

# Carderock Division Naval Surface Warfare Center

West Bethesda, Maryland 20817-5700

---

**CDNSWC-TSSD-98-06** July 1998  
Total Ship Systems Directorate  
Research and Development Report

## **PLAN FOR DOD WIDE DEMONSTRATIONS OF A DOD IMPROVED INTERACTIVE ELECTRONIC TECHNICAL MANUAL (IETM) ARCHITECTURE**

by

Joseph J. Fuller, Chairman  
Tri-Service IETM Technology Working Group



---

Approved for Public Release - Distribution Unlimited

---

# CONTENTS

<b>ABSTRACT .....</b>	<b>1</b>
<b>ACKNOWLEDGEMENTS .....</b>	<b>2</b>
<b>1.0 BACKGROUND .....</b>	<b>3</b>
1.1 Problem.....	3
1.2 NAVAIR Initiative.....	4
1.3 Tri-Service IETM Technology Working Group Task .....	4
1.4 Joint Logistics Commanders Requirements.....	4
1.5 Purpose of the Present Report.....	5
<b>2.0 TRI-SERVICE IETMTWG TASK PLAN .....</b>	<b>6</b>
2.1 Overall Task Plan.....	6
2.2 Schedule for DoD Effort.....	6
2.3 Products Needed Prior to Demonstrations .....	6
2.4 Technical and Management Teams Established .....	7
<b>3.0 OBJECTIVE OF PILOT DEMONSTRATIONS .....</b>	<b>8</b>
<b>4.0 CRITERIA FOR SELECTING CANDIDATE SYSTEMS .....</b>	<b>9</b>
4.1 General.....	9
4.2 Specific IETM Technology.....	9
4.3 Weapon System Program Commitment .....	9
<b>5.0 APPROACH TO AND IDENTIFICATION OF CANDIDATE PILOT-DEMONSTRATION SYSTEMS .....</b>	<b>11</b>
5.1 Army Candidate Systems.....	11
5.2 Navy Candidate Systems .....	11
5.3 Air Force Candidate Systems.....	11
5.4 Marine Corps Candidate Systems .....	12
5.5 Overall Tri-Service Perspective .....	12

<b>6.0 SUMMARY OF PILOT-DEMONSTRATION COVERAGE AND SUPPORT ORGANIZATIONS .....</b>	<b>13</b>
6.1 Weapon System Programs Participating in Pilot Demonstrations.....	13
6.2 Range of Selected IETM Technology and Complexity.....	13
6.3 Organizational Support for the JIA Demonstration Effort .....	16
6.4 Measures of Effectiveness .....	16
6.4.1 Army Planned Metrics.....	16
6.4.2 Navy Planned Metrics .....	19
6.4.3 Air Force Planned Metrics.....	19
6.4.4 Marine Corps Planned Metrics .....	20
<b>7.0 SUMMARY OF ARMY PILOT-DEMONSTRATION SYSTEMS .....</b>	<b>21</b>
7.1 AN / PPS-5.....	21
7.2 EPLRS Net Control Station (NCS) (V)2 and (V)3 .....	23
7.3 Apache Longbow .....	26
<b>8.0 SUMMARY OF NAVY PILOT-DEMONSTRATION SYSTEMS .....</b>	<b>30</b>
8.1 LM2500 Gas Turbine System.....	30
8.2 F/A-18.....	37
8.3 ATIS-AIR Server .....	40
8.4 NSSL Digital Library Design Project.....	43
8.5 Submarine Ship System Manual (SSM) .....	44
8.6 E-6B .....	53
<b>9.0 SUMMARY OF AIR FORCE PILOT DEMONSTRATION SYSTEMS .....</b>	<b>61</b>
9.1 General Methods and Procedures Technical Order (TO) .....	61
9.2 F-22.....	63
9.3 JSTARS.....	64
<b>10.0 SUMMARY OF MARINE CORPS PILOT-DEMONSTRATION SYSTEMS .....</b>	<b>67</b>
10.1 The Tactical Air Operations Module and the Tactical Interface Group (AN/TYQ-23) ....	67

10.2 Tactical Remote Sensor System.....	69
10.3 Diode Demonstration Set, TS-268A/U-B,U-D (SL-4-00019).....	72
10.4 Advanced Amphibious Assault Vehicle (AAAV).....	74
<b>11.0 SYSTEMIC PILOT-DEMONSTRATION AND LABORATORY EVALUATION EFFORT .....</b>	<b>78</b>
11.1 Background .....	78
11.2 Purpose.....	79
11.3 Planned Effort.....	79
11.4 Tasks .....	80
11.5 Scope.....	80
11.6 Approach.....	80
11.7 Resources Required (Hardware/Software).....	81
11.8 Demonstration Participants .....	81
11.9 Risks.....	82
11.10 Metrics (Measures Of Effectiveness) To Be Used .....	82
11.11 Exit Criteria.....	82
11.12 POA&M .....	82
11.13 Special Considerations .....	83
<b>APPENDIX A – TECHNICAL TEAM .....</b>	<b>84</b>
<b>APPENDIX B – MANAGEMENT TEAM .....</b>	<b>84</b>

This page Intentionally Left blank

## ABSTRACT

This Report describes the Pilot-Demonstration Phase of the development of a Joint IETM Architecture (JIA) designed to assure Service-wide interoperability of Interactive Electronic Technical Manuals (IETMs) based on emerging World Wide Web technology. The goal of the JIA is to provide an environment in which all legacy, and newly acquired, Electronic Technical Manuals can be read by any end user with a common user-interface display system, regardless of authorship of the Technical Information.

The JIA development program is being carried out by the Tri-Service IETM Technology Working Group (IETMTWG), chaired by the Naval Surface Warfare Center, Carderock Division (NSWCCD), in accordance with directives established by the Office of the Assistant Deputy Undersecretary of Defense (ADUSD(LRM)) and the Joint Commanders Group for Communications and Electronics (JCG-CE) of the Joint Logistics Commanders. The development effort will culminate in the promulgation of appropriate policy directives, user-guidance documentation, and appropriate MIL-PRF-acquisition documents to assure full-spectrum interoperability.

The Pilot Demonstration Phase of the effort has been established to demonstrate that representative systems of the Army, Navy, Air Force, and Marine Corps can successfully be made JIA-compliant with a minimum of effort. The demonstration systems chosen for this purpose by Service members of the IETMTWG include a complete range of IETM complexity, from the simple forms of digitized legacy Technical Information to the most highly developed and integrated interactive Technical Information systems. Similarly, they include a broad spectrum of commercial technologies now in use for generation of IETMs.

Military systems chosen for the Pilot Demonstration Phase are the following:

### Army:

- AN/PPS-5 Radar System Computer
- EPLRS Net Control Station
- Apache Longbow

### Navy:

- LM-2500 Gas Turbine System
- F/A-18 Aircraft
- ATIS-AIR Server
- New SSN (NSSN) Digital Library
- Submarine Ship System Manual (SSM)
- E-6B Aircraft

### Air Force:

- General Methods and Procedures TO
- F-22 IMIS
- JSTARS

### USMC:

- AN/TYQ-23 Tactical Air Operations Module
- Tactical Remote Server System
- Diode Demonstration Set TS-268A/U-B, U/D
- Advanced Amphibious Assault Vehicle (AAAV)

This Report summarizes the demonstration plan for each of the above systems.

## ACKNOWLEDGEMENTS

A number of people have contributed to the preparation of this Report, particularly in preparing the Pilot Demonstration plans involved. The efforts of the following people have been especially important:

Arnie Dow (MKI)

Gary Forrester (BTAS)

Glenn Handrahan (AERA)

Eric Jorgensen (NSWCCD)

Robert Kidwell (ManTech)

Pushpa Merchant (PBM Associates)

Sam Rainey (SSTC)

Greg Ransom (MKI)

Bill Rumschlag (Newport News Shipbuilding)

Frank Skewes (Electric Boat)

George Vlahos (BTAS)

## **1.0 BACKGROUND**

The transmission of digital data within the Military Services is quickly becoming the dominant method for communicating and accessing Technical Information needed to maintain DoD field operations. In response to directives from the Office of the Secretary of Defense, all of the Military Services have ongoing efforts to convert paper-based technical documentation into digital format. They are rapidly replacing existing maintenance and logistic-support Technical Manuals with Interactive Electronic Technical Manuals (IETMs). Since this data is needed to sustain war-fighting capability in Joint operations, a uniform approach is required for acquiring, managing, and viewing this information. Accordingly, procurement of Technical Information using divergent technologies and formats must be replaced by a coordinated procedure. Regardless of the source, weapon-support data must be read and viewed by a common user-interface system, and must be accessible from a uniform electronic technical-library interface. Such a common process for managing and deploying digital data will make most effective use of existing resources and will assure maximum interoperability

### **1.1 Problem**

In 1992 the DoD issued three Military Specifications for Service-wide use in the acquisition of IETMs. In accordance with these specifications, advanced database-oriented IETMs are now being acquired for many of the DoD's new major weapon systems. In addition, millions of pages of existing paper Technical Manuals have been converted to digital form. Due to the level of technology when the Specifications were issued, nearly all early IETM developers had to create both new authoring systems and compatible user-presentation systems. These authoring and presentation systems, developed for individual IETMs, were necessarily interdependent, and an IETM authored by one activity could not necessarily be viewed using a presentation system developed by another activity. There was no de facto standard such that a final IETM package delivered to the Government could be viewed accurately with a standard presentation system. Initially, this was not a problem for a weapon-system Acquisition Manager who acquired IETMs, because the developer, typically a prime contractor, was able to control both the IETM and the display system for the dedicated user population for any particular weapon system. But, as the use of IETMs became more widespread, it became important to establish an infrastructure to manage and distribute IETMs and IETM updates to multiple field sites and to provide life-cycle support for numerous IETMs. In this environment, a lack of interoperability, consisting of a situation in which differing IETMs can neither be viewed on the same standard presentation system nor electronically reference each other, has become a major impediment to the effective use of IETMs in providing field support to operational weapon systems. Also, since a common definition of the structure of the delivered IETM is lacking, it has been very difficult to define



the requirements for, or to make the initial design of, a standard infrastructure to support IETMs in the field.

### **1.2 NAVAIR Initiative**

The F/A-18 Program Office (PMA-265) and the Naval Air Systems Command (NAVAIR 3.6) recognized this problem and initiated a major study to develop a Navy IETM Architecture (NIA) which will assure wide electronic Technical Information interoperability. The Naval Surface Warfare Center, Carderock Division (NSWCCD), formulated a technical approach to resolving these interoperability problems through the use of WWW technology and COTS products. The proposed approach was reviewed and concurred with by NAVAIR-3.6 and Naval Aviation Weapon System Programs including the F/A-18, V-22, JTCTS, H-60, and H-1 during an August 1996 meeting at the Naval Postgraduate School and subsequent meetings of the NAVAIR Executive Steering Committee. A program to carry out the required effort was funded by the F/A-18 Program Office and was conducted under the technical leadership of the Fleet User-Systems Design Branch (Code 2052) of NSWCCD. This effort is supportive of the Navy Logistics Information Strategy Plan (NLISP) of 8 July 1997.

### **1.3 Tri-Service IETM Technology Working Group Task**

In October 1996, NSWCCD presented this approach to representatives of the OSD(CALS) Office, who concurred with the proposed Architecture and requested a review by the Tri-Service IETM Technology Working Group (IETMTWG). In December 1996, the DoD Tri-Service IETMTWG, chartered by the OSD CALS Office of DUSD(L), endorsed the NAVAIR Project Plan as an approach which offers the potential for a DoD-wide solution. At the request of the OSD CALS Office, the IETMTWG has outlined a program to adapt and expand the NAVAIR project into a DoD-wide effort that involves prototyping and testing the improved interoperability methodology using a Tri-Service spectrum of weapon systems. This Tri-Service IETM Interoperability Task was officially funded by OSD in November 1997 to prototype and test a DoD methodology and architecture.

### **1.4 Joint Logistics Commanders Requirements**

The proposed Tri-Service IETMTWG planned effort has been reviewed by the Technical Publications Subpanel of the Joint Commanders Group for Communications and Electronics (JCG-CE) as a solution to one of the major goals of the JCG-CE Publications Panel, the achievement of field interoperability for IETMs. The proposed approach was approved, and the

Joint Logistics Commanders (JLC) recommended, by a memorandum<sup>1</sup> of 10 June 1997, that the Deputy Under Secretary of Defense (Logistics) modify the Tri-Service IETMTWG Charter to include JCG-CE goals, and that the project be conducted as a collaborative effort between the JCG-CE and the Tri-Service IETMTWG. In his letter of 9 July 1997, the DUSD(L) concurred with recommendations of the JLC.<sup>2</sup> A new Charter<sup>3</sup> for the IETMTWG incorporating the JCG-CE goals was promulgated on 20 June 1997.

#### **1.5 Purpose of the Present Report**

The purpose of the present Report is to summarize the status of current planning for the Pilot-Demonstration phase of the IETMTWG Task and to identify and describe Service weapon systems selected for this purpose. These Systems have been chosen both to cover a wide range of technology and to provide a broad representation of the types of Electronic Technical Information now in Service use. For those Systems for which commitments to participate in the Pilot-Demonstration program have been received from the appropriate Program Managers, the Report also includes more detailed System descriptions. Proposed in-house Laboratory demonstrations and evaluations to supplement these efforts, in order to provide information at a system level, are also described.

---

<sup>1</sup> **Memorandum for DUSD (Logistics)** from Joint Logistics Commanders, 10 June 1997. Subj.: Recommendations to Modify Tri-Service Interactive Electronic Technical Manual (IETM) Technology Working Group Charter to Incorporate Goals of Joint Commanders Group for Communications Electronics (JCG-CE) Electronic Technical Publications Panel.

<sup>2</sup> **Memorandum for Joint Logistics Commanders** from DUSD (Logistics), dtd 9 July 1997. Subj.: Modification of Tri-Service Interactive Electronic Technical Manual (IETM) Technology Working Group Charter to Incorporate Goals of Joint Commanders Group for Communications Electronics (JCG-CE) Electronic Technical Publications (ETP) Panel.

<sup>3</sup> **Memorandum for Chairman, Tri-Service IETM Technology Working Group**, from Acting Director, CALS, 20 June 1997, Subj.: Charter Approval.

## 2.0 TRI-SERVICE IETMTWG TASK PLAN

### 2.1 Overall Task Plan

The overall schedule for the execution of the IETMTWG task was established initially at the March 1997 meeting of the Tri-Service IETMTWG and reviewed at the September 1997 meeting. The technical effort was planned as an 18-month effort, a time period consistent with the requirements of the JCG-CE. With the issuance of project funding by the OSD(CALS) Office on 16 November 1997 and the forwarding of funds by NSWCCD to the other Services on 25 November 1997, the official start date of the effort was established as 1 December 1998. The overall schedule follows:

### 2.2 Schedule for DoD Effort

I.	Establishment of Requirements and Issues	12/01/97 - 03/28/98
II.	Refinement of Architecture and Pre-Test Planning	04/01/98 - 06/31/98
III.	Pilot-Demonstration Phase	07/01/98 - 12/30/98
IV.	Analyze Test Results	01/01/99 - 03/31/99
V.	Recommend Policy, and Prepare Guidance Documents and Specifications	04/01/99 - 06/30/99

### 2.3 Products Needed Prior to Demonstrations

At its 28-29 January 1998<sup>4</sup> meeting, the IETMTWG identified the following actions and products as required prior to the start of the Pilot Demonstrations:

- Firm commitment from Project Managers of all Demonstration Systems to participate in the Pilot-Demonstration program
- Development of Measures of Effectiveness (MOEs) for Cost/Benefit Analyses
- Demonstration Plans (Generic and specific to each Demonstration System)
- Initial DoD Architecture and Products needed for Demonstrations
- Detailed technical report on proposed DoD Architecture
- Converted data for Demonstrations
- Tutorials for IETM managers, developers, and users

---

<sup>4</sup> Minutes of the 28-29 January 1998 meeting were distributed to Service members of the IETMTWG.

