TEST AND EVALUATION MASTER PLAN (TEMP)

FOR THE

PORT AND WATERWAYS SAFETY SYSTEM (PAWSS) PROJECT

Prepared/Submitted by:	_____	_____
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EXECUTIVE SUMMARY

This document outlines the Test Concept for the Ports and Waterways Safety System (PAWSS) Project. This Test and Evaluation Master Plan (TEMP) purpose is to reduce risk and ensure the PAWSS project meets all System Specification and Statement of Work (SOW) requirements.

The Vessel Traffic Services (VTS) System acquired through the PAWSS project is a navigation safety related information system that consists of sensors, communications, personnel, and decision support equipment that permit the Coast Guard to manage the nation's waterways by monitoring vessel traffic and distributing information to assist the mariner in the performance of maritime duties.

The acquisition of this VTS system will integrate Digital Selective Calling/Automatic Identification System (DSC/AIS) and Commercial Off-The-Shelf (COTS) equipment and software to the maximum extent possible to provide an unintrusive, low cost, quality system. A summary of the planned system tests at New Orleans are as follows:

A. **Developmental Test and Evaluation (DT&E).** DT&E will be iterative throughout the incremental build approach. Limited DT&E will be first conducted at Gretna Light for technical acceptance of the System Integration Contractor (SIC) installed baseline VTS system. Following system acceptance, an evaluation of DSC/AIS transponder performance will be conducted. End-to-end DT&E system acceptance testing will be conducted after completion of the Vessel Traffic Center (VTC) and installation of the full complement of VTS equipment. The SIC will also conduct an uninterrupted two week test for Reliability, Maintainability, and Availability (RMA) to ensure the system meets the system requirements. Follow-on DT&E will be conducted for any system improvement. The Project Manager (G-AVT) will prepare the DT&E Report specifying whether the system is ready for OT&E.

B. **Operational Test and Evaluation (OT&E).** OT&E will occur iteratively against the requirements stated in the Operational Requirements Document (ORD) and will be conducted by the Sponsor's Representative (G-MOV) after the corresponding system increment has successfully completed DT&E. Testing will be in accordance with the OT&E Plan and performed by a joint Coast Guard and Marine/Port stakeholder team. OT&E of the VTS system capabilities at the VTC will be conducted to ensure the system meets the requirements in the ORD. Independent Operational Testing Oversight (IOTO) of operational test activities will be conducted by local maritime and port representatives of the Lower Mississippi River Waterway Safety Advisory Committee (LMRWSAC). A report of their observations and findings will be provided to the Coast Guard. The Sponsor will prepare the OT&E Report with justification to proceed to KDP 4.

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Chapter 1 INTRODUCTION

A. **Background.** The Vessel Traffic Services (VTS) System acquired through the Ports and Waterways Safety System (PAWSS) Project is a shore based information system located near the marine environment and involved in port operations. It includes control of system information technology units in an operations center with sensors and communication networks at remote sites in the port's vicinity. The remote sites will be located in all-weather environments. The Vessel Traffic Centers (VTCs), which will be the center for each port, will be in an office environment with proper operating temperature and humidity controls for computers and electronic equipment. The VTCs will require a controlled environment room for computers, processors, etc. (air conditioned 24 hours).

The System Integration Contractor (SIC) will be tasked to design the New Orleans VTC. The VTS system will be a modified Commercial Off-The-Shelf (COTS) system and will use modular design to extend capabilities and insert advanced technology in future increments.

This Test and Evaluation Master Plan (TEMP) is prepared in accordance with COMDTINST M4150.2D, Systems Acquisition Manual. References are listed in Appendix A. Acronyms are listed in Appendix B. Primary contacts are listed in Appendix C.

B. **Operational Performance Requirements.** The system operational performance requirements include the following: monitoring, tracking and surveillance, automated and manual data processing, decision support, voice and non-voice communications, analysis, recording, and reporting. Performance requirements are contained in the Operational Requirements Document (ORD) and in the System Specification and synopsized in Table 1-1.

C. **Critical Technical Parameters.** Critical technical parameters for the system are contained in Chapter 4 of the ORD and in the System Specification. Critical parameters that will be tested include accuracy, prediction capability, availability, environmental, data access, and data archive. The critical technical parameters are summarized in Table 1-2.

