials: A Bill of Materials (BOM), JPL Form 6255/DSN, is generated to itemize each hardware (and any embedded, diagnostic software) item that is a part of the modkit. The BOM includes the property numbers. Documentation may be listed on the BOM as one line item and then detailed on the Documentation List. The data listed on the BOM becomes the basis for the Modkit Cover Memo and the Network Delivery Memo.

Documentation List: The documentation list contains a list of all documents included in the modkit. The documentation list should include the document number, version, title, and release date.

Lien List Report: The current lien list report as of the Consent-to-Ship meeting. The OE attaches the report to the EDCL and includes it in the modkit at the DLF. This item is not required for modkits implementing temporary ECOs.

Test Procedures and Data Sheets: The first article acceptance test (FAAT) report, including the test procedures and the data sheets, are included in the modkit. If the article being shipped is article 2 through N of the equipment, then any data sheets for tests conducted on this specific article should also be included in the modkit. If acceptance testing is to be conducted on-site, the acceptance test procedures are included in the modkit and the acceptance test report is liened. This item is not required for modkits implementing temporary ECOs.

First Installation Report: The First Installation Report presents the results of performing the first installation of the hardware configuration item. The report:

- Identifies any modkit deficiencies
- Describes any installation or modification procedure errors or corrections
- Identifies drawing errors
- Documents installation testing results
- Identifies hardware deficiencies
- Provides actual time to install/test
- Identifies any operability problems

The First Installation Report is included by the CDE as part of all subsequent modkits to sites installing the same equipment. This item is not required for modkits implementing temporary ECOs.

Other: Any other delivery items necessary for installation and operation.

Modkit Cover Memo: The memorandum briefly describes the ECO, the schedule, the estimated installation time, the affected facilities, and any exceptions to the ECO. It also identifies the assigned OE and includes any special instructions from the OE. A capability statement, which identifies the capabilities of the hardware, is also included in the memorandum. The memorandum is addressed to the appropriate Complex/Site director and maintenance supervisor, with information copies sent to the CDE and the OE's Supervisor.

The Modkit Cover Memo is prepared after the modkit arrives at the DLF, and is included within the modkit shipment to the site.

4.6 DESCRIPTION OF MODKIT SHIPMENT MEMOS

The following items are required to ship a modkit, but are not considered part of the modkit.

Shipping Request (JPL form 1063). A Request for Shipping Receiving Memo (Form 1063) is required to ship the modkit to the DLF. This form is part of the JPL shipping process and is not unique to DSMS. The CDE prepares the form (with support from their property representative).

If the modkit final destination is GDSCC or another O&M Contract location, the "Reason for Shipment" (Box 22) **must** indicate "Permanent Transfer of Equipment, DD1149 Required" so that JPL Shipping prepares and processes the appropriate DD1149 forms.

Network Delivery Memo. The Network Delivery Memo (NDM) is the shipper request used to ship the modkit from the DLF to its final destination. The NDM is prepared using the information in the Equipment Tracking Summary (ETS) database and the Modkit Cover Memo; it includes destination locations, part numbers, etc. The NDM is attached to the modkit, but is not inside (i.e., part of) the modkit.

Section 5

MESkit Procedure

5.1 GENERAL

This section describes the assembly and shipment of **Maintenance Equipment and Spares** kits (referred to as a MESkit). A MESkit is a shipment of equipment from the CDE to the OE (not to a specific site). The OE allocates spares and maintenance equipment to the DSN facilities or to network spares.

The purpose of the MESkit procedure is to ensure that the maintenance equipment and spares have been tested and are ready for delivery to DSN facilities; that the MESkit contains all required items (per the approved Maintenance and Sparing Agreement (MSA)); and that any missing items or incomplete activities have been documented as liens. The MESkit procedure is utilized whenever the CDE has a set of spares and/or maintenance equipment ready for shipment to the OE.

The term ‘Spares’ refers to equipment that is not permanently installed within operational equipment (that is, they do not include ‘hot backup’ equipment that is part of the operational hardware; see 813-205 for further information on definition of spares). Spares include both site and network spares.

‘Maintenance Equipment’ refers to equipment used for testing and maintenance of operational equipment, but not permanently installed within operational equipment (that is, diagnostic equipment that is a physical part of the operational hardware is not considered maintenance equipment).

The procedure is a simplified version of the modkit procedure. A MESkit Delivery Checklist (MDCL) is used when preparing and delivering the MESkit, and as a basis for identifying any liens against the MESkit. The OE determines the destinations for the MESkit items (such as site CMF or network spares facility), and prepares the paperwork for delivery to these destinations.