- Resolution of issues required to carry out Demonstrations
- Release of funding for remainder of Tri-Service effort.

#### **2.4 Technical and Management Teams Established**

At the March 1997 meeting of the IETMTWG, it was agreed that such a DoD Interoperability Effort should be planned and conducted for each Service by an in-house Laboratory, or by a support contractor with extensive knowledge of Service IETM policy, procedures, and technology. Such a Tri-Service Pilot-Demonstration phase of the DoD Architecture would involve a careful definition of the Service IETM–interoperability problems and requirements, interaction with the System Acquisition Managers of the selected pilot systems, and evaluation to determine the cost-effectiveness of the improved Architecture for the systems selected.

In order to develop and demonstrate an improved interoperability DoD IETM architecture, a Technical Team was formed under the IETMTWG. Based on its experience in developing the Navy IETM Architecture, the Navy was selected to lead the DoD effort. Eric Jorgensen of NSWCCD was named as the DoD Task Leader. Key members of the NAVAIR Technical Team from NSWCCD and ManTech formed the core of the Tri-Service Interoperability Team. Additional Service Representatives were added to the Technical Team by the appropriate Service members of the IETMTWG. Current Service Technical Team members include: PBM Associates (Army), MKI (USMC), BTAS (Air Force), and AERA, Newport News Shipbuilding, General Dynamics Electric Boat (Navy). A list of current members of the Technical Team is given in Appendix A.

At its January 1998 meeting, the IETMTWG considered that a Management Team should be established within the DoD Interoperability Task Team to resolve or coordinate the resolution of management Issues and propose policy decisions involved in design and implementation of the improved interoperability Architecture, particularly in those areas beyond the purview of the Interoperability Task Team. The following were designated as members of this Team: PDSM (Air Force), LOGSA (Army), MCSC (USMC), NAVAIR/NAVSEA (Navy), and Tri-Service IETMTWG Chairman. A list of current members of the Management Team is given in Appendix B.

### 3.0 OBJECTIVE OF PILOT DEMONSTRATIONS

The objective of the Pilot Demonstrations is to demonstrate end-user interoperability of a broad DoD spectrum of proprietary and legacy Electronic Technical Manuals by encapsulating them into a common IETM view package format which can be viewed by a single commercially available user-information interface.

The above Objective implies establishment of the following technical capabilities:

- An authoring system to effectively create and manage the IETM view packages (regardless of which authoring tool, etc., is used).
- An infrastructure that permits a military component to distribute and present view packages.
- A system that permits an end user to perform his job effectively through access to required Technical Information and that allows him to retrieve relevant data from other ETMs/IETMs, including those of other Services, if necessary.

#### 4.0 CRITERIA FOR SELECTING CANDIDATE SYSTEMS

##### 4.1 General

The following general criteria for selection of Candidate Systems for Pilot Demonstrations were established by the Tri-Service IETMTWG (at a meeting on 10-11 Dec 1998<sup>5</sup>):

- All levels of ETM/IETM functionality (All Classes)
- Innovative IETM authoring and presentation systems, in which individual Service Weapon System Programs have made a major investment
- Representative Joint and Multiple Service Programs
- Representative Service-specific programs
- Both legacy and new ETMs/IETMs
- Weapon System Schedule Suitable for Pilot Demonstration
- Weapon System Program Office Cooperative

##### 4.2 Specific IETM Technology

All classes of ETMs/IETMs should be covered in the Pilot Demonstrations. Candidate Joint Service weapon-system programs should also be identified. Specific ETM/IETM types that should be accommodated include those using approaches or technologies such as the following:

PDF	Class II SGML (EBT)	JIMIS
QUILT	AIMSS	F-22 (IMIS)
TechSight	MediaLynk (Litton)	ATIS (TMS Interview)
IPDF	IADS	HTML (from Texcel)

##### 4.3 Weapon System Program Commitment

The DoD IETM Interoperability Project is a cooperative effort of the ADUSD(LRM), previously known as the OSD(CALS) Office, and the JCG/CE. ADUSD(LRM) has assigned technical responsibility to the Tri-Service IETMTWG and has agreed to provide resources for the technical team consisting of NSWCCD, ManTech, and technical representatives of each of the Services. However, at the initiation of this effort, the ADUSD(LRM) position was that any additional resources associated with the demonstrating of the architecture would have to be provided by the individual Services and Weapon System Program Offices. Consequently, a

---

<sup>5</sup> Minutes of the 10-11 Dec 1998 meeting were distributed to Service members of the IETMTWG.

major criterion in the selection of Pilot-Demonstration Systems was that no additional resources would be required for Demonstrations by the Weapon System Program Office. At the January 1998 Tri-Service IETMTWG meeting, the JCG/CE representative stated that the recent JLC memorandum<sup>1</sup> endorsing the Web-oriented approach to interoperability presents a powerful impetus for any Acquisition Manager to participate in demonstrating the resulting Architecture and in identifying suitable Service Pilot-Demonstration Systems.

## **5.0 APPROACH TO AND IDENTIFICATION OF CANDIDATE PILOT-DEMONSTRATION SYSTEMS**

### **5.1 Army Candidate Systems**

The list of Army Candidate Systems for Pilot Demonstrations was based on a meeting at Redstone Arsenal on 14-15 January 1998 and on the Army technical representatives' efforts following the IETMTWG Jan 1998 meeting. This lists covers the range of IETMs in the Army's current and planned inventory.

- The AN/PPS-5.
- An IADS Manual (weapon system not selected).
- A weapon system with an IETM based on AIMSS software, possibly the Fox (Picatinny) or another TACOM system.
- Apache Longbow.
- A TACOM IETM Using EMS-2.
- EPLRS Net Control Station.

### **5.2 Navy Candidate Systems**

The list of Navy Candidate Systems for Pilot Demonstrations was prepared at a meeting of the Navy IETM Interoperability Team, composed of representatives from the air, surface, and subsurface warfare areas, held at the Naval Surface Warfare Center Carderock Division on 27 January 1998. Subsequent to this meeting, the Space and Naval Warfare Systems Command identified the Link-16 Communications System as a Candidate Pilot-Demonstration system. The Navy Candidate Pilot-Demonstration Systems include:

- The LM-2500 Gas Turbine System.
- The F/A-18 Aircraft Radar System.
- A portion of the ATIS-AIR inventory
- NSSN Digital Library Design Project.
- Submarine Ship System Manuals (SSM).
- Link-16 Communications System.

### **5.3 Air Force Candidate Systems**

At the 28-29 January 1998 meeting of the Tri-Service IETM Technology Working Group, the Air Force team identified the following Air Force candidate systems for Pilot Demonstrations:



- The F-22 IMIS-based IETM.
- JSTARS, a Class 4 IETM.
- An IPDF General Series Technical Order.

#### **5.4 Marine Corps Candidate Systems**

- Test Set, Diode, TS-268A/U-B, U-D (SL-4-00019)
- Tactical Remote Sensor System
- Tactical Air Operations Module (TAOM) and the TAOM Interface Group (TIG)
- AAV (Advanced Amphibious Assault Vehicle).

#### **5.5 Overall Tri-Service Perspective**

At the 28-29 Jan 1998 IETMTWG meeting, all of the Service representatives reported that they had received firm commitments from the Program Managers for one or more Candidate systems that would fully participate in the Pilot-Demonstration phase of this effort.

The Working Group considered that the Candidate weapon systems chosen cover essentially the entire range of current IETM technology, and that they constitute representative cases for the great majority of the DoD's millions of pages of digitized Electronic Technical Manuals. It was the consensus of the Working Group that the cooperation of Service Program Managers has now been assured to the extent that efforts to initiate preparation for the Pilot-Demonstration program could begin immediately, or as soon as remaining FY 1998 funds could be released. An OSD CALS representative at the meeting agreed.

## 6.0 SUMMARY OF PILOT-DEMONSTRATION COVERAGE AND SUPPORT ORGANIZATIONS

### 6.1 Weapon System Programs Participating in Pilot Demonstrations

During the 3rd Quarter of FY 98, Service Representatives of the DoD IETM Interoperability Task Team met with members of the individual Weapon System Program Offices to explain the JIA approach and technology, and to obtain commitments for participation in the Pilot Demonstration phase of the project.

The following weapon-system programs have agreed to participate in Pilot Demonstrations of the JIA:

Army	Navy	Air Force	USMC
AN/PPS-5	ATIS-AIR	General Methods and Procedures TO	Diode Test Set
EPLRS Apache Longbow	LM-2500 Submarine SSMS NSSN Library F/A-18 E-6B	F-22 JSTARS	TAOM TRSS AAAV

### 6.2 Range of Selected IETM Technology and Complexity

Service members of the IETMTWG have selected weapon systems that will provide as wide a spectrum as possible for the JIA Pilot-Demonstration Program, from the standpoint of ETM/IETM complexity (ranging from Class I ETMs to Class IV/V IETMs). Table 1 shows the range for the Demonstration Systems chosen. At least one Demonstration system in each Service has been selected to demonstrate the applicability of the JIA to fully interactive IETMs using databases compliant with MIL-PRF-87268 and MIL-PRF-87269.

Similarly, an effort has been made to cover as wide a range as possible of commercial and Government technologies currently in use for preparing ETMs and IETMs. Table 2 summarizes the technologies used to prepare existing ETMs/IETMs for the weapon systems shown in Table 1.

**Table 1. Distribution of Service Pilot-Demonstration Systems over ETM / IETM Classes**

<b>Service</b>	<b>Class I / II</b>	<b>Class III</b>	<b>Class IV / V</b>
<b>ARMY</b>	AN/PPS-5	EPLRS	APACHE LONGBOW
<b>NAVY</b>	ATIS-AIR LM-2500 Submarine SSMs NSSN Library	E-6B	F/A-18
<b>AIR FORCE</b>	General Methods and Procedures TO		F-22 JSTARS
<b>MARINE CORPS</b>	DIODE TEST SET	TRSS TAOM	AAAV

**Table 2. ETM / IETM Technology Selected for JIA Pilot Demonstrations**

<b>Service</b>	<b>ETM / IETM CLASSES</b>		
	<b>Class I / II</b>	<b>Class III</b>	<b>Class IV / V</b>
<b>ARMY</b>	PDF	DynaWeb	QUILT
<b>NAVY</b>	PDF NIRS/NIFF Server HTML NAVY SGML	DynaWeb	AIMSS
<b>AIR FORCE</b>	IPDF		JIMIS F-22 (IMIS)
<b>MARINE CORPS</b>	PDF	IADS MediaLynk	TechSight

### **6.3 Organizational Support for the JIA Demonstration Effort**

Support for the JIA development and demonstration effort has been organized into three teams:

- A Management Team to coordinate the Pilot-Demonstration effort with the individual Services and to assure that individual Service requirements are met;
- A Technical Team to complete the development of the Architecture itself, to guide technical aspects of the Pilot Demonstrations, and to interpret the results;
- A Pilot-Demonstration Team, which will carry out the actual demonstrations.

Table 3 shows the participants in these three teams for the various Services as well as DoD activities responsible for overall coordination of the effort.

### **6.4 Measures of Effectiveness**

A series of quantitative and qualitative Measures of Effectiveness has been developed for this effort, primarily through the efforts of ManTech WVA and the JCG-CE. These metrics were presented and discussed at a meeting of the IETMTWG held 19-21 May 1998. Table 4, which was developed at that meeting, shows the applicability of potential metrics to the Pilot-Demonstration efforts of the individual Services. At the 28-29 July 1998 meeting of the Tri-Service IETMTWG, Service Representatives identified the primary metrics that they are planning to incorporate into their Pilot Demonstration efforts.

#### ***6.4.1 Army Planned Metrics***

The Army Representatives identified planned metrics in the following five categories, listed in order of priority:

- (1) Improved Ease of Use and Increased Customer Satisfaction.
- (2) Improved Interoperability and Improved Capability for Joint Operations.
- (3) Improved Scalability.
- (4) Reduced Physical-Storage Requirements.
- (5) Reduced Manpower Requirements.

**Table 3. Organizational Support of JIA Development Effort**

<b>Service</b>	<b>Management Team</b>	<b>Technical Team</b>	<b>Pilot Demonstration Team</b>
<b>ARMY</b>	LOGSA JCG-CE	PBM Associates	CECOM Boeing Venntronix QuestTech
<b>NAVY</b>	NAVAIR 3.3 NAVSEA 92L NSWCCD 2052	NSWCCD NAVSEA 04TD Antech AERA	Raytheon Boeing Newport News Shipbuilding General Dynamics Electric Boat NSWCCD-SSES AERA NSWCCD E-6 IPT NADEP JAX MaCT
<b>AIR FORCE</b>	AF-PDSM	BTAS	F-22 Program Office Lockheed Martin JSTARS Program Office Northrop Grumman AF-PDSM Mitre
<b>MARINE CORPS</b>	MARCORSYSCOM	MKI	General Dynamics NSWCCD Litton Data Systems
<b>DoD</b>	ADUSD (LRM)	NSWCCD ManTech	NSWCCD ManTech

**Table 4. Applicability of Proposed Metrics  
to Pilot Demonstration Program of the Services**

		AF	Army	Navy	Marine Corps
	Minimize Paper Requirements				
	Reduce Printing Costs				
FS	Reduce Update Delay	X	X	X	X
CS	Reduce Administrative Manpower	X	X	X	
	Reduce Physical Storage Costs				
FS	Reduce Shipping Costs			X	
CS, SS	Increase Viewer Configuration Control	X	X	X	
	Reduce CD Reproduction & Management Costs				
	Make Push Technology Easier, More Responsive				
SS	Make Viewing Standards More Commercial			X	
	Assure Common Viewer on One CD				
FS, SS	Maintain/Ensure Longer Viewing Lifespan of Information	X	X		
LS	Increase Customer Satisfaction (Levels)	X	X	X	X
FS, SS	Reduce Cost	X	X		X
SS	Improve Scalability			X	
SS	Improve Security			X	
SS, FS	Improve Interoperability			X	
CS	Improve Ease of Use			X	
CS	Reduce Time Required and Delays	X	X	X	X
	Simplify Process				
CS	Assure Joint Operation				X
CS	Improve Accuracy	X	X	X	
CS	Improve Currency	X	X	X	X
	Improve Deployability				X

**Note:** CS, FS, and SS refer to Customer Service, Functional Service and System Service Metrics.

### ***6.4.2 Navy Planned Metrics***

The Navy Representatives classified metrics planned for use in the Pilot Demonstration program in four categories:

- (1) Accuracy and Currency
  - (a) Reduced Update Delivery
  - (b) Easier and More Responsive Push Technology
  - (c) Improved Timeliness
  - (d) Improved Accuracy of the Technical Information
- (2) Common Look and Feel
  - (a) More Commercial Viewing Standards
  - (b) Common Viewer on One CD
- (3) Improved Interoperability and Improved Joint Operations
- (4) Reduced Authoring, Preparation, and Maintenance
- (5) Reduced Administrative Manpower
- (6) Reduced Production and Management Costs
- (7) Reduced-Cost Elements

### ***6.4.3 Air Force Planned Metrics***

The Air Force Representatives identified metrics planned for use in Air Force Pilot Demonstrations: They are, listed in order of priority:

- (8) Improved Customer Satisfaction
- (9) Improved Ease of Use
- (10) Improved Scalability
- (11) Reduced Shipping Costs and Other Cost Elements.
- (12) Improved Timeliness
- (13) Improved Interoperability; Achieving a Common Viewer on One CD
- (14) Viewing Standards Made More Commercial
- (15) Reduced Physical-Storage Costs
- (16) Easier and More Responsive Push Technology



#### ***6.4.4 Marine Corps Planned Metrics***

The Marine Corps Representative identified metrics planned for Marine Corps Pilot Demonstrations, consisting of:

(17) Reduced Update Delay

(18) Improved Customer Satisfaction

(19) Reduced Cost Elements

(20) Improved Timeliness

(21) Improved Capability for Joint Operations

(22) Increased Currency

(23) Improved Deployability

## **7.0 SUMMARY OF ARMY PILOT-DEMONSTRATION SYSTEMS**

### **7.1 AN / PPS-5**

**Program Manager:**

Maj. Raguindin

**PM's Receptiveness:**

Unknown, initial willingness to participate shown by PM reps and contractor.

