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RESULTS OF THE INVESTIGATION OF THE NAVAL CONSTRUCTION FORCE (NCF) INFORMATION TECHNOLOGY WORKING GROUP

by

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May 2001

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The Working Group focused on the IT systems to support TOA management and current Navy IT systems used by the Fleet. Data was collected by interviewing and issuing data calls to NCF operators. Subject matter experts were used to obtain detail information concerning specific IT systems.

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EXECUTIVE SUMMARY

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Based on initial investigations, migration of NCF to a fully implemented logistics IT solutions will be an intensive effort. This effort will require a complete mapping of NCF business processes, will involve numerous activities and likely require a multi-workyear effort. This effort should include:

- Map current and desired NCF logistic business processes
- Document the maintenance and material management (3-M) business process currently being employed by Amphibious Construction Battalion TWO (ACB2)
- Further investigate the processes and capabilities of MicroSNAP modules
  - Investigate the capabilities of CTS module to determine applicable NCF employment (i.e., management of augment tools)
  - Further investigate the differences and similarities between MOSS and OMMS modules
  - Determine feasibility of creating a direct link between MOSS and OMMS in order to support the SCLSIS loop
  - Complete a business case analysis of CESE maintenance procedure to determine how current business practices can be modified to support use of OMMS
  - Investigate the capability of capturing ERO historical data within MOSS
    - Determine who would benefit from the capturing of this data
    - Determine what business practices are in place to use this data, what are the data fields captured, who would use it, and where would this data be maintained
- Further investigate the processes and data flow required for migration to the Navy standard configuration, logistics, and supply systems

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BACKGROUND

The Naval Facilities Engineering Service Center (NFESC) is located on the Naval Base Ventura County (NBVC/PH), Port Hueneme, California. NBVC/PH is home port to the Pacific Seabees and home to Naval Construction Battalion Center (CBCHUE). CBCHUE was formerly known as the Seabee Logistics Center (SLC). CBCHUE's primary mission is to provide centralized logistic support to the Naval Construction Force (NCF) worldwide. This includes specialized engineering, acquisition, information technology, logistics support, and material maintenance to the NCF, Amphibious Force, and to other operating units.

NFESC has been working on various asset information technology programs sponsored by the Office of Naval Research (ONR) and the Marine Corps Systems Command, Amphibious Warfighting Technology Directorate (MARCORSYSCOM AWT). The program's objectives are to develop, test, and evaluate the hardware and software components that will enable Navy and Marine Corps forces to track and monitor equipment and supplies as they move to and from various points of embarkation and debarkation.

In June 2000, the NCF Command, Control, Communications, Computer and Intelligence (C4I) Quality Management Board (QMB) formally established the NCF Information Technology (IT) Working Group, under the leadership of the NFESC with supporting roles from SLC and both Naval Construction Brigades (NCB). The goal of the Working Group was to harness the ideas and energy of the various initiatives and serve as the subject matter experts on how best to continue data management system development.

CBCHUE formally tasked NFESC to provide analysis and planning in support of the Naval Construction Force (NCF) Logistics Information Technology (IT) systems. The effort was in direct support of the NCF C4I QMB efforts to assist the NCF Logistics QMB in improving the NCF logistics systems. The Working Group was the conduit for ensuring the taskings were accomplished. The statements of work issued to the NFESC are shown in Appendix A and Appendix B.

Initial tasking was focused on establishing the baseline of current IT systems used by the NCF. As the Working Group began meeting and performing investigation, taskings were further refined to focus on two main capabilities: TOA management and operational logistics. The first area of investigation for TOA management was the MicroSNAP enhancements being developed by the Second Naval Construction Brigade (2NCB) specifically addressing TOA management. This investigation also included the Weapons Systems File and Configuration Data Management procedures. The second area of focus was the link between the Maintenance and Operations Support System (MOSS) and Organizational Maintenance Management System (OMMS) modules of MicroSNAP.

This report documents the findings resulting from investigations performed from May 2000 until November 2000. Supporting documentation resides in the Appendices C through O. Further information may be obtained by contacting the NCF IT Working Group members.

NCF IT Architecture Mapping

The initial area of investigation was to develop an IT architecture map demonstrating the current state of NCF data management. The NCF IT systems have been characterized as being

partially implemented Navy systems, lacking of comprehensive functionality, relying on legacy or "home grown" systems, and lacking integration between systems. The IT architecture map was to show all current software, which applications are linked and sharing data, and which ones are currently under revision or being replaced. A data call was issued to functional users of NCF IT systems users to determine the current status. Functional users submitted input sheets. Once the programs were identified, the subject matter experts of each program were identified. A data collection sheet was developed to gather in-depth capabilities and data structure from each program identified.

The identified software programs currently in use are listed in the tables in Appendix C. For the most part, each software solution creates an island of data. There is minimal interconnectivity among databases. The investigation of software applications shows that there are various database "families" employed across the NCF. For example, MicroSNAP uses both DOS- and Windows-based platforms with FoxPro database. NCFMIS resides within a mainframe in a DataComm database. Homegrown systems are generated using Microsoft Access or Excel. The more recently implemented or developed programs, such as Maximo, PISTOL, and Construction Battalion Construction Management (CBCM), employ open architecture format for data. Although not currently established, interconnectivity in the future is easily obtained due to the open database structure. This wide variety of data warehousing validates the fact that there is no common IT approach within the NCF for gathering and storing data.

In particular, the NCF does not have a single source of TOA data. Civil Engineer Support Equipment (CESE) data is centrally located and maintained; however, non-CESE data is fragmented among the brigades, regiments, and battalions. TOA management is accomplished through the use of battalion or NCB developed spreadsheets and databases, which do not readily import or export data. These "islands of data" prohibit data access, visibility, and reporting; limit analysis capabilities to determine requirements; and do not allow for automatic procurement within the Navy Supply system.

MICROSNAP INVESTIGATION

The next area of investigation was the Navy Supply software, MicroSNAP. SPAWAR Chesapeake was funded by the Second Naval Construction Brigade (2NCB) to produce a software requirements specification (SRS) detailing the enhancements required in MicroSNAP to allow for management of the TOA at the field level. Embedded in the investigation were the research of the Weapons Systems File (WSF) and the establishment of a Configuration Data Manager (CDM). The CDM provides data to the Configuration Data Manager Database – Open Architecture (CDMD-OA).

MicroSNAP modules

MicroSNAP is a suite of software modules developed, owned, operated, and maintained by SPAWAR. Users pay for yearly life cycle support costs. The following are brief descriptions of the individual MicroSNAP modules:

- **SFM** (Supply and Financial Management) manages material requirements, requisitions, receipts, inventory, and financial data. This module can be a stand-alone application or

placed on a LAN. SFM is installed at 57 sites within the NCF. SFM is a DOS-based program. SFM Windows prototype was installed at 2NCB and CBU 411 in October 2000, for a 60 to 90 day evaluation.

- **SMS** (System Management Subsystem) maintains site configuration and user access, and is the backbone of all MicroSNAP applications and must be present for any other modules to operate. Therefore, it is installed and operational at all MicroSNAP SFM sites. SMS is a DOS-based module, which will need to be upgraded to a Windows-based version to support the SFM Windows version.
- **OMMS** (Organizational Maintenance Management System) manages and helps control organizational-level equipment configuration, maintenance, and associated logistics support data. This data enables overall visibility and evaluation of the key factors associated with maintenance and material management, such as equipment reliability, maintainability, availability and condition; part demand data; and maintenance man-hours. A more detailed description of OMMS' capabilities follows.
  - Provides the Naval Sea Systems Command (NAVSEA) an authorized means of automating reporting procedures related to ships' maintenance and material management (3-M) requirements in accordance with OPNAVINST 4790.
  - Receives and sends data and reports between sites participating in the ship configuration and logistic support information system (SCLSIS) data flow loop.
  - Produces a wide variety of standard or tailored reports providing equipment configuration, equipment maintenance, logistics support data, APL, and COSAL information.
  - Facilitates proper accounting of installed, removed, modified, or relocated pieces of equipment, and maintains equipment, Allowance Parts List (APL), and Consolidated Shipboard Allowance List (COSAL) data.
  - Documents and monitors repairs and changes to existing equipment.
  - Supports maintenance functions and generates standard Navy reports.
  - Provides capability to order parts (also provides direct interface with the Micro SFM subsystem).
  - Provides the capability to process externally generated maintenance actions.
  - Provides the capability to generate and manage work packages.

  This module is required to operate within the SCLSIS loop if the 3M maintenance philosophy is employed. It is an integral part of the SCLSIS loop, by feeding data to the CDM to the CDMD-OA to the WSF. OMMS automates the 3M (maintenance and material management) tracking and reporting system using the 2K (ship's maintenance action) and CK (ship's configuration change form) forms. NCF units do not currently employ OMMS. However, OMMS is being evaluated at Amphibious Construction Battalion (PHIBCB TWO). OMMS is a DOS-based program, with a Windows version in development.
- **MOSS** (Maintenance and Operations Support System) manages vehicle inventory, maintenance, and operations; schedules preventive and corrective maintenance. MOSS provides a seamless interface with SFM if operating on the same hardware, i.e., PC workstation or LAN. Otherwise data exchange is via external methods, i.e., floppy disk,

e-mail. MOSS is not capable of reporting into the CDMD-OA. All data is maintained on a local level. MOSS was developed specifically for the NCF to manage CESE maintenance. In 1994, a study determined the OMMS would not meet requirements of the NCF to mange CESE. MOSS was developed in response to OMMS not meeting the business process requirements of the NCF (See Appendix D). MOSS generates an equipment repair order (ERO) as the authority to perform work on equipment. The ERO is used to track the type of repair for a vehicle and documents total hours for direct labor, indirect labor, and inspection. In addition, MOSS is uniquely capable of providing equipment operations and equipment dispatch functions; however, it currently does not track NCF licensing. MOSS is a Windows-based module.

- **CTS** (Custody Tracking System) automates the issue, turn-in/rotatable pool, and custody tracking processes. CTS is an add-on to the SFM module. CTS was developed and funded by SPECWAR, as a result of requirements to manage organizational clothing. CTS is currently installed at 3NCB and Gulfport for use by the TOA managers. CTS is not currently used by battalions. However, each regiment is allowed up to five sites with no additional life cycle support costs. It was not determined to what extent CTS is currently used. CTS could be used to manage augment tools, since they are not managed in a hierarchical structure. CTS is a Windows-based module.
- **APEX** is not a MicroSNAP module, but allows web viewing of MicroSNAP information. APEX is a centralized data repository providing claimancy-wide query capability. It collects data from application processing sites, transmits data to a collection facility, and stores the data on an Internet/Intranet web server for easy access by authorized users. This data can be queried over an Intranet or the Internet, thus providing visibility and a consolidated "snapshot" of operating sites' data. Must use web browser to use APEX. The Windows version of APEX is currently being beta tested at 2NCB. There is an initial cost for setting up the web server, training, and data load on the system to initialize use of APEX. APEX requires an annual life cycle support fee. Any enhancements are funded by the user recommending the changes.
- **TOAMS** (Table of Allowance Management System) application is beginning to be developed. When fielded, it is predicted to manage the NCF TOA and track inventories throughout their life cycles. Ultimately, the completed TOAMS application will integrate with other MicroSNAP applications (SFM, SMS, MOSS, OMMS, and CTS) and external interfaces (APEX). This integrated system will handle supply, maintenance, and TOA management. Development of this module began in July 1999, with funding from 2NCB. TOAMS will be a Windows-based module.

TOAMS Software Requirements Specification (SRS)

SPAWAR developed an SRS, which is scheduled for final approval in second quarter FY01. The MicroSNAP TOAMS SRS follows these guiding principles:

1. Conforms to current NAVFAC conventions.
2. Provides functionality that currently does not exist.
3. Shares/exchanges data where such requirement exists rather than duplicate it.
4. Usable by ALL TOA holders, not just an NMCB or NAVFAC unit.
5. Requirements are derived from:

a. NAVFAC, NAVSUP and NAVSEA instructions, publications and manuals.
b. Other related instructions (example 2/3NCBINST 4400.3).
c. Commonly accepted CB cultural practices.
d. Direct observation and participation in the involved processes.

The TOAMS SRS defines the requirements needed to automate the TOA management function. The application described in the SRS will be a Windows-based application that will record, analyze and report the status of a particular unit's TOA. The application will support planning and budgeting; inventory control; and asset management. The application will use both data currently stored in existing MicroSNAP applications and several new data elements specific to the TOA. It was determined since MicroSNAP TOAMS will share data with multiple MicroSNAP application, it was best to create a new application. Since TOAMS will depend on other MicroSNAP applications, it is important that the latest releases of all MicroSNAP applications are used for site-specific TOAMS configurations. Failure to use up-to-date releases may interfere with the seamless interface between modules.

The TOAMS effort began when StoreKeepers (SK) assigned to the NCF identified the lack of a TOA management system. The SRS was developed to address the needs of the SKs managing the TOA as well as TOA operators. A concise effort was undertaken to gather requirements needed to manage a TOA. The first step was to identify all personnel and functions which "touch" the TOA. These individuals were called "process owners." In addition, interviews with current Battalion personnel were conducted. A cross-section of personnel from Camp Moscrip was interviewed for input. However, the SRS does not consider the requirement for maintaining an organic unit embarkation capability, or support materials required for construction Materials Liaison Office(MLO).

The final TOAMS SRS should provide the full definition of requirements necessary for the field level units to perform all operation objectives as envisioned by the NCF. If developed correctly, the SRS should support the development of software to support field-level TOA asset management, regardless of the platform in which the programming code is developed.

TOAMS Cost and Timeline

As part of the final SRS, functional capabilities for TOAMS will be prioritized by criticality. It is probable that implementation will be in phases based upon the priority of functionality. Costs to develop the complete TOAMS software were estimated by SPAWAR at $750,000 and a timeline of 18 months. This estimation was considered conservative and subject to revision once the final SRS is accepted. According to SPAWAR, a draft POA&M has been completed. The final POA&M will be completed after the functional priorities are determined and the SRS is accepted. It is anticipated the SRS will be finalized in CY 2001.

CURRENT STATUS OF MICROSNAP WITHIN THE NCF

SFM and MOSS are the only modules that are currently used by the NCF. Connectivity between the two modules does not currently exist. Information generated in MOSS is "re-entered" in SFM. Similarly, data generated in SFM is "re-entered" in MOSS.

Life cycle costs for SFM are funded on a yearly basis and paid for by each brigade's mission management funds. Costs depend on the number of sites utilizing SFM. MOSS was a NAVFAC funded program. All modifications and upgrades are the responsibility of the NCF, since they are the sole organization that uses MOSS. Since MOSS is a NCF specific module of MicroSNAP, further enhancements to MOSS are expected to be funded by NAVFAC/CBCHUE. Proposed upgrades to MOSS in the near future are incorporating NCF licensing and providing a MOSS/OMMS link. The costs/time frame/availability of funding to accomplish these tasks are unknown at this time.

One utility untapped by the NCF is historical ERO data captured by MOSS. It is probable that if this function were not used, it would be phased out of future versions of this module.

To implement any other modules of MicroSNAP will cost money and time. SPAWAR Chesapeake provided an initial verbal estimate for installation and support of OMMS. The cost estimate is $138K to install OMMS at all current SFM sites. Annual life cycle support fees will be determined by SPAWAR at a future time. Preliminary discussion indicates life cycle cost currently paid to support the SFM module only will increase to provide support for the OMMS module.

Weapons System File (WSF) and the Ship Configuration and Logistics Support Information System (SCLSIS)

The WSF serves as a repository for information provided during the provisioning process. It consists of two sets of databases: WSF and CDMD-OA. The WSF is further divided into three separate database files: Level A, Level C, and Master Item File (MIF). Level A relates Ship Unique Identifier Code (UIC) to Allowance Parts List (APL) or Allowance Equipage List (AEL). Level A also contains the ship's configuration data. Level C relates the APL/AEL to parts and contains equipment configuration and technical data. There also appears to be a Level B within the WSF. Additional information on Level B is discussed later.

CDMD-OA database is a central repository for configuration management data. Data is updated electronically by the CDM via MicroSNAP OMMS module, which automatically updates WSF Level C. CDMD-OA relies on a hierarchical structure code (HSC), which is a 12-digit code that functionally identifies the equipment within the system. The code is based on the expanded ship work breakdown structure and relates directly to an APL/AEL number.

The provisioning process provides the following information: equipment configuration, inventory management, maintenance significant parts, and technical coding. WSF provides all supply and maintenance information registered against the UIC based on configuration input. It also includes repair parts, special tools, and support items required for the operation; overhauls; maintenance; and repair of installed equipment within the units' maintenance capability.

Data residing in the WSF drives configuration management. Updates and retrieval of data from the WSF are an integral portion of the SCLSIS loop, which includes MicroSNAP OMMS, MicroSNAP SFM, Configuration Data Manager Database – Open Architecture (CDMD-OA), 3-M database, and the Automated Shore Interface (ASI). ASI accepts externally generated transactions that update both MicroSNAP OMMS and MicroSNAP SFM databases to ensure synchronization with authorized shore-based data managers. The objectives of SCLSIS are to establish and maintain accurate configuration and associated logistic support information for

critical systems within the Navy. Pictorial representations of data flow within the SCLSIS loop are provided in Appendix E.

Currently, the only portion of the WSF utilized by the NCF is Level B, which houses CESE APL data. Level B originally was designed to relate the systems to the equipment, and is not actively used within the SCLSIS loop. Updates to the CESE APL data are entered manually by NAVICP via requests submitted by CBCHUE.