In cases where a MESkit is shipped from a vendor site, the same functions that occur at the CDE location **shall** occur at the vendor site.

5.2 MESKIT PROCEDURE FLOW

Figure 5-1 contains the basic flow from assembly of a hardware MESkit to its delivery to the OE. Notes about each step are included below. The procedure for delivering delayed or liened items of a MESkit is described in Section 5.3. The description of MESkit items is presented in Section 5.4. Section 6 describes the lien submission and closure procedure used to track missing items.

Some MESkit deliveries may require variations to this procedure (e.g., cases where it is necessary to ship from a vendor directly to a DSCC site). If a variation is required, then the procedure to be used **shall** be documented, and signed by the CDE and OE. Any shipment to overseas sites **must** still be coordinated with JPL shipping.

The MESkit process addresses delivery from the CDE to the OE; the OE is responsible for delivery of the items to the appropriate destinations, usually via Priority-3 (consolidated) shipments. Timeline considerations are similar to those detailed in the modkit process (see Section 4.3).

5.2.1 Step 1: MESkit Assembly

The CDE assembles the appropriate tested spares and maintenance equipment per the MSA or the task plan. The CDE **shall** ensure that all equipment (whether prepared by CDE or a vendor) has the appropriate NASA property numbers for fabricated or purchased items per NASA/JPL Property practices.

The CDE prepares a Request for Shipping Receiving Memo (Form 1063) to send the MESkit to the DLF; the form should list all items in the MESkit. The CDE should work with the OE to determine if the final destination of any items will be Goldstone or other O&M Contract location. For those items, the “Reason for Shipment” (Box 22 of Form 1063) **must** indicate “Permanent Transfer of Equipment, DD1149 Required”, so that JPL Shipping-Receiving prepares the appropriate DD1149 form.

For any items expected to be sent overseas, the CDE prepares a list of vendor contact information and any export certificates/letters and includes it in the MESkit.

The CDE prepares the MDCL form, and attaches the shipment list of all hardware items. Documentation included should be noted on the form or the attached shipment list.

5.2.2 Step 2: QA Inspection

The CDE contacts QA for inspection of the MESkit. The CDE **shall not** change the MESkit after inspection (otherwise re-inspection **must** occur). The CDE **shall not** ship the MESkit to the DLF until the MDCL has been stamped by QA.

5.2.3 Step 3: MESkit Review

The CDE contacts the OE for review of the MESkit prior to shipment to the DLF. The OE accepts the MESkit by signing the MDCL. Any liens against the contents of the MESkit **must** be entered on a Lien Submission Worksheet, which the OE then sends to the Transfer and Lien Coordinator (TLC).

The OE delivers the signed and stamped MDCL to the TLC who assigns it a number. The CDE, using the Request for Shipping Receiving Memo from Step 1, ships the MESkit to the DLF.

5.2.4 Step 4: Forms Processing

The TLC assigns the number to the MDCL, files a copy, sends a copy to the OE, and notifies the CDE and QA of the number assignment.

5.2.5 Step 5: Lien Resolution

The CDE is responsible for closing all liens as soon as possible. In general, liens are closed by supplying the missing item or performing an incomplete activity. If the CDE and the task manager determine that a lien cannot be completed, it should be closed administratively with approval of the DSN Operations Manager and the Implementation Engineering Manager (see Section 6).