TABLE 1-1
OPERATIONAL PERFORMANCE REQUIREMENTS

OPERATIONAL EFFECTIVENESS

REQUIREMENT	PARAMETER	THRESHOLD
Vessel Surveillance	Accuracy	Detects vessel position to within 20m RMS for 3nm, and to within 100m RMS for 24nm
Prediction Capability	Maximum prediction capability	Predicts vessel locations within .20nm for 30 min prediction, and within 1.0nm for a 3 hr prediction
External Interfaces	Interface capability	Interfaces to many Coast Guard and other existing or planned information systems

OPERATIONAL SUITABILITY

REQUIREMENT	PARAMETER	THRESHOLD
Availability	Minimum Availability	99.75% on a monthly basis
Environmental	Temperature	-25 C to 50 C
	Wind	65 knots sustained (gusts to 100 knots)
	Humidity/weather	20% - 100% condensing Rain, fog, snow, sleet, freezing rain
	Corrosion	Salt spray
	Other	Vibration, sand, static discharge, dust
Data Access	Speed	Access all information within 1 sec after request with position data display updated at intervals not to exceed 4 sec with receipt of data from up to 100 transponders and 200 targets per radar scan
Data Archive	Time	Data archive and data retrieval for a period of 32 days

TABLE 1-2

CRITICAL TECHNICAL PARAMETERS MATRIX

CRITICAL TECHNICAL PARAMETER	TEST EVENT	TECHNICAL THRESHOLD	TEST LOCATION	TEST SCHEDULE	DECISION SUPPORTED
Temperature	System test	-25C to 50C*	New Orleans	DT&E	Proceed to OT&E
Humidity	System test	20% to 100% condensing	New Orleans	DT&E	Proceed to OT&E
Wind speed	System test	65 knots sustained, 100 knot gusts	New Orleans	DT&E	Proceed to OT&E
Vessel surveillance	System test	Detects vessel position to within 20m RMS for 3nm, and to within 100m RMS for 24nm	New Orleans	DT&E	Proceed to OT&E
Prediction capability	System test	.20nm for 30 min	New Orleans	DT&E	Proceed to OT&E
Computing speed	System test	All information within 1 sec after request, and position data display updated at intervals not to exceed 4 sec with receipt of data from up to 100 transponders and 200 targets per radar scan	New Orleans	DT&E	Proceed to OT&E
Availability	System test	99.75% on a monthly basis	New Orleans	DT&E	Accept system Proceed to OT&E

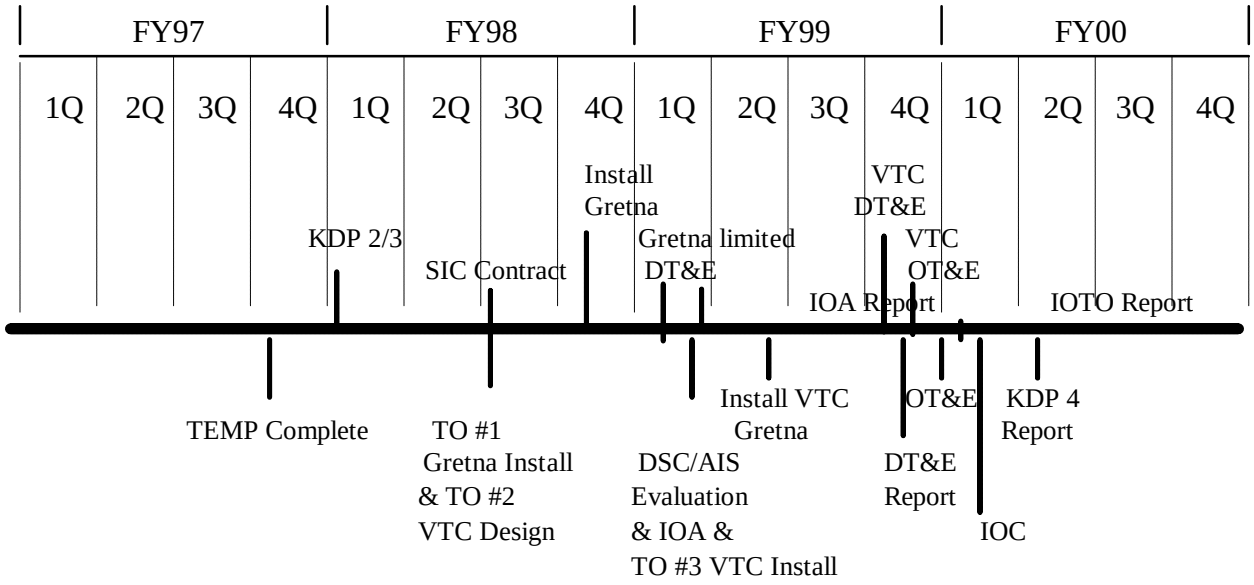
*Temperature effects shown do not include the effects of solar radiation. These effects will be considered.