**Performing Test Facility:**

CECOM RDIT, QuesTech.

**Resources Needed:**

None at this time.

**Vendor Participation:**

Adobe, SGML Viewer (SoftQuad possibly), ISODraw (possibly).

**Vendor Resources Needed:**

None at this time.

**ETM/IETM Current Status:**

Under development using MIL-STD-2361 DTDs (Class II / III), planning on distributing PDF files.

**End-User Demo Candidates:**

Qualified AN/PPS-5 operators / maintainers (MOS 96R).

**Hardware Implications:**

Hardware platform still TBD (most likely the Litton HTU).

**Demonstration Scenario:**

The system documentation currently being distributed as large PDF files, will be distributed as PDF files in the work package format. The test will be of the functionality that can be retained (or that will be lost) while trying to link the work package sized PDF files to create a virtual document. Distribution to the user will be on the hardware platform being fielded by the weapon system program.

**Reason For Selection:**

Will demonstrate the use of small PDF files (WP size) being loaded as encapsulated objects. In this case will also need to develop an addressing scheme for document components.

Possibly may be able to test SGML and CGM4 files as encapsulated objects.

**Background:**

The PPS-5 program is in the process of upgrading the system to incorporate digital technology. The new design called for the use of a computer for the operation of the radar system. As such the only logical solution was to host the technical manual on the same computer that was to be fielded for operation.

Since the tech manual being authored is in a format compatible with the delivery of encapsulated objects or source data delivery to a Web browser, the Army should experience minimal, if any, difficulty in complying with the objectives of the Tri-Service IETM Technology Working Group's Interoperability Task.

**Possible Issues:**

- Delivering and managing small (WP size) PDF files.
- Viewing of existing source data in a Web compatible SGML viewer such as SoftQuad's Panorama.
- ISODraw viewer availability as a plug-in to a Web browser.

The AN/PPS-5 contractor originally developed the data for paper technical manuals (TMs) using MS Word for Windows 95. With the program's decision to find a better means for managing and delivering its TMs, the decision was made to convert all the MS Word files into FrameMaker + SGML format and use the FrameMaker application to SGML tag all of the data in accordance with the Army TM Document Type Definitions (DTDs) in MIL-STD-2361. The edited SGML tagged files are saved as PDF files for delivery to the field. The FrameMaker application automatically converts the IDREF(s) in the SGML file into links (hotspots) in the PDF file.

Currently, all of the figures are being created as TIFF files and being imported into FrameMaker prior to saving the TMs as PDF files. Since the hardware to be used by the AN/PPS-5 technician is yet to be determined, initial plans call for the delivery of the IETM to the field by CD-ROM.

**Demonstration of Technology:**

The Army intends on using the Adobe Acrobat plug-in for Web browser as the means for viewing the IETM. The plans are not to serve up the data over a Web or intranet, at this

time, but to deliver the IETM view package and Acrobat reader by CD-ROM. If the hardware to be fielded will support the set up of a personal Web server the concept of serving up the encapsulated objects and viewer application may be demonstrated.

If demonstration of SGML and CGM4 file delivery is feasible, a similar scenario would be set for that Pilot Demonstration.

**Concept:**

The electronic technical manuals would be delivered to the field on CD-ROM. Whether the viewer application is also delivered on the same CD-ROM or is pre-installed on the portable maintenance aid is still a question. The operator / maintainer would be presented with a “table of contents” of all of the document components that make up the particular electronic technical manual. The document components (work packages) would be identified by number and title. The operator / maintainer would select the work package to be viewed. Once selected the appropriate document component would be rendered on the user’s screen.

**Unresolved Issues:**

- Converting existing TIFF files into CGM4 format (within timeframe).
- Addressing of WPs (document components) of a TM vs. the entire TM.
- Acrobat’s ability to handle (resolve) references between document components.
- Hardware platform to be used by program.

**7.2 EPLRS Net Control Station (NCS) (V)2 and (V)3**

**Program Manager:**

LTC Weinzettle

**PM’s Receptiveness:**

PM supports the Pilot Demonstration.

**Performing Test Facility:**

CECOM RDIT, Venntronix Corporation.(EPLRS NCS contractor)

**Resources Needed:**

None at this time.

**Vendor Participation:**

- Chrystal Software (Astoria Document Component Management System)
- ArborText (Adept Editor & Document Architect)

- INSO/EBT (DynaText Publisher, Browser & DynaWeb Server)
- Adobe (FrameMaker+SGML & Acrobat Capture)

**Vendor Resources Needed:**

None at this time.

**ETM/IETM Current Status:**

The EPLRS NCS contractor developed two versions of EPLRS NCS Operators Manuals, i.e., (V)2 and (V)3 in SGML utilizing the MIL-STD-38784C DTD. The third version for the (V)4 is currently under development. Initial draft (V)2 and (V)3 Operator's IETMs have been delivered on CD-ROM with DynaText Browsers. They are Class III IETMs containing some Class IV functionality.

The SGML document objects are stored in the Astoria database system. Astoria is being used to manage the multiple versions ensuring consistency and maximizing reuse of the document objects between the multiple versions. Document versions are exported out of Astoria as valid SGML instances. The instances are then able to be imported into a wide array of tools for delivery in multiple media form, i.e., printouts, CD-ROM, internet/intranet, and electronic publishing formats, i.e., SGML, XML, HTML, and PDF viewers.

The EPLRS NCS contractor authored the SGML data with ArborText's Adept Editor bridging to Astoria database. An instance was imported into FrameMaker+SGML. FrameMaker specific items were then modified so that documents could be printed to paper in a customized format familiar to the user. The contractor also converted the FrameMaker+SGML files to PDF format for delivery with Acrobat Viewer on CD-ROM.

The EPLRS NCS contractor is currently using DynaText to import the instances from the Astoria database and distribute them to Army users on CD-ROM. Utilities are being developed by the contractor to convert the MIL-STD-38784C DTD to HTML for use with Microsoft Internet Explorer and Netscape browsers.

Further experimentation is being accomplished with importing the SGML instances from the Astoria database for use with other SGML browsers as well as XML Browsers as they become available. The Astoria database will also be used as a distribution device to provide dynamic logistics documents on demand. By storing the documents in SGML and managing the document objects in Astoria, tremendous flexibility is gained with the delivery of the information in a wide variety of forms and formats.

**End-User Demo Systems:**

- Qualified EPLRS NCS (V)2 and (V)3 Operator IETMs

- Hardware Implications.
- Hardware platform still TBD

**Demonstration Scenario:**

Data that was authored for distribution using the DynaText application will be re-hosted for Web distribution using the DynaWeb application. The functionality of the re-hosted data as an encapsulated object in a Internet Explorer viewing environment will be demonstrated.

**Reason for Selection:**

Will demonstrate the portability of document objects from the Astoria Document Component Repository to a wide variety of IETM instances capable of being viewed with SGML, XML, and HTML viewers, including Microsoft Internet Explorer. Will evaluate the portability of DynaText files into DynaWeb, and the use of DynaWeb, INSOs Web-enabled browser, as a plug in for Internet Explorer. If this option does not work, can always convert the source SGML to HTML.

**Background:**

The EPLRS NCS contractor is implementing a phased migration of EPLRS NCS logistics documentation into SGML document objects which are being stored and managed using Chrystal Software, Inc. Astoria Document Component Management System. Phase 1 consisted of converting EPLRS NCS (V)2 and (V)3 Operators Manuals from word processor format into SGML utilizing the Arbor Text Adept Editor and managing the versions with the Astoria repository. Final product of Phase 1 was customized printed technical manuals. Phase 2 involved the production of EPLRS NCS (V)2 and (V)3 Operator IETMs from the Phase 1 SGML database utilizing the DynaText Publisher and delivering them on CD-ROM with DynaText Browsers. Phase 3, which is currently in progress, consists of developing computer based training (CBT) for EPLRS NCS (V)4 operators, integrating the CBT and (V)4 Operator IETM, and delivering them on a common CD-ROM. A large portion of the data for the (V)4 version has already been developed using the modified MIL-STD-38784C DTD. The program's schedule for delivery of the (V)4 release nicely coincides with the Pilot Demonstration.

**Possible Issues:**

- Portability of DynaText files to DynaWeb and the level of effort required.
- DynaWeb availability as a plug-in to a Web browser.

The EPLRS NCS contractor originally developed the data for paper technical manuals (TMs) using Microsoft Word (word processor). With the program's decision to find a better means

for managing and delivering TMs, the decision was made to convert the Microsoft Word files to SGML, tagging the data in accordance with MIL-STD-38784C Document Type Definition (DTD). The SGML is being stored and managed in an Astoria repository as document objects, including all text, tables (in CALS Table Format), and graphics (in various formats including CGM, TIFF, EPS, and JPEG). Specific instances can be exported from the Astoria repository by version, i.e., (V)2, (V)3, or (V)4, and revision level. In addition, these instances may be printed manuals or IETMs capable of being viewed in various forms, i.e., SGML, XML, or HTML, using appropriate browsers.

**Demonstration of Technology:**

INSO Corporation's DynaText viewer is one of the most common commercial SGML viewer applications. The company has indicated that it does not plan on providing the DynaText viewer as a plug-in for the Web browsers. Instead, the vendor has developed a Web-based application to be used by its customers who intend on delivering data over the Web. If the conversion of DynaText files to DynaWeb is an effort that requires minimal manual intervention it may be feasible on a large scale (not just for the pilot but for full production scenario). But if the contrary is true then it may be more feasible to convert the SGML files to HTML or even use a different SGML viewer that is available as a Web-enabled plug-in.

**Concept:**

The electronic technical manuals would be delivered to the field on CD-ROM. The viewer application is also delivered on the same CD-ROM. The operator / maintainer would be presented with a table of contents of a particular electronic technical manual. The initial table of contents is further expandable allowing the user to specifically select the information he / she expects to be displayed on the screen. If the DynaWeb solution is not feasible, the SGML data would be filtered (converted) into HTML for display in the Web browser. The PM may be willing to test the capability of serving up the information either through an intranet type setup or using a personal server.

**Unresolved Issues:**

- Availability of DynaWeb as a plug-in.
- Amount of manual intervention required to convert the DynaText files to DynaWeb.

**7.3 Apache Longbow**

**Program Manager:**

William Wadlington is the Program Manager's point of contact

**PM's Receptiveness:**

The Program Manager is willing to participate in the pilot test as long as no cost to the program.

**Performing Test Facility:**

Boeing, St. Louis

**Resources Needed:**

TBD

**Vendor Participation:**

Boeing, St. Louis and Mesa

**Vendor Resources Needed:**

None

**ETM/IETM Current Status:**

The Class IV IETM was fielded for the Apache Longbow at Fort Hood April 7, 1998. The system was used to disassemble and reassemble aircraft for delivery. It is now being used to maintain the aircraft.

**End User Test Candidates:**

Qualified Apache Longbow maintainers

**Hardware Implications:**

Pentium class PC (200 Megahertz or higher recommended), 32 Megabytes RAM minimum, 1.3 Gigabytes free hard disk space minimum, Microsoft Windows 95 or Windows NT 4.0 or later, Oracle 7.3, Netscape 4.05 or later, Internet Explorer 4.0 or later, and Sun Microsystems Java Plug-in 1.1 or later.

**Test Scenario:**

The Apache Longbow IETM will be loaded onto a Web server. An Oracle 7.3 database server (local or network) will be loaded with the Apache Longbow IETM data. The Apache Longbow IETM will then be demonstrated on both Netscape and Internet Explorer Web browsers from a client.

**Reason for Selection:**

- The Apache Longbow IETM is a Class IV IETM displaying data from an Oracle database. It is a complete, fielded IETM, consisting of 720 Megabytes of data and 246 Megabytes of graphics.



- The system will demonstrate a large-scale database driven Class IV IETM derived from
- MIL-PRF-87268 and MIL-PRF-87269 running within the Netscape and Internet Explorer Web browsers and utilizing P/URL-like addressing for interoperability into and out of the system.

**Background:**

The Apache Longbow IETM is a Class IV IETM compliant with MIL-PRF-87268 and MIL-PRF-87269. The system was initially developed as a demonstration of an automated maintenance environment for the Navy F/A-18C/D. It has since been chosen as the production IETM system for the Army Apache Longbow AH-64D, Navy F/A-18E/F, and Navy F/A-18C/D programs, and is also being used on an Air Force CRAD addressing Aircraft Battle Damage Assessment and Repair. The system is currently fielded for the Army AH-64D program.

Both the presentation system and authoring system were built by Boeing and are offered by Boeing as COTS products. The presentation system runs on Windows 95/NT and multiple flavors of UNIX and utilizes the Oracle, Sybase, or Informix database engines to store and retrieve IETM data. Graphics are multi-picture CGM format.

**Possible Issues:**

The system is in the process of being Web-enabled. The pilot may demonstrate limited functionality due to time constraints.

At a minimum, the system will demonstrate display of Tests, Tasks, Rectifications, Faults, Outcomes, Parts, and Descriptive Information with full navigation forward and back and link capabilities.

**Demonstration of Technology:**

Interoperability into the system will be demonstrated by displaying a static HTML page with P/URL links into the IETM. Selection of a link will cause the Apache Longbow IETM to be loaded across the network and start running at the requested IETM element. Within a specially authored task for the study, external P/URL addresses will be authored to start other Web-server applications, demonstrating interoperability out to other Web applications (eventually, IETMs).

Inclusion of the entire Apache Longbow IETM dataset will provide insight into the scalability of the Apache Longbow IETM and feasibility for a Web application.

**Concept:**

The IETM is delivered to the field on a CD-ROM containing the presentation system, graphics files, and database. The maintainer enters the IETM through a List of Contents screen dynamically generated from the database. The data is organized in a System/Subsystem hierarchy. The user selects a System/Subsystem and then has available different types of data to view: parts, maintenance actions, testing & troubleshooting, descriptions, a RPSTL graphic, and other non-procedural data. Once the user selects a type of data, a list of titles of available data (of that type for that system) appears. When the user selects a title and presses Run or Browse, the data is displayed.

**Unresolved Issues:**

The amount of functionality that will be demonstrated in the limited time frame to conduct the study.

## **8.0 SUMMARY OF NAVY PILOT-DEMONSTRATION SYSTEMS**

### **8.1 LM2500 Gas Turbine System**

#### **LM2500 Program Manager:**

NAVSEA 03X32 (Mr. Duane Robinette) 703-602-7120

[robinette\\_duane@hq.navsea.navy.mil](mailto:robinette_duane@hq.navsea.navy.mil)

#### **POC For Demonstration:**

Glenn Handrahan, AERA, Inc. 703-486-1993. [slapshot@ami.net](mailto:slapshot@ami.net)

#### **Current LM2500 IETM Status:**

The LM2500 O-level manuals have been SGML tagged to the NAVSEA C2 DTD for display in the DynaText Browser.

#### **Purpose:**

This document forms the basis for conducting a demonstration of the Joint IETM Architecture using Navy legacy technical data. The LM2500 Marine Gas Turbine, the prime mover for the DD 963 Class, the DDG 51 Class and the CG 47 Class, has been selected as the candidate for this demonstration.

#### **Specific Objectives:**

Successful completion of this test will demonstrate NAVSEA 04s capability of repurposing its legacy SGML IETM data for display in a Web browser. The table enclosed at the end of this report will also serve as a guideline to determine conformance of the key JIA interoperability factors. Particular emphasis will be placed on:

- Verify accuracy of SGML to HTML conversion efforts.
- Accessibility of IETMs from an intranet arrangement.
- Display of information in a Web browser without loss of functionality.
- Assess display of vital information (warnings, cautions, etc.)
- Ability to view graphics without a significant amount of time delay.
- Determine P/URL electronic addressing scheme.