Because NCF does not use MicroSNAP OMMS, it is outside of the SCLSIS loop. In order for the NCF to participate in the WSF and the SCLSIS loop, MicroSNAP OMMS will need to be deployed. The following must be considered, as a minimum:

a. Establishment of a Configuration Data Manager(s) (CDM)
b. Development of hierarchical structure codes for TOA assets
c. Establishment of TOA asset databases within WSF, each UIC requires a unique database
d. Independent validation of TOA asset information
e. Determination of number of OMMS sites to be established

Due to the complexity of the SCLSIS loop, all the mechanisms to complete the SCLSIS loop have not been identified by the NCT IT Working Group. If the NCF decides to utilize the WSF, further investigation is required prior to developing an implementation plan. Preliminary associated costs related to the CDMD-OA, MicroSNAP OMMS, CDM, and Automated Shore Interface are provided in Appendix F.

RECOMMENDATIONS

1. Further investigate the processes and data flow required for migration to the Navy standard configuration, logistics, and supply systems.

   If the SCLSIS loop is to be implemented, further investigation is required. Once the complete SCLSIS loop is understood, mapping of NCF business process relating to the process can begin. Once business processes are agreed upon, a migration plan can be developed. Based on initial investigations, migration to a fully implemented SCLSIS loop business process will be an intensive effort. The effort will involve numerous activities and likely require a multi-workyear effort. A possible source to provide cost, time, and benefit estimates of the WSF is the Fitting Out and Supply Support Assistance Center (FOSSAC), which specializes in providing Naval forces with supply-related engineering, training and support services. Their web site address is http://www.norfolk.navy.mil/price_fighters/fossac/index.htm.

2. Fully map current and desired NCF logistic business processes.

   An intense investigation of NCF business practices in mission and logistics support will assist in identifying the IT systems that enhance the processes. After business practices are mapped, IT systems can be identified to enhance capability and an IT investment plan can be developed.

3. Document the 3-M business process currently being employed by PHIBCB TWO.

3-M is a well-established philosophy within the Navy community. Documenting and understanding the processes that are evolving at PHIBCB TWO will facilitate mapping and implementing NCF business processes.

4. Further investigate the processes and capabilities of MicroSNAP modules
   a. Investigate the capabilities of CTS module to determine applicable NCF employment (i.e., management of augment tools). CTS is capable of tracking issue/return of assets. The NCF is currently lacking a management tool for augment tools. Since augment tools are not managed in a hierarchical structure, CTS may have the capability to meet this function. Each Regiment is allowed up to five sites with no additional life cycle support costs.
   b. Further investigate the differences and similarities between MOSS and OMMS modules.

      Document the direct "cross-over" of data elements between MOSS and OMMS. Appendix G contains data record comparison between OMMS A-1 record and ERO. This record comparison is only one small aspect of the data comparison that needs to be documented.
   c. Determine feasibility of creating a direct link between MOSS and OMMS in order to support the SCLSIS loop. SPAWAR is aware of the need for the MOSS/OMMS link, and has put this requirement high on its proposed enhancement list for MOSS. However, the costs/time frame/availability of funding are unknown at this time.
   d. Complete a business case analysis of CESE maintenance procedure to determine how current business practices can be modified to support use of OMMS.
   e. Investigate the capability of capturing ERO historical data within MOSS. The MOSS module captures historical data. However, at present time data are deleted from the system. First step would be to determine who would benefit from the capturing of this data. The next steps would be to determine what business practices are in place to utilize this data, what are the data fields captured, who would use it, and where would this data be maintained.

5. Employ a disciplined process to facilitate the NCF Logistics IT solution. Detailed processes are employed in current software development. Problem definition and requirements should be defined in detail in order to employ a software solution that meets the needs of various levels of logistics supports. A point paper on the subject of software construction is contained in Appendix H.

APPENDIX A

SOW for DOC N6258300WR40072

1. Provide engineering and program support for the development of NCF Logistics Information Technology (IT) Initiative. This effort will include:

   - Define current NCF software, including POCs, where installed and operating capabilities and requirements met.
   - Identify current IT initiatives
   - Establish NCF IT IPT
   - Identify areas that require MC connectivity
   - Define preliminary requirements for the NCF IT System
   - Propose NCT IT Investment Plan

2. Advise SLC and IPTs of opportunity with MC asset information and asset visibility under development at the ESC

3. Continue to provide engineering and program support of the ABFC program.

APPENDIX B

SOW for DOC N6258300PO40002

Provide continued analysis and planning in support of NCF Information Technology (IT). This effort will be in direct support of the NCF C4I QMB efforts to assist the NCF LOG QMB in improving NCF Logistic Systems. To include but not limited to:

1. Validate current MSNAP capabilities. What is it doing for us today? What is it doing for others that we don't use?

2. Research cost and time to expand MicroSnap capabilities. What do the 2NCB funded MicroSnap enhancements give us? What NCF business processes need to change as a result? What other obvious enhancements could be made?

3. Make specific recommendation back to LOG QMB/ESG on increased use of MicroSnap.

4. Prepare detailed cost estimates, SME and management resource recommendations, and proposed timelines to develop an NCF Maximo TOA Management capability (to include synchronization with existing Navy financial and supply systems.)

5a. (LOG QMB tasking) Identify available FY01 funding for software development.

5b. (C4I) develop plan for obligating FY01 funding. Provide justification for FY02 and out year funding.

APPENDIX C

NCF Software Spreadsheet

SOFTWARE ACRONYM/NAME	PURPOSE/ CAPABILITIES	FUNDING	STATUS	COMMENTS	FUTURE CAPABILITIES	PLATFORM/ SYSTEM	DATA FILE TYPE	AGENT/POC
MAXIMO http://ncf.navfac.navy.mil/c4iqmb/business/Related_Links/MAXIMO/MAXIMO_Status.htm	Replaces SAMMS Camp Maintenance	NAVFAC	Install in Okinawa/ Puerto Rico Guam/Rota next	Version 4.01 all modules w/ complete functionality Currently client server based but will eventually be a WEB based data warehouse	Replace other SAMMS modules Interface with ABFCView and Timberline (Not funded - like to have)	MAXIMO	Oracle or Sybase	NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
PISTOL Personnel Information System for Training Operations and Logistics http://ncf.navfac.navy.mil/c4iqmb/business/Related_Links/PISTOL/train.htm	Replaces SAMMS Personnel/Admin/Training	NAVFAC	NMCB 4 and 7 now using Installation/training underway Users' Guide and SOP developed	Connectivity issues for deployed camps (firewalls) Acceptance by the NCF (home-grown databases)		Open architecture	Oracle	NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil Implementation managers: CUCM Dickey 31st R72 SWCS Halsey 20th R71
CBCM Construction Battalion Construction Management http://ncf.navfac.navy.mil/c4iqmb/business/Related_Links/cbcm.htm	Construction project mgmt (planning; estimating; tracking; developing safety, QC, and envr plans) Produce Fast Plans and Level of Effort projects (req in contingencies w/ minimal data or time for detailed efforts)	3rd NCB	Implementation in progress 6.0 beta test 02/00 Contract compl 06/00	Replaces CBCM 2.1 (DOS-based) NCF C4I QMB provided requirements for the development of this application		Open architecture	Microsoft Access	SLC / Monitor Systems Inc LT Thomas Mitoraj or UCCM Mrsny MitorajTJ@cecos.navy.mil or MrsnyMJ@cecos.navy.mil
MATERIAL LIAISON OFFICE (MLO) http://ncf.navfac.navy.mil/c4iqmb/business/Related_Links/mlo.htm	Inventory management of construction material. Replaces SAMMS MLO. System imports data from BOM - Timberline	C4I QMB	Prelim Beta version distr for test Feb00-Mar00. Beta 2 version to be out around 7-31-00.	$50K invested. Needs around $25K to finish. Program is around 95% functional.	Import data from SAMMS MLO	Visual Basic / Access	Microsoft Access	31st NCR Nick Kozin kozinn@thirdncb.navy.mil Cassell Consulting
BILL OF MATERIAL (BOM) / TIMBERLINE http://ncf.navfac.navy.mil/c4iqmb/business/Related_Links/timberline.htm	Accounting/estimating of construction material for BOMs Replaces SAMMS BOM	3rd NCB	Program in use at both Naval Construction Regiments (NCRs)	$100K invested. Program is a COTS. Exports BOMs to new MLO program.	To deploy to other units will require additional licenses which may be expensive according to 31ST NCR.	Timberline Precision Collecting	Microsoft Access	31st NCR Nick Kozin kozinn@thirdncb.navy.mil Timberline
MICROSNAP Microcomputer Shipboard Nontactical ADP Program http://apex.massolant.navy.mil/microsnap/	Consists of the two major modules which are SFM - Supply Financial Module and OMMS - Operations & Maintenance Management System	SPAWAR	Currently used by the NMCBs. Replaced SAMMS OPTAR program		2NCB has a contract with SPAWAR for $100K for a MicroSnap - TOAMS initiative	FoxPro	dBase	SPAWAR Gerry C. Lynch glynch@massolant.navy.mil
SFM (MicroSnap) Supply and Financial Management Subsystem http://www.massolant.navy.mil/mic-snap/mic-snap2.htm#SFM	Material requirement, requisition, receipt processing; inventory mgmt; budgeting/financial reporting; subsystem mgmt	SPAWAR	Software is deployed			FoxPro	dBase	SPAWAR Gerry C. Lynch glynch@massolant.navy.mil
***OMMS** (MicroSnap)* *Organizational Maintenance Management Subsystem* http://www.massolant.navy.mil/mic-snap/mic-snap2.htm#OMMS	Equipment configuration mgmt, maintenance mgmt, log support data mgmt, automated shore interface processing, upline reporting, subsystem mgmt	SPAWAR	Software is deployed	Not used by NCF.		FoxPro	dBase	SPAWAR Gerry C. Lynch glynch@massolant.navy.mil
MOSS (MicroSnap) Maintenance & Operations Support System http://ncf.navfac.navy.mil/slc/log%20Moss.htm	Equipment maintenance & operations support Replaces SAMMS EO/EM NCF equivalent to OMMS	NAVFAC/SLC	Prototype testing completed. Installation schedule dependent on POCs	MOSS will be the NCF equivalent to OMMS	Supply Financial Module Future modifications	FoxPro	dBase	SLC Don Curtis/Judy Takahara curtisdr@slc.navfac.navy.mil

NCF Software Spreadsheet (Continued)

SOFTWARE ACRONYM/NAME	PURPOSE/ CAPABILITIES	FUNDING	STATUS	COMMENTS	FUTURE CAPABILITIES	PLATFORM/ SYSTEM	DATA FILE TYPE	AGENT/POC
APEX (MicroSnap) http://www.scn.spawar.navy.mil/product2.htm	Web-based data repository for data from MICROSNAP	SPAWAR	Currently available	Once MICROSNAP - TOAMS developed, TOA data will be uploaded to APEX				2NCB Cdr Grau graucv@2ncb.navy.mil SPAWAR Gerry C. Lynch glynch@massolant.navy.mil
INITIATIVE **TOAMS** (MicroSnap) Table of Allowance Management System http://ncf.navfac.navy.mil/slc/system%20toams.htm	Visual load diagramming, kitting, packing management, asset visibility and comparison, Integrated Logistics Overhaul, system interfaces	2nd NCB Initiative	Currently in requirements / functional analysis phase	Module would interface with MICROSNAP SFM and provide data to APEX				2NCB Cdr Grau graucv@2ncb.navy.mil
TC AIMS II Transportation Coordinators' Information for Movement System http://www.tcaimsii.belvoir.army.mil/	DoD system for asset identification for unit movement and possible management. Based on MAGTF MDSS II	DoD joint services program	Interface link from NCFMIS currently being tested	Should provide asset visibility. Program is supposed to replace unique services programs		Open architecture	Sybase	US Army/ Ft Belvoir Karenda Bernal Maj Jim Brundage brundje@hqda.army.mil
NCFMIS Naval Construction Force Management Information System http://ncf.navfac.navy.mil/slc/ncf%20mainframe%20sys.htm	Includes CASEMIS, CESMIS, and SUPMIS	NAVFAC	Fully developed application Maintenance only			Mainframe DMC Mechanicsburg	DataCom dB	SLC Don Curtis curtisdr@slc.navfac.navy.mil NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
CASEMIS (NCFMIS) Construction, Automotive & Specialized Equipment MIS http://ncf.navfac.navy.mil/slc/ncf%20mainframe%20sys.htm	Equipment asset mgmt budget, procurement, inventory	NAVFAC						SLC Don Curtis curtisdr@slc.navfac.navy.mil NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
CESMIS (NCFMIS) Civil Engineer Support MIS http://ncf.navfac.navy.mil/slc/ncf%20mainframe%20sys.htm	NCF requirement mgmt, packing plans, TUCHA data	NAVFAC						SLC Don Curtis curtisdr@slc.navfac.navy.mil NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
ABFC/TOA View (CESMIS) Advanced Base Functional Component View http://ncf.navfac.navy.mil/slc/AbfcToa%20config.htm	Provide Web-based view of ABFC / TOA data at the Section, Facility, Assembly and NSN levels	NAVFAC	Collecting feedback from users and making more user-friendly	Data is extracted from CESMIS		Developed using Cold Fusion	Oracle	SLC Don Curtis curtisdr@slc.navfac.navy.mil NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
SUPMIS (NCFMIS) Supply MIS http://ncf.navfac.navy.mil/slc/ncf%20mainframe%20sys.htm	Material asset mgmt Repair parts, tech manuals FIR and cost accounting PWRMS and Brigade Final Title assets located at CBCs	NAVFAC						SLC Don Curtis curtisdr@slc.navfac.navy.mil NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
CBC Containerization (SUPMIS) ???	Barcoding / scanning containers Receipt, pack, stow record Interface w/ SUPMIS and CESMIS	SLC/NAVFAC		Data is exchanged from SUPMIS		Clipper	dBase	SLC Don Curtis curtisdr@slc.navfac.navy.mil NITC Debbie Schultzel schultzeldh@nitc.navfac.navy.mil
NCF Readiness Reporting ???	Intranet stratification of TOA requirements to assets by unit.	SLC		Data is extracted from CASEMIS, CESMIS, and SUPMIS as well as manual input of forward deployed camp info			Microsoft Access	SLC Don Curtis curtisdr@slc.navfac.navy.mil

NCF Software Spreadsheet (Continued)

SOFTWARE ACRONYM/NAME	PURPOSE/ CAPABILITIES	FUNDING	STATUS	COMMENTS	FUTURE CAPABILITIES	PLATFORM/ SYSTEM	DATA FILE TYPE	AGENT/POC
MAGTF LOGAIS Marine Air-Ground Task Force http://mcsd.ala.usmc.mil/Magtf/MAGTFII.htm	Includes MDSS II, CAEMS, and TC AIMS	USMC	Version 5.2 Program is used by the Marines and is used for material loaded on MPF ships			Power Builder & C++	WATCOM Database	MARCORSYSCOM – Albany
MDSS II (MAGTF) MAGTF Deployment Support System http://mcsd.ala.usmc.mil/MAGTF/Mdssii.htm	Force and deployment data	USMC	Version 4.0/4.1/4.1a	SLC currently provides data from the Containerization program and NCFMIS which is then used for tracking MPF TOA Embarkation module exports data for use with CALM			WATCOM Database	MARCORSYSCOM - Albany
CAEMS (MAGTF) **Computer Aided Embarkation Management System** http://mcsd.ala.usmc.mil/magtf/Caems.htm		USMC					WATCOM Database	USMC Maj Augusto G. Cata cataag@hqmc.usmc.mil
CALM Computer Aided Load Manifest http://www.ssg.gunter.af.mil/calm/	Aircraft load plans and reports	USAF	Version 5.4	Imports MAGTF LOGAIS MDSS II embarkation module export data				Charles E. Madigan, MSgt, USAF charles.madigan@gunter.af.mil
INITIATIVE **Automated Tool Crib / Central Tool Room** No website	Automate NCF Central Tool Room	NAVSUP Initiative	On hold					NFESC Katy Lunsford lunsfordkp@nfesc.navy.mil
INITIATIVE **TOA Asset Bar Coding** No website	Bar coding for asset visibility (camps / 2 homeports) Check in & out TOA items to Seabees	3rd NCB N4 Initiative		Not related to "TOAMS"				SLC Don Curtis curtisdr@slc.navfac.navy.mil
INITIATIVE **Material Kitting System** http://www.cubiscan.com/	Automated freight handling, material handling, and warehousing systems where dimensional data must be rapidly and accurately obtained for use in computing shipment and logistics planning, storage space planning, material sorting	2nd NCB N4 Initiative		Cubiscan COTS System		QBITTM		2NCB Cdr Grau graucv@2ncb.navy.mil
INITIATIVE **Container Optimization** http://www.advanced-logistics.com/	Material packing plan - provides the best utilization of space, within weight specifications, with appropriate center of balance	2nd NCB N4 Initiative		Advanced Logistics Systems COTS System		Advanced Loading System		2NCB Cdr Grau graucv@2ncb.navy.mil

APPENDIX D

SAMMS EMS/MicroSNAP II MDS/OMMS Evaluation Report

Judith A. Takahara
CESO, Code 1572T
Nov 18, 1992

SAMMS EMS/MICRO SNAP II MDS/OMMS EVALUATION

1.0 PURPOSE:

The purpose of the evaluation is to analyze the differences between the **Micro SNAP II** **M**aintenance **D**ata **S**ubsystem **(MDS)**, more appropriately called the **O**rganizational **M**aintenance **M**anagement **S**ubsystem **(OMMS)**, and the **SAMM** **E**quipment **M**aintenance **S**ystem **(EMS)** and to determine the feasibility of utilizing MDS in the Naval Construction Force (NCF). There will be a requirement to interface the Civil Engineer Support Office COP AL data base with the Micro SNAP II System, for repair parts, which is much the same as the SPCC COSAL update feature of Micro SNAP II.