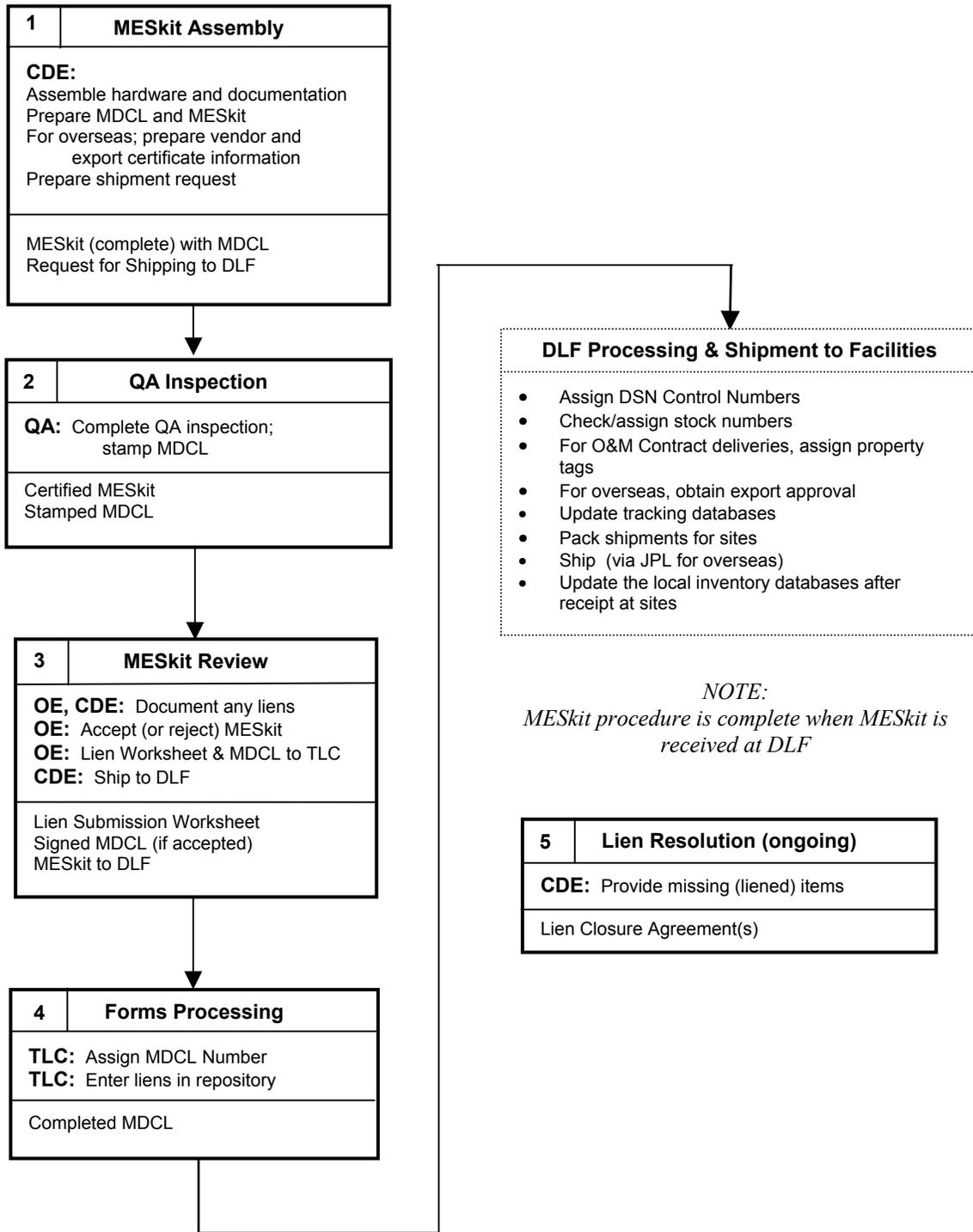


Figure 5-1: Flow of MESkit Procedure

5.2.6 DLF Processing and Shipment to Facilities

After delivery of the MESkit to DLF, the MESkit procedure is complete. The following is a general description of the distribution process after receipt of the MESkit at DLF:

- The OE determines the distribution of the maintenance equipment and spares to overseas sites, O&M Contract sites, and to the network maintenance facilities. If the allocation to overseas and O&M Contract locations has changed since the determination made with the CDE (in Step 1), then the OE is responsible for the paperwork to change the property assignments and tags. DLF applies the property tags for hardware that is being delivered to O&M Contract locations (cannot be applied without the DD1149 form). The DLF updates the Equipment Tracking Summary (ETS) database to include the property numbers.
- DLF attaches DSN Control numbers to the spares and test equipment. DLF assigns pseudo stock numbers, if required. The OE ensures that all items requiring stock numbers (federal or pseudo) are properly tagged with valid numbers. DLF and the OE update tracking databases.
- For each overseas shipment, the DLF obtains an export approval for the shipment.
- The DLF packs the hardware and documentation for shipment to each facility. Overseas shipments are routed through the JPL Shipping Department.
- The physical equipment can sometimes be shipped by a vendor directly to the site; but for overseas shipments from the states, this **must** be coordinated through the JPL Shipping Department.
- Each site updates the local inventory of spares and maintenance equipment after receipt.

5.3 SHIPPING A MESKIT LIEN ITEM

The shipment of a liened MESkit hardware item **shall** be via the DLF, using the same procedure as defined in Section 5.2. For these items, the Lien Closure Agreement (see Section 6) is used in place of the MDCL. A QA inspection and stamp is required on the Lien Closure Agreement before it is sent to DLF.

For non-hardware lien items, shipment through DLF is not required. In either case, the OE provides a copy of the Lien Closure Agreement to the TLC, who then closes the lien in the lien database.