#### **Scope:**

The demonstration plan will address the methodologies and procedures required to execute a test of the JIA. Microsoft's Internet Explorer (IE) and Netscape's Navigator have the built-in capability to display textual information in HTML. For over five years, NAVSEA 04 has

been converting technical manuals to SGML, the parent language of HTML. The manuals are tagged to the NAVSEA C2 DTD, a derivative of the CALS DTD. This demonstration will address the capability to convert the SGML tagged material to HTML and view the result in a Web browser.

**Approach:**

The versatility of SGML tagged data has provided the opportunity to conduct two separate tests on the source data. Each test requires utilization of commercial-off-the-shelf (COTS) products. See attached graphic.

**Demonstration Method A** – This approach involves the delivery of dynamic Web pages using the OmniMark Technologies Konstruktor. When configured properly, Konstruktor generates a typical HTML conforming Web page from disparate data forms including SGML source data. The approach initially requires the development of a set of rules converting SGML elements to their equivalent HTML companions. The remainder of the test will focus on configuring Konstruktor to interface properly with the Oracle database and Web server. Once completed, a typical transaction will be conducted according to the following:

- a) The IETM user requests an IETM via a hyperlink.
- b) The Web server calls an application programming interface (API) function or common gateway interface (CGI) application.
- c) The API function or CGI application calls the OmniMark server.
- d) The OmniMark server decodes the request and creates a response.
- e) OmniMark server sends the response to the API function or CGI application.
- f) The response is sent to the Web server.
- g) The Web server sends the response to the browser.
- h) The browser displays the IETM.
- i) When the user closes the HTML page, the page no longer exists, until the next request for that identical page is received.

**Demonstration Method B** – We will utilize Texcel's Information Manager (TIM) 2.0 version to create static HTML pages. A conversion program to convert SGML to HTML will also be required and will run internal to TIM. Texcel will then export HTML pages, which will be stored on a Web server.

**Resources Required:**

The resources required to perform this test include:

- Microsoft IIS or Netscape Suitespot Web Server
- OmniMark’s Konstructor Software or Texcel’s Information Manager
- Oracle Database Software

**Demonstration Participants:**

- Glenn Handrahan – AERA
- Eric Jorgensen – NSWC Carderock
- Lance Dreschler – OmniMark
- Mike Miller – Texcel
- Duane Robinette – NAVSEA 03
- John Hartranft – NAVSEA 03
- Phil Hans – NAVSEA 04
- Marty Cohen – NSWC Philadelphia

**Risks:**

The underlying technology for this demonstration is relatively new and not totally proven. Obtaining commitments from the software vendors (OmniMark and Texcel) to participate at no cost to the Government is essential. Buying the software (\$25,000 +) is beyond the financial resources available for this project.

**Metrics:**

The following table will be used to assess the effectiveness of the pilot demonstration:

<b>Metric</b>	<b>Konstruktor</b>	<b>Texcel</b>
Display w/o loss of functionality		
Display of critical elements		
Able to separate components into logical elements		
Display of graphics		
Able to retrieve elements in a reasonable time frame		
P/URL links completed satisfactorily		

**Exit Criteria:**

A report analyzing the results of this test will be issued upon completion. The report will document the lessons learned in implementing the JIA for NAVSEA C2 tagged IETMs and will determine the cost effectiveness and benefits of the JIA. All objectives outlined in Section 4.0 of this report will be addressed.

**POA&M:**

See attached milestone chart.

**Special Considerations:**

Technical support from Texcel and OmniMark may be required. Installation of the application servers and Oracle database at the Carderock Lab will need to be coordinated.

**Key JIA Factors for Demonstration by the LM2500 Pilot Demonstration**

<b>1</b>	The IETM is viewed through the JIA browser interface.
<b>2</b>	A generic Web Server functioning as a single electronic library for dissimilar IETMs.
<b>3</b>	An IETM-peculiar additional Application Server is used which can function as an add-on electronic library to the basic generic Web Server.
<b>4</b>	P/URL addressing is used when authored information refers to other IETMs.
<b>5</b>	P/URL addressing can be used by other IETMs to reference into the IETMs employing a publishable set of addressable access/entry points.
<b>6</b>	No loss of functionality (compared with a standalone IETM application) occurs in viewing the information through Browser interface.
<b>7</b>	Show use of one or more objects from legacy data as part of a browser display page.
<b>8</b>	Show use of reusable and multipurpose software display components in an IETM application, which was originally used for different application.
<b>9</b>	IETM operates in a connected intranet.
<b>10</b>	IETM operates in an occasionally connected mode.
<b>11 a</b> <b>b</b>	<b>a</b> IETM operates in a stand-alone mode employing personal server. <b>b</b> IETM operates in a stand-alone mode without use of server.
<b>12 a</b> <b>b</b>	<b>a</b> Uses supported COTS or GOTS authoring products. <b>b</b> Uses supported COTS or GOTS run-time/viewing software components.
<b>13</b>	Application incurs no incremental cost to distribute software components to other DoD users.
<b>14</b>	All software components are downloadable via intranet and are automatically installable – only decision of user is to accept installation.

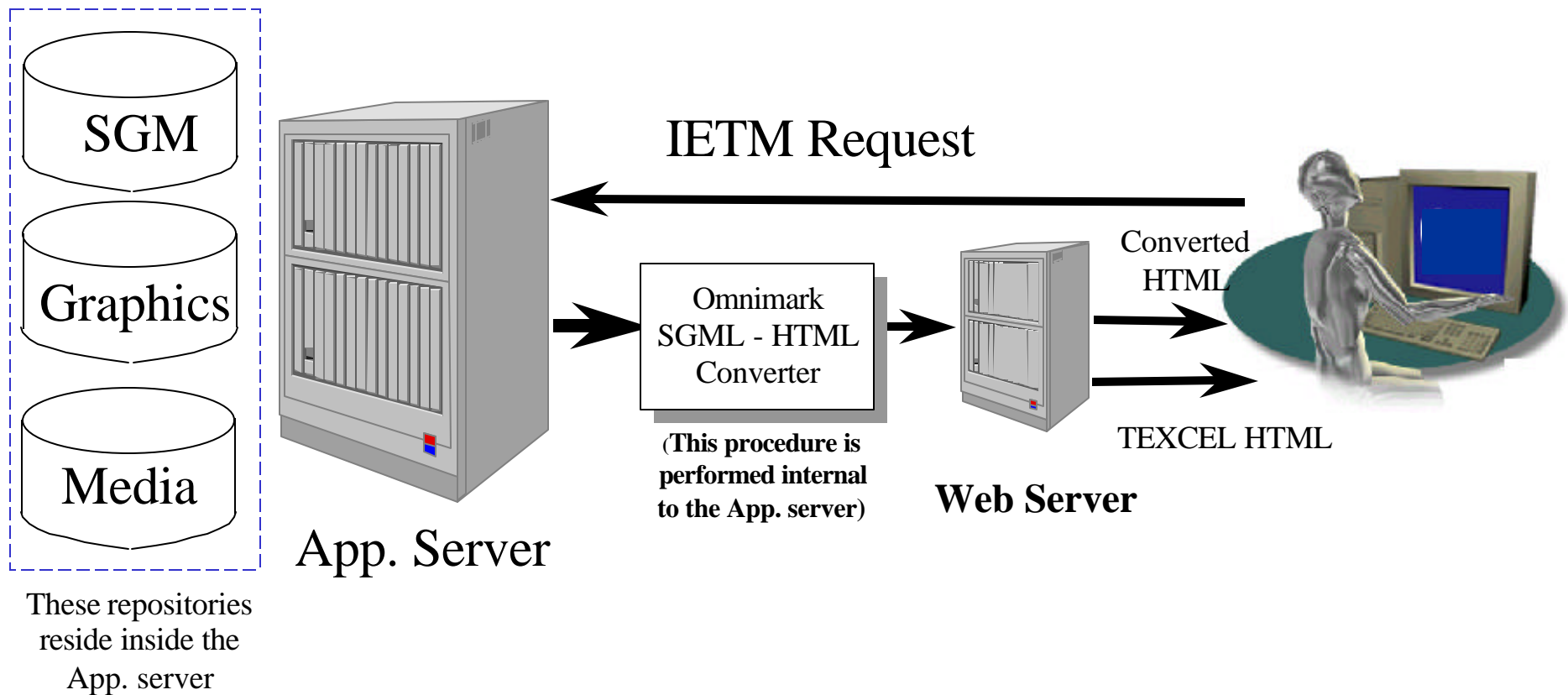
# LM2500 POA&M

Event	Month	June	July	Aug	Sept	Oct	Nov	Dec
<b>Method 1</b> <b><i>HTML Converter</i></b> Refine Omnimark Filter Convert TIFFs Determine Server Config. Test SGML to HTML Test Server Communication Develop other components (CGM, Shockwave) Test all components			▲	▲	▲	▲		
<b>Method 2</b> <b><i>TEXCEL</i></b>  Install TIM 2.0 Develop dB structure Map SGML to HTML Test vanilla HTML Test HTML + other components			▲	▲	▲	▲	▲	▲

# LM2500 Test Scenario

## NAVSEA C2 SGML to HTML

35







## 8.2 F/A-18

### **System Acquisition Manager or Project Office.**

F/A-18 PMA: Lt. Matt Herl, 301-757-7654

Raytheon POC: Chuck Dipman, cedipman@ccgate.hac.com, (310) 364-5542

### **Background**

The F/A-18 has existing IETMs which presently run stand-alone on a Windows 95 Portable Electronic Display Device (PEDD) employing an IETM using custom software developed for the Navy. That software requires sustaining resources to maintain and augment it to meet Program requirements. The Program does not want to fund this sustaining software maintenance cost and is actively looking for a commercial supported authoring and presentation capability which will meet program requirements for maintaining the F/A-18 IETMs and also meet the requirements of the recently published Navy IETM Architecture (NIA). The Raytheon Corporation has indicated that it will, using Raytheon resources, upgrade its AIMSS COTS tool to meet both the F/A-18 requirements and also the NIA requirements. The Program plans to conduct an evaluation of the AIMSS tool and its ability to meet program requirements in the Dec 1998 time frame. The extension to make this evaluation a JIA pilot test is to simultaneously evaluate the AIMSS tool as a JIA conforming product at the same time the Navy evaluations are being conducted. This demonstration evaluation will also be a good opportunity to test the extent to which the NIA conforms to the JIA from a developers perspective. NSWC/CD is involved in both evaluations and while it will be privy to certain intermediate milestones before the planned public prototype demonstration, these intermediate results will be subject to non-disclosure provisions because of the proprietary nature of the development. As such, this JIA plan lists no intermediate milestones.

### **Purpose.**

The key purpose of this demonstration is to demonstrate that major IETM software vendors can and will develop product which conforms to the 4 JIA specifications (browser, addressing, encapsulation, & server) and at the same time meet a major DoD weapon systems program objectives. It is to be noted that this specifically does not include the source data sharability requirements.

### **Specific Objectives.**

Specific objectives include the following:

- Evaluate implementation of a custom Active-x control interfacing directly with a data base server in the JIA context (i.e., a Type SC and DS combination).
- Demonstrate willingness and ability of major vendor to implement JIA (browser, addressing, encapsulation, & server).
- Authoring and Display of Class 4 F/A-18 IETM with legacy material into a COTS product

**Scope.**

Scope of the evaluation is the prototype (i.e. alpha version) of the commercial Raytheon AIMSS Version 4 software and a small subset of F/A-18 IETM data. Software will be designed to the NIA (i.e., specifies Windows NT compatible version of Intranet and use of Microsoft COM/Active-x implementation conforming to Navy IT-21).

**Approach.**

All development is being performed by the vendor (Raytheon), with the evaluation by NSWC/CDCD. Strong business motive to perform and succeed is Vendor's commitment to F/A-18 Program to have viable product in promised time frame. NSWC will monitor progress on a non-disclosure basis but will be able to report findings out only at completion of the test phase (planned Dec 98).

a) Test Technology:

- Test Data-collection:
- Compare the JIA specifications (browser, addressing, encapsulation, & server) to the implementation.
- Form, Fit, Function

b) Test Procedures:

- Does the IETM work in the NSWCCD systemic testing laboratory environment?
- The IETM is viewed through the JIA browser interface.
- A generic Web Server functioning as a single electronic library for dissimilar IETMs.
- Can URLs to external products be authored in and traversed during run-time?
- Can URLs from other IETMs and/or HTML files initiate an AIMSS IETM within the browser real-estate?
- What is needed to install the AIMSS system? What kinds of system resources are used (e.g. disk space, memory, CPU overhead)

c) Demonstrate the following JIA characteristics/benefits:

- An IETM-peculiar additional Application Server is used which can function as an add-on electronic library to the basic generic Web Server.
- No loss of functionality (compared with a standalone IETM application) occurs in viewing the information through Browser interface.
- Show use of one or more objects from legacy data as part of a browser display page.
- Show use of reusable and multipurpose software display components in an IETM application, which was originally used for different application.
- IETM operates in a connected intranet.
- IETM operates in an occasionally connected mode.
- IETM operates in a stand-alone mode employing personal server.
- Uses supported COTS or GOTS authoring products.
- Application incurs no incremental cost to distribute software components to other DoD users.
- All software components are downloadable via Intranet and are automatically installable – only decision of user is to accept installation

**Analysis:**

- Where did the demonstration vary from JIA specifications (browser, addressing, encapsulation, & server), if it does?
- Why was the exception taken, if it does?
- What was done that should be part of the JIA, as the core or as an option?
- Provide such recommendation(s) to the Tri-Service IETM Working Group.

**Resources required (hardware/software).**

- A workstation running Microsoft NT with either Personal Web Server or Internet Information Services 4.0 and the Raytheon AIMSS Version 4 Web-based IETM with Reader Component(s) for Microsoft Internet Explorer 4.0 or better (should be available in NSWC/CD Laboratory).
- AIMSS V4 licensee – already procured in advance by F/A-18 Program – need one designated for demonstration.

**Demonstration Participants.**

Raytheon, NSWC/CD, NAVAIR

**Risks.**

- URL Redirection Failure

- Too much navigation controlled by the Browser Component versus the browser shell
- Server Software problems – e.g. server and database driver conflicts
- Unanticipated Browser problems e.g. Back button causes loss of query and user is nowhere

**Metrics (Measures Of Effectiveness) to be used.**

- Interoperability with other IETMs.
- Viewing Standards Are More Commercial
- Customer Satisfaction (Levels)

**Scalability**

- Common Browser Interoperability
- Ease of Use
- Deployability

**Exit Criteria.**

It runs in the IT-21/NT implementation of the JIA as setup in the lab that meets program objectives for an IETM.

**POA&M.**

- Prepare – April – Nov 1998 (details proprietary – non disclosure agreement)
- Prototype – Dec 1998
- Test Phase – Dec 1998
- Final Report – Jan 1998

**Special Considerations**

None.

**8.3 ATIS-AIR Server**

**Program Manager:**

NAVAIR 3.6 (ATIS-AIR)

**PM's Receptiveness:**

Very supportive.

**Performing Test Facility:**

MaCT; NSWC Carderock

**Additional Resources:**

No additional resources needed

**Vendor Participation:**

MaCT (Maximum Control Technologies)

**Vendor Contribution:**

Availability of MaCT Custom NAVAIR ATIS Server Product and accompanying ORACLE Database (under contract to NAVAIR)

**ETM/IETM Current Status:**

Existing Inventory of raster-scanned NIRS/NIFF CD-ROM-based/paper-based TM-page images (i.e., Navy ATIS format)

**End-User Evaluators:**

NAVAIR selected uniformed maintenance technicians at PAX River NAS.

**Hardware Implications:**

Use Existing MaCT Prototype password-protected Web Server and DBMS under contract to NAVAIR utilizing Internet delivery on existing workstations.