2.0 OBJECT:

The primary objective of the evaluation is to prepare a report that outlines the differences between these two systems, and how they relate to the CESE COSAL's. This report will ultimately be sent to the 2nd and 3rd Brigades for their review.

3.0 REFERENCES:

The following materials were used as references:

- CESO SAMM: Equipment Maintenance System and User Manual
- NAVMASSO Micro SNAP II MDS/OMMS Subsystem .MDS/OMMS Processing Flowchart
- Micro SNAP II MDS/OMMS Demo/Overview provided by NA VMASSO
- COMCBP AC/COMCBLANT Equipment Management Instruction 11200.1E
- SPCCINST 4441.170A
- CESO COSAL Maintenance Evaluation by Mr. Seth Johnson

4.0 EQUIPMENT MAINTENANCE SYSTEM BACKGROUND:

The SAMM Equipment Maintenance System is designed in accordance with the COMCBPAC/COMCBLANT Instruction 11200.1E, also known as the Red Book. EMS tracks a variety of information about all equipment (primarily CESE) assigned to the NCF and the

Special Operating Units (SOU's), including make, model, year, location, serial numbers, stock numbers, maintenance history, attachments, collateral equipment, maintenance scheduling, and repair parts requisitions.

EMS is a stand-alone system and is designed for use by CESE maintenance personnel. EMS interacts with the Equipment Operations System on a daily basis; however, the systems are designed to function independently. The use of two computers permits the equipment operations personnel and the equipment maintenance personnel maximum access to the systems needed to support their individual but related functions.

- **Software and Hardware Requirements:**

Software: *MS-DOS* -- EMS has been tested with *versions 3.3, 4.01, and 5.0* however other versions may also be suitable.

Hardware: *286/386/486* based computer with compatible monitor, and at least 2 megabytes of hard disk storage

Optional Network: NETBIOS compatibility. Tested on Novell Netware, Artisoft Lantastic, and 3Comm 3+ networks. EMS will probably work with other NETBIOS compatible networks. The SAMMS multi-user Bill of Material (BM) system, designed by Information Systems Technology Center (ISTC), has successfully run on Banyon Vines; so, I would assume that Banyon Vines would support EMS since both the EM and the EMS LAN versions were designed by Information Systems Technology Center (ISTC) using the same Data Driven system concept.

5.0 MAINTENANCE DATA SUBSYSTEM (MDS)/ORGANIZATION MAINTENANCE MANAGEMENT SUBSYSTEM (OMMS) BACKGROUND:

The Micro SNAP II MDS/OMMS subsystem, provides an on-line interactive **3-M** (Maintenance Material Management) system. MDS/OMMS is developed according to the 3M 4790.2 instruction and provides Maintenance and COSAL Support and Updates. The Navy utilizes the instruction 4790.2K (2 Kilo) to perform maintenance actions. The MDS/OMMS subsystem includes 3-M functions related to the current Ship's Maintenance Project Master (CSMP) database. This data base consists of Maintenance Data Collection System (MDCS) actions, Configuration Change (CK) actions, and Work Center Work List (WCWL) actions. The Maintenance Data Subsystem **is not** used by the 2nd and 3rd NCB units and no action has been taken to get any COSAL data transferred to it.

The Micro SNAP II system has been written to run in both stand-alone PC mode or in a multi-user mode on a NOVELL LAN with multiple file servers. It is also written to allow for multiple Unit Identification Codes (UIC).

MDS/OMMS is designed for operation with a minimum amount of dollars for repair parts inventory and support on a ship. MDS serves as a way to track the equipment related to the parts that break in the Fleet. This information is important because problems identified by one ship are often faced by other ships throughout the fleet using similar equipment.

MDS/OMMS essentially operates in almost a paperless environment, at least that is the intention; hence, not many documents need to be handled. The cost savings can be tremendous.

- **Software and Hardware Requirements:**

Software: MS-DOS 5.0, and FOXPRO/LAN Version 1.02 compiled to use FOXPRO runtime.

Hardware: *286/386/486 (386 is recommended)*, 2MB RAM, 9 track tape drive, 320 tape backup unit, and a 300 MB hard disk drive (minimum 260 MB).

Network: Certified to operate in a multi-user mode on a NOVELL LAN (with multiple file servers).

6.0 FUNCTIONAL EVALUATIONS:

There are major differences between the design of the Micro SNAP II MDS/OMMS Subsystem and the design of the SAMM Equipment Maintenance System. Because the two systems are very complex, only some of the major design differences where I see noticeable differences are documented. The comparisons that follow are derived both from the highest functional levels within the two systems, and from some of the detailed level functions and fields. Some of the major differences are as follows:

- **Maintenance Action tracking:**

It appears that maintenance actions in both Micro SNAP II OMMS/MDS and SAMMS EMS are tracked utilizing similar methods.

Micro SNAP II MDS/OMMS Maintenance Actions are assigned a Job Sequence Number (JSN). This is used in association with the Work Center to track the maintenance action. The work center is pre-filled with the user's primary work center. The work center and JSN are combined to create the Job Control Number (JCN).

SAMMS EMS assigns an Equipment Repair Order Number (ERO #). The first four characters of the JSN are two alpha characters, followed by two numeric characters, such as AA00. The last four characters of the ERO number are a locally assigned JSN, which runs continuously from 0001 through 9999 for rotating and non-rotating units, with no regards for end of fiscal year or NMCB BEEP.

- **Generate an Equipment Repair Order (ERO):**

SAMMS EMS *prepares and utilizes the ERG as the sole authority to perform work on equipment in the following categories:* scheduled maintenance (PM), interim repairs exceeding 1.0 man-hours or which require repair parts, modernization or alteration of equipment, and deadline cycling or preservation of equipment. The *ERO* is used to track the type of the repair for a vehicle, and document and total the hours for direct labor, indirect labor, and inspection, which equates to the total time an item of equipment is out of service.

Indirect labor is how much time it takes for everyone involved in the preliminaries for the repair and before the actual repair is done. The following people would charge their time to indirect labor: Inspector, Tech Librarian, DTO Clerk, PM Clerk, and Parts Expediter. Direct Labor accounts for the mechanics time.

Other items listed on the ERO (but not limited to) are: ERO number, USN/ID number, equipment cost code, activity UIC, job order number, location/allowance, type repair, meter readings, make, engine mfg., engine model, chassis serial number, function code, work description, pri/sec, manhours (actual and estimate) and estimated mat'l cost.

- **Create a Maintenance Action 4790.2K (deferral):**

In Micro SNAP II MDS/OMMS, a 4790.2K (deferral) must be opened/entered to begin a Maintenance Action. The 4790.2K contains such information as the work center, equipment, what's wrong, who's repairing the equipment, manhours required, etc. There is a filter screen that is used to initiate the Maintenance Action. The **RIN** (**R**ecord **I**dentifier **N**umber), APL, or EIC can be selected in this screen if it's known. After the filter screen helps the user to obtain the correct APL, the ADD Deferred Maintenance Action screen (2K) must be entered. It looks just like a 2K in the 3M Manual. After all the data is entered on the Add screen, *the JSN is automatically assigned.* The Maintenance Action gets added to the Current Ships Maintenance Plan (CSMP) data base file.

The *3M Coordinator* (Repair Officer, Engineer Officer, etc.) *determines if the job can be accepted.* This coordinator assigns the Maintenance Action to a work center. This assignment is not done in the MDS/OMMS subsystem. The 3M coordinator keeps the CSMP data accurate.

If a deferred item is an Inspection Survey (INSURV) item (safety deficiencies noted during inspections), an indicator is set to indicate that it's an INSURV, and the only options that can be used are Deferred MDCS Action, Completed MDCS Action, and Add a Job by JCN.

An INSURV item in SNAP might compare to a Safety item in SAMMS EMS. In MDS/OMMS, the INSURV is performed prior to the overhaul of the ship. Engineers familiar with the ship, perform an inspection and review all the 3M maintenance records. The main purpose of the INSURV is to make sure the ship is doing its job in maintaining the ship.

In the EMS system, a safety item (vehicle) has to be fixed immediately. It's only held until the part is received. The vehicle can't be dispatched until it's fixed. Dispatch checks the vehicle and if the deficiency has not been fixed, the vehicle gets sent back to the mechanic. This process gets repeated until the repair is done correctly.

- **Create a Maintenance Action 4790.CK:**

In Micro SNAP II MDS/OMMS, a 4790.CK (Configuration Change) is generated for an addition, deletion, or movement of equipment. For new equipment, the CK is generated for the purpose of obtaining maintenance, parts support, and technical manuals. Cards will be generated that detail what needs to be done to maintain the equipment. The CK maintenance action causes

the Weapons Systems File (WSF) to be updated, so it's known what equipment is onboard and where it is located.

In SAMMS EMS, the configuration change information gets recorded in the Equipment History File. A Maintenance Action (which does not exist in the EMS system; only an ERO) does not get generated to reflect a change in equipment. There are no external files other than the files in the Equipment Operations system that receive Equipment History File "change" information. EMS does not receive updates/changes in the form of ASI processing as does the SNAP system.

A deletion would be processed when a piece of equipment gets sent to disposal because it has a status code that indicates it's not in shop, it's not ready, and it can not be fixed.

- **Create a Ships Force Work List (SWFL) Maintenance Action:**

In Micro SNAP II MDS/OMMS, the SWFL is used to add non- maintenance type actions and document manhours for repairs that are not related to equipment configuration. No APL is listed for these actions. Overdue SFWL actions (those open for a length of time exceeding the maximum number of days set by the 3-M Coordinator) may be changed to a deferred MDCS action.

In SAMMS EMS there is no comparable feature to track non- maintenance type actions; it's only responsible for tracking repairs made on the equipment (vehicles).

- **Direct Turnover (DTO):**

In Micro SNAP II MDS/OMMS, a maintenance action generates a DD1250. When the mechanic opens up a 2K job, and chooses to order parts (repair parts or consumables), the NSN's are displayed for an APL. The appropriate NSN's are chosen, and once this process is complete the parts are reviewed in the Tech Edit ((Supply and Financial Management (SFM) module) process. This process checks the NSN, COG, ill, price, etc., and determines whether the parts are available, or if they need to be ordered DTO. The information gets sent back to the division requesting the items for approval to issue or order the items. Once the approval is made, the 1250's can be generated and automatically printed. If an item is urgent such as a CASREP or an ANORS, the storekeeper can manually enter the 1250 data and can then print a 1250 form. The forms are sent to the requisitioning (financial) storekeeper to order the items. DTO requisitions are eventually output to DAAS.

When a requisitioned items is received, the Supplementary Address on the 1348 will indicate where to send the item. When an item is received in the SFM module, the item is marked as received in the MDS module, and if it's a Not-In-Stock or Not Carried item, the demand is recorded (entered) in the demand history files.

In SAMMS EMS, a DTO requisition (Form 1250) is processed (handwritten) if parts are needed and they aren't available. The DTO option is keyed to the USN and the requisition number. A temporary requisition number gets assigned to the requisition. When a copy of the

requisition comes back from Supply, it will Dave the permanent requisition number on it. The temporary requisition number is replaced and recorded with the permanent requisition number, along with any Supply status information. A multi-purpose data entry screen is used to order, receive, and issue DTO parts. EMS automatically purges DTO's with an issue date older than 30 days. *EMS does not have an automated, print 1250 form feature.*

Note: There is no automated requisition status/input from SUPMIS in EMS. The option (connection) was never established or programmed.

For deadlined equipment, the vehicle can't be used until the DTO part is received and the vehicle gets repaired. The DTO clerk maintains the deadline file and the deadline status file.

- **Allowance Parts Lists (APL's):**

In Micro SNAP II MDS/OMMS, the ship's equipment file contains a summary of the installed equipment. The COSAL file contains the APL and AEL information related to each equipment or system.

Micro SNAP II is heavily tied into the APL's. When you order parts, you must have an APL number. An exception is when the item is not related to an equipment configuration such as ordering non-maintenance related supplies that have no associated APL's. Some non-maintenance items can be items such as cleaning compounds, rags, oils, tools, etc. These can be carried items.

The SAMMS EMS does not track the APL's. The mechanic keeps track of the parts required to repair equipment. There can be 3 APL's noted in the Equipment History file, but the *Equipment Maintenance System is not heavily tied to the APL.*

- **Preventive Maintenance:**

There is no Preventive Maintenance scheduling/tracking in Micro SNAP II MDS/OMMS; however, on every ship there is a Planned Maintenance System (PMS), which is a series of cards used to perform maintenance on all pieces of equipment. This PMS is separate from the SNAP system, but acts as a front end if maintenance can't be accomplished at the PMS level. If there is a problem and it can't be fixed in a certain amount of time (a time frame prescribed by the TYCOM, such as 24 hours, 1 week, or 30 days), and the repair requires some type of assistance from an activity external to the ship, the repair is documented in the PMS as being deferred, and it is entered (opened up) in Micro SNAP II *MDS/OMMS* as a deferral (2K). Deficiencies that have not been corrected and are reported by INSURV would also be deferred. When logging man hours, a 2K or SFWL can be used to track the manhours. You can only track manhours that are used to do a PM. This information can be put in the remarks block.

MDS/OMMS tracks maintenance that can not be done properly. There are many reasons for the deferral such as there is no one on-board who can fix the problem (training may be needed), or there are no parts. If the part is not in the MDS subsystem, and there is a certain

demand for the part, then the part may become a carried item. An Engineering Facility does the research to get the new parts.

Maintenance can be performed without the TYCOM approval. As the maintenance proceeds, man hours are extended up to the point where the repair action gets stopped; whether or not the repair gets completed. The remarks block is used to indicate if the part is broken, and codes are used to document when a problem is discovered and the reason why the work stopped.

The purpose of SAMMS EMS is to keep the vehicles maintained through Preventive Maintenance tracking processes. All data (Equipment History and Equipment Maintenance data) for the vehicles in the allowance gets entered into the history file. When the history has been entered and completed on the vehicle, a schedule is created for preventive maintenance. The vehicles are scheduled regularly to go in for preventive maintenance.

- **Equipment Maintenance and Equipment Operations relationships:**

As stated in section 4.0, SAMMS EMS interacts with the Equipment Operations System on a daily basis. Data is exported from the EM system to the EO system, and vice versa. The purpose of the file transfers is to ensure that each system has current vehicle information.

Equipment Maintenance exports the following data to Equipment Operations: USN, ECC, Model, and PM Schedule for the vehicles. Once the, Equipment Operations has the USN and the ECC data, then dispatch of r vehicles can occur. Equipment Operations is only able to dispatch those vehicles for which it has current information.

Equipment Operations exports the following data to Equipment Maintenance: Date (in and out), if vehicle is ready for dispatch or in the shop, meter readings (in and out -used for continuous mileage tracking), and outshop date.

Micro SNAP II MDS / OMMS does not have the Equipment Operations and the Equipment Dispatch and Licensing functions, which must exist in order to perform data transfer functions between the Equipment Maintenance and the Equipment Operations systems.

- **United States Navy Registration Number (USN):**

On Ship, there is no provision for handling USN numbered equipment; however, there are many other ways to identify or find the equipment. Each major piece of equipment, such as a fork lift, has a unique **R**ecord **I**dentifier **N**umber (**RIN**) assigned to track the equipment. Each peripheral piece of equipment also has a unique RIN. The RIN is the primary search key in the Equipment file. If the MDS/OMMS subsystem were to be used for tracking USN'S, there would have to be a validation team (assigned by the Concord Weapon Systems people) sent to the site who would set up the RIN's. The USN might be put in the Valve Mark field, or it could possibly be part of the Equipment System Designator (ESD). The data would also have to be added to the Ships Configuration and Logistics Support Information (SCLSI) database file retained by SPCC. The key to SAMMS EMS is the USN. The USN is the identifier for a particular piece of equipment (vehicle).

- **Equipment Code (ECC or EC):**

In SAMMS EMS, the 6-character ECC is listed as a number to identify the type of equipment/vehicle. This number can be a duplicate, if a vehicle is exactly the same as another vehicle. It's used along with the USN to identify the equipment.

The ECC number is not listed in Micro SNAP II MDS/OMMS.

- **Equipment Identification Code (EIC):**

The 7-character EIC field is used in Micro SNAP II MDS/OMMS to identify the system, subsystem, equipment category in that system, and additional definition of the equipment part. This data field is pre-filled by the system from information in the Ship's Equipment File.

The EIC is not used in SAMMS EMS.

- **Location:**

The location in Micro SNAP II MDS/OMMS indicates where the item is that needs to be repaired. It is a four part field made up of the compartment, the deck, the frame, and the side.

The location in SAMMS EMS is a location/allowance code consisting of a 3 character field used to indicate where the unit is, i.e., the code CR1 might represent the equipment allowance in Roosevelt Roads (camp).

- **Unit Identification Codes (UIC):**

Micro SNAP II is written to allow for multiple UIC's.

SAMMS EMS documents the UIC on the ERO. Only one UIC can be entered on an ERO. NCB's and other special units each have a unique UIC.

- **Functional Description:**

The functional description field in Micro SNAP II MDS/OMMS is used as an APL level description and is actually a repeat of the APL description.

The functional description field in SAMMS EMS is the name of the actual repair being done, i.e., replace axle gasket. This functional description is the same as the work description on the ERO. The functional description is preceded by a functional code, which is an assigned code for the functional description itself.