5.4 DESCRIPTION OF MESKIT ITEMS

This section provides an expanded description of the MESkit items (for those unfamiliar with MESkit preparation). The items contained in a MESkit are:

MESkit Delivery Checklist (MDCL) Form: The MDCL is an agreement between the CDE and OE that the MESkit can be shipped to DLF. A copy of the MDCL form is included in Appendix B.

Maintenance Equipment: Equipment required for maintenance, diagnosis, or testing is provided by the CDE as agreed to in the Maintenance and Sparing Agreement (MSA). Includes special tools; calibrated tools generally have a DSN control number; but most others do not. Commercial or custom software (and related documentation) for the maintenance equipment **shall** be listed on the documentation list and on ‘Other’ item line of the MDCL, and **shall** be identified and archived per SPMC. Commercial software items must be accompanied by a ‘Third-Party-Software Delivery Form’ (TDF); see 813-126 for additional details.

Spares: Hardware items used to replace failed items in operational equipment, as agreed to in the MSA. Every spare should have a stock number (Federal or pseudo) linked to the DSN control number.

Documentation for Maintenance Equipment: MESkit documentation may include (as appropriate for the kit) released drawings with applicable Engineering Change Instructions (ECIs), and released Operations & Maintenance (O&M) Manuals, Technical Manuals (TMs), or Maintenance Procedures.

Documentation List: A list of all documentation included in the MESkit (if applicable). The documentation list should include the document number, version, title, and release date.

Test Procedures and Data Sheets: Any test procedures and test data pertinent to the spares or maintenance equipment are included.

Section 6

Lien Processing Activities

6.1 LIEN SUBMISSION AND LIEN REPORTS

Liens are used to track incomplete ETA items, missing modkit/MESkit deliverables, and significant deficiencies. Each lien is associated with a DSMS 820-061 configuration item (such as, an assembly or functional group). The Transfer and Lien Coordinator (TLC) maintains the lien database, which includes both open and closed liens.

The Lien Submission Worksheet is used to record any new liens identified at the Transfer, Consent-to-ship (CTS), DSCC Satisfaction Assessment Meeting (DSAM), and DSMS Delivery Review (DDR) meetings. For each lien, the lien category (as defined on the Lien Submission Worksheet) is also included.

The CDE and OE concur on all liens submitted. A completion date **must** be supplied for each lien. The completion date **must** not be later than the end date of the task or some other plan and resources for closing the lien **must** be identified.

The OE submits the lien worksheets to the TLC, who assigns it sequential number for that hardware configuration item, and enters it into the lien database. The sequence numbers of liens continue throughout the life of the 820-061 item (i.e., the sequence number is not reset for each new ETA or EDCL/MDCL for that hardware).

A lien remains open and associated with that hardware until the deficiency is corrected, or until the 820-061 item is obsolesced. Closed liens remain in the database as a permanent record.

A Lien List Report lists all open liens for a specific DSMS 820-061 configuration item at the time of the report. Anyone may generate a Lien List Report from the lien database, or request a report from the TLC.

The TLC produces various lien status reports. The monthly lien status reports (sorted by line organization) indicate open and past-due liens. The TLC also produces other reports, such as notification to CDE and OE that a lien is almost due, and a report to the Service System Manager (SSM) and the Section Managers on past due liens. Lien reports sorted by ECO or EDCL/MDCL may also be requested.

The CDE's Section Manager and the Service System Manager (SSM) should ensure that appropriate resources are applied to any overdue liens. The DSMS Implementation Engineering Manager may also convene "close-out" negotiation meetings, as required.

6.2 LIEN RESOLUTION AND CLOSURE

Lien closures are documented on the Lien Closure Agreement form (see Appendix B), which is generally prepared by the CDE. There are two ways to close a lien:

1. By supplying the missing or incomplete item and submitting the Lien Closure Agreement (LCA) form.
2. By an approved justification for non-delivery; which results in a lien being “administratively closed.” Liens are administratively closed only when both Operations and Engineering management agree that there is insufficient value in delivering the missing item. The LCA form is used to document this agreement and approval (note that additional signatures are required to administratively close a lien).

Examples of justifications for closing liens administratively are:

- Testing liens are no longer relevant, because the hardware has been replaced and tested in a newer configuration.
- Documentation liens are no longer valid, because documentation for subsequent versions of the hardware is now available.

The TLC supports the approval sign-off process for “administratively closed” Lien Closure Agreements.

Liens being closed by delivery should not be included on the same form as liens being closed administratively, due to the different levels of approval.