**Demonstration Scenario:**

- July 98: MaCT to convert ATIS CD-ROMs to ORACLE Database using a proprietary process. This is already underway as part of a NAVAIR funded evaluation of this process and product. The MaCT custom Web server converts ORACLE to PDF one page at a time for on-the-fly Web server delivery across an intranet. User access/indexing information delivered as HTML-on-the-fly.
- Aug 98: Install MaCT Server at NSWCCD Lab. Add additional test electronic TMs to the installed database. This will be the actual server used as part of the funded NAVAIR evaluation and will allow the JIA team to evaluate and observe close-up. MaCT will install several versions to test using Netscape as well as Microsoft server and browser clients. The JIA team will observe these experiments.
- Sept 98: Conduct evaluation of process as it relates to data. The NAVAIR test and evaluation server will be moved to San Diego in Oct/Nov but demo version will remain at Carderock.

**Reason for Selection:**

Ability to deliver large inventory (thousands of TMs) of electronic-legacy ATIS-encoded TMs on a NIA compliant intranet/browser with low conversion cost.

**Background:**

NAVAIR has already converted most of their legacy TMs to a Navy standard raster-scan MIL-STD-format, AITM NIRS/NIFF on CD-ROMs. NAVAIR is evaluating various options

for utilizing that large store of information on a intranet with a Web browser interface, eliminating many of the limitations of the older technology ATIS LAN utilized on surface ships. This demonstration effort is about to commence under NAVAIR sponsorship. With very little expansion the effort can be used to evaluate the NIA based approach and standards.

**Demonstration of Technology:**

This project demonstrates encapsulation of an electronic legacy system as a custom server with an associated database server (a NIA Type 4 construct), but with the only requirement on the client to contain the easily available Acrobat Viewer plug-in/control. Also being evaluated is the vendor's claim of very low cost of conversion from the CD-ROM based legacy system.

**Concept:**

The principal concept demonstrated here is the ease and low cost of converting massive quantities of digital legacy data and serving it out on a NIA intranet with no additional cost for the browser clients.

**Unresolved Issues:**

This approach is clearly designed to operate best in connected mode. The unresolved business and performance issue is the suitability of this solution for the detached PEDD operational scenario.

#### **8.4 NSSF Digital Library Design Project**

**System Acquisition Manager or Project Office:**

Program Manager PMS-450

POC: Jeff Lawlor - PMS-450TLD

**ETM/IETM Current Status:**

Existing Data from Trident Program IETMs and preliminary NSSF HTML products will be used to demonstrate interoperability in a shipboard network environment

**Purpose:**

During the development of the NSSF digital library design, one of the primary functional requirements identified by digital library stakeholders was the implementation of a Web-based library environment for display of IETMs through a standard user interface. Another functional requirement is the ability to view library products in both network and standalone modes. The NTDP network is a Windows NT network that will support intranet server software. It will also support the 32-bit version of ATIS. It is the intent of the digital library design working group to test the use of Web-based products on the shipboard network and on a standalone client workstation.

**Specific Objectives:**

The main objective of this pilot is to test the implementation of the basic design concepts for the digital library design for NSSF using the DOD interoperability specifications.

**Scope:**

The implementation of digital library design concepts will demonstrate the ability to deliver Web-based IETM products that are interoperable with other products in the library. The ability to interface with ATIS on the NTDP network will also be demonstrated.

**Approach:**

[1] Electric Boat will convert existing SGML data to HTML format for access in an intranet environment on NTDP prototype network. URLs used for interoperable links will be developed in accordance with the DOD addressing specification.

[2] Electric Boat will configure NTDP network and Microsoft BackOffice intranet server to test implementation options for a combined ATIS/intranet digital library access scheme

[3] Electric Boat will configure standard intranet browser software to implement desirable client-based functionality.



[4] Electric Boat will monitor and evaluate effort and coordinate evaluation by PreCom Unit end users.

**Resources Required:**

NSSN Non Tactical Data Processing SubSystem (NTDPS) Prototype Network as host for digital library pilot. MS BackOffice is the intranet server software employed on NTDPS.

**Demonstration Participants:**

Seawolf Class Pre-Commissioning Unit (PCU) members will be asked to evaluate Web-based user access to NSSN digital library. The demonstration will be supported by NSSN NTDPS and Digital library working group members.

**Risks:**

Schedules and efforts for the digital library will take priority over efforts for the proposed pilot.

**Metrics:**

- Customer Satisfaction Levels
- Interoperability
- Ease of Use

**Exit Criteria:**

- Demonstration of interoperability to PCU members with satisfaction survey completed
- Successful ATIS-intranet interoperability testing
- Successful operation of Web-based products

**POA&M (TBD):**

New schedule for digital library not available — will forward separately.

**Special Considerations:**

The test environment for the digital library pilot is the NTDPS network prototype installed at Electric Boat. Portability of the pilot may be limited to portions of the entire test scenario.

## **8.5 Submarine Ship System Manual (SSM)**

**Overview :**

This document is a plan for the development of a shipboard digital library based on the Extensible Markup Language (XML), a new Web-based standard. A goal of this project is demonstrate the ability to capitalize on the extensive work undertaken by the DoD in

converting technical documentation to Standard Generalized Markup Language (SGML) format, by automating their export to XML format for direct viewing using Web browsers.

This project is one of several submitted to the Tri-Service IETM Technology Working Group, which is responsible for developing IETM interoperability standards applicable to all branches of the DoD. XML is one of the most promising technologies and it is intended that the results of this effort will form a technology baseline for NAVSEA 92L, the sponsor of this project.

This plan describes the development steps involved as well as additional issues which should be considered in order to employ XML in a full-scale production system.

**Project Summary:**

This project will develop a library of XML-based Ship System Manuals (SSMs) in Interactive Electronic Technical Manual (IETM) format, and integrate the library with the Advanced Technical Information Support (ATIS) System for shipboard use. The intent is to automate the production process so that existing SGML source files can be converted to interactive format with a minimum of effort.

This project will demonstrate the entire automated IETM production process, starting from converting a portion of an existing SGML library to XML format, applying XSL formatting styles, linking to external files and libraries, and integrating the output files with the ATIS, where they can be viewed using a Web-based browser along with legacy IETMs (which use different viewers).

To the extent possible, a user interface (UI) consistent with legacy IETMs integrated with ATIS will be employed to retain a common look and feel. However, the UI shall not be developed at the expense of newer document viewing techniques which have become de-facto standards as Web browsers have become prevalent in everyday life.

As part of the project, links to legacy IETMs (with proprietary viewers) will be demonstrated.

**Project Background:**

At recent meetings of the NAVSEA 92L Submarine Interclass Digital Publishing Working Group (IDPWG), there has been considerable discussion about the benefits of employing Web-based technology to IETM development. Several prototype systems have been developed with excellent results, both in production cost savings and in the use of newer, more powerful viewing techniques. IDPWG members feel that the group should start to take

advantage of advances in the commercial environment. Furthermore, if Web browsers can view legacy IETMs, all existing work to date can be retained.

In addition, a proposed Navy IETM Architecture (NIA) document is being developed by NSWC Carderock, Code 2052, which has similar goals, and is intended to replace previous guidelines and recommendations for the development of Navy IETMs. This project will conform to the guidelines being established in the NIA document

Newport News Shipbuilding (NNS) has the responsibility of maintaining and updating Submarine Ship System Manuals for the Seawolf and Los Angeles Classes. These documents have been converted to SGML for consistency and ease of maintenance. In the production of electronic versions of these technical manuals, NNS has been working with the ATIS Project Office producing CD-ROMs for access and display aboard submarines. These CD-ROMs are produced using proprietary authoring and viewing products by INSO (formerly EBT) and InfoAccess. Recently, these vendors have expressed a reluctance to maintain and update their products, as they too are moving to Web-based tools.

In an effort to employ more open standards, NNS has been closely monitoring the evolution of XML, a publishing technology currently undergoing approval by the World Wide Web Consortium (W<sup>3</sup>C), the internet standards organization. The most appealing feature of XML is that it can be automatically produced from SGML and directly viewed using Web browsers. Since XML is a subset of SGML, XML files contain most of the user-defined content-specific tags. With an SGML editor, it is a one-step process to convert SGML files to XML format.

Both Microsoft and Netscape deliver limited XML support in the current release of their browsers, with a strong endorsement to support the not-yet-developed remaining XML components, as they become approved by the W<sup>3</sup>C.

#### Project Phases

<b>Project Phase</b>	<b>Description</b>	<b>Completion Date</b>
1. Project Summary	Management summary of the project	Completed
2. Project Plan (This Document)	Development plan with all technical requirements, (including optional features and alternate approaches, risks, and development schedule).	Feb 20, 1998
3. Requirements Review	Technical review of all items in the Project Plan. Resulting from the meeting, the Project Plan shall be finalized and the design/development shall begin.	Week of March 1, 1998

4. Test Plan	Description of all of the tests required to support Tri-Service Pilot Testing	March 9, 1998
5. Software Development	Develop the production process to convert the SGML source files to XML, add IETM functionality, and integrate the files with ATIS. Develop XSL scripts as required. Develop translators for IETM-specific features, (such as a separate TOC).	June 1, 1998
6. Test Demonstration of ATIS-Compliant XML-Based SSM Library	An integrated final product, with all features described in the Project Plan being demonstrated. The demonstration shall encompass the conversion from source files to a completed ATIS library	July, 1998 at NNS October, 1998 at NSWC-CD

**Development Approach:**

Developing an XML-based IETMs from SGML source files is not simply converting SGML tags to XML tags. IETM functionality goes way beyond simply presenting sequential information on a screen for the technician. This section describes the development aspects of proposed IETM functions under consideration. Each is subject to discussion at the Requirements Review prior to being approved.

**(1) Define Requirements:**

The first step shall be to determine the level of functionality of the IETM which is practical for this project, within the time and budget constraints. Features which are under consideration include:

<b>IETM Function</b>	<b>When to Develop</b>	<b>Difficulty</b>	<b>Method</b>
An auto-generated Table of Contents from the SGML source file, displayed in a separate window, and linked to the steps in the IETM (or some other equivalent functionality)	Baseline System	Easy	Cascading Style Sheet (CSS) Or OmniMark Script
Make TOC expandable		Medium difficulty	Dynamic HTML

<p>Cautions &amp; warnings displayed before procedural step(s) which may be hazardous. With specific backgrounds.</p> <p>They should be acknowledged before proceeding.</p> <p>After being read, they should still be accessible in icon form at the bottom of the frame, for the duration of the hazardous activity.</p>	Baseline System	Easy	XSL Script Or CSS Or OmniMark Script
	After Baseline	Medium difficulty	(Same)  Dynamic HTML
Sequential IETM procedures displayed one step at a time, with “Next” and “Previous” buttons.	Baseline System	Easy	XSL Script Or OmniMark Script Or CSS

<b>IETM Function</b>	<b>When to Develop</b>	<b>Difficulty</b>	<b>Method</b>
<p>Graphics applicable to a particular step should be immediately accessible from within the step.</p> <p>Implementation mechanisms under consideration:</p> <p>Automatically displayed.</p> <p>Include an in-line thumbnail of the graphic.</p> <p>A link from the figure reference.</p>	Baseline System	Relatively Easy	OmniMark Script or CSS  (Possibly with preprocessing of graphics)
<p>Bookmarks</p> <p>System management of user bookmark files</p>	<p>Baseline System</p> <p>After Baseline</p>	<p>Easy</p> <p>Difficult</p>	Assign menu item to button or icon
Full-text search mechanism, available at chapter, document, and library level.	Baseline System	Easy:	COTS S/W

List of Figures and List of Tables, each in a separate window, auto-generated from the SGML source file (or some other equivalent functionality).	Baseline System	Medium Difficulty	XSL Or CSS Or OmniMark Script
User notes, (if determined to be useful in existing IETMs).	After Baseline	Difficult	Custom code
<b>IETM Function</b>	<b>When to Develop</b>	<b>Difficulty</b>	<b>Method</b>
<p>Inclusion of a “Control Panel” or toolbar for user access to IETM features.</p> <p>Typically, a control panel includes some or all of the following buttons or icons:</p> <ul style="list-style-type: none"> <li>• Next &amp; previous steps</li> <li>• Backtrack, i.e., previous entry (may use browsers back)</li> <li>• A “find” and/or full-text search.</li> <li>• Exit from the IETM.</li> <li>• Start over (not needed if don’t do Next/Prev steps)</li> <li>• View Control, i.e., view/hide TOC, full-screen view, etc. (Frames)</li> <li>• Print screen; Print image (or a selected portion).</li> <li>• Clipboard operations: copy, paste</li> <li>• Graphic viewing operations; zooming, panning, etc.</li> <li>• (see above) User Notes</li> <li>• User Bookmarks</li> </ul>	Not Sure at this Time	Many functions are easy; others are more difficult	<p>Assign menu selections or Active-X controls to buttons or icons.</p> <p>Some custom code will be required.</p>

The above IETM features shall be evaluated based on the following criteria:

- d) The extent to which their compliance with MIL-PRF-87268 is required.
- e) Usefulness to the fleet, based on previously developed IETMs

- f) Difficulty in developing the function, i.e., cost vs. benefit. The use of third-party “plug-ins” shall be considered where applicable, both in terms of their technical features and cost.
- g) Difficulty in integrating the function in an automated IETM production system.

**(2) Develop Production Techniques:**

The second step shall be to develop methods to automate the conversion of the SGML source files to XML format and to automatically apply the styles to the resultant files. For the conversion from SGML to XML, either COTS s/w shall be used or an OmniMark translator shall be developed. Integration of IETM features, such as the generation of an interactive TOC shall be automated where possible, since manual-authoring is not acceptable in the NNS high-volume IETM development environment. To the extent possible, this process should rely on existing production techniques used at NNS, since a project goal is to ensure that all work is directly applicable to an existing environment. Style sheets/scripts will be required in order to automatically insert proper HTML or tags in procedures to control the flow through the IETM (such as processing “Previous/Next” buttons) and to produce a frame-based view package.

**(3) Develop IETM Library:**

Linking from the Web-based product back to ATIS to bring up engineering drawings and other raster-based ETMs and Infoaccess or DynaText-based ETMs will be tested at NNS and demonstrated at NSWC-CD to the extent practical. Linking from the Web-based product to another Web-based product that is separate from ATIS (implying that there is a Web server somewhere to link to) will also be demonstrated if possible. Assuming that the above production techniques which were developed work properly, this step should mostly be a debugging event and refining.

**(4) Integrate With ATIS:**

The following steps are required for ATIS integration:

Develop an “IETM.NDX” file, which defines the entry points into the IETM. There may be one or multiple entries per manual. This file is put at the root of the CD and is used by ATIS to identify what IETMs are available on the CD. There is an “import” routine in ATIS to make the CD known to ATIS.

- h) Verify that the IETM library executes properly in all 3 modes of ATIS operation:
- i) Network Mode: Kubik jukebox, NT or Novell 3.1.2 network. The CD can be run from local CD drive or a CD tower

j) Standalone Mode: CD is run from local CD drive (with ATIS functionality)

k) Icon Launch: No ATIS functionality; the CD is run from a local drive.

The IETMs must be able to quickly and easily switch from one mode of operation to another. The IETMs should run under Windows 3.11, Windows-95, and NT at a 640x480x256 color resolution or better.

#### Issues and Considerations:

- Browser & Plug-In Selection:

Browser selection should be defined for this project. Currently, MS Internet Explorer 4 (IE4) is the browser of choice because it is most compliant with the XML standards. However, Netscape Corp. has committed to full compliance with the XML standard, so an IETM developed for IE4 should work on Netscape Navigator 4 (NN4). For commonality, an overall design compatible with both browsers is desirable, but it may not be possible to accommodate plug-ins and third-party products. UNIX compatibility is the only other compatibility issue; IE4 currently will not run under UNIX, but NN4 will. (ATIS is Windows-based, so this may not be an issue). Ensuring compatibility under Windows-95/NT guarantees compliance with the Navy's Information Technology for the 21<sup>st</sup> Century (IT-21) initiative.

As a future issue, the IETMs developed in this project have applicability beyond a controlled shipboard installation, such as a depot or on a internet server, where the user choice of a browser cannot be controlled, it will be necessary for:

- i. The browser and any plug-ins must be delivered with the IETMs, or
- ii. The IETM must determine both the browser type and version (and any plug-ins used), and the notify the user if the browser is prior to Rev. 4 (and cannot support XML). Such browser and plug-in verification scripts exist. The message can request the user to download the proper browser or components.