Chapter 2 PROGRAM SUMMARY

A. **Integrated Schedule and Test and Evaluation (T&E) Funding.**

1. Table 2-1 depicts the PAWSS Project Integrated Schedule.

TABLE 2-1
PAWSS PROJECT INTEGRATED SCHEDULE



LEGEND:
DSC/AIS - Digital Selective Calling/Automatic Identification System
DT&E - Developmental Test and Evaluation
FY - Fiscal Year
IOA - Independent Operational Assessment
IOC - Initial Operational Capability
IOTO - Independent Operational Testing Oversight
KDP - Key decision Point
OT&E - Operational Test and Evaluation
Q - Quarter
TEMP - Test and Evaluation Master Plan
TO - Task Order
VTC - Vessel Traffic Center

2.. Table 2-2 depicts the PAWSS Project T&E funding.

TABLE 2-2
PAWSS PROJECT T&E FUNDING

	FY98	FY99	FY00	FY01 & Beyond
AC&I				
TOTAL				

B. **Management.** This Section outlines the various organizational entities involved in the system Test and Evaluation (T&E) activities. Additional responsibilities are specified in the Statement of Work (SOW) and Task Orders.

1. **Transportation Systems Acquisition Review Council (TSARC).** The TSARC will review the system T&E major reports and supporting documentation for KDP approval.

2. **Administration Acquisition Executive (AAE) for the Coast Guard.** The AAE by delegation from the Commandant, is the Vice Commandant. The AAE is the senior member and chairs the Coast Guard Acquisition Review Council (CGARC) who will make recommendations to the TSARC for all major acquisition decisions. The TEMP and TEMP Updates which are prepared by the Project Manager, will be submitted to the Vice Commandant for approval. The AAE will receive all T&E Reports including the Independent IOTO Report that supports KDP 4.

3. **Coast Guard Acquisition Review Council (CGARC).** The CGARC will the review major T&E documentation. CGARC will make recommendations to AAE regarding readiness to enter KDP 4.

4. **The Assistant Commandant for Acquisition (G-A).** G-A is responsible for ensuring that projects are well planned, effectively executed, and conform to established policies and procedures. G-A will review T&E plans and reports.

5. **The Assistant Commandant for Marine Safety and Environmental Protection (G-M).** G-M, as Project Sponsor, is responsible for analyzing and documenting mission, functional, and system performance and sustainability requirements. G-M will submit the OT&E Plan for AAE approval. G-M will also sign the OT&E Report supporting the KDP 4 decision to enter Production and Deployment.

6. **Project Manager, Vessel Traffic Services (G-AVT).** The Project Manager is responsible for coordinating the overall T&E program. G-AVT plays an important role in T&E planning, reporting and funding. G-AVT will coordinate program activities with the test community, especially the test organization. G-AVT will also ensure that the testing addresses the Critical Operational Issues (COIs), and that it provides feedback to the SIC. Some important T&E functions G-AVT perform are:

   a. Oversee the Test Management Oversight Team (TMOT)

   b. Responsible for preparation of the TEMP and TEMP updates

   c. Prepare the project DT&E Plan

   d. Review and comment on SIC draft Test/Inspection Reports

   e. Prepare the final DT&E Report

   f. Interface with the SIC and Government testing community

   g. Interface with SETA, the System Engineer

   h. Provide project funds to support all testing operations.