When a missing modkit item is being shipped, the LCA is used in place of the EDCL for delivery of that item. If the item is hardware, QA **must** inspect the hardware and sign/stamp the LCA.

If a waiver has been approved for the non-delivery of an EDCL item, then a lien **shall** not be written against that item. Waivers are used for requesting a deviation during the planning process.

Appendix A

Abbreviations and Acronyms

BOM	Bill of Materials
CCT	Central Communications Terminal
CDE	Cognizant Development Engineer
CM	Configuration Management
CMF	Complex Maintenance Facility
COTS	Commercial-Off-The-Shelf
CTS	Consent-to-Ship (meeting)
CTT	Compatibility Test Trailer
DDP	Development and Deployment Plan
DDR	DSMS Delivery Review
DLF	DSN Logistics Facility
DSAM	DSCC Satisfaction Assessment Meeting
DSCC	Deep Space Communications Complex
DSMS	Deep Space Mission System
DSN	Deep Space Network
DSS	Deep Space Station
DTF	Development Test Facility
ECM	Engineering Change Management (part of DSMS CM)
ECI	Engineering Change Instruction
ECO	Engineering Change Order
ECR	Engineering Change Request
EDCL	Equipment Delivery Checklist
ETA	Equipment Transfer Agreement
ETS	Equipment Tracking System [database]
FA	First Article
FAAT	First Article Acceptance Test
FIP	Facility Installation Plan
HW	Hardware
ICE	Implementation Coordination Engineers
LCA	Lien Closure Agreement
LSW	Lien Submission Worksheet
MCD	Maximum-Likelihood Convolutional Decoder
MDCL	MESkit Delivery Checklist
MESkit	Maintenance Equipment and Spares kit
MIL	Merritt Island Launch facility
modkit	modification kit
MSA	Maintenance and Sparing Agreement

NDM	Network Delivery Memo (shipper to site)
NPG	NASA Procedures and Guidelines
OE	Operations Engineer
O&M	Operations & Maintenance (manual or contract)
PDMS	Product Data Management System
PEM	Project Element Manager
QA	Quality Assurance
SCD	Service Capability Development (process)
SPC	Signal Processing Center
SPMC	Software Production Management and Control (part of DSMS CM)
SSM	Service System Manager
SW	Software
SWTA	Software Transfer Agreement
tbd	to be determined
TLC	Transfer and Lien Coordinator
TM	Task Manager
URL	Universal Reference Locator
WA	Workmanship Assurance or Work Agreement

Appendix B

Numbering Conventions for Forms and Sample Forms

The current, official versions of the all forms described in this document can be found at <http://csocjplonline.jpl.nasa.gov/ecmweb/newforms.htm>, or by contacting the Transfer and Lien Coordinator (TLC). Included herein for information purposes are samples of the forms (current at the time of publication of this document). The transfer and delivery forms include:

- DSN Equipment Transfer Agreement (ETA)
- Addendum for the DSN Equipment Transfer Agreement (ETA)
- Equipment Delivery Checklist (EDCL)
- MESkit Delivery Checklist (MDCL)
- Lien Submission Worksheet (LSW)
- Lien Closure Agreement (LCA)

The TLC assigns numbers according to following convention:

1) Equipment Transfer Agreement (ETA)	Eyyynnnn
2) Equipment Transfer Agreement (ETA) Addendum	Eyyynnnn-Ann
3) DSN Equipment Delivery Checklist (EDCL)	Eyyynnnn-CLnnnn
4) DSN MESkit Delivery Checklist (MDCL)	Eyyynnnn-CLnnnn
4) DSN Lien Submission Worksheet**	(not applicable)
5) DSN Lien Closure Agreement (LCA)	(none at this time)

Where: yy is the last two digits of the year (such as 99 for 1999), and
 nnnn is a unique number assigned by the TLC
 nn is a unique number assigned by the TLC

** note that each lien will be assigned a unique number in conjunction with its 820-061 number.

DSN EQUIPMENT TRANSFER AGREEMENT (ETA)

I. IDENTIFICATION

Date: _____ Configuration Item Number: _____

Hardware Assembly Name: _____

Applicable ECR(s): _____ ECR Title: _____

Applicable ECR(s): _____ ECR Title: _____

Applicable ECR(s): _____ ECR Title: _____

ECM Office use only

E _____
(ETA Number)

E _____
(Previous ETA Number)

II. CHANGE DESCRIPTION

III. HARDWARE DOCUMENTATION STATUS

(If an item is waived or not applicable, reference the approved waiver or put "N/A" under document number.)