- Delays in XML standards approval:

XML actually consists of 3 standards, XML- the data format, XLL- the linking language, and XSL- the style language. XML has been approved by the W<sup>3</sup>C, and XLL is going through the final stages of approval. However, XSL has a way to go. Meanwhile, without W<sup>3</sup>C approval, Microsoft has built XML capability in its Web browser and has released sample XSL code for testing and demonstration purposes.

As a backup approach, if W<sup>3</sup>C XSL ratification stalls, Cascading Style Sheets (CSS) are supported on IE4 and NN4, to provide the necessary capability. If there are unforeseen problems here, a fallback position for this project will be to develop a SGML-to-HTML



translator to meet the majority of the objectives, still delivering an automated document production process based on Web-based IETMs.

- Integration of Web browsers with ATIS:

Discussions with ATIS architects have indicated that there should be no problems in this area.

- Selection of a Web-based search engine:

There are several products which meets of the needs of the project, but licensing fees are involved. As a design consideration, evaluation of free search tools should be done.

- XML technology applicable to View Packages:

Although not to be a part of the baseline system, the concept of view packages should be considered for future development, since XML offers the ability to dynamically create custom views of the information. One of the largely unfulfilled hopes of the MIL-PRF-87268 and MIL-PRF-87269 standards was that different uses could be made of the same data. For example, the same documentation database could support both training and troubleshooting. With legacy documents, both the contents and navigation paths through the IETMs are fixed when the documents were created. By judicious use of content tags, multiple uses can be made of the same document.

With the SSM documents, it is difficult to support both training and operational procedures because these documents were created solely to describe operations. To add training functionality, additional information will likely be required, such as tests, supporting materials, etc. Another issue is that pre-built search indexes will not work with dynamic documents.

The purpose of mentioning these issues at this time is to ensure that the design will allow for growth in this area.

- Common IETM look and feel among differing IETMs:

The proposed Navy IETM Architecture (NIA) recognizes that this is an important unresolved issue and recommends that MIL-PRF-87268 be revised to accommodate the Web browser interface. This does not really provide any guidance for this project, so it is recommended that the user interface for this project match the one of existing IETMs being delivered by NNS on ATIS platforms as much as possible.

#### **Metrics and Other Key JIA Factors for Testing:**

- Metrics. The following table, at a minimum, will be used to assess the effectiveness of the pilot demonstration. In addition, existing ETM test plans used for ATIS testing may be employed.

Display w/o loss of functionality compared to previous ETM baseline.
Display of critical elements compared to previous ETM baseline.
Able to separate components into logical elements compared to previous ETM baseline.
Display of graphics compared to previous ETM baseline.
Able to retrieve elements in a reasonable time frame compared to previous ETM baseline.
P/URL and ATIS links completed satisfactorily.

- Key JIA Factors. Other JIA factors to be tested may include:

The IETM is viewed through the JIA browser interface.
A generic Web Server functioning as a single electronic library for dissimilar IETMs.
P/URL or ATIS 'INTERFACE.EXE' protocol addressing is used when authored information refers to other ETMs or IETMs.
P/URL addressing can be used by other IETMs to reference into the IETMs employing a publishable set of addressable access/entry points.
No loss of functionality (compared with a standalone IETM application) occurs in viewing the information through Browser interface.
Show use of one or more objects from legacy data as part of a browser display page.
Show use of reusable and multipurpose software display components in an IETM application, which was originally used for different application.
IETM operates in a connected intranet.
IETM operates in an occasionally connected mode.
IETM operates in a stand-alone mode employing personal server.
IETM operates in a stand-alone mode without use of server.
Uses supported COTS or GOTS authoring products.
Uses supported COTS or GOTS run-time/viewing software components.
Application incurs no incremental cost to distribute software components to other DoD users.
All software components are downloadable via intranet and are automatically installable – only decision of user is to accept installation.

## 8.6 E-6B

### Program Manager:

E-6 IPT 3.3.1F Betty Murphy, 904-779-3703, murphy\_b.psd@navair.navy.mil

POC: Betty Murphy, E-6 IPT 3.3.1F, 904-779-3703, murphy\_b.psd@navair.navy.mil

### **Current E-6B IETM Status**

The E-6B manuals have been SGML-tagged to the 38784STD-BV1D1PO (non-work package) and MIL-M-81927 LegacyV1.0 (work package) DTDs for display in the Dynatext Browser (version 4.1). The IETMs have been tested in the squadrons and will be fielded when hardware becomes available.

### **Purpose**

This document forms the basis for conducting a demonstration of the Joint IETM Architecture using Navy legacy technical data. The E-6B IETMs have been selected as the test candidate for this demonstration.

### **Specific Objectives**

Successful completion of this test will demonstrate the E-6 IPT's capability of repurposing its legacy SGML IETM data for display in a web browser. INSO Corporation, the developer's of Dynatext, have developed a web based delivery software package known as DynaWeb. The table enclosed at the end of this report will also serve as a guideline to determine conformance of the key JIA interoperability factors. Particular emphasis will be placed on:

- l) Verify accuracy of SGML to HTML conversion efforts (via DynaWeb).
- m) Accessibility of IETMs from an Intranet arrangement.
- n) Display of information in a web browser without loss of functionality.
- o) Assess display of vital information (warnings, cautions, etc.)
- p) Ability to view graphics without a significant amount of time delay.
- q) Determine P/URL electronic addressing scheme.

### **Scope**

The demonstration plan will address the methodologies and procedures required to execute a test of the JIA. Microsoft's Internet Explorer (IE) and Netscape's Navigator have the built-in capability to display textual information in HTML. The E-6B program has converted their paper based technical manuals to SGML and view the CD ROM versions of the manuals in Dynatext. A sister product, DynaWeb will produce HTML on-the-fly from Dynatext books.

### **Approach**

The versatility of SGML tagged data has provided the opportunity to conduct a comprehensive test of DynaWeb's capabilities. Under this demonstration, the E-6B IETM project team will configure a Microsoft Internet Information Web Server with the DynaWeb

(version 4.0) application. Once verified as operating properly the team will then test DynaWeb “stylesheets” that pseudo HTML tag the current E-6B SGML based IETM. The resulting HTML will display in a web browser without any loss of functionality and will mimic the Dynatext IETM interface.

**Resources Required**

The resources required to perform this test include:

- Microsoft IIS Web Server
- INSO’s DynaWeb Application

**Demonstration Participants**

- NAVAIR (PAXRIV)
- COMSTRATCOMWING ONE (Tinker AFB, Oklahoma City)
- E-6 IPT (Jacksonville, FL)
- VQ-3 and VQ-4 (Tinker AFB, Oklahoma City)

**Risks**

DynaWeb is a relatively stable software package with a variety of applications available on the World Wide Web. Of concern is the performance of customized plug-ins that enhances the functionality of the CD ROM based IETM. These plug-ins may need to be converted to Web based software components (ActiveX, Java, etc.) for the IETM to function properly.

**Metrics**

The following table will be used to assess the effectiveness of the pilot demonstration:

<b>Metric</b>	<b>DynaWeb</b>
Display w/o loss of functionality	
Display of critical elements	
Able to separate components into logical elements	
Display of graphics	
Able to retrieve elements in a reasonable time frame	
P/URL links completed satisfactorily	

**Exit Criteria**

A report analyzing the results of this test will be issued upon completion. The report will document the lessons learned in implementing the JIA for a DynaWeb IETM and will determine the cost effectiveness and benefits of the JIA. All objectives outlined in Section 4.0 of this report will be addressed.

**POA&M**

See attached milestone chart.

**Special Considerations**

Technical support from INSO may be required. Installation of the DynaWeb application server at the Carderock lab will need to be coordinated.

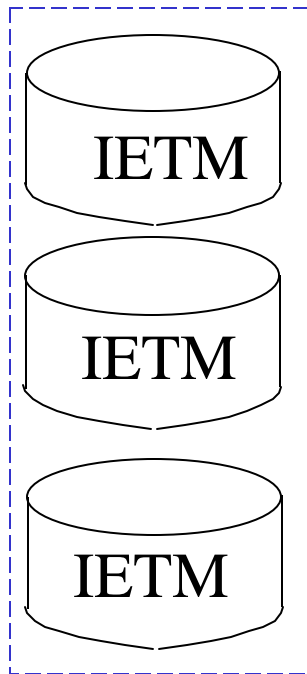
## Key JIA Factors for the E-6B Pilot Demonstration

<b>1</b>	The IETM is viewed through the JIA browser interface.
<b>2</b>	A generic Web Server functioning as a single electronic library for dissimilar IETMs.
<b>3</b>	An IETM-peculiar additional Application Server is used which can function as an add-on electronic library to the basic generic Web Server.
<b>4</b>	P/URL addressing is used when authored information refers to other IETMs.
<b>5</b>	P/URL addressing can be used by other IETMs to reference into the IETMs employing a publishable set of addressable access/entry points.
<b>6</b>	No loss of functionality (compared with a standalone IETM application) occurs in viewing the information through Browser interface.
<b>7</b>	Show use of one or more objects from legacy data as part of a browser display page.
<b>8</b>	Show use of reusable and multipurpose software display components in an IETM application, which was originally used for different application.
<b>9</b>	IETM operates in a connected intranet.
<b>10</b>	IETM operates in an occasionally connected mode.
<b>11 a</b>	IETM operates in a stand-alone mode employing personal server.
<b>b</b>	IETM operates in a stand-alone mode without use of server.
<b>12 a</b>	Uses supported COTS or GOTS authoring products.
<b>b</b>	Uses supported COTS or GOTS run-time/viewing software components.
<b>13</b>	Application incurs no incremental cost to distribute software components to other DoD users.
<b>14</b>	All software components are downloadable via Intranet and are automatically installable – only decision of user is to accept installation.

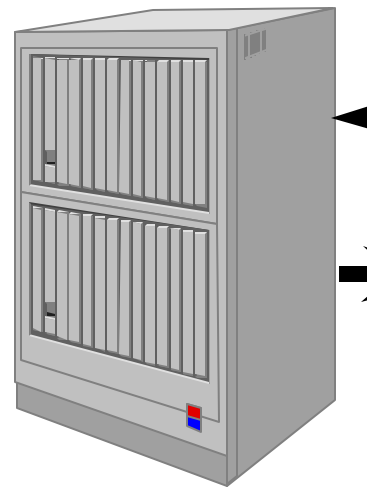


# E-6 IPT Test Scenario of the DynaWeb Server

59



E-6B IETMs residing in Dynatext books



Web Server w/DynaWeb loaded

IETM Request



(This procedure is performed internal to the web server)

Converted HTML





# E-6B IETM POA&M

69

Event	Month	June	July	Aug	Sept	Oct	Nov	Dec
<u><i>DynaWeb Conversion</i></u> Prepare Web IIS Server Test Server Configuration Generate Stylesheets Test Stylesheets Refine Stylesheets Test all components								

The Gantt chart illustrates the following task dependencies:

- Prepare Web IIS Server:** Starts in late September, ends in early October.
- Test Server Configuration:** Starts in early October, ends in mid-October.
- Generate Stylesheets:** Starts in mid-October, ends in late October.
- Test Stylesheets:** Starts in late October, ends in early November.
- Refine Stylesheets:** Starts in early November, ends in mid-November.
- Test all components:** Starts in mid-November, ends in late November.

## **9.0 SUMMARY OF AIR FORCE PILOT DEMONSTRATION SYSTEMS**

### **9.1 General Methods and Procedures Technical Order (TO)**

#### **Program Manager:**

Gail Brown

#### **PM's Receptiveness:**

Committed.

#### **Performing Test Facility:**

Air Force Product Data Systems Modernization (PDSM) Program Office

#### **Resources Needed:**

Systems engineering and LAN support; Plus one NT server with Web-serving capability; Planned funding of the Air Force Technical Team in the amount of \$65K will be required to support this effort.

#### **Vendor Participation:**

None. TOs are maintained organically.

#### **Vendor Resources Needed:**

None.

#### **ETM/IETM Current Status:**

Class II IETM

#### **End-User Test Candidates:**

Technical order managers at WR-ALC/TILT; SA-ALC/TILDT; OC-ALC/TILDT; OO-ALC/TILDT; SM-ALC/TILDT

#### **Hardware Implications:**

One NT server running the Microsoft Internet Information Server (MSIIS) to host files and applications.

#### **Demonstration Scenario:**

The Air Force will set up an NT Server to host the Microsoft Web server, IPDF TOs, and the Adobe Acrobat Reader. The General Series TOs will be made available to the public via "byteserving" (page-at-a-time downloading). The client will test the integrity of the internal

and external links of the TO. If the client does not have the Adobe Reader plug-in, the host will make the viewer available.

**Reason for Selection:**

Approximately 16 million pages (250,000 books) of Air Force legacy technical orders are in the process of being converted to IPDF.

**Background:**

The Air Force Product Data Systems Modernization (PDSM) Program Office is the managing organization for the Air Force's legacy TO conversion. Our discussion with the PDSM Deputy Single Manager indicates she is willing to use IPDF TOs and Adobe Acrobat to evaluate the TSWG interoperability project. At this time, we intend to use General Series Technical Orders (managed and updated at Wright-Patterson AFB) found throughout the Air Force. An example is the 00-5-1 TO, which we have access to in IPDF format.

**Demonstration of Technology:**

The Air Force PDSM Program Office intends to demonstrate a Web based delivery system using existing IPDF technical orders. The demonstration should utilize an integrated viewer with a common browser which features page-at-a-time downloading. The implementation should offer a minimum of user intervention demonstrating the ability to “serve-up” data over the World Wide Web. Security will not be addressed in this project. All technical orders used in the project will hold a Distribution Statement A, releasable for public distribution.

**Concept:**

Using a PC linked to the Internet, the user will insert the URL address of the server containing the General Series TOs. Conceptually, the user will access the server containing the technical orders and click on the file of interest and be able to immediately view the first page of the document without waiting for the entire document to download. The user will have the option of downloading the document in the background while viewing the pages of interest. The viewer will be integrated with the browser and maintain the common look and feel of the browser. If the viewer is not available on the users client system, the host will support real time installation of the necessary viewer. The user will be able to click on an external link and reach the referenced TO located on another server.

**Unresolved Issues:**

- Link integrity with byteserving capability.
- Implementing the use of a common browser.

## 9.2 F-22

### **Program Manager:**

Gerry L. Freisthler, Deputy SPO Director, F-22 (ASC/YF)

### **PM's Receptiveness:**

The F-22 has accepted participation in the JIA review.

### **Performing Evaluation Facility:**

There is no test facility for this effort; however, the JIA evaluation will be accomplished at Lockheed Martin, Fort Worth and the F-22 SPO.

### **Resources needed:**

Personnel from the F-22 IMIS and TOD sections will review the JIA.

### **Vendor Participation:**

Lockheed Martin

### **Vendor Resources Needed:**

IMIS and TOD personnel.

### **ETM/IETM Current Status:**

Class IV IETM

### **End-User Test Candidates:**

None.

### **Hardware Implications:**

The hardware implications do not apply since we will not actually convert data and trial run the JIA on a display.

### **Evaluation Scenario:**

The F-22 will conduct a thorough evaluation of the JIA, but will not perform a test due to the fact that F-22 IMIS is not set up to be used as an object encapsulated system on the Web. Current F-22 priorities present scheduling conflicts and do not allow for re-engineering the F-22 IMIS and testing the JIA requirements by the end of CY 98.

### **Reason for Selection:**

The F-22 SPO is the Air Force's lead program for proving the benefits of Class IV IETMs in the Air Force. All development work on Class IV or V IETMs in the Air Force is on hold until the F-22 implementation generates lessons learned for future implementations.

**Background:**

We met with Bill Mejias and Captain Scott Fagan from the F-22 Technical Data Division. We have received the go-ahead to work with Lockheed Martin Fort Worth in accomplishing the JIA evaluation for the F-22 IMIS.

**Additional Information:**

The F-22 IMIS is composed of an IBM-compatible, client-server, workstations and PMAs. They run SCO CMW+ operating system.