- **Technical Manuals:**

Micro SNAP II MDS/OMMS does not keep track of technical manuals; however, there is a separate Technical Publication Library System (unrelated to the SNAP systems) designed by NCTAMS LANT, which automates a facility's technical publication library and includes barcode technology, if desired. Currently, the 2nd Brigade is utilizing this library system.

Technical Manuals are not tracked in SAMMS EMS. The mechanic goes to the technical library to get the information to put on the 1250 for a given part and he uses this information to get the part from ARP or to order the part DTO.

7.0 COSAL SUPPORT/MAINTENANCE

How the reporting of a configuration change is supported and how a ship reports the population of new vehicles:

The COSAL for an NMCB would probably compare to the Ships Hull, Mechanical, Ordnance and Electrical COSAL used in the SNAP system; however, there are big differences in the way that he NMCB's and the Ships get their COSAL support.

In Micro SNAP II MDS/OMMS, a maintenance action causes action to the CQSAL. This is how the COSAL is run/setup. The Ship reports the configuration changes and the population of new vehicles to SPCC by using a Configuration Change Report 4790/CK. The ship is different than the NMCB's because the Skipper of the ship has to send papers to SPCC detailing the ships configuration change. The NMCB's don't have to do this. This is all done for the NMCB's by CESO at the request of the Equipment Office.

In the NMCB's, a requirement is submitted from the 2nd and 3rd Brigade's Equipment Office Program Managers. CESO's Construction, Automotive and Specialized Equipment Information System (CASEMIS) and the 2nd and 3rd NCB Equipment Offices have the equipment on record. Based on file changes, the managers tell CESO to generate COSAL support (new COSAL). CASEMIS handles the configuration reporting (record keeping) of the equipment. CESO initiates the COSAL through SPCC. If an individual item/part in an APL needs to change, CESO prepares a form 1220, and mails the form to SPCC. SPCC performs data entry on 1220's to change the APL at SPCC.

CESE COSAL Maintenance

The methods used for initial outfitting and re-supply of parts to the NCF and to the Naval Ships are different. A comparison was made during a conference at the 20th NCR in 1987, and the differences still hold true to today.

- **FLSIP and like shipboard COSAL methods:**

The Fleet Logistics Support Improvement Program (FLSIP) COSAL Program commences with a very minimal (baseline) initial outfitting storeroom allowance, and through the 3M reporting process, collects usage data, computes adjustments based on models and

forwards reports to unit supply officers, which are used as authorization to increase or decrease storeroom allowances. FLSIP COSAL changes require at least a 30 day collection of usage data, computation and reporting back to supply officers before storeroom increases can be ordered and stocked. Sixty days after the high usage occurs, parts could be on the shelf. This process minimizes unit supply officer local management decision making and flexibility because the computer tells them what to do.

The FLSIP method would not accomplish what the NCF needs because in the NCF, Supply is notified immediately and parts are ordered right away. Keeping shipboard COSAL's current with a ships actual equipment configuration has always been a difficult process. The opinion is that the use of a mechanized COSAL maintenance program such as FLSIP may not be a good idea for the NCF.

NAVFAC and CESO have not gone to this FLSIP method. The Equipment side of the Second and Third Brigades have not gone to FLSIP either. They prefer a manual review of consumption data and adjustments in accordance with special criteria that are not provided for in the standard FLSIP program. That criteria is initial outfitting support of new, or like-new equipment in a 60 day wartime contingency. Allowance Change Requests can be submitted by the using battalion but the decision criteria remains the same.

- **NAVFAC CESE COSAL method:**

The CESE COSAL provides a complete list of initial outfitting parts authorized by NAVFACENGCOM maintenance policy to support new or like-new construction, automotive, matcrial-handling, and specialized equipment. Each camp site receives two CESE COBALs; one for organic and one for augment, which are updated during each deployment rotation (about every 7 months).

The NAVFAC CESE COSAL Program commences with an initial outfitting storeroom allowance of mission essential parts (starters, alternators, water pumps, tires, etc.) plus required maintenance parts (filter elements, spark plugs, etc.) for support of 60 day (1200 hours) contingency or mobilization operation, without re-supply.

If one site has a high usage, the allowance doesn't get changed for everyone. Orders must be made by the supply office to supply the parts. One site doesn't justify changing the APL, as would happen in the FLSIP method.

Changes to a NAVFAC CESE initial outfitting APL affects the total population for that APL regardless of age, location, deployment or storage (PWRMS, Readyline, etc.) status and results in automatic storeroom allowance increases or decreases for all Nary units being supported.

The NAVFAC CESE COSAL Program assumes unit supply officers will solicit planned requirement recommendations from the maintenance supervisor, determine items to be ordered and stocked in anticipation of need, maintain COSAL allowance on an "issue-one/order-one" or

Selective Item Management (SIM) basis, and review the historical demand file to determine Not Carried or Part Numbered items to stock.

The result is that the current NAVFAC CESE COSAL Program starts all units off with a well-stocked initial outfitting storeroom allowance and permits the maximum amount of local management decision making regarding adjustments to take place without delay for usage reporting and computations.

- **Overall assessment of the COSAL methods:**

The FLSIP method is designed for lifetime operation of the ship or activity. FLSIP is a system that has a different mission than that of the CESE COSAL for the NCF. FLSIP continually gives you changes and keeps you moving in the proper direction for the life of the ship. CESE in the NCF is maintained in a new (or like new) condition for mobilization/deployment to a 60 day/1200 hour operation and requires a mobile repair parts storeroom/COSAL.

8.0 CONCLUSION:

This evaluation provided an overview of many major functional differences between MDS/OMMS and SAMMS EMS. These two systems are developed according to different, instructions. It is improbable that MDS/OMMS, as it is currently designed, could be utilized in the NCB environment. Either MDS/OMMS will need to be changed to adapt to the Seabee operational environment and methods, or the Seabee environment will need to make changes in the way operations are performed in order to utilize MDS/OMMS to do business. A major detailed analysis would be required to determine the additions and modifications that would be required to properly utilize MDS/OMMS.

9.0 ALTERNATIVE:

If standardization is the intention, the shorebased PWMA Transportation system may be more appropriate for use in the NCF.

The Public Works Management Activity (PWMA) Transportation System managed by the PWMA Division at FACSO, Port Hueneme, more closely resembles SAMMS EMS than MDS/OMMS. The Transportation system is a civilian shorebased system developed utilizing Micro Focus COBOL. It processes maintenance schedules for equipment, records maintenance, tracks the time against job orders, issues trip tickets, and keeps track of operators times, among many other features. The Shop Repair Order (SRO) function basically resembles the EMS Equipment Repair Order (ERO) function. The SRO is keyed on the USN and its purpose is to track time, labor, and material, and it can be deferred if parts aren't available.

The PWMA Transportation system provides management reports such as financial, job order, and cost category reports, and NAVFAC required utilization and exception reports (i.e., accident exception report). Although the look of PWMA Transportation system is quite different than the SAMMS Equipment Maintenance System, it basically tracks the same work. The

system is Equipment Maintenance (EM) and Equipment Operations (EO) all in one. Additionally, it contains a Fuel interface module which is tailored to a particular unit.

APPENDIX E

SCLSIS Loop Diagrams

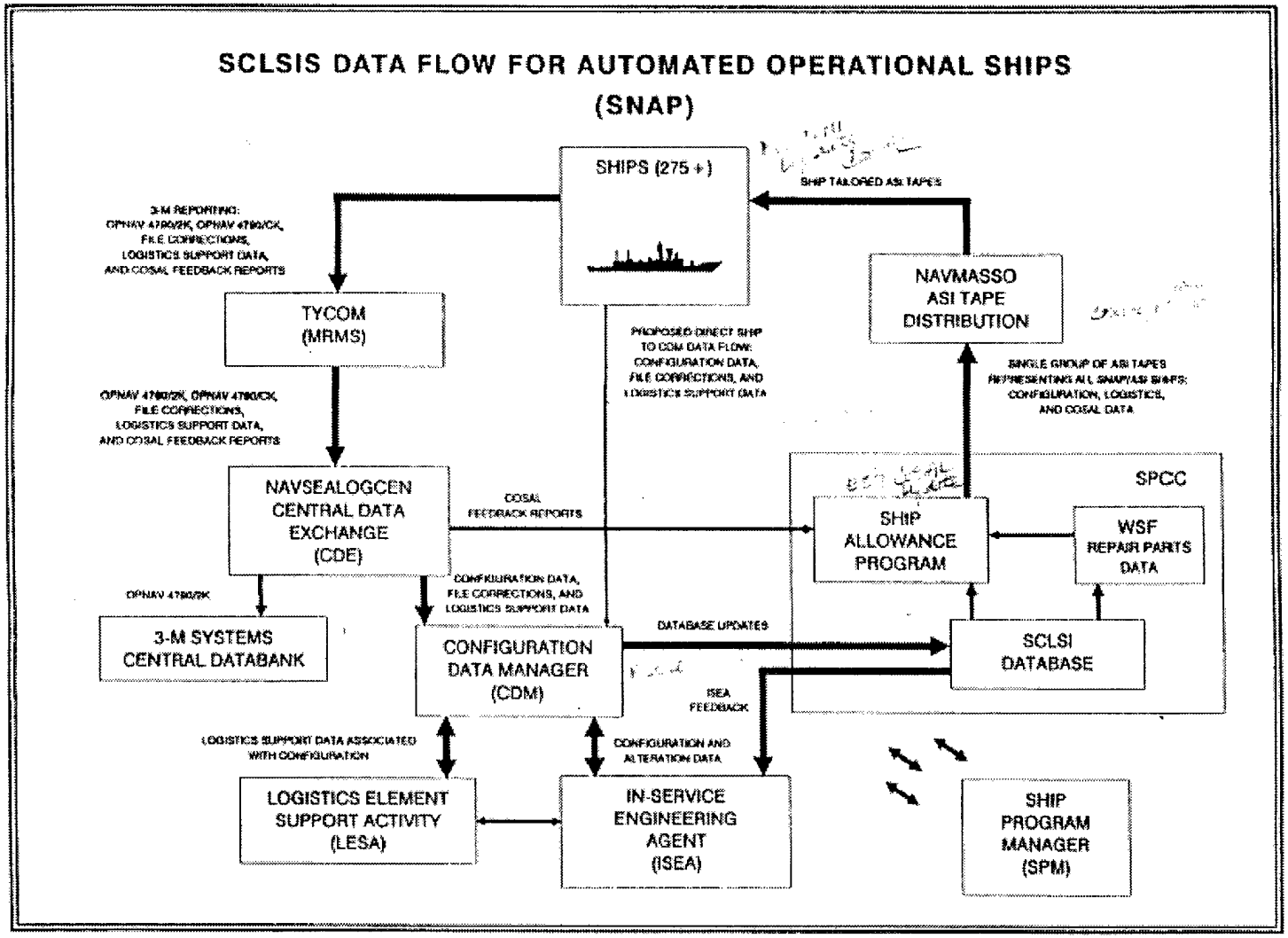

Figure 1

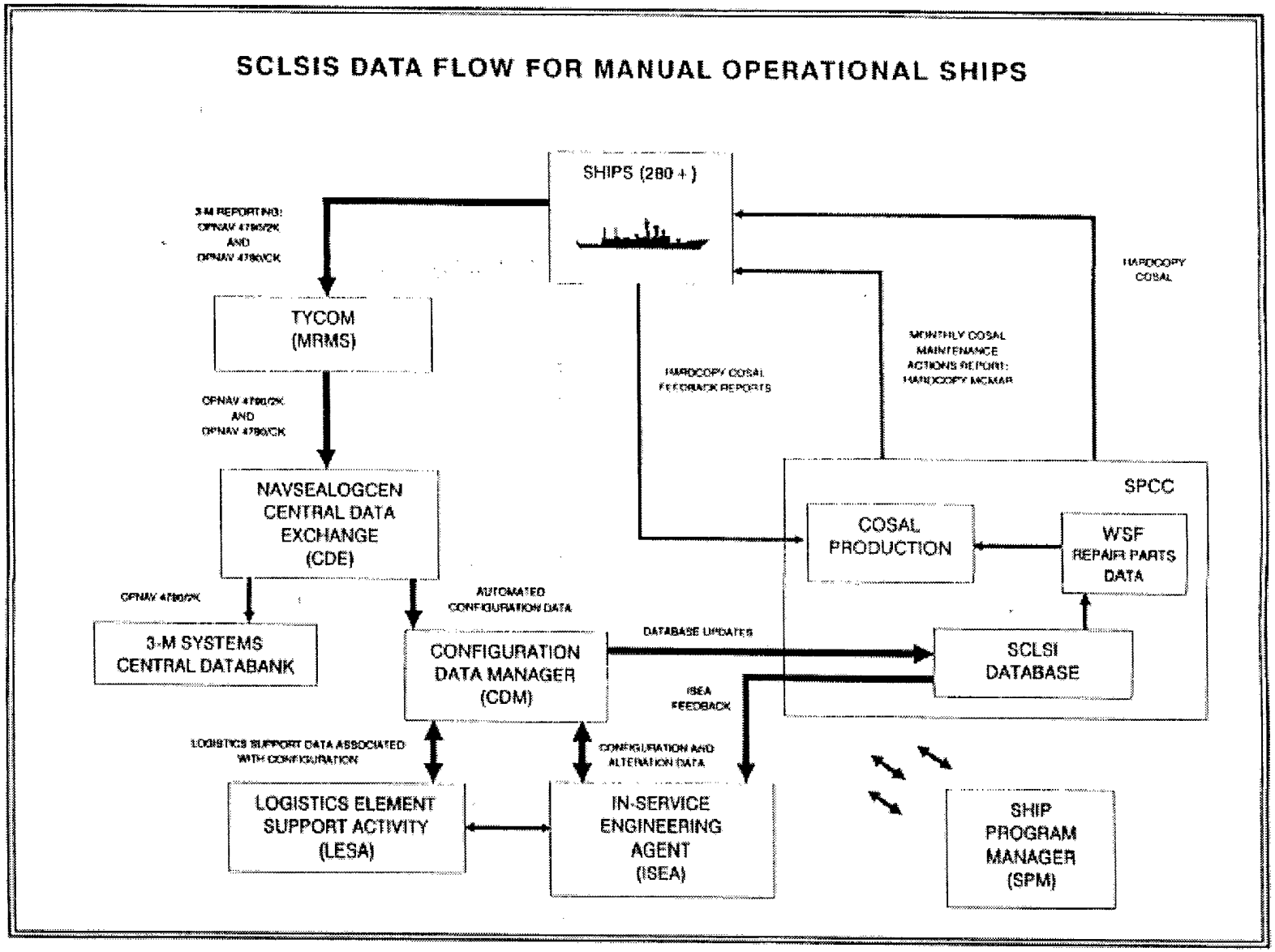
SCLSIS DATA FLOW FOR MANUAL OPERATIONAL SHIPS
SHIPS (280 +)
3-M REPORTING:
OPNAV 4790/2K
AND
OPNAV 4790/CK
TYCOM
(MRMS)
OPNAV 4790/2K
AND
OPNAV 4790/CK
NAVSEALOGCEN
CENTRAL DATA
EXCHANGE
(CDE)
OPNAV 4790/2K
3-M SYSTEMS
CENTRAL DATABANK
AUTOMATED
CONFIGURATION DATA
CONFIGURATION
DATA MANAGER
(CDM)
LOGISTICS SUPPORT DATA ASSOCIATED
WITH CONFIGURATION
LOGISTICS ELEMENT
SUPPORT ACTIVITY
(LESA)
CONFIGURATION AND
ALTERATION DATA
IN-SERVICE
ENGINEERING
AGENT
(ISEA)
HARDCOPY COSAL
FEEDBACK REPORTS
MONTHLY COSAL
MAINTENANCE
ACTIONS REPORT:
HARDCOPY MCMAR
HARDCOPY
COSAL
SPCC
COSAL
PRODUCTION
WSF
REPAIR PARTS
DATA
DATABASE UPDATES
SCLSI
DATABASE
ISEA
FEEDBACK
SHIP
PROGRAM
MANAGER
(SPM)