	DOCUMENT/DRAWING NUMBER OR CONTROLLED RECORD ID	DATE RELEASED (No future dates)	Located at URL
Maintenance and Sparing Agreement (MSA) (attached)	_____	_____	_____
System Safety Checklist	_____	_____	_____
First Article Acceptance Test Report (with test data sheets)	_____	_____	_____
Installation (or Modification) Procedures	_____	_____	_____
Maintenance Procedures	_____	_____	_____
Operations and Maintenance (O&M) Manuals, including any Subsystem-Level Manuals	_____	_____	_____
Commercial Technical Manuals (TMs) (attach a list, if more space is required)	_____	_____	_____
Training Materials	_____	_____	_____
Drawings: Top Assembly and Subsystem Configuration	_____	_____	_____
IDL/NDL	_____	_____	_____
Other Documentation	_____	_____	_____

IV. LIEN STATUS

Attach current Lien List Report.

DSN EQUIPMENT TRANSFER AGREEMENT (ETA)

I. IDENTIFICATION

Date: _____
 Configuration Item Number: _____
 Hardware Assembly Name: _____

ECM Office use only
E _____ (ETA Number)

V. INITIATED (Ready for first article delivery)

SAFETY:

The DSMS Safety Engineer has reviewed the equipment design and associated installation/handling procedures, and confirms that DSMS safety requirements have been met, and that appropriate System Safety Checklist data has been provided.

 Date
 DSN Safety Engineer

CDE/OE:

The CDE and OE agree that the equipment (including subassemblies identified in the top assembly drawing) has successfully completed required pre-installation tests, and that documentation necessary for installation is available to operations. All liens relative to documentation or testing have been entered into the lien database.

_____	_____	_____	_____
	Date		Date
Cognizant Development Engineer		Operations Engineer	

VI. APPROVED (Operational use permitted)

The personnel below agree that the equipment has successfully completed a first installation, that no critical testing or documentation liens exist affecting operational use, and that sufficient training has been provided to permit operational use.

_____	_____	_____	_____
	Date		Date
Task/WA Manager		DSMS Implementation Engineering Manager	
_____	_____	_____	_____
	Date		Date
DSN Operations Manager		M & O Contract Operations Manager	

VII. COMPLETE (Maintenance responsibility accepted)

The responsibility for maintaining the installed equipment is accepted by Operations. Any remaining liens are minor relative to proper maintenance of the equipment, and the plan for closing these is acceptable.

_____	_____	_____	_____
	Date		Date
Operations Engineer		DSN Operations Manager	

ADDENDUM TO THE DSN EQUIPMENT TRANSFER AGREEMENT (ETA)

I. IDENTIFICATION		<p style="text-align: center;">ECM Office use only</p> <hr/> <p style="text-align: center;">E</p> <p style="text-align: center;">(ETA Number)</p> <hr/> <p style="text-align: center;">-A</p> <p style="text-align: center;">(Addendum Number)</p>
Date: _____	Configuration Item Number: _____	
Hardware Assembly Name: _____		
Applicable ECR: _____	ECR Title: _____	
Applicable ECR: _____	ECR Title: _____	
Applicable ECR: _____	ECR Title: _____	
II. CHANGE DESCRIPTION		
Sub-assemblies affected by this Addendum: _____		
III. MODS TO ORIGINAL AGREEMENT		
Attach to this addendum: A list of new or modified hardware documentation per Section III of the original agreement. Include First Article Test Report.		
IV. LIEN STATUS		
Attach current Lien List Report.		
V. INITIATED		
The CDE and OE agree that the equipment (including subassemblies identified in the top assembly drawing) has successfully completed required pre-installation tests, and that documentation necessary for installation is available to operations. All liens relative to documentation or testing have been entered into the lien database.		
_____	Date	_____
Cognizant Development Engineer		Operations Engineer
VI. APPROVED AND COMPLETED		
The responsibility for operating and maintaining the installed equipment is accepted by Operations. Any remaining liens are minor relative to proper operation and maintenance of the equipment, and the plan for closing these is acceptable.		
_____	Date	_____
DSMS Implementation Engineering Manager		DSN Operations Manager

DSN EQUIPMENT DELIVERY CHECKLIST (EDCL)