7. **Program Sponsor Representative (G-MOV).** Prior to DT&E, the Program Sponsor's Representative, Office of the Vessel Traffic Management (G-MOV) defines operational characteristics for the ORD. G-MOV develops the COIs in the ORD which provide focus and direction for OT&E. G-MOV has the lead role in OT&E while G-AVT takes on a technical monitoring role. Specific T&E functions performed by G-MOV include:

   a. Permanent member of the TMOT

   b. Review and comment on the TEMP

   c. Review and comment on TEMP updates

   d. Assist in preparation of the project DT&E Plan

   e. Review and comment on the final DT&E Report

   f. Develop COIs

   g. Conduct OT&E

   h. Provide an Operational Test Director (OTD)

i. Prepare the final OT&E report for the Sponsor's (G-M's) signature.

8. **Test Management Oversight Team (TMOT).** A TMOT has been established and is chaired by the project's Technical Manager (G-AVT-3) who represents G-AVT. The TMOT primary contacts are shown in Appendix C and consists of representatives from the following organizations:

PERMANENT MEMBERS: G-AVT, G-MOV, G-SCE, G-SCT, G-A-3

AD HOC MEMBERS: G-LPL, G-WKS, MLC, C2CEN, System Engineer (SETA), and the SIC

ADVISOR: G-A-2, Acquisition Technical Staff

Specific T&E functions performed by the TMOT include:

a. Serve as primary point of contact with the local maritime and port representatives of LMRWSAC

b. Assist in the preparation of the TEMP

c. Assist in updating the TEMP

d. Assist in preparing the project DT&E Plan

e. Assist in the execution of the SIC Test Plan/Procedures, if applicable

f. Provide T&E program advice and recommendations to G-AVT

g. Serve as a source of technical expertise in test related disciplines

h. Assist in resolving T&E problems

i. Review test activities

j. Provide oversight in the acceptance of the system.

9. **Test and Evaluation Working Group - Digital Selective Calling/Automatic Identification System (TEWG-DSC/AIS)**

The TEWG-DSC/AIS is a subset of the TMOT and will assist the Project Manager in evaluating DSC/AIS transponder technology.

10. **Acquisition Quality Assurance Staff (G-A-3).** G-A-3 will be a permanent member of the TMOT. G-A-3 will review the TEMP and the project DT&E plan to include any revisions and updates.

11. **The Office of Electronics Systems (G-SCE).** G-SCE will be a permanent member of the TMOT. G-SCE functions as technology advisor, computer resources support/planner, and provides life cycle support.

12. **The Office of Communications Systems (G-SCT).** G-SCT will be a permanent member of the TMOT. G-SCT functions as an DSC/AIS technology advisor, communication resources support/planner, and provides life cycle support.

13. **System Integration Contractor (SIC).** The SIC will plan, manage, tailor, procure and as necessary, integrate, install, test, deliver and maintain the system. The SIC will:

    a. Participate in the TMOT

    b. Plan, execute, report, and assist in resolving all system DT&E activities. This includes preparing a SIC Test Plan/Procedures and Test/Inspection Reports

    c. Provide test resources as required for DT&E at New Orleans and other Coast Guard sites, if applicable

    d. Appoint a Developmental Test Director (DTD) for all DT&E activities and events

    e. Provide a master test schedule that documents timing of all DT&E events

    f. Install and test the VTS system

    g. Support test activities by providing technical, maintenance, and logistics resources

    h. Maintain the VTS system during DT&E, OT&E, and as required by the Coast Guard.

14. **System Engineer (SE) and Independent Verification and Validation (IV&V) Agent.** The SE and IV&V agent contractor (The SETA Corporation) will support G-AVT by assisting in the system project acquisition. The SE will:

    a. Participate in the TMOT

    b. Assist in planning, coordinating, preparing the TEMP and the project DT&E Plan in coordination with the TMOT

    c. Assist in preparing the System Specification that incorporate sound T&E principles that follow the ORD, the TEMP and the DT&E Plan

d. Assist in preparing a solicitation that incorporates sound T&E principles that follow the ORD, the System Specification, the TEMP and the DT&E Plan

e. Provide technical coordination as directed by G-AVT

f. Witness T&E events

g. Recommend changes to the T&E program, as required

h. Provide IV&V support, as required.