Figure 2

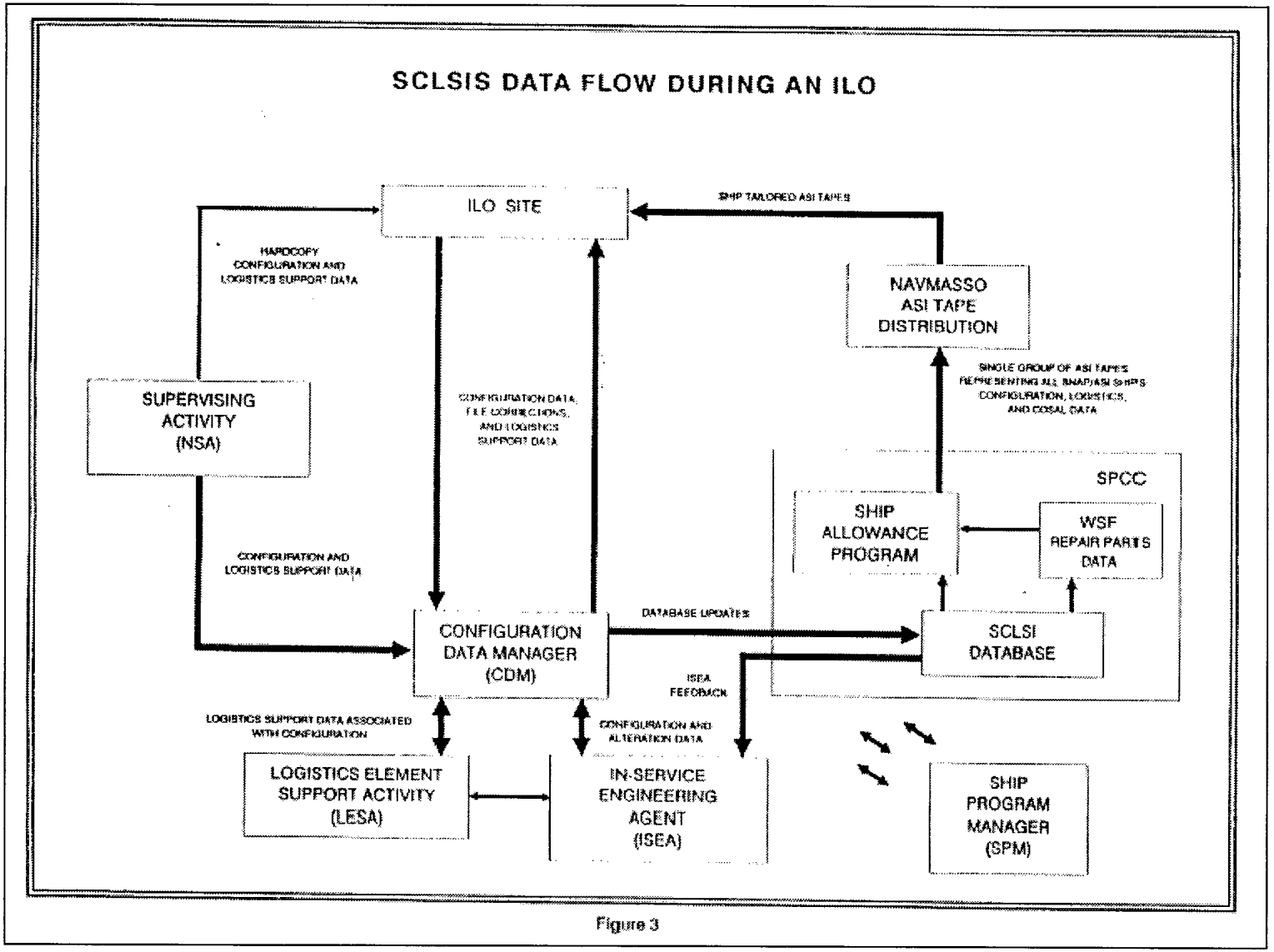
SCLSIS DATA FLOW DURING AN ILO
ILO SITE
SHIP TAILORED ASI TAPES
HARDCOPY CONFIGURATION AND LOGISTICS SUPPORT DATA
NAVMASSO ASI TAPE DISTRIBUTION
SUPERVISING ACTIVITY (NSA)
CONFIGURATION DATA, FLE CORRECTIONS, AND LOGISTICS SUPPORT DATA
SINGLE GROUP OF ASI TAPES REPRESENTING ALS, SNAP/ASI SHIPS CONFIGURATION, LOGISTICS, AND COSAL DATA
SPCC
SHIP ALLOWANCE PROGRAM
WSF REPAIR PARTS DATA
CONFIGURATION AND LOGISTICS SUPPORT DATA
DATABASE UPDATES
CONFIGURATION DATA MANAGER (CDM)
SCLSI DATABASE
ISEA FEEDBACK
LOGISTICS SUPPORT DATA ASSOCIATED WITH CONFIGURATION
CONFIGURATION AND ALTERATION DATA
LOGISTICS ELEMENT SUPPORT ACTIVITY (LESA)
IN-SERVICE ENGINEERING AGENT (ISEA)
SHIP PROGRAM MANAGER (SPM)

Figure 3

APPENDIX F

Related costs/REQUIREMENTS FOR CDMD-OA

CDMD-OA:	Cost per Unit Identification Code per year
	View only - $2,000 per UIC per year
	Edit capability - $4,000 per UIC per year

Software Requirements:	
Oracle SQLnet (ver 1.0, 2.1, 2.2, 2.3)	
Windows (ver 3.1, NT, 95, 98)	
CITRIX Web Client	Downloadable from CDMD web site
MicroSnap OMMS	**$$$ (unknown)**

Hardware Requirements:

486/75 CPU
VGA Monitor
3MB RAM memory
NIC
800 MB Hard drive

UIC established

CDM established	CBCHUE sending personnel to CDM training FY01

Costs related to MicroSnap OMMS

NAVICP-M

Validate configuration of each UIC	Reimbursable effort (travel and labor)
Perform site validations	
Load adds/changes/deletes in WSF	

SPAWAR CHESAPEAKE

Licensing fee	$138K for 57 NCF sites
Initialize MicroSnap OMMS	$1.00 per record, minimum $500.00
Life cycle cost	**$$$** (unknown)
	Travel costs

Costs related to Configuration Data Manager for NCF

NAVICP-M

Based on number of UICs	Ex. $18,000 for 24 UICs

CBCHUE

Training course	**$$$** Travel costs
Dedicated personnel	**$$$** per manyear

Costs related to Automated Shore Interface

RADCOM – automated updates	**$$$** (unknown)
SPAWAR – floppies	None

APPENDIX G

MicroSNAP OMMS A1 Record Compared to MicroSNAP MOSS

(A1 Record Comparison.doc / 3-22-00)

A1 Data Element Name	Pos	Mandatory* see below	In MOSS	MOSS Comments / Field Names
Record Type	1-2	Yes	No	
Action Code	3-3	Yes	No	
Unit Identification Code	4-8	Yes	No	In SMS
Work Center	9-12	No	Yes	Mandatory - Primary Work Center in museraccess.cprimwc (4 pos)
Job Sequence Number	13-16	No	No	ERO's only - in meqptmnt.cjobseqno (4 pos)
Page Number	17-20	No	No	
RIN (Record Identification Number)	21-25	Yes	No	
MCC (Service Importance Code)	26-26	Yes	No	
Log. Support Status Code	27-28	No	No	
Blank	29-32			
Military Essentiality Code	33-33	Yes	No	In SMS
CAGE (Component/Mission)	34-38	No	Yes	Mandatory - in mequ.ccage (5 pos)
APL/CID/RIC Component ID	39-49	Yes	Yes	Not mandatory - in mequ.capl (11 pos)
EIC (Equipment Ident. Code)	50-56	Yes	No	
Application Code (Parent APL)	57-67	No	No	MOSS has 3 APL fields in mequ (capl, capl2, capl3)
Qty per Application	68-73	Yes *1	?	Default to 1?
Equipment Serial Number	74-88	Yes *2	Yes	Mandatory - in mequ.cequserialno (19 pos)
Parent Eqpt Serial Number	89-103	No	No	
Data origin./Valid. Code (DO/VC)	104-105	Yes	No	
Service Application Description	106-160	No	No	
Service Application Code	161-170	Yes	No	
Location	171-182	No	Yes	Mandatory - in mequ.cequlocation (6 pos)
VM/ESN or PRID	183-197	Yes *3	No	

A1 Data Element Name	Pos	Mandatory* see below	In MOSS	MOSS Comments / Field Names
Space Work Center (WCRC)	198-201	No	Yes	Not mandatory - in mequ.cequwcrc (4 pos)
Maintenance Work Center (WCRE)	202-205	Yes *4	Yes	Mandatory - in mequ.cequwcre (4 pos)
HSC (+ 6 other fields)	206-217	Yes	No	
Subcategory Code (SCAT)	218-224	Yes *5	No	
Installation Status Code (ISC)	225-225	Yes	No	
Valid Source/Action Code	226-227	No	No	
Equipment ID Number (EIN)	228-253	No	No	
Category Code	254-254	No	No	
Selected Equipment Indicator	255-255	No	No	
Reason Not Validated	256-256	No	No	
Equipment Functional Description	257-304	Yes	Yes	Mandatory – prefilled from EC Number – in mequ.cequlongdesc (40 pos)
Equipment/System Designator	305-319	Yes	No	
Configuration Reporting Activity	320-328	No	Yes	Not Modifiable – in mequ.ccactivityuic (6 pos)
Configuration Report Initials	329-332	No	Yes	Not Modifiable – in mequ.clastmodby (3 pos)
Configuration Report Date	333-338	No	Yes	Not Modifiable – in mequ.dlastmoddte (8 pos)
Blank	339-400			

*1 = Must be equal to 1 if AEL COL NBR is assigned. Cannot be greater than 1 if Serial Number or PRID is assigned.

*2 = Blank if quantity per application is greater than 1. Required if quantity equals 1 and PRID is blank.

*3 = Mandatory entry if quantity per application equals 1 and serial number is blank.

*4 = Required at equipment add time interactively or via ASI verify bulk input.

*5 = Mandatory if the configuration item is electronics test equipment.

APPENDIX H

Point Paper on Software Construction Preparation
Ideas extracted from the book
Code Complete by Steve McConnell[1]

Steps of Software Construction

Building software is a lot like building a house or a skyscraper. The amount of preparation done before construction begins depends on what you want to build. The amount of time spent on each of the following construction steps depends on the size of the project. The smaller the project the less time needed in each step.

1. Problem Definition - System Specification
2. Requirements
3. Architectural Design
4. Detailed Design
5. Coding and Debugging
6. Unit Test
7. System Test
8. Maintenance

The quality of the finished product depends on the quality of the preparation.

Much of the success or failure of a project is already determined before construction begins.

Problem Definition

The first step is to define the problem. "We are cold at night and get wet when it rains. We want to keep all of our stuff safe. We need a place to sustain our lives, work and play (using the latest tools) safely and comfortably." That is a problem statement that constructing a house will solve. What is the problem the SUL is trying to solve?

Requirements

The next step is requirements. "We want a two story 2300 square ft. house with a three car attached garage (wired for sound, TV and high power tools) and a stucco (walls) and tile (roof) exterior. Three bedrooms and three bathrooms with a master bath and walk-in closet attached to the master bedroom. A sound insulated surround sound and Internet (cable modem) ready den with room for a 60" flat screen display. And a gourmet kitchen with standard (not custom) equipment (range, oven, refrigerator, etc.)" These requirements specifically state what features are required and give boundaries

[1] Code Complete: A Practical Handbook of Software Construction, Microsoft Press, Redmond, Washington, 1993, Chaps. 1-3 "Laying the Foundation", pp. 1-52

for the architect to follow when she designs (draws blueprints) the house. What logistic features does the Small Unit need to complete its tasks?

The eventual occupant of the house best answers the questions these first two steps ask.

Stable requirements are the myth and Holy Grail of software development. The more you work on a project the better you understand it and your needs. Therefore, it is inevitable that you will want to add or change features. An IBM study reveled that the average project experiences a 25% change in requirements during development.

So how do we deal with changing requirements?

1) We make sure that the requirements are of high quality. Requirements can be checked for content, completeness and quality using Steve McConnell's requirements checklist[2].
2) Make sure everyone knows the cost of requirements changes. For example to move a load bearing wall 6 inches, after construction requires redesign and rebuild. The load the wall is holding is temporarily supported while the old wall is removed and the new one installed. The high cost comes not so much from the materials but the time and labor involved.
3) Set up a change control procedure. For example setting specific times or stages when all new requirements will be addressed. This allows the builder time to deal with either constructing to the plan or laying out new plans.
4) Use development approaches that accommodate changes. You can use the following two approaches together or separately.
   a) Prototyping the software with a small inexpensive team to explore the requirements before the forces are sent in to build.
   b) Evolutionary development where short development cycles build a little then users provide comments around and around.

Architecture

At this point in software development of complex systems, a professional software architect should probably be consulted. Just as the home architect translates the needs and wants of the future occupants into a comprehensive plan that uses the latest tools and techniques, so to the software architect. High quality architecture will discuss modules[3] in the system, information in each module and rationales for including and excluding all possible design alternatives. The architecture should be a conceptual whole, fit the problem and meet the requirements. It should state its objectives clearly, for example: is the goal to be as flexible to change as possible or high-speed performance? Each may do the same thing but in entirely different ways. It should be

---

[2] McConnell, pp.33-34 (I am also searching for more on this subject (not a moron))

[3] "A module is a collection of routines that work together to perform a high level function...", McConnell, p.36

as machine and language independent as possible. It should identify risks and steps to minimize those risks. Finally, it should be easy to understand.

Program organization

The architecture should specify the system in broad terms as well as the major modules in the program. This should show the builder how the modules work together and that alternatives were considered but not chosen for particular reasons. Each feature should be covered by at least one module and each module should be as independent as possible.

Change Strategy

The architecture should describe a strategy for handling changes clearly. It should show that a particular change has been anticipated and that it can be dealt with in a particular fashion.

Buy-vs-build decisions

The architecture should specify what software is to be reused and how it will be made to conform to the architecture.

Major data structures

The architecture should describe the major files, tables and data structures to be used. It should specify the organization and contents of any databases used.

Key Algorithms and Major Objects

If the architecture depends on specific algorithms or objects, it should specify which ones should be used and the reasons why particular ones were chosen.

Generic Functionality

Users interface, input/output, memory management and string storage should all be addressed in the architecture by estimating or describing the functionality.

Error Processing

The architecture should define the strategy for handling errors, when to catch them, how to avoid them and when to let the user know.

Robustness[4]

The architecture should clearly indicate what level of over-engineering, assertions[5] and fault tolerance is expected.

Performance

The architecture should address speed and memory goals. It should provide estimates and explain why the goals are achievable.

---

[4] "Robustness is the ability of a system to continue to run after it detects an error.", McConnell, p. 41

[5] "An assertion is an executable statement placed in the code that allows the code to check itself as it runs. When an assertion is true, that means everything is operating as expected. When it is false, that means it has detected ... [something unexpected and] 'asserts' that it found an error [in the code]., McConnell, p41

Let the code construction begin.

The amount of time spent on problem definition, requirement analysis, and software architecture varies with the needs of the project. "Generally a well-run project devotes 20 to 30 percent of its schedule and effort to planning, requirements and architecture. The 20 to 30 percent doesn't include time for detailed design – that's part of construction."[6]

Detail design

The detail design involves choosing programming languages and programming conventions. Programming conventions include variable names, routine names, formatting conventions and commenting conventions.

[6] McConnel, p50

APPENDIX I

Working Group Members and Points of Contact

Name	Command	Code	Phone	DSN	e-mail
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APPENDIX J

Email from CAPT King dated 05 Oct 2000

-----Original Message-----
From: King, Dan [mailto:King.Dan@hq.navy.mil]
Sent: Thursday, October 05, 2000 8:56 AM
To: 3NCB N01 CAPT SHEAR (E-mail)
Cc: Alvin Kuehn; C Grau; David Balk; 'Hughes, John'; James McConnell; JIM COWELL; Jonathan Miller; Kenneth Pieczonka; Lunsford, Katy (E-mail); Michael Hickinbotham; W MCKERALL; William Hargrove; '3NCB N6 LCDR STEVENSON' (E-mail); Plockmeyer CAPT (E-mail); Lawless, Matt J; Chase Alan L (CBCPH) (E-mail); Catherine_D_Alexander (E-mail); Don Curtis (E-mail)

Subject: C4I QMB Tasking for NCF Logistics IT Systems

Sir,

The purpose of this e-mail is to better define the tasking of the C4I QMB regarding the information systems supporting NCF Logistics.

1. Background: As briefed and discussed last month by the LOG QMB, the NCF logistics information systems are centered around two main sets of capability:

a. TOA Management: To manage NCF TOAs both on a force-wide basis and at the operation unit level.

b. Operational Logistics: To perform supply management functions integrated with the maintenance and spare parts systems. Included as part of this Operational Logistics system would be a integrated maintenance system for units to manage their CESE/TOA maintenance programs.

SUPMIS is the current War Reserve Material TOA Management system; CAPT Plockmeyer demonstrated how Maximo could be used to perform this function on force wide basis.. MicroSNAP is the current Operational Logistics system, but has not been fully implemented and thus does not have full functionality. The NCF CESE maintenance system is not integrated with MicroSNAP at this time, although some development is underway to create a MOSS-OMMs link. We also discussed the fact that eventually NAVSUP will migrate the Navy operational supply system from SNAP/MicroSNAP system to a yet to be defined system, possibly R-Supply or a NAVSUP ERP solution. No timeline has yet been set for this migration. Similarly, it was discussed that the Navy 3M system may migrate to another maintenance system for the future. However, this migration was not confirmed as a definite plan and no timeline was given for any migration, should it occur.

Based on this, the overall strategy for improving the NCF Logistics system was to take some near term actions to improve functionality (i.e. "stop the bleeding") of the two main NCF logistics systems until the future plans of the Navy supply and maintenance systems were known. Ultimately, the NCF would migrate to these future Navy systems.

2. Original C4I QMB Proposal: When the C4I QMB and the LOG QMB met last month, the C4I QMB proposed studying whether or not MicroSNAP could be enhanced to perform the force level TOA Management functions and whether Maximo could be enhanced to perform some of the supply functions of Microsnap. Based on this review, it would then be determined whether to program MicroSNAP or Maximo to do the NCF TOA Management function.

3. Revised LOG QMB Proposal: The LOG QMB would like to change the direction of the C4I QMB tasking. Rather than study whether or not Maximo or MicroSNAP could be enhanced to perform the functions of the other, the LOG QMB would like the C4I QMB to focus on assessing whether or not the development of a interim solution can be accomplished in a timely and cost effective manner. Specifically the direction that the LOG QMB would like to pursue is

a. Developing Force wide TOA management capability into MAXIMO.
b. Enhancing/integrating MicroSNAP to provide improved, unit level TOA management capability
c. To hold off on the 3M system migration until it is clear what the NAVSEA plan is for moving to an Enterprise Resource Planning (ERP) maintenance solution. Once that is clear, the Maximo vs. NAVSEA ERP alternative can be assessed against each other.