I. IDENTIFICATION Configuration Item Number: _____ Date: _____ Configuration Item Name: _____ ECR Number: _____ ECR Title: _____ Assembly Drawing Number: _____		ECM Office use only E _____ (ETA Number) -CL _____ (Check List Number)																																																								
II. MODKIT DELIVERY DESCRIPTION: <input type="checkbox"/> Check if Temporary ECO	III. QUANTITY Total copies: (____) Installation Locations: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 30%; text-align: center;">(Quantity per location)</th> </tr> </thead> <tbody> <tr><td>_____</td><td style="text-align: center;">(____)</td></tr> </tbody> </table>			(Quantity per location)	_____	(____)	_____	(____)	_____	(____)	_____	(____)	_____	(____)																																												
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HARDWARE AND DOCUMENTATION CHECKLIST (items in delivery): <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">YES</th> <th style="width: 10%; text-align: center;">NO</th> <th style="width: 5%; text-align: center;">NA</th> </tr> </thead> <tbody> <tr> <td>Item 1 Equipment Transfer Agreement (ETA) or ETA Addendum</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Item 2 ECO (provide ECO Version Letter) _____</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Item 3 Operational Hardware _____</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Item 4 Special Tools _____</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Item 5 Two (2) copies of released Installation or Modification Procedures, include applicable testing (Pre-released documentation is acceptable for temporary ECOs) _____</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Item 6 Two (2) sets of released, reduced drawings or ECIs for user documentation. 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Item 13 Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																							
V. SIGNATURES Quality Assurance at CDE location: QA Inspector: _____ Date: _____ QA Certification Number: _____ <hr style="border-top: 1px dashed black;"/> Quality Assurance at DLF location: (if needed) QA Inspector: _____ Date: _____ QA Certification Number: _____ <hr style="border-top: 1px dashed black;"/> The personnel listed below agree that all items checked YES above have been provided in the Modkit. <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; text-align: center;">_____</td> <td style="width: 10%; text-align: center;">Date</td> <td style="width: 40%; text-align: center;">_____</td> <td style="width: 10%; text-align: center;">Date</td> </tr> <tr> <td style="text-align: center;">Cognizant Development Engineer</td> <td></td> <td style="text-align: center;">Operations Engineer</td> <td></td> </tr> </table>			_____	Date	_____	Date	Cognizant Development Engineer		Operations Engineer																																																	
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Cognizant Development Engineer		Operations Engineer																																																								

DSN MESKIT DELIVERY CHECKLIST (MDCL)

I. IDENTIFICATION		ECM Office use only	
Configuration Item Number: _____	Date: _____	<u> E </u> (ETA Number)	
Configuration Item Name: _____		<u> -CL </u> (Check List Number)	
II. MESKIT DELIVERY DESCRIPTION:			
III. HARDWARE AND DOCUMENTATION CHECKLIST (items in delivery):			
	<u>YES</u>	<u>NO</u>	<u>NA</u>
Item 1 Spares _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item 2 Maintenance Equipment (including test equipment, special tools, etc.) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item 3 O&M Manuals, Technical Manuals, and Maintenance Procedures (for maintenance equipment) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item 4 Two (2) sets of released, reduced drawings or ECIs for user documentation (for maintenance equipment) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item 5 Documentation List _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item 6 Two (2) copies of Test Procedures with test data sheets, if applicable. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Item 7 Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IV. SIGNATURES			
Quality Assurance at CDE location: _____		Date _____	QA Certification Number _____
QA Inspector:			
The personnel listed below agree that all items checked YES above have been provided in the MESkit.			
_____	Date _____	_____	Date _____
Cognizant Development Engineer		Operations Engineer	

DSN LIEN CLOSURE AGREEMENT

I. IDENTIFICATION

Configuration Item Number: _____ CI Title: _____

Check One:

- Check here if lien(s) to be closed administratively.
Requires all signatures except QA
- Check here if lien(s) to be closed.
Requires CDE and OE signatures. Requires QA signature on hardware delivery items.

Use separate form for Administratively closed liens and delivered liens

II. CLOSURE LIST

Lien Number	Description
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

III. ADMINISTRATIVE CLOSURE JUSTIFICATION

IV. QUALITY ASSURANCE (required to deliver hardware missing from a Modkit and/or MESkit)

QA Inspector:	Date	QA Certification Number
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V. CONCURRENCE

Cognizant Development Engineer	Date	Operations Engineer	Date
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VI. ADMINISTRATIVE CLOSURE APPROVAL

DSMS Implementation Engineering Manager	Date	DSN Operations Manager	Date
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Appendix C

Guidelines for Hardware Transfer Meetings

Purpose/Objective:

The hardware Transfer meeting evaluates the readiness of the hardware to be transferred to a DSN. The meeting is conducted at the hardware configuration item (usually assembly) level. This meeting occurs before the Consent-To-Ship (CTS) meeting for the first article (FA) of a hardware configuration item. The Transfer meeting can be combined with the FA CTS meeting, if the CDE and OE agree that to be more efficient. Agenda items for both meetings **must** be addressed at a combined meeting.