**Demonstration of Technology:**

The JIA evaluation will not involve demonstration of technology.

**Concept:**

The F-22 program and its prime contractor, Lockheed-Martin, will evaluate the JIA from two key perspectives:

- 1) What does it take to Web enable the F-22? and
- 2) What does it gain the Air Force?

**Unresolved Issues:**

Implementing the use of a common browser.

**F-22 POA&M:**

- 1. Scope Evaluation .....Jun 98
- 2. Initial JIA Analysis.....Jul 98
- 3. Assess Authoring System and Data Conversion Impacts .....Aug 98
- 4. Evaluate JIA Migration Requirements .....Sep 98
- 5. Assess JIA benefits to F-22 and USAF Infrastructure.....Sep 98
- 6. Compile Evaluation Report.....Oct 98

**9.3 JSTARS**

**Program Manager:**

Col. Robert H. Latiff, System Program Office Director, ESC/JS

**PM's Receptiveness:**

The Joint STARS program has agreed to participate in the demonstration of the applicability of the JIA to the JSTARS IMIS(JIMIS) system..

**Performing Test Facility:**

The test facility has not yet been selected. Evaluation efforts are likely to occur in several places to include the System Program Office at Hanscom AFB, Massachusetts, Warner-Robins Air Logistics Center in Georgia, and the Northrop Grumman facility in Melbourne, Florida.

**Resources Needed:**

The number of resources will vary during this project, but will include a blend of contractor and military personnel. Once the test scenarios have been adequately defined, the total number of resources needed will be determined. Currently, the project is receiving attention from 3 individuals at Hanscom and one at Warner-Robins ALC.

**Vendor Participation:**

Northrop Grumman

**Vendor Resources Needed:**

The vendor will need to establish the JIMIS environment along with the hardware implications described below.

**ETM/IETM Current Status:**

Class IV IETM

**End-User Test Candidates:**

Warner-Robins ALC, Captain Scott Livingston, JSTARS Technical Orders (WR-ALC/LKSO), will determine what, if any, end users will review the JIMIS/JIA.

**Hardware Implications:**

One NT server running the Microsoft Internet Information Server (MSIIS) server to host files and applications. One server to host database.

**Test Scenario:**

Test scenarios are currently being developed.

**Reason for Selection:**

JSTARS is developing IETMS but offers a different flavor of SGML based IETM than the F-22 program. Utilizing data from the JSTARS program as well as data from the F-22 will provide a useful test of interoperability using different IETM implementations.

**Background:**

We contacted two representatives from the Joint STARS Development Division at Hanscom AFB. In addition, we spoke to Mark Cannon, the Northrop Grumman JIMIS representative in Melbourne, Florida. Mr. Jim Kuhn (Mitre) and Major Susan Thibodeau (JSTARS) provided us some insight on the JIMIS effort, as well as their thoughts towards participating in the Navy interoperability project. The JIMIS program has ported its viewer to the NT environment and is investigating the use of Web technologies for viewing its TOs.

**Additional Information:**

The JIMIS viewing package is hosted on a Sun Solaris workstation. JIMIS uses Oracle as its database and was designed to be "87269 compliant". The JIMIS viewing package has been ported over to Windows NT (an all-in-one Windows NT package), but has kept a very similar X-windows look and feel in its GUI.

**Demonstration of Technology:**

JIMIS has already performed some informal in-house prototyping of an Internet browser viewer that reads the JIMIS database. No modifications to the Grumman-authored database were required for this web design. JSTARS is particularly interested in how their extensive Joint STARS database, for which 100% of the "O-level" data is authored and has just begun to be used in the field, will migrate to an eventual web-based system. The specifics of the demonstration are TBD.

**Concept:**

The JSTARS program has in the past evaluated Web-based technologies for use in their JIMIS program. Personnel from JSTARS will select a maintenance procedure that they intend to web-enable the JIMIS screens related to the procedure.

**Unresolved Issues:**

- Implementing the use of a common browser.

## **10.0 SUMMARY OF MARINE CORPS PILOT-DEMONSTRATION SYSTEMS**

### **10.1 The Tactical Air Operations Module and the Tactical Interface Group (AN/TYQ-23)**

#### **System Acquisition Manager or Project Office:**

MARCORSYSCOM, C4I/Air Defense

#### **POC for Demo:**

Arnie Dow or Greg Ransom (703) 221 2222 MKI\_SYSTEMS@PIPELINE.COM

Harry Whittaker (301) 227 3388 whittake@dt.navy.mil

#### **Relevant Background on Weapons System ETM/IETM Status:**

This proprietary class 3 IETM was developed and is marketed by Litton Data Systems under the trade name of MediaLynk. This is a joint Marine Corps/Air Force IETM that has been fielded since December 97. Recently the weapon system's PIP reached a favorable milestone III decision which will provide MediaLynk enhancements and new starts as they pertain to the system integration efforts and upgrades.

#### **Purpose of the Demonstration:**

Is the MediaLynk IETM viewable through the JIA browser interface as it exists today?

#### **Specific Objectives of the Demonstration:**

The demonstration was established to see if a proprietary legacy data authored IETM (MediaLynk) could be loaded onto an intranet and viewed through the JIA browser interface in the "stand alone" mode. If not, will a commercial off the shelf "helper application" provide the necessary temporary interface?

#### **Scope:**

Utilizing the fourteen JIA demonstration elements established by the Core Architecture Team, evaluate and demonstrate in the NSWCCD laboratory environment, MediaLynk's ability to perform within the JIA.

#### **Approach:**

NSWCCD provided all hardware and software required during the evaluation. Data collection methodologies were based upon observing and documenting how MediaLynk performed or did not perform in accordance with the fourteen key JIA elements, once loaded onto the NSWCCD intranet.



**Resources Required:**

NSWCCD Laboratory resources (computers, software, intranet, etc.)

NSWCCD engineers

**Demonstration Participants:**

L. John Junod, NSWCCD

Harry Whittaker, NSWCCD

Greg Ransom, MKI SYSTEMS, (USMC)

**Risks:**

Inherent within the proprietary nature of MediaLynk’s authoring and viewing software are assumptions of potential failures to operate within the JIA.

**Metrics:**

Measures of effectiveness were predicated on interoperability. Could MediaLynk operate within the JIA, independently or was a “helper application” required”

**Exit Criteria:**

The successful completion of this demonstration can occur only when MediaLynk performs fully in a Web environment without the aid of a “helper application.” Currently MediaLynk encounters a number of obstacles that inhibit JIA interoperability. It was found that MediaLynk could not initialize on NSWCCD’s intranet environment in either the standalone mode or with the aid of a “helper application.” The demonstration participants believe that the challenges were MediaLynk’s proprietary structure and have contacted Litton Data Systems regarding their interest in WWW utilization for IETM distribution. Responding to questions provided by Mr. Whittaker, Litton indicated that they were presently developing capabilities for MediaLynk to perform in a Web environment.

**USMC “MEDIALYNK (TAOM)” PILOT DEMONSTRATION  
ELEMENTS RESPONSE**

<b>DEMONSTRATION ELEMENT*</b>	<b>MEDIALYNK (TAOM)</b>
<b>1</b>	<b>NO (w/HELP)</b>
<b>2</b>	<b>YES</b>
<b>3</b>	<b>NO</b>
<b>4</b>	<b>YES</b>
<b>5</b>	<b>YES</b>
<b>6</b>	<b>YES</b>
<b>7</b>	<b>NO</b>

<b>8</b>	<b>NO</b>
<b>9</b>	<b>YES</b>
<b>10</b>	<b>YES</b>
<b>11</b>	<b>YES</b>
<b>12</b>	<b>NO</b>
<b>13</b>	<b>NO</b>
<b>14</b>	<b>NO</b>

**\* DENOTES CORE ARCHITECTURE TEAM ELEMENTS**

**POA&M :**

Litton intends to demonstrate their product's new JIA compliant ability during CALS Expo 98. Naturally, the TAOM Program with assistance from MARCORSYSCOM Code PSD-M4, will negotiate with Litton to acquire this capability once it has been evaluated and accepted as JIA compliant.

**Special Considerations:**

Communication paths were established between Litton and NSWCCD to ensure that the vendor's development efforts are, at minimum, structured and perform within the scope of the present and future JIA.

**10.2 Tactical Remote Sensor System**

**System Acquisition Manager:**

MARCORSYSCOM, C4I

POC

Arnie Dow or Greg Ransom, MKI\_SYSTEMS.PIPELINE.COM, (703) 221-2222

Harry Whittaker, NSWCCD, whittake@dt.navy.mil, (301) 227-3388

**Relevant Background on Weapon System ETM/IETM Status:**

When OSD provided funds for the Marine Corps to convert legacy paper technical manuals to electronic format, the Marine Corps divided its legacy data into three categories as follows:

- Those which would not be converted because it was not economically sound for various reasons.
- Those that would be converted to PDF Format based upon an economic analysis.
- Those that would be SGML tagged and converted it IETMs also based upon economic analysis.

This is a TM that met the criteria to be converted to a level 3 IETM using the 16-BIT architecture of Interactive Authoring Display System (IADS).

**Purpose of the Demonstration:**

Is this IADS IETM viewable through the JIA browser interface as it exists today?

**Specific Objectives of the Demonstration:**

The demonstration was established to see if a Government off the Shelf (GOTS) IETM, IADS, could be loaded onto an intranet and viewed through the JIA browser interface in the “stand alone” mode. If not, will a commercial of the shelf “helper application” provide the necessary temporary interface?

**Scope:**

Utilizing the fourteen JIA demonstration elements established by the Core Architecture Team, evaluate and demonstrate in the NSWCCD laboratory environment, IADS’ ability to perform within the JIA.

**Approach:**

NSWCCD provided all hardware and software required during the evaluation, to include a software package called “Reachout/Passport” which functioned as a “helper application” during this test.

Data collection methodologies were based upon observing and documenting how IADS performed or did not perform in accordance with the fourteen key JIA elements once loaded onto the NSWCCD intranet

**Resources Required:**

- NSWCCD Laboratory resources (computers, software, intranet, etc.)
- NSWCCD engineers

**Demonstration Participants:**

- L. John Junod, NSWCCD
- Harry Whittaker, NSWCCD
- Greg Ransom, MKI SYSTEMS, (USMC)

**Risks:**

Although, IADS’ IETM status can be categorized as not fully mature at this time, the risks involved with utilizing this authoring and viewing package for this evaluation are minimal.

Prior to the evaluation, it was assumed that a “helper application” would be required to operate within the JIA.

**Metrics:**

Measures of effectiveness were based on interoperability. Could IADS operate with the JIA independently or was a “helper application” required?

**Exit Criteria:**

Full success of this demonstration could occur only if IADS could perform unconditionally in a Web environment without the aid of a “helper application” (during the May 98 meeting the IETMTWG Technical Team determined that the use of “helper applications” was not fully JIA compliant.). It was found that IADS could easily load onto the intranet, however, “Reachout/Passport” was used as a “helper application” to assist IADS to play in a Web environment. Once IADS was established within the Web environment, there appeared to be no loss of functionality of the IETM.

**USMC “IADS (TRSS)” PILOT-DEMONSTRATION ELEMENTS  
RESPONSE**

<b>DEMONSTRATION ELEMENT*</b>	<b>IADS (TRSS)</b>
<b>1</b>	<b>YES (w/Help)</b>
<b>2</b>	<b>YES</b>
<b>3</b>	<b>YES</b>
<b>4</b>	<b>YES</b>
<b>5</b>	<b>YES</b>
<b>6</b>	<b>YES</b>
<b>7</b>	<b>(?)</b>
<b>8</b>	<b>YES</b>
<b>9</b>	<b>YES</b>
<b>10</b>	<b>YES</b>
<b>11</b>	<b>YES</b>
<b>12</b>	<b>YES</b>
<b>13</b>	<b>YES</b>
<b>14</b>	<b>YES</b>

**\*DENOTES CORE ARCHITECTURE TEAM ELEMENTS**

**POA&M:**

Working with NSWCCD personnel and Mr. Rich Gramly, IADS PM, the Marine Corps intends to explore all issues to bring Marine Corps developed IADS IETMs within the scope of the JIA. An accurate milestone schedule can be provided only when funding is established

and Mr. Gramly has evaluated the delta between the complexity of the JIA requirements to IADS present state of compliance.

**Special Considerations:**

Presently, IADS responds positively to all but 1 (#7) of the 14 Key Demonstration Elements adopted during the May 98 IETMTWG meeting. Questions regarding the future plans and development of the IADS authoring and viewing software, as they relate to IETM Web distribution, are being prepared to be presented to the IADS PM, Mr. Richard Gramly. IADS is a GOTS package so there is no incremental cost to distribute downloadable software to DoD users. IADS software components are downloadable via HTTP and are also automatically installable.

**10.3 Diode Demonstration Set, TS-268A/U-B,U-D (SL-4-00019)**

**System Acquisition Manager or Project Office:**

MARCORSYSCOM, PM TMDE

**POC for Demo:**

- Arnie Dow or Greg Ransom (703) 221-2222, MKI\_SYSTEMS.PIPELINE.COM
- Harry Whittaker (301) 227-3388 whittake@dt.navy.mil

**Relevant Background on Weapons System ETM/IETM Status:**

When OSD provided funds for the Marine Corps to convert legacy paper technical manuals to electronic format, the Marine Corps divided its legacy data into three categories as follows:

- Those which would not be converted because it was not economically sound for various reasons.
- Those that would be converted to PDF Format based upon an economic analysis.
- Those that would be SGML tagged and converted to IETMs also based upon economic analysis.

This Test Set is one of about 1,800 that met the criteria for PDF Format. This is an old and proven technology that only needs verification that it will play on the common browser. Currently the Test Set file is hosted on MCLB Albany's Homepage and is available to all authorized users.

**Purpose of the Demonstration:**

Will PDF file TMs that are presently resident on MCLB Albany's Homepage, play on the JIA common browser?

**Specific Objectives of the Demonstration:**

The demonstration was established to see if PDF file TMs could be loaded onto an intranet and viewed through the JIA browser interface in the "stand alone" mode. If not, will a commercial off the shelf "helper application" provide the necessary temporary interface?

**Scope:**

Utilizing the fourteen JIA demonstration elements established by the Core Architecture Team, evaluate and demonstrate in the NSWCCD laboratory environment, PDF's ability to perform within the JIA.

**Approach:**

NSWCCD provided all hardware and software required during the evaluation, to include a software package called "Reachout/Passport" which functioned as a "helper application" during this test. Data collection methodologies were based upon observing and documenting how PDF files performed or did not perform in accordance with the fourteen key JIA elements once loaded onto the NSWCCD intranet

**Resources required:**

- NSWCCD Laboratory resources (computers, software, intranet, etc.).
- NSWCCD engineers.

**Demonstration Participants:**

- L. John Junod, NSWCCD
- Harry Whittaker, NSWCCD
- Greg Ransom, MKI SYSTEMS, (USMC)

**Risks:**

PDF file TMs is an old proven technology , the risks involved with utilizing this authoring and viewing package for this evaluation are minimal. Prior to the evaluation, it was assumed that a "helper application" would be required to operate within the JIA.

**Metrics:**

Measures of effectiveness were based on interoperability. Could PDF file TMs operate within the JIA independently or was a "helper application" required?

**Exit Criteria:**

Full success of this demonstration could only occur if PDF file TMs could perform unconditionally in a Web environment without the aid of a “helper application” (during the May 98 meeting the IETMTWG Technical Team determined that the use of “helper applications” was not fully JIA compliant.). It was found that PDF files were easily downloaded from Albany’s Homepage onto the NSWCCD server for intranet distribution, however, “Reachout/Passport” was required as a “helper application” to assist PDF play in a Web environment. Once the PDF files were established within the Web environment, there appeared to be no loss of functionality of the ETM/IETM.