4. Proposed C4I QMB Tasking: If we take this approach, the C4I QMB tasking would need to change from studying Maximo and MicroSNAP to developing an integrated plan (including costs and timelines) to accomplish the following goals:

4.1 Review the Systems Requirement Document produced by SPAWARS as well as the cost estimate and timeline for enhancing the capability of MicroSNAP to manage NCF TOAs at the local, unit level. This review should assess whether it will be feasible and cost effective to accomplish the following subgoals:

a. Modify the Weapons System File to accommodate the hierarchical structure of an NCF TOA
b. Develop local, field level TOA/inventory management capability for the Seabee Camps/CBCs
c. Implement Configuration Management through the use of the Weapons System File

If feasible, cost effective, and timely, the C4I QMB should develop a plan for implementing these MicroSNAP enhancements. If not feasible due to excessive cost or development time, advise the LOG QMB if any other options exist to enhance unit level, local TOA management capability that would be both cost effective and timely.

4.2 Determine what additional information systems development or process is required to implement the MOSS-OMMS link to capture spare parts usage under the current maintenance system. Develop a cost estimate and timeline to implement.

4.3 Develop a cost estimate and timeline to implement force level TOA management capability into Maximo.

4.4 Develop a plan to create single source of NCF TOA data, accessible by Maximo, for force level TOA management processing/analysis. This plan should include both the architecture of the data source, the process to migrate the existing data to this Master TOA data source, as well as the cost and timeline to implement.

4.5 Determine what additional information systems development is required to create the interfaces necessary to link Maximo and MicroSNAP so that TOA configurations and TOA inventories and the Master TOA Data stay syncronized. Develop a cost estimate and timeline to implement these links.

4.6 Develop a recommendation regarding the organizational structure/project management, subject matter expert (SME) support/resources required to direct/manage the Logistics IT improvement effort.

This goal of this proposed change is to position the NCF to be able to initiate the interim solution as quickly as possible. This approach would allow the NCF to make near term progress on improving capability at both the Force and unit levels, while not precluding the eventual migration to the long range Navy Logistics solution. The attached set of slides illustrates the current, proposed near term, and likely long term phases of the IT improvements for the NCF.

5. Maintenance System At the joint LOG & C4I QMB, there were different proposals as to how to handle the Maintenance system. The option was to implement the 3M capability of MicroSNAP or whether to use the maintenance module/capability of Maximo. The proposal detailed above does not resolve that issue. On one hand, it was felt that Maximo had better capability and that a 3M solution was not the best fit for the NCF. On the other hand, the direction from N4 is migrate to standard Navy systems, with 3M being the Navy shipboard maintenance standard. Thus the concern was that a Maximo developed maintenance system may not be in keeping with the direction to move to standard Navy systems, even though Maximo is a NAVFAC, shore installation standard Navy system. Subsequent discussions with NAVSEA indicate that they are going to migrate from 3M to a COTS based, enterprise level (ERP--enterprise resource planning) maintenance package in the next year or two. The recommendation would be to continue to research the Maintenance portion of the NCF Logistics system, so that whatever system we choose to implement positions the NCF well for migration to this long term Maintenance solution. According to the NAVSEA IT rep, if they goes to this ERP based maintenance system, the Navy will use the maintenance processes of that system, even if that means that it departs from the current 3M system. However, NAVSEA did state that much of the same approach/philosophy of 3M will be retained (reliability based maintenance, the maintenance requirements and parts/tools listings currently captured on the 3M cards will be converted into computerized work orders in the new system). Depending on how fast this ERP

system might be fielded, it may make sense to hold off on implementing 3M and just make the transition to the ERP type system. In the interim, the data needed to make either system work could be developed (maintenance requirements, parts lists, ect.) since this will be a significant effort unto itself. This information can be reused under any system we migrate to. Due to the uncertainty of the maintenance system migration, recommend we research this further before taking any specific actions on implementing 3M in any form.

Request your thoughts on changing the C4I QMB direction as detailed above. Is the C4I QMB willing to take this approach and tackle the taskings of paragraph 4 above? The goal would be to report back to the LOG QMB at the earliest possible date, so that the total funding requirement and timeline is known. In PR-01, funds were programmed for NCF IT modernization. These funds were generally intended for hardware replacements, but could be used for software/systems development if it was felt to be a more urgent priority. The LOG QMB would need to make this case to the NCF ESG. The sooner we know if an interim solution is feasible and its cost, the sooner we can make that funding call and begin implementation.

Very Resp,

Dan King

<<NCF IT System Proposal.ppt>>

CDR Dan King
OPNAV N446
Seabee Programs
(703) 604-9945
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king.dan@hq.navy.mil

APPENDIX K

Report on taskings directed in memo from Capt. King to Capt. Shear, "C4I QMB

TASKING FOR NCF LOGISTICS IT SYSTEMS" dtd 5 Oct 00. See Attachment 1.

Tasking 4.1 Review the Systems Requirement Statement.

Tasking 4.1a Weapon Systems File (WSF) and 4.1c Configuration Management

1. The WSF structure can not be modified without an extended timeframe and unknown financial burden. Representatives from NAVICP stated they were unaware of any modifications to the WSF structure. Currently no NCF data resides within the WSF.
2. The CDM must be established. The CDM is the NAVSEA agent for maintaining configuration and associated logistics support for an activity represented in the Ship Configuration and Logistic Support Information (SCLSI) database. Only the cognizant CDM can input data into the SCLSI database. CDM responsibilities include:

    a. Process configuration changes initiated by the activity or the In-Service Engineering Agent, Ship's Equipment File corrections, and logistics support data into the SCLSI database.
    b. Initiate configuration changes to correct erroneous or missing data in the SCLSI database. The file corrections ultimately update MicroSnap and shore databases via the Automated Shore Interface (ASI).
    c. Compare the activity's MicroSnap database with the SCLSI database and reconcile differences before the start of ILO operations.
    d. Process ILO/Naval Supervising Activity (NSA)-initiated equipment file corrections and logistic support data into the SCLSI database so it accurately reflects the activity's equipment and logistics support databases.
    e. Perform baseline validations. Providing validation aids to SCLSIS Validations Teams.

3. In order to populate the WSF, the CDM must establish accurate electronic data reflecting the current TOA configuration. This must be completed for each unique Unit Identification Code (UIC) specific TOA, i.e., Camp Moscrip, Camp Mitchell, Homeport TOAs.
4. Once the data has been obtained, NAVICP performs a site validation of each unique TOA. Once this is complete, NAVICP loads adds/changes/deletes into the WSF and generates spare part and allowance data in the form of COSALs.

    CBCHUE stated Ruben Frutos could accomplish the task after training is completed – December 2000. The alternative will be to fund NAVICP to be the CDM. NAVICP efforts to establish NCF data in the WSF are cost reimbursable.

Costs for NAVICP to maintain the WSF data for the NCF are based on number of UICs – estimated $18,000 per year for 24 UICs.

5. SPAWAR Chesapeake installs and initializes MicroSnap OMMS at each UIC location. The cost for the initialization is $1.00 per Allowance Part List/Allowance Equipage List (APL/AEL) record, with a minimum cost of $500 per UIC, plus the travel expenses for the SPAWAR personnel. This does not include the licensing fee(s) for the MicroSnap OMMS application.

   How many APLs per TOA?
   What is the time frame SPAWAR recommends per UIC?

6. In addition, in order to utilize the Automated Shore Interface (ASI), which provide automatic electronic data transfer to the activity via the SCLSIS loop, the licensing fees are also involved.
7. Data updates to the WSF are fed through the SLCSIS loop using OMMS. The only path to feed the WSF is to utilize OMMS. Currently OMMS is not used by the NCF. NCF uses a NCF unique MicroSnap module - Maintenance and Operations Support System (MOSS) (see MicroSnap MOSS timeline below).

   a. 1992 – CESO initiates a study to determine if the NCF should go to a standard Navy maintenance system (OMMS/3M) or COTS/GOTS system.
   b. 1994 – CESO/CBC Gulfport/NAVMASSO meeting decides 3M is not applicable and not an effective way to perform vehicle maintenance
   c. Nov 1994 – CESO sends requirements to NAVMASSO requesting cost estimate
   d. Jun 1995 (9 months) – NAVMASSO sends cost estimate
   e. Sep 1995 (3 months) – CESO contracts with NAVMASSO to produce a Seabee "3M" module
   f. Jul 1996 (10 months) – SPAWAR accepts project
   g. Nov 1996 (4 months) – CESO funds project ($200,000)
   h. Mar 1997 (4 months) – first development planning meeting
   i. May 1997 (2 months) – functional analysis meeting
   j. Sep 1997 – Jun 1999 (21 months) – MOSS developed
   k. Jul 2000 (13 months) – production installation (4 years)

Tasking 4.1b Field Level TOA Management System

1. SRS was completed in Fall 2000 and distributed to the functional users for comments. On-site review with functional users was completed by 2NCB in Nov 2000. The SRS is a good starting point for defining the requirements for developing a field-level TOA management system. SRS was developed to address the needs of the SKs managing the TOA. Current business practices dictate the SKs are

responsible for the approximately 60% of the TOA. It is unclear how much input the "other operators" have provided. Recommend that battalion TOA operators, e.g. MLO, CTR, ARP personnel review for potential additional requirements.

MicroSnap TOAMS, as currently proposed, will be built on a "standard Navy Supply System." However, its implementation will result in yet another NCF unique and specific solution. The management/ maintenance/upgrades will be the unique financial and requirements responsibility of the NCF. Furthermore, it has been agreed MicroSnap has a finite life, due to other NAVSUP initiatives such as R-Supply and ERP. With TOAMS being a NCF unique solution, migration to a future system will likely require additional funding by NAVFAC to implement. With the NCF being such a small portion of the Navy Supply System, the anticipated migration to the future system may be lost until larger platforms are converted.

a. Does not utilize open database structure
b. Relies on other portions of MicroSnap being implemented

- SFM (Supply and Financial Management) is used at battalion level for purchasing supplies
- OMMS (Organizational Maintenance Management System) provides organizational level maintenance and is not currently employed by NCF units, with no active plans to implement.
- SMS (System Management Subsystem) maintains site configuration and user access; the backbone of all MicroSnap applications and must be present for any module to run, therefore it is installed and operational at all MicroSnap SFM sites.
- MOSS (Maintenance and Operations Support System) manages vehicle inventory, maintenance, and operations; schedules preventive and corrective maintenance; interfaces with SFM, only if operating on the same hardware, i.e. PC workstation or LAN.
- CTS (Custody Tracking System) automates the issue/return process; works in conjunction with SFM. It is currently available at 3NCB TOA manager and Gulfport TOA managers. CTS is not currently used by battalions. However, CTS could be used to manage augment tools, since they are not managed in a hierarchical structure.
- APEX allows wed viewing of MicroSnap information. Must use MicroSnap Windows to use APEX. The Windows version is currently being beta tested at 2NCB. There is a one-time only cost to initialize use of APEX. The cost is unknown.

2. Costs to develop MicroSnap TOAMS were estimated by SPAWAR at $750,000, and a timeline of 18 months. This estimation was considered conservative, and due to revision once the final SRS is accepted. Draft POA&M has been completed. The final version will be completed after the SRS is accepted. Past performance of SPAWAR developing NCF solutions should be considered. 2NCB funded SPAWAR to develop the SRS in July 1999. Current anticipated completion date is CY 2001.

Why are we not using an open database for TOA management?

Why are there unique requirements for force-level TOA and field-level TOA management systems? Are there any restrictions from preventing a single solution?

Tasking 4.2 MOSS-OMMS link

No interface currently exists between MOSS and OMMS to complete the SCLSIS loop. There is no time or cost estimates for this link at this time.

APPENDIX L

Meeting Minutes: WSF/CDMD-OA Conference
24 October 2000

Meeting was held at 0800, 24 October 2000 in Room G200/201 at NFESC Bldg 1100 Port Hueneme, CA.

Attendees:

Craig Sheesley, NAVICP-M
Steve Santos, NAVICP-M
Rob Johnston, NFESC
Anne Lyons, NFESC
Dave Schuelke, NFESC
LCDR(s) Shawn Cullen, CBCHUE
Don Curtis, CBCHUE
Dave Winn, CBCHUE
Elizabeth Collins, CBCHUE
Judy Totten, CBCHUE
Ruben Frutos, CBCHUE
Art Quilantang, CBCHUE
SKCS Leandro Senores, 31st NCR
Sonia Murphy, EFDSW
Debbie Schultzel, NITC

ISSUES:

Can the Weapon Systems File be modified to accommodate the hierarchical structure of the NCF TOA?

Can configuration management of field level TOA be implemented through the use of the Weapons System File (WSF)?

DISCUSSIONS:

1. The "WSF" is actually two sets of databases – WSF and Configuration Data Management Database – Open Architecture (CDMD-OA)

2. WSF is maintained by NAVICP-M. WSF database is divided into three separate database files – Level A, Level C, and Master Item File (MIF):

   Level A – relates Ship Unique Identifier Code (UIC) to Allowance Parts List (APL) or Allowance Equipage List (AEL)
   – contains the ship's configuration data

   Level C – relates APL/AEL to parts
   – contains equipment configuration and technical data

   MIF – relates NIIN to APL/AEL
   – contains item management data

3. WSF is an asset tracking database only

4. CDMD-OA database is central repository for configuration management data:

   a. Updated electronically by CDM via MicroSnap OMMS module which automatically updates WSF Level C, updates Level A every two weeks
   b. Hierarchical Structure Code (HSC)
      - 12-digit code, functionally identifies the equipment within the system
      - First five digits based on the Expanded Ship Work Breakdown Structure (ESWBS)
      - Relates directly to an APL/AEL number

5. APL/AEL is the common data field between the WSF and CDMD-OA

   a. Allowance Parts List is a listing of parts required to repair/maintain equipment in the field; the APL is computed using FLSIP Model and 3-M maintenance data
   b. Allowance Equipage List is a listing of parts required for a piece of equipment to function/perform; all items must be provided

CONCLUSIONS:

Can the Weapon Systems File be modified to accommodate the hierarchical structure of the NCF TOA?

The NCF should be able to utilize the WSF and the CDMD-OA. The following points should be considered for feasibility:

- Install MicroSnap OMMS at CBCHUE for Configuration Data Managers
- Install MicroSnap OMMS at the field level
- Code the TOA Hierarchical Structure to fit the HSC (see figure 1)
- Investigate use of computer script to automatically develop hierarchy codes vice human effort
- Investigate possibility of MicroSnap TOAMS as database for field unit requirements
- Investigate use of WSF "Planned Adds" with the same HSC as "Installed" HSC; theoretically requirements may be compared to assets

Can configuration management of field level TOA be implemented through the use of the Weapons System File (WSF)?

The NCF should be able to manage the configuration of field level TOA by developing AELs for:

- TOA Assemblies
- TOA Kits

- Communications gear
- Weapons
- Field repairable items

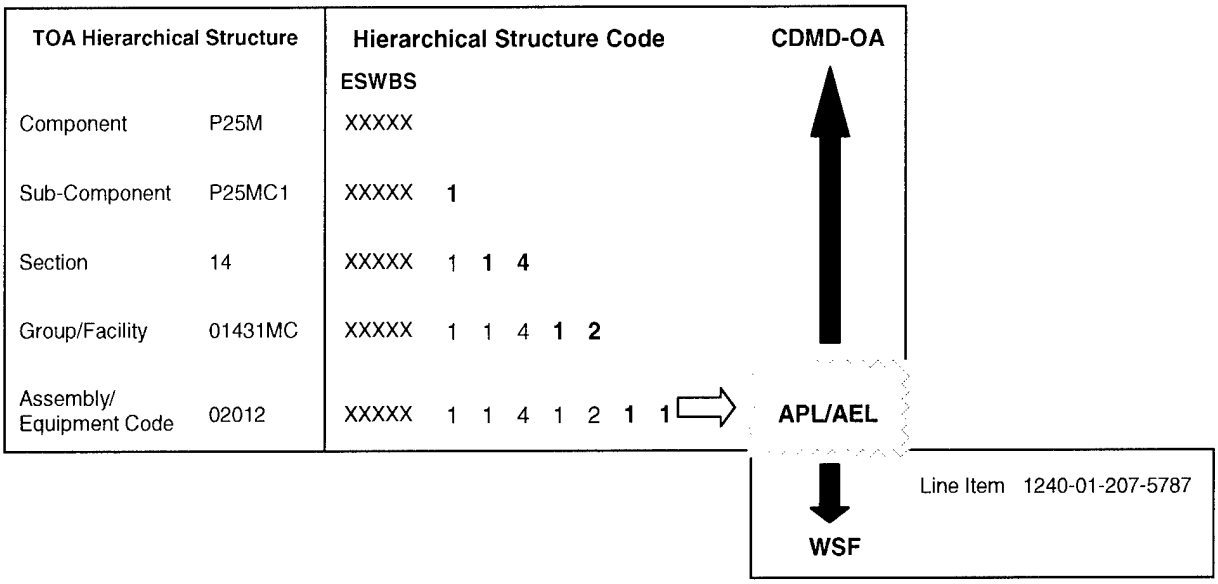


Figure 1. Example of TOA, CDMD-OA and WSF Relationship.