This **must** be a ‘real’ meeting (not teleconference) at the CDE/development location. It is scheduled by the CDE before the shipment of hardware assemblies to Operations, and after first article hardware acceptance testing (unless this testing **must** be done on-site). Successful completion of this meeting results in an ‘initiated’ ETA, which is prerequisite to shipment, installation, and operational use of the hardware assemblies.

Key Participants:

Responsible Individual:	Cognizant Development Engineer (CDE)
Team Members:	Task Manager
	DSN Operations Manager
	Operations Engineer (OE)
	Quality Assurance Representative
	DSMS Implementation Engineering Manager (Office 940)
	DSMS/DSN Safety Engineer, if required
	Others, as required

Meeting Input:

Page 1 of the ETA **must** be completed for this meeting, and all required ETA attachments. Documentation referenced on the ETA should be available at the time of the meeting.

Meeting Agenda:

Using the completed ETA as a guide, the hardware configuration item (assembly) is reviewed for readiness for transfer and delivery. The availability of documentation needed to install and operate the hardware is verified. Missing or unreleased documentation (such as, Installation Procedures) are documented as liens on a DSN Lien Submission Worksheet (LSW).

Meeting Output:

The output of this meeting includes Lien Submission Worksheets and the initiated ETA form signed by the CDE and OE.

Appendix D

Guidelines for Consent-To-Ship (CTS) Meetings

Purpose/Objective:

The CTS meeting evaluates the readiness of a hardware modkit to be delivered to a DSN operational site. The shipment cannot occur until the meeting is successfully completed. The first article CTS meeting may be combined with the transfer meeting, if the CDE and OE agree that this is the most efficient approach.

The first article CTS meeting should be held at the CDE/development location (not via teleconference). It is scheduled by the CDE before the shipment of hardware assemblies to operations, and after the first article has completed hardware acceptance testing (unless that testing is planned to occur on-site).

CTS meetings subsequent to the first-article shipment may be via teleconference. QA inspects the hardware before it is shipped to DLF.

Key Participants:

Responsible Individual:	Cognizant Development Engineer (CDE)
Team Members:	Operations Engineer (OE)
	Quality Assurance Representative
	Others, as required

Meeting Input:

The EDCL with Sections I through IV completed is required for this meeting, as well as all required attachments to the EDCL. It is recommended that QA inspect the hardware prior to the meeting, and sign/stamp the EDCL.

Meeting Agenda:

Using the EDCL as a guide, the readiness of hardware modkit for delivery and installation is confirmed. The availability of released documentation needed to install and operate the hardware is verified. Missing items or incomplete activities (such as First Article Acceptance Testing) are recorded as liens on a DSN Lien Submission Worksheet (LSW). The OE **must** confirm the readiness of the applicable facility to receive the shipment.

Meeting Output:

The output of this meeting includes Lien Submission Worksheets and the EDCL form signed by the CDE and OE, and signed/stamped by QA.

Appendix E

Guidelines for DSCC Satisfaction Assessment Meetings

The purpose of the DSCC Satisfaction Assessment Meeting (DSAM) is to ensure that Operations personnel at the subject facility have an opportunity to express any concerns about the delivery, and to assign new liens and action items relative to resolving these concerns. The DSAM is required for the first installation of major modifications at each facility (e.g., DSCC). Key participants in an DSAM meeting are:

- Task Manager**
- CDE**
- OE**
- Office 930/JPL Representative**
- DSCC Operations Manager**
- DSCC Engineering Manager**

The recommended agenda for these meetings is:

- 1) Validate the status of installation relative to:
 - ECO status in ECM database
 - Transfer Agreement Status
 - Modkit Installation and Testing Results
- 2) Discuss in detail the Operations view of
 - Functional anomalies
 - Spares Availability
 - Training Status
- 3) Review all open liens, applicable to the specific DSCC
 - Identify and document new liens
 - Identify liens that can be closed
- 4) Assign action items for activities not appropriate as formal liens

A meeting report should be generated, including an agreement that when specified Action Items and Liens are closed, the facility manager will be satisfied that proper operation and maintenance can occur at the site. The liens (and/or action items) are resolved in Step 10 of the Modkit Procedure (see 4.2.10).

DSAM meetings relative to minor tasks are recommended, but not required. For these meetings, the same agenda as outlined above can be followed.

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