15. **Coast Guard Acceptance Team (CGAT).** A multi-disciplined CGAT will be assembled by G-AVT to oversee SIC system integration efforts and to witness T&E activities. The CGAT will represent the Coast Guard at tests, assist in the evaluation of test results and provide status reports, if applicable, to the Project Manager.

16. **Independent Operational Testing Oversight (IOTO) Representatives.** The LMRWSAC and Maritime/Port stakeholders will be invited to provide representatives to observe T&E activities. In addition to the sponsor, local maritime and port representatives from LMRWSAC will serve the role of an independent testing organization to provide oversight of the process and outcomes. It is expected that at the closure of OT&E activities, a findings and observations evaluation of operational test periods will be provided to the Coast Guard in the form of an IOA Report and an IOTO report.

17. **Districts.** New Orleans, located in the Eighth District will be the first port to receive a PAWSS Project VTS system. As required, other Districts and Maritime/Port stakeholders will provide assistance/inputs in integration, installation, facility planning, and obtaining resources.

Chapter 3 DEVELOPMENTAL TEST AND EVALUATION (DT&E) OUTLINE

A. **DT&E Overview.** DT&E will be iterative throughout the incremental build approach, and will be conducted first at New Orleans. This section provides an overview of DT&E requirements that the SIC must conduct prior to and after installation of the VTS system at the New Orleans VTC. Since the initial system installation will be a commercially available system and not a system development, the SIC Test Plan/Procedures will focus on the system's technical performance acceptance in the first port. This will include an evaluation of DSC/AIS transponder performance. DT&E must be successfully accomplished at New Orleans prior to OT&E of the SIC's installed system in the VTC. Follow-on DT&E will be accomplished for any system improvement both within the SIC's facilities and at the site prior to operational testing.

1. **System Certification Prior to Installation and DT&E.** The SIC will perform equipment check-out and certify to the Government prior to shipping and installing the baseline system at the New Orleans Gretna Light facility that the integrated system meets the performance criteria required for Gretna system specifications and performing DSC/AIS transponder evaluation. Also, the SIC will certify to the Government prior to shipping and installing the VTS system at the New Orleans VTC that the system meets the performance criteria required for the VTS System Specification.

2. **DT&E at New Orleans.** The SIC will assemble the COTS hardware and software, all subsystems, and all other equipment necessary to install and implement the VTS system; and provide all resources in the specified New Orleans Vessel Traffic Service Area (VTSA) and, as applicable, other specified lower Mississippi River areas (other than equipment and services that are expressly stated as Government furnished) to conduct the system acceptance DT&E.

   The first limited DT&E at New Orleans will occur after the SIC has installed the baseline system at the Gretna Light facility. The SIC will appoint a Developmental Test Director (DTD) to conduct DT&E activities.

   The end-to-end DT&E at New Orleans will be conducted by the SIC DTD to verify the equipment, software and interface and performance of the installed system as integrated with the VTC satisfactorily meets the system requirements and specifications technical acceptance criteria.

   In addition, as part of this end-to-end DT&E, the SIC DTD will conduct an uninterrupted two week test for evaluating RMA to ensure the system meets specifications and requirements.

The SIC will permit the Coast Guard and/or the Government's representatives and selected local maritime and port representatives of the LMRWSAC unrestricted observation during the DT&E. The SIC DTD will work closely with the Coast Guard Acceptance Team (CGAT) to facilitate familiarization and aggressive system acceptance testing to enable the Government to gain an honest evaluation of the system's technical performance.

B. **DT&E to Date.** No DT&E has been conducted to date.

C. **Future DT&E.** DT&E at New Orleans will start no earlier then 4QFY99. When the PAWSS Project VTS system requirements and specifications are approved, the DT&E requirements will also be further defined. All DT&E will be at the system level.

1. **System Configuration Description.** The system will include three segments:

   a. Operational Segment

   b. Facilities Segment

   c. Support Segment

   The Operational Segment provides the functionality to support the maritime community. This includes the following functional areas: DSC/AIS transponder ship-to-ship transfer of information, ship-to-shore, and shore-to-ship transfer; independent surveillance; operational data processing; decision support; communications; analysis; recording and reporting; and human-system interface (HSI). This segment also includes all systems providing communications between the VTC and remote sites, between VTC and ships, and between VTC and other external users and systems.