APPENDIX M

Notes from MicroSnap Conference
07 Nov 00

Attendees:

Don Curtis, CBCHUE Code N6
Dave Winn, CBCHUE Code N6
Anne Lyons, NFESC Code 32
Katy Lunsford, NFESC Code 32
Dave Schuelke, NFESC Code 221
SKCS Senores, 31st NCR R41C
Judi Takahara, CBCHUE Code N6
Brian Garrigan, SPAWAR Code 91
Mark Anderton, SPAWAR Code 90

There are 600 people at Space and Naval Warfare Systems Command, Chesapeake Division. SPAWAR is primarily responsible for non-tactical support systems for supply and admin systems afloat and ashore - surface, subsurface, aviation, ground; cradle to grave support - design, development, implementation, life cycle support. MicroSnap, NALCOMIS, NCTSS, ATLASS II+ are some of their programs, products.

Funding to SPAWAR is reimbursable from customers (including CNET). Normally, they develop a product for a customer but if we could get together with SPECWARCOM, perhaps we could share costs with them.

ORGANIZATIONAL MAINTENANCE MANAGEMENT SYSTEM (OMMS) - DOS based

OMMS system manages the organizational level equipment configuration, equipment maintenance, and logistical support data. Integral part of SCLSIS loop. Feeds data to the Configuration Data Manager (CDM) to CDMD-OA to WSF. Automates the 3M (Maintenance and Material Management) tracking and reporting system using 2K and CK forms. 3M is the maintenance portion of OMMS and is administered by NAVSEA 04. OMMS NG (new generation) will replace old OMMS program under SNAP and is used in NCTSS.

Equipment Configuration

Equipment Maintenance Management

Logistics Support Data Management

SCLSIS Loop

Automated Shore Interface (ASI) updates from the CDM are loaded into MicroSNAP

Interfaces - OMMS interfaces with SFM; allows parts to be ordered by NSN or part number

Discussion

OMMS feeds data through the SCLSIS loop via 2K or CK. A 2K is opening a job against the equipment (work order). A2K relates directly to an ERO in MOSS. Changing brake shoes on a

truck is an example of a 2K. A CK is an actual part change or a new part e.g. deleting one part and adding another. A brand new model of a brake shoe uses a CK.

MOSS is not capable of reporting anything into the CDMD-OA. That is all locally kept info. Terms (words) describing OMMS and MOSS may be different but yet describe the same process. SKCS Senores says we need a meeting to determine what OMMS cannot provide. MOSS and OMMS are starting to merge.

Determine what information from systems development is required to implement MOSS/OMMS link. We've already spent a lot of money getting this info; how can we take advantage of what we already have in MOSS without reinventing the wheel? Answer is more on the data elements than on the equipment side. Place CESE equipment in OMMS but keep it also in MOSS so people will not see as big a change. This isn't the most efficient way to do this but probably the most practical.

CDM is responsible for equipment configuration. Analysis of maintenance data falls under NAVSEA responsibility. NCF may require a separate CDM for each unit in the field, and possibly a counterpart at each brigade. Each NMCB is not the same just as each ship in the same class is not the same. UIC stays at the deployment site. When a battalion goes to a specific site (say Rota) a site UIC is used in addition to the Battalion UIC.

SUPPLY FINANCIAL MANAGEMENT (SFM) - DOS based

SFMs on ships use OMMS. CMs, GMs, and ITs use OMMS in Seabee battalions. SFM automates management of material requirements, requisition, receipt, inventory, and financial accounting functions. Adheres to NAVSUP P-485 requirements. Provides some supplemental data based on the customers indiviual requirements. Transmits data via DAMES, DAAS, SALTS, STARS-FL.

Requirement, Requisition and Receipt Management

Once SFM becomes windows based, complete ERO process will be automated through MOSS/SFM. Prototype of windows based SFM starts this next Monday (13 Nov) and will be available 90 days later. MOSS feeds data into SFM. SFM does not feed data back into MOSS. Won't have to go to SFM to determine status. 58 sites will be using MOSS. At a major deployment site, there could be four or five different users.

Inventory Control Management

Financial Management

Interfaces

SFM interfaces with OMMS via ASI, APL/COSAL, SEAS reporting.

Discussion

SFM future enhancements include reimbursable control codes and standard document numbers.

MAINTENANCE AND OPERATION SUPPORT SYSTEM (MOSS) - Windows based

There is no APL data in MOSS. The functionality could be placed in MOSS if needed. MOSS manages vehicle inventory, maintenance, and operations of CESE. MOSS does for CESE equipment what OMMS does for non-CESE equipment. MOSS key benefits includes managing vehicle inventory, vehicle maintenance, operations, schedules preventive maintenance, flexible configuration, and role-based user access. MOSS, OMMS, and SFM will work together in any combination.

Equipment Configuration Data
Dispatch Operations
Reports (On-line or printed)
Manage Direct Turnover (DTO) Parts
Maintenance Supervisor Review
Off-site data exchange
The intention of the downloaded ERO data was to provide a historic reference of what's been done. Historical data cannot be updated to enter missed data.

Discussion

R46 currently has two stand-alone applications according to Judi. Two separate offices perform maintenance and operations of CESE equipment. R46 is done at the end of the Ethernet line. They have poor conductivity and routing is a problem. They go off-line frequently. Data is transferred to a diskette or other electronic file and transported to the other office. When at a deployed site, there may be only two laptops and connectivity to main site may not be available. R46 maintenance is connected to a LAN.
Are component substitutes available? Not through SFM.

Detach and deploy a subset of equipment will be a future enhancement. Additional future enhancements will be discussed at a users group meeting this month.

CUSTODY TRACKING SYSTEM (CTS) - Windows based

Automates the issue, turn-in and custody processes using both CTS-unique data and data from MicroSNAP SFM

Functions

Individual custody records
Issues and turn-ins
Financial reports
Master templates
Import/export custody records

Interfaces

CTS interfaces with SFM

Discussion

Future enhancements include interface with MicroSnap TOAMS and ad-hoc query.
Navairwarcen Pax River (AIT for Navy) has a contract for SPECWAR to determine an inventory system with bar coding.
CTS and TOAMS are not related; use both at the same time. CTS can be used to track augment tools.

TABLE OF ALLOWANCE MANAGEMENT SYSTEM (TOAMS) – Windows based

Implementation timeline for TOAMS is not available - a conservative estimate 18 months and $750,000. TOAMS draft software requirements specification (SRS) has been developed. Visited Camp Moscrip to observe business practices. Reviewed existing software (ABFC view, SAMMS/ILO). Questioned representatives of the Seabee community. Draft SRS being reviewed by 2NCB. Draft POA&M developed, will be finalized after approval of SRS.

Functions

Viewing of TOA and ABFC
Maintain TOA
Maintain augment
Excess/shortage maintenance

Discussion

TOA is actually deployed at the site. ABFC is missing sequence (assembly/facility) numbers.

TOAMS will have the ability to track home site equipment as well as track a detached subset of the TOA.

The ability to repack equipment is needed since original packing may not be available or in good condition. ALS has different packing scenarios. There is a proposed interface between ALS and TOAMS; TOAMS talks to MicroSnap. Master (original) packing data should be with TOAMS which gets the location of equipment within a container location from ALS.

MOSS maintains CESE equipment. OMMS data is not visible within TOAMS.

APEX – Internet based

Intranet/internet-based centralized data repository providing claimancy-wide query capability
Microsnap is an end-user product of APEX

Discussion

Seabee community will control access; not SPAWAR. Foxpro is database. Should be available early next year.

GENERAL DISCUSSION

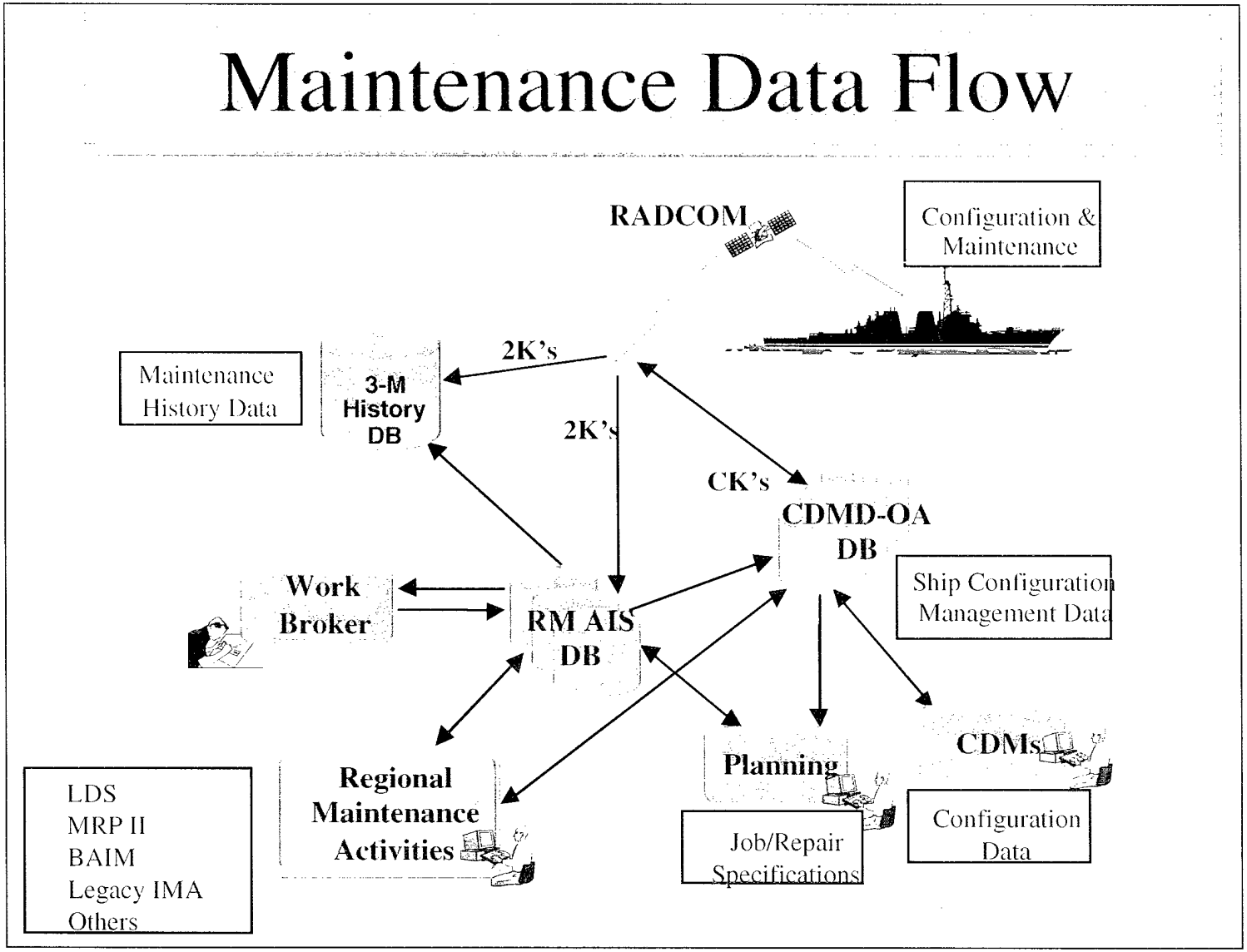
MicroSnap will run on a stand-alone pc, lan, or regional system. There are over 300 customers using MicroSnap. MicroSnap was originally designed from SNAP II for customers who didn't have the equipment to run the Navy Tactical Command Support System (NTCSS) suite, which is a client server.

MicroSnap may not be useful eight years down the road. Everyone may be required to migrate to the NTCSS suite.

3M SKED is a separate program developed by NAVSEA.

SPAWAR does not have a standard costing scheme across all programs; can offer the whole range of services. We should come to an agreement that we will support the program once implemented. We should not to go into production until a business agreement has been reached.

APPENDIX N


Maintenance Data Flow
RADCOM
Configuration & Maintenance
Maintenance History Data
3-M History DB
2K's
2K's
CK's
CDMD-OA DB
Ship Configuration Management Data
Work Broker
RM AIS DB
CDMs
Planning
Regional Maintenance Activities
Job/Repair Specifications
Configuration Data
LDS
MRP II
BAIM
Legacy IMA
Others

APPENDIX O

Lessons Learned: Total Asset Visibility Project (now TOAMS)

Background

This Lessons Learned covers the period from August 1998 to the present (November 2000). The absence of asset visibility at our deployed sites had become the focus of attention in August 1998. The bulk of the assets are contained in a battalion's Table of Allowance (TOA). This compromised efforts to manage assets and provide total accountability. 2NCB initiated Total Asset Visibility (TAV) efforts by attempting to capture the needed information into MicroSNAP.

This first effort failed because the data structure required to reflect the TOA's hierarchal structure could not be duplicated in the then current version of MicroSNAP.

The concept of visibility expanded to encompass accountability and thus the term Total Asset Accountability (TAA). In time TAA as it applied to NMCB TOAs took on the more NCF specific title of TOA Management System or TOAMS. TOAMS, more than a philosophy of asset accountability focused on field management and accountability of in-use assets.

During Calendar year 1999 TOAMS development was dedicated largely to finding and testing new technology to support our requirements. Software and hardware tested were, APEX (SPAWAR), MicroSNAP alteration, Advanced Loading System (ALS), Cubiscan, 3Comm's Palm computing platforms with scanning capability (PalmIIIx).

"TOAMS 2005" was an idea of how a variety of current hardware might work together to perform some tasks if they could interface with a larger system. That larger system was not addressed in "TOAMS 2005". The source documentation for this idea is a Power Point Presentation of the same name.

The Seabee Logistics Center created a web accessible asset visibility map that reflected NCF assets worldwide. At that same time a Computer Aided Design (CAD) style three-dimensional (3D) display of packed assets (that is of CB material in an ISO container) was considered very useful in asset management. The intent was to provide the CB in the field enhanced visibility of assets, right down to where it was in a sealed ISO container and to provide feed back on asset location to this asset visibility map.

It was this vision that led the team to research visually diagramed asset packing and movement programs. Typically these products either focused on In Transit Visibility (ITV) or creation of packing plans based on cube and weight, not dimensions and loading orientation. Others produced pictures as dictated by the user. We found one that would take the raw information about the material to be packed and tracked and produce visual (3D) loading plans, and asset tracking, ALS. (ALS is in use by a number of large corporations, for example FedEx. ALS provides FedEx with ITV and load plans on the fly among other practical and administrative features.)

AREAS RESEARCHED/DEVELOPED:

ALS:
APEX
MicroSNAP Alteration:
Cubiscan:
Portable Bar Code Readers (PBCR):
- Palm devices

Other Government Software

EFFORTS RATED:

ALS

This software created loading plans for any variety of conveyance platforms (Bulk 20 containers, 463L pallets, TRIcons, ect...). It was necessary to provide the program with the weight and dimensions of the items to be loaded. The user could set a variety of restrictions and keep together, keep apart rules, loading orientation, loading sequences and preferred container type.

The software performed wonderfully, exceeding my expectations. It followed all the rules we set for it, balanced the container and slightly reduced the number of containers we expected to use. The loading diagrams were easy to read

ALS will be more useful to the military if it is integrated into some sort of a data warehouse. During the test of ALS the dimensional data for the Bravo pack-up was recorded on excel spreadsheets. These sheets were created for ease of reading and not with data integrity or database structure in mind. So the most challenging part of the ALS test was converting the spreadsheets into something the program could understand. This "data massaging" process would be avoided if the information were already being kept in an inventory management software like MicroSNAP

Drawbacks: ALS did have trouble with smaller containers and flat racks. In the Bravo pack-up test it was necessary to visually review and change many of the recommended scenarios. The software does allow for this. It was not used for configured containers.

Recommendation: I believe that ALS would aid individuals creating Master Packing Plans and impromptu packing plans for mount out or limited cargo movement in exactly the same way that an adding machine aids an accountant. It does not replace the knowledge, intuition or experience of load planners but it can save them considerable labor. Considering that, I would like to see it interfaced with the appropriate data sources and available to SLC and embark personnel for their use.

Cubiscan

The Cubiscan by Quantronics is a device that weighs and measures objects and records that information automatically. It can feed the information into any number of software applications and works with scanners easily. It required little training.

My evaluation of this is that it has value only in an industrial warehouse, placed in an assembly line setting. Used there it could establish and keep current a baseline of dimensional data on items at the NSN level.

I do not see its utility for the larger boxes. It is faster to hand measure kit and facility boxes than it is to move the box to the cubiscan. A second draw back is that each series of the cubiscan can handle packages only within certain limited weights and dimensions. The larger ones won't "see" a small item and the smaller cubiscans cannot accommodate a large package. To measure

all of the TOA all three size machines would need to be present, and even at that the largest and heaviest items would still not fit.

My recommendation is to have one of the 100 series on the assembly line at the CBCs, strictly for the purpose of measuring the line items. I would not deploy these to a camp, DFT or det. The information collected should be fed back to Item managers.

PBCRs

We did very little direct testing of Portable Bar Code Readers. We did use and were happy with the PALM III scanner and a keyboard emulator called Wasp. PBCRs are a very straightforward decision. There are a variety of bar code readers that can interface with any number of software applications. A user can pick and choose the best device for the environment, task and worker. The range runs from very small wands and pens to Palm computing platforms, to large ruggedized guns with RF transmission.

Conclusion: We need AIT; PBCRs are well established, familiar to most users and widely available. AIT should be implemented at any data collection point practicable.

MicroSNAP ALT (Now MicroSNAP TOAMS)

The alteration to MicroSNAP, briefly, is a change to its inventory capability. Historically MicroSNAP could not accurately reflect TOA assets because of the unique nature of the TOA's hierarchy that is needed for line item data to be meaningful and the more elaborate storage (or "in use") location requirement.

Altering the inventory system, or rather adding the functionality to accommodate these two things, is the core of the alteration. Ancillary to this alteration are things like added report capability, allowances based on a TOA, Embark and Packing plan generation (via CALM, CAEMS and/or an ALS type of application that is to be imbedded in or linked to MicroSNAP), visibility to ABFCView data from SLC, expanded/improved AIT and others.