**USMC “PDF FILE TMs (DIODE TEST SET)” PILOT-  
DEMONSTRATION ELEMENTS RESPONSE**

<b>DEMONSTRATION ELEMENT*</b>	<b>PDF FILES TMs (DIODE TEST SET )</b>
<b>1</b>	<b>YES (w/HELP)</b>
<b>2</b>	<b>YES</b>
<b>3</b>	<b>YES</b>
<b>4</b>	<b>YES</b>
<b>5</b>	<b>YES</b>
<b>6</b>	<b>YES</b>
<b>7</b>	<b>(?)</b>
<b>8</b>	<b>YES</b>
<b>9</b>	<b>YES</b>
<b>10</b>	<b>YES</b>
<b>11</b>	<b>YES</b>
<b>12</b>	<b>YES</b>
<b>13</b>	<b>YES</b>
<b>13</b>	<b>YES</b>

**\*DENOTES CORE ARCHITECTURE TEAM ELEMENTS**

**POA&M:**

Continue to work with NSWCCD personnel to achieve complete JIA compliancy by the end of the calendar year.

**10.4 Advanced Amphibious Assault Vehicle (AAAV)**

**System Acquisition Manager or Project Office:**

DRPM, AAAV

**POC for Demo:**

Eric Jorgensen, NSWCCD (301) 227-1622 JorgensenEL@dt.navy.mil

**Relevant Background on Weapons System ETM/IETM Status:**

The AAV is the latest of a long line of amphibious vehicles employed by the Marine Corps. It will employ a very large (high dollar) state of the art technology with on-board diagnostics and embedded training. Considering the early R&D stage that the AAV is in, there are a number of unresolved issues that can be addressed up-front and early with regard to AAV JIA compliance. Test data for the AAV is being developed by General Dynamics Land Systems to be displayed using the GD TechSight viewing System. That system is not JIA compliant as it is a stand-alone application which is not structured to be Web-enabled as required by JIA. However; General Dynamics is developing a product, TechSight Web, that is Web enables and promises to be able to display the TechSight SGML data in the same manner as the stand-alone software. GD has offered to participate in the proposed Pilot Demonstration at no cost to the Government in order to demonstrate the TechSight Web capability.

**Purpose of the Demonstration:**

Can AAV IETM data developed for the GD TechSight Viewer operate within the JIA common browser using the new TechSight Web commercial product?

**Specific Objectives of the Demonstration:**

The demonstration was established to see if the AAV IETM can be loaded onto an intranet and viewed through the JIA browser interface using the same data base as provided to the Program to evaluate in the “stand alone” mode. The specific objective is to determine if the Web-enabled product can display the data as well as the stand alone version.

**Scope:**

The scope of the evaluation will be limited to three test IETMs being delivered to the AAV Program as part of the currently underway AAV development process.

**Approach:**

The demonstration will be undertaken entirely by General Dynamics Pittsfield, the vendors of the TechSight Products. Data will be provided to GD Pittsfield by the GD land Systems AAV prime contractor with the permission of the Program Office. Data collection methodologies will based upon observing and documenting how AAV files perform n the TechSight Web environment as compared to the TechSight stand-alone product. The initial tests will be conducted at the Pittsfield facility; however, the demonstration will be moved to the NSWC laboratory after all data conversion is completed.



Final evaluations will be conducted by the NSWC staff with regards to the fourteen key JIA elements once loaded onto the NSWCCD intranet

**Resources Required:**

- CD Pittsfield to provide all data conversion and loading tasks and provide the TechSight Web software. Some special provisions may have to be made regarding the COTS products included in the TechSight Web product, primarily the underlying SGML data base.
- NSWCCD Laboratory resources (computers, software, intranet, etc.)
- AAV and NSWCCD engineers

**Demonstration Participants:**

- General Dynamics Pittsfield
- NSWC and AAV Staff.

**Risks:**

The primary risk is that the GD claim of transferability of the TechSight Database from the stand-alone product to the Web product will not operate as claimed. There is a very limited chance that the GD data will not be available in a timely manner and/or the TechSight Web product will not be ready; however this risk appears to be very slight at this time.

**Metrics:**

- Does the IETM operate as well on Web product as Stand-alone? Y/N
- Is the TechSight Web product available as a commercially supported product?
- Cost of conversion of database from one product to the other. Goal is that the process is fully automated and one-time. Ideally the same database will feed both.

**Exit Criteria:**

Full success of this demonstration could occur only if AAV IETM could perform unconditionally in a Web environment without the manual modification of the data base.

**POA&M:**

TechSight Web product fully operational at GD sight ..... 1 Aug  
Database for Test IETM #1 available ..... 15 Aug  
Initial Operational Test of TS Web ..... 1 Sep  
Data Base for Test AAV IETM #2 ..... 1 Oct  
Operational Test Moved to NSWC Lab Complete Demo IETMs 1 & 2. 15 Oct  
Data Base for Test AAV IETM 3# (with diagnostics info and link) ..... 1 Nov  
Complete Demo Evaluation..... 15 Nov  
Write-up Demo Program ..... 15 Dec

**Special Considerations:**

Because the AAV Program is in the R&D phase of development, there are many unresolved issues regarding its IETM development. Mr. Joe Fuller and Mr. Eric Jorgensen (both from NSWCCD) are funded to provide support to the AAV PM while MARCORSYSCOM Code PSD-M3 is responsible for the final publication of the IETM. Unresolved issues will be addressed as they occur. GD Pittsfield may limit participation somewhat to available marketing resources but has promised to support demo to the extent described with the available version of their software.

## 11.0 SYSTEMIC PILOT-DEMONSTRATION AND LABORATORY EVALUATION EFFORT

### 11.1 Background

The JIA Pilot Demonstration Programs will independently check out and demonstrate the effectiveness of many of the individual characteristics of the proposed JIA and will show that DoD Weapon System Programs can develop IETMs in accordance with the JIA. However, Pilot Demonstration efforts will not individually check out or evaluate the Architecture as a whole. Such a demonstration would require multiple IETMs operating within the same JIA-compliant intranet. Nor will the Pilot effort demonstrate certain systemic capabilities of a JIA infrastructure, such as distribution of IETM View Packages to distributed intranets, or a capability to synchronize PEDDs which are only occasionally connected to the intranet. The expectation implicit in the JIA, that a dedicated intranet can be created on demand, is based on existing research and investigation; however, a laboratory demonstration of such an action in a DoD facility would reduce the risk and uncertainty of this important assumption.

The JIA addresses two important elements of interoperability. All Pilot Programs will demonstrate the first of these elements: the ability to view any IETM with a single browser. However, the second element, the ability to simultaneously access other JIA-compliant IETMs with the same browser and to incorporate the information into one IETM, is not being demonstrated to any significant extent. This situation results from the fact that IETMs have been, by design, selected from widely different communities and, therefore, IETMs used in one Pilot Demonstration Test program will not necessarily be able to address data sets contained in another Pilot Program. Nevertheless, this important aspect of the JIA can be demonstrated in a laboratory by artificially annotating the content of the Pilot IETMs so as to reference other Pilot IETMs even if the actual relationship is artificial (e.g., a Navy system referencing an unrelated Air Force IETM). The cost to expand the current Pilot programs so as to permit evaluation of the JIA for this kind of interoperability with real cases would be prohibitive, and unnecessary for the technical evaluation.

The Laboratory effort will also be required to investigate the extent to which modifications to a particular intranet and its shared servers necessary for the installation of one IETM system may make the network unsuitable for different IETM systems (a common problem with non-Web-based LAN systems). A facility that can simulate the overall systems is needed to evaluate the problem.

Accordingly, the Naval Surface Warfare System, Carderock Division, will supplement the currently planned JIA Pilot Demonstration programs with a series of in-house demonstrations designed to assess several of the expected JIA faculties at the system level.

### 11.2 Purpose

The purpose of the Systemic Demonstration and Laboratory Evaluation is to demonstrate and evaluate the JIA capabilities and features that will not be demonstrated in the individual pilot projects. In particular, the Systemic Demonstration will evaluate the ability to view and download, using a single Web browser, information from multiple types of JIA-compliant IETMs simultaneously; and to incorporate such information into a single in-house IETM.

### 11.3 Planned Effort

During the development of the NIA (Navy IETM Architecture), NSWCCD established a laboratory and Demonstration facility for the initial Navy tests. This facility will be made available for JIA evaluations with some selective modification and expansion to accommodate the simultaneous installation of most, if not all, of the Pilot Demonstrations. For example, the facility was established as an IT-21 (i.e., Microsoft NT and Microsoft Servers) network, and evaluation of DII COE and non-Microsoft servers would will require additional installations on the Laboratory network(s).

At the May 1998 Tri-Service JIA Team meeting it was agreed that to accomplish full evaluation of the effectiveness of the JIA, certain laboratory evaluations and demonstrations of systemic objectives would be required concurrently with the Pilot Demonstration Phase of the Effort to include:

- Evaluation of Single-User Device (both hardware and software) operating with all Service Demonstrations and applications. This will include construction of the Domain Name Services (DNSs) needed to host the different objects on the same intranet in the Laboratory.
- Evaluation of the capability to support the cited "occasionally connected PEDD" scenario, including switchable DNSs.
- Evaluation of a "distributed architecture" concept, including the implementation of several distribution techniques involving "push" technology and intranet channels.
- Demonstration and evaluation of techniques for automatically downloading and installing software components over an intranet.
- Demonstration of the full use of the JIA addressing model. The current Demonstration programs will of course demonstrate this process to a limited extent, but the actual content will not exercise cross-referencing to other Demonstration programs. The laboratory test will evaluate and demonstrate significantly more extensive use of the electronic cross-referencing feature.

#### **11.4 Tasks**

Specific objectives include the evaluation and demonstration of the following capabilities and features of the JIA:

- Multiple disparate IETM implementations can operate on the same intranet and can be viewed with a single browser on a particular viewing device;
- Using the same browser, JIA compliant IETMs can electronically reference and access different IETMs;
- The ability to incorporate into an IETM a selection from another IETM so that it appears to the user to be a coherent single IETM;
- Ease of re-mapping of server references in JIA P/URLs into specific intranet-server locations in order to effect the required electronic addressing;
- Ability to update and synchronize distributed JIA intranets from a central infrastructure server;
- Effectiveness of techniques for automatically downloading and installing software components over a JIA intranet;
- The suitability of the JIA in a DII COE environment using non-Microsoft servers and client browsers as well as in the more common Microsoft environment;
- Develop experience upon which to base recommendations in the JIA Guidebook to be developed in 1999.

#### **11.5 Scope**

The scope of the proposed systemic evaluations will be limited to the IETMs developed for the JIA Pilot Demonstrations. However, since these projects are very diverse and represent all classes of IETMs being used in the DoD, this limitation is not considered restrictive. Some selected emerging Web-based technologies (e.g., JAVA, Dynamic HTML, XML with interactive XSL style sheets) will be evaluated in the laboratory to show the extent to which the JIA can accommodate emerging technologies. No significant weapon-system content, however, will be authored for these technologies.

#### **11.6 Approach**

This effort will be carried out in two phases. The first phase will consist of a porting process for each of the Demonstration projects to get them operating in the NSWCCD laboratory. This phase will be scheduled on a case-by-case basis as the Demonstrations become available. In general,

they will not be ported to the laboratory until they are essentially completed as running products. The second phase will involve a variety of both hardware and software infrastructure installations. This phase will also involve demonstrations of Web-based electronic-documentation techniques not covered in the suite of Pilot Programs. For the infrastructure efforts, a planning meeting will be held in July 1998 to develop the initial list of needed trials and Demonstrations. This planned evaluation list will be reviewed monthly; revisions will be based largely on progress to date and resources available. The major limitation to the effort will be lack of available technical personnel. It is planned to carry out this effort at both NSWCCD and ManTech WVA with the intent to eventually port all Demonstrations (that survive the first professional evaluation cut) to NSWCCD. All Demonstration development will be completed by December 1998, with activity beyond that time frame concentrated on ongoing demonstration and education of affected parties in all of DoD. A traveling road-show version of the Demonstrations will also be developed for the 1999 time frame. The evaluations will be documented during the period December 1998 to March 1999, with publication of a report supporting the policy recommendations to follow.

#### **11.7 Resources Required (Hardware/Software)**

Selected upgrading of the servers and software in the existing NSWCCD laboratory will include, at a minimum, the following laboratory upgrades for JIA systemic tests.

- r) Hardware Upgrades for Laboratory
  - Upgrade Existing NT Server for NAVAIR NIRS/NIFF Demonstration
  - Additional NT Server for DII/COE Demonstration
  - Additional W98 Graphics Workstation with Dual Displays
  - B-Size Laser Printer compatible with NT Servers
  - Ethernet/LAN Bridge, Communications Upgrades, & Backup Devices
  - Ruggedized PEDD
  - Large Size Monitor (30" XGA)
- s) Various Software Purchases (Including Microsoft Subscription Renewal)

#### **11.8 Demonstration Participants**

Key participants are the JIA technical staff at NSWCCD and ManTech West Virginia.

### **11.9 Risks**

There is no risk that the proposed Demonstrations and evaluations will not be useful in developing the JIA and recommendations on applying it to actual IETMs acquisitions and deployment. There is some risk that certain elements on the proposed Demonstration and evaluation agenda may not operate as expected without modification; however, identification of those anomalies is a primary objective of the tests and evaluations. In this regard, a greater risk lies in failing to perform these hands-on evaluations and in relying on desk research only.

#### **11.10 Metrics (Measures Of Effectiveness) To Be Used**

The principal MOE is the binary measure: the extent to which the system works without modification in the test environment.

The principal subjective MOEs will be (1) the extent to which the architecture is transparent to the end user (i.e., the extent to which what is going on behind the scenes is not apparent to the user, who sees the composite presentation only as an integrated whole) and (2) the extent to which an individual system administrator can fully install and apply the JIA (i.e., that installing and building the intranet requires only rudimentary computer network skills).

#### **11.11 Exit Criteria**

This particular Demonstration involves many scenarios, some of which will evolve from initial ones. Some Demonstrations will fail and others may not be completed by the end of FY 1998. The Demonstrations will continue into Dec 1998 at which time the exit criteria will be a professional judgement of the team: Have we learned and demonstrated enough to develop recommendations and JIA guidelines? Or: Has it been demonstrated that the Architecture will not work in the real world?

#### **11.12 POA&M**

The POA&M for this effort will be subject to change during the July-to-December 1998 time period, but major driving milestones will be as follows:

Initial detailed planning meeting	prior to 28 July Team meeting
Augment and expand Laboratory resources	Aug-Sep 1998
Porting program plans for each of the Pilot Demos	as Pilot available
Revise Infrastructure and Misc.-Projects Plan	21 Aug 1998
Initial Demonstration Capability & Preliminary Results	15 Sep 1998
Complete Ports of Pilot Demos	1 Dec 1998
Complete Tests and Final Demo Capability	8 Jan 1999
Recommended Changes to Architecture	1 Feb 99
Report of System-Demo Findings	15 Apr 1999

### 11.13 Special Considerations

Close coordination will be required among contributing team members. Some Pilot projects use expensive commercial software products which we have not budgeted to purchase. Hopefully vendors will provide trial license at least through July 1999.



**Proposed DoD Joint IETM Architecture - JIA**

**APPENDIX A – TECHNICAL TEAM**

**Members of the Technical Team discussed in Par. 2.4 are as follows:**

Eric Jorgensen, (Team Leader) NSWCCD	Pushpa Merchant Army	Glenn Copen, ManTech
	Arnie Dow USMC	Bob Kidwell ManTech
L. John Junod NSWCCD	Greg Ransom USMC	Joe Brazy ManTech
Harry Whittaker NSWCCD	Glenn Handrahan Navy	Tom Morris ManTech
George Vlahos USAF	Frank Skewes, Navy	Don Reynolds ManTech
Gary Forrester USAF	Bill Rumschlag Navy	Dave Cooper Antech

**APPENDIX B – MANAGEMENT TEAM**

**Members of the Management Team discussed in Par. 2.4 are as follows:**

Steve Holloway USAF	Beth Barnetson USMC	Larry McGowan Navy
John Zibell Army	John Baranowski Navy	Joe Fuller Tri-Service IETMTWG