The MicroSNAP TOAMS by design follows these guiding principles:

1. It conforms to current NAVFAC conventions.
2. It is intended to provide functionality that currently does not exist.
3. It should be able to share / exchange data where such requirement exists rather than duplicate it.
4. It should be usable by ALL TOA holders, not just an NMCB or NAVFAC unit.
5. The requirements are derived from:
    a. NAVFAC, NAVSUP and NAVSEA instructions, publications and manuals.
    b. Other related instructions (example 2/3NCBINST 4400.3)
    c. Commonly accepted CB cultural practices.
    d. Direct observation and participation in the involved processes.
    e. Interviews / open communication with process owners.

Conclusion: The basis of the alteration is simple; its implementation complex. I look forward to a comprehensive TOA management tool in this alteration.

NOTE: An important point of clarification: this alteration has assumed the name MicroSNAP TOAMS. This identification is recent. It is not the TOAMS 2005 concept broadly advertised in calendar year 1999 until February 2000. These two distinct, different projects developed along different lines and by different personnel.

Palm IIIx

Palm pilot like devices show great promise for future utility if they are incorporated into a larger information system. Otherwise they are sophisticated personal organizers but of little use to TOA management.

The greater power in the palm computing devices results from writing small programs for them. This kind of effort is not something we should realistically expect of most sailors. It is for this reason that I say they should be incorporated into a larger information system.

The 3com platform we tested cold do anything a basic data base could and the programming enabled information processing, retrieval and even collection via a stylus, scanner or synchronization with another computer.

We put the ABFC view data into it and wrote a 3com based ABFCview program that worked like the familiar DOS based version. We also put one core of the Bravo pack-up into the PalmIIIx. The information consisted of Facility, Assembly, Box numbers, Sequence numbers, dimensions, capability set and packed location.

I also experimented with storing large text files for reference with great success. The Palm III with the scanner on it worked very well and scanned accurately every test.

In conclusion, the Palm computing device is convenient, versatile and powerful if properly programmed and linked to useful information. It can provide multiple functions while also being a PBCR that links or synchs with parent application. The caveat is that without programming and source data it is otherwise a sophisticated personal organizer and planner. The version we tried was not rugged and on one occasion broke beyond repair by simply dropping it once.

APEX

Apex is a centralized data repository providing claimancy-wide query capability. It can accept data from any number of sources. Currently it holds MicroSNAP data and 3NCB book data.

Our trial of this system was successful. Because MicroSNAP held only limited TOA information at the time of the test we found no immediate use in TOA. It is however very useful for supply/financial and asset management and has been used by the SPECWAR community for several years now. 2NCB will use it in FY01 for supply/financial and TOA visibility. The TOA portion, yet to be implemented, is an interim application for use until MicroSNAP TOAMS is operational.

CONCLUSION: APEX is the essential link between CB assets in the field (MicroSNAP TOAMS) and visibility of those at the brigades. Its extensive query, report and export capabilities facilitate complete, accurate analysis of any question or subject. It alleviates data calls and reporting from the field.

If MicroSNAP is maintained under current supply disciplines in accordance with current instructions and applicable publications the TOA custodian will not need to take any other action in order to have full visibility and accountability at the local and brigade level.

Other Government Software

Command and Control Applications Compendium 2000 is available at http://www.mcu.usmc.mil/ccss/CCSC/c2%20compendium/default.htm.

Overview Of Automated Systems And Capabilities

TRANSPORTATION RELATED AUTOMATED SYSTEMS AND CAPABILITIES

There are a number of transportation related command and control (C2) systems, automated information systems (AISs), and automated identification technologies (AITs) designed to assist in transportation planning, management and execution. What follows is a description of selected systems and capabilities. Where applicable, world wide web (WWW) locations and POCs for systems/capabilities have been included.

JOPES

Joint Operations Planning and Execution System

JOPES is the integrated, joint, conventional command and control system used by the Joint Planning and Execution Community (JPEC) to conduct joint planning, execution and monitoring activities. JOPES supports senior-level decision-makers and their staffs at the National Command Authority (NCA) level and throughout the JPEC. It is a combination of joint policies, procedures, personnel, training and a reporting structure supported by automated data processing systems, reporting systems, and the Global Command and Control System (GCCS). JOPES is a GCCS application.

During peacetime conditions, JOPES is used for deliberate planning to produce OPLANs, CONPLANS, and concept summaries. In crisis, JOPES is used for Crisis Action Planning (CAP) to produce OPORDs. JOPES facilitates rapid building and timely maintenance of OPLANs, Concepts of Operation (CONOPs), and concept summaries. In CAP, it supports rapid development of effective options and OPORDs in no-plan situations or when existing plans must be adapted. JOPES is used to conduct a transportation feasibility analysis after the CINC, supporting CINCs and Service components develop the TPFDD. It supports effective management of operations in execution across the spectrum of mobilization, deployment, employment, sustainment, and redeployment activities.

The Army proponent for JOPES is the DA Deputy Chief of Staff for Operations and Plans (DCSOPS), Attn: DAMO-ODO-M, 400 Army Pentagon, Washington DC 20310-0400.

Telephone is DSN 224-0655/1614 or commercial (703) 614-0655/1614. Overall proponent for JOPES is the JS/J3.

TC-ACCIS

Transportation Coordinator-Automated Command and Control Information System

The TC-ACCIS is an information management and data communications system that Army units (active and reserve) use to plan and execute deployments. System capability includes the ability to create and maintain unit movement data, prepare convoy requests, create military shipping labels and other movement documentation, and preparing vehicle load cards and vehicle/container packing lists. Principle system users within the division and installation are the UMOs, ITO, UMCs, and IC-UMOs. Selected TC-ACCIS functionality will migrate to TC-AIMS II.

Units maintain their AUEL and develop their DEL using TC-ACCIS. TC-ACCIS software resides on computers at the ITOs of CONUS installations and ITOs or movement control units in overseas theaters. The ITO, using the central computer, will consolidate requirements and transmit equipment lists and transportation requests to systems outside TC-ACCIS. For example, CONUS ITOs transmit AUEL and DEL to FORSCOM's Computerized Movement Planning and Status System (COMPASS) data base. The information can then be used to update JOPES. Through TC-ACCIS, the ITO also provides MTMC the deployment requirements (such as DEL), domestic routing requests, export traffic release requests, and passenger transportation requirements.

Questions concerning TC-ACCIS should be directed to PM, TC-ACCIS; 9350 Hall Road, Suite 142; Ft Belvoir VA 22060-5526. Telephone is commercial (703) 923-1062.

TC-AIMS II

Transportation Coordinators' Automated Information for Movement System II

TC-AIMS II is a joint information management system that provides functionality for facilitating the movement of unit personnel, equipment, and supplies during peace and war, and provides visibility data of those forces from home station to the conflict and back. Its primary mission is to support the warfighter in the planning and execution of deployment, sustainment, and redeployment of forces during peace and war. TC-AIMS II will integrate current DOD transportation systems supporting installation and unit movement requirements into a single system.

TC-AIMS II includes functionality found in three separate Service legacy systems: the Air Force's Cargo Movement Operational System (CMOS), the Army's TC-ACCIS, and the Marine Corps Transportation Coordinator's-Automated Information Management System (TC-AIMS). Planned system functionality includes providing source item level detail information on equipment and personnel to the separate Service and/or Joint TPFDD systems, rail loading and convoy planning/scheduling, automated Military Standard Transportation and Movement Procedures (MILSTAMP) documentation, common user lift requests to transportation component commands (TCCs), creating and maintaining unit equipment list (UEL)/DEL, and sharing load plan information with air/ship stow planning systems. The system will also provide GTN with unit movement ITV information for passengers and cargo. TC-AIMS II is currently in prototype development.

Questions concerning TC-AIMS II can be addressed to TC-AIMS II-JPMO; Attn: SFAE-PS-TC; 9350 Hall Road, Suite 142; Ft Belvoir VA 22060-5526. Telephone is DSN 656-0525 or commercial (703) 806-0525. More information is available on the TC-AIMS II home page at http://www.tcaimsii.belvoir.army.mil.

DAMMS-R

Department of the Army Movements Management System-Redesigned

DAMMS-R provides an automated movement information management capability to movement managers involved in providing movement control and allocation of common user land transportation in a theater. It also provides theater mode operators with a tool to assist in the management of their assets, including personnel, equipment, and terminal/trailer transfer points. The system has a financial management capability to assist in maintaining records and payment for commercial movements. DAMMS-R consists of six separate but interrelated subsystems used by transportation planners, movement managers, mode operators, traffic controllers, transshippers, and unit movement personnel. These subsystems are the shipment management module, movement control team operations module, mode operations module, convoy planning module, highway regulation module and transportation addressing module.

Currently DAMMS-R is fielded in two Blocks. Block 1 includes the shipment management, movement control team operations, mode operations and transportation addressing modules; and block 2 contains the highway regulation and convoy planning modules. DAMMS-R Block 3 will replace Block 1. It is scheduled for initial operational capability (IOC) in Mar 98 and will offer improved functionality for the modules currently in Block 1. Selected DAMMS-R functionality is planned for migration to TACIMS-II.

The POC for DAMMS-R is PM-ILOG, 800 Lee Ave, Ft Lee VA 23801-1718. Telephone is DSN 687-60476646/6653 or commercial (804) 734-6047/6646/6653.

AALPS

Automated Air Load Planning System

AALPS provides DOD with an automated information system to support the process and functions of aircraft estimation, aircraft gross load planning, deliberate load planning and execution, and tracking of movement statistics during deployments. AALPS reached IOC in Apr 97 and over 400 systems are currently fielded. Selected Computer Aided Load Manifesting (CALM) functionality is scheduled to be available in AALPS in Mar 98, with the CALM system being terminated in Jun 99. AALPS functionality is scheduled for migration to TCAIMS II. AALPS full operational capability (FOC) is planned for Jul 99.

Questions concerning AALPS can be addressed to HQ MTMC Attn: MTIM-AL, Room 517, 4040 N. Fairfax Drive, Arlington VA 22203. Telephone is DSN 426-8205 or commercial (703) 696-8205.

GTN

Global Transportation Network

GTN is an automated command and control information system that provides an integrated view of transportation information. It provides USTRANSCOM the ability to perform command and control operations, planning and analysis, and business operations to meet customer requirements. GTN also provides ITV for the defense transportation system (DTS). GTN collects

and integrates transportation information from selected DOD systems for use by transportation data customers: the NCA, CINCs, USTRANSCOM, and the Services. The system provides these users the ability to monitor movement of forces, cargo, passengers, and patients and movement of military and commercial airlift, sealift and surface assets.
GTN achieved IOC in Mar 97 and is available in both WWW and client server applications. The initial operational capability contains the ITV functionality. The command and control functionality and other capabilities are scheduled in subsequent deliveries leading to the planned GTN FOC in Aug 99.
The GTN Program Management Office is located at USTRANSCOM; TCJ6, Attn GTNPMO; 508 Scott Drive; Scott Air Force Base, IL 62225. Telephone is DSN 576-2866 or commercial (618) 256-2866. The POC for GTN training is USTRANSCOM J4-JTO, DSN 576-8042 or commercial (618) 256-8042. The POC for user accounts is USTRANSCOM J4-MSS, DSN 576-8015 or commercial (618) 256-8015. More information about the GTN system is available at http://wwwgtn.safb.af.mil/homepage/. Additionally, Appendix A provides instructions for obtaining access to GTN.

AIT

Automated Identification Technology
AIT encompasses a variety of read and write storage technologies that capture asset identification information. These technologies include bar codes, magnetic strips, integrated circuit cards, optical memory cards (OMCs) and radio frequency (RF) identification tags. They are used for marking or "tagging" individual items, multipacks, air pallets, and containers. AIT devices offer a wide range of data storage capacities from a few characters to thousands of bytes. The devices can be interrogated using a variety of means including contact, laser, or RF. The information obtained from the interrogations can then be provided electronically to automated information systems. AIT includes the hardware and software to create the storage devices, read the information stored on them, and integrate that data with other logistics data. AIT also includes the use of satellites to track and redirect shipments.

Bar Codes

A bar code is an array of parallel, narrow, rectangular bars and spaces that represent a group of characters in a particular symbology. Bar codes are applied on labels, paper, plastic, ceramic, and metal by a variety of marking techniques. A reader scans the bar code, decodes it, and transfers data to a host computer. Within DOD and the Army a common use of linear bar codes is the military shipping label which contains the transportation control number (TCN) and other transportation information. In the future, DOD plans to phase in two-dimensional bar codes for selected areas of use. Two dimensional bar codes have a greater data capacity and are more durable than linear bar codes.

Radio Frequency Identification (RFID) tags

RFID is used to identify, categorize, and locate people and materiel automatically within relatively short distances (a few inches to 300 feet). The RFID labels are known as tags or transponders. They contain information that can range from a permanent ID number programmed into the tag by the manufacturer to a variable 128-kilobyte memory that can be programmed by a controller using RF energy. The controller is usually referred to as a reader or

an interrogator. An interrogator and a tag use RF energy to communicate with each other. The interrogator sends an RF signal that "wakes up" the tag, and the tag transmits information to the interrogator. In addition to reading the tag, the interrogator can write new information on the tag, thus permitting a user to alter the tag's information within the effective range. Interrogators can be networked to provide extensive coverage for a system.

The Army uses an active RF tag that accommodates line-item detail information to provide ITV and stand-off, in the box visibility of container contents. As an example, the tag, which contains data on the container contents, is placed on the container and then read as it passes interrogators located at nodes or other critical locations within the transportation system. RFID capabilities provided by active RF tags are beneficial when a user needs to locate and redirect individual containers. RFID may also be used in an austere environment where there are inadequate systems or communications infrastructure, and to facilitate the AIS capture of asset data. The active RFID capability offers significant capabilities for yard management, port operations, and in-transit visibility (ITV). The United States Army Europe (USAREUR) currently use RF tags to track selected cargo.

Optical Memory Cards

OMCs use the optical technology popularized by audio compact disks (CDs) and audio-visual CD-ROM (read only memory) products. Although users of those products can write-once/read-many (WORM) times, the OMC differs in that information is written to the card in increments rather than at one time. An OMC can have data written to it in a sequential order on many occasions until all available memory has been used. An OMC is similar in size to a credit card and can be easily carried. DOD activities use OMCs when extensive content detail is required, such as for multipack, air pallet, container, trailer, and rail-car shipments. The Defense Logistics Agency's Automated Manifest System (AMS), uses a DOD standard OMC. The primary objective of AMS is to facilitate automated receipt processing. OMCs are used best when a data audit trail is required or an extensive amount of data has to be stored.

Satellite-Tracking Systems

A satellite-tracking system provides the ability to track the exact location of vehicles and convoys. The latitude and longitude locations of trucks, trains, and other transportation assets equipped with a transceiver are transmitted periodically via a satellite to a ground station. Some systems also provide two-way communications between a vehicle operator and a ground station for safety, security, and rerouting.

Satellite tracking uses a cellular or satellite-based transmitter or transceiver unit to communicate positional information, encoded and text messages, and (in the case of sensitive DOD ordnance movements in the CONUS) emergency messages from in-transit conveyances to the ground station. Transceiver-based technologies also permit communications from a ground station to the in-transit conveyance. A user can compose, transmit, and receive messages with small hand-held devices or with units integrated with computers. The US European Command (USEUCOM) is using satellites to track convoys and critical shipments as they move to and from Bosnia.

The following description, using USEUCOM as an example, clarifies how a satellite-tracking system works. A system has five components: a subscriber unit, satellite, earth station, network control center (NCC), and logistics managers. A subscriber unit is installed on the conveyance being tracked. The unit exchanges information with an earth station via satellite. The earth

station is connected to an NCC that stores information in electronic mailboxes. Logistics managers access their mailboxes to receive information from subscriber units and return information to them.
Questions concerning AIT for the Army can be addressed to DA DCSLOG,
US Army Logistics Integration Agency, Attn: LOIA-LS, 5001 Eisenhower Ave, Alexandria VA 22333-0001. Telephone is commercial (703)-617-4493 or DSN 767-4493. More information is available on AIT at WWW site http://lia.army.mil/ait/index.htm

Their home page is also recommended: http://lia.army.mil/

LOGAIS

Logistics Automated Information System
Primary Purpose: A family of systems used to track people, supplies, and equipment. The coordinated, mutually supporting, personal computer based programs support peacetime operations and immediate, on-hand crisis action/time sensitive operational and logistics planning and execution of deployment and redeployment of MAGTF and NSE in independent, joint and combined operations.
Contains Marine Air Ground Task Force War planning System II (MAGTF II), MAGTF Deployment Support System II (MDSS II), Transportation Coordinators' Automated Information Management System (TC AIMS), Asset Tracking for Logistics and Supply System (ATLASS), Computer Aided Embarkation Management System (CAEMS), Automated Identification Technology (AIT), and the MAGTF Data Library (MDL).

MDSS II

MAGTF II Deployment Support System II is a unit database and all of a unit's equipment resides in it. It does allow one item to be associated with other items. This is MDSS II's "Association" function. It can create a parent for an NSN level item. The analogy to this might be understood as Assembly to NSN or APL to NSN. The systems capability stops with this single level of association and is therefore incompatible with the much more complex TOA hierarchy system.

CALMS

Computer Aided Load Manifesting System Is the system that provides an interactive graphics tool for producing detailed aircraft load plans which meet aircraft constraints (less commercial aircraft), based on data imported from MDSS II. Capability has been used as standalone program for some time.