   The Facilities Segment consists of port facilities including the VTCs, communication sites, and remote sensor sites.

   The Support Segment is composed of system administration and maintenance, and software development and maintenance for integration of COTS and new technology.

   The SIC will design the VTS system according to the SOW requirements and specifications and the Coast Guard will approve it.

2. **System DT&E Objectives.** DT&E will focus on the technical requirements detailed in the SOW. As defined in the ORD and System

Specification, the system will function under the requirements, parameters and thresholds, which are summarized in Table 1-2.

3. **System DT&E Events, Scope of Testing, and Basic Scenarios.** DT&E at New Orleans will be iterative with a final DT&E of the VTS system integration in the VTC. The DT&E conducted at New Orleans will evaluate the system in a riverine environment. System DT&E conducted at New Orleans must meet system technical requirements. Scenarios will be developed, as appropriate. Local maritime and port representatives from the LMRWSAC will be invited to participate as observers of DT&E.

4. **Limitations.** All environmental limitations specified in Table 1-1 and the System Specifications may not be observed. However, the SIC must design the system to function should these extremes ever occur. Testing of requirements will be based on technical risk associated with the particular item.

D. **DT&E Special Topics.** DT&E Special Topics will be discussed in detail in the PAWSS Project DT&E Plan. These topics are as follows:

- Reliability, Maintainability, and Availability
- System Safety
- Software Test and Evaluation
- Staffing and Training
- Survivability
- Logistics Supportability
- Environmental Concerns
- Electromagnetic and Environmental Effects

E. **DT&E Plans and Reports.**

1. **DT&E Plan.** The Project Manager (G-AVT) will develop a high level project DT&E Plan which will contain DT&E information from the Coast Guard perspective. G-A will approve the plan following TMOT concurrence clearance.

   The SIC Test Plan/Procedures will describe the SIC's planned DT&E activities at New Orleans. The SIC Test Plan/Procedures will outline objectives, events, schedule, equipment, and the major paragraph headings of the Test/Inspection Report. The SIC's Test Procedures will provide

specific information on the test item, the approach, the location, the schedule, number of tests, extent of participation, and anticipated Government participation. G-AVT approves the SIC Test Plan/Procedures.

2. **Test/Inspection Reports.** The SIC will submit to G-AVT a draft Test/Inspection Report following any system technical performance test conducted at New Orleans. These reports will be staffed by the G-AVT to the TMOT and CGAT for review and comment.

3. **DT&E Report.** G-AVT will prepare a DT&E Report upon completion of the New Orleans DT&E at the VTC, which specifically addresses whether the system is ready for OT&E. A final DT&E Report will be forwarded to the CGARC via G-A.

Chapter 4 OPERATIONAL TEST AND EVALUATION (OT&E) OUTLINE

A. **OT&E Overview.** This section provides an overview of OT&E requirements. OT&E at New Orleans will occur iteratively against the requirements stated in the ORD and will be conducted by the Sponsor's Representative (G-MOV) after the corresponding system increment has successfully completed DT&E. Testing will be in accordance with the OT&E Plan and performed by a joint Coast Guard and Marine/Port stakeholder team. OT&E of the VTS system capabilities at the VTC will be conducted to ensure the system meets the requirements in the ORD.

Testing will consist of evaluation of the system in normal operational conditions over a period of time stressing operational periods. Resources specified in Chapter 5 will be used in various operational scenarios to provide realistic tests to support resolution of the COIs.

The Independent Operational Assessment (IOA) function will be accomplished by local maritime and port representatives of the LMRWSAC at the conclusion of the evaluation of DSC/AIS transponders performance near and remote to the Gretna Light facility. They will provide their assessment of operational suitability and operational effectiveness.

In addition to the OT&E, an IOTO will be conducted by local maritime and port representatives from the LMRWSAC serving the role of an independent testing organization to provide oversight of the process and outcomes. A summary of their observations and findings will be provided to the Coast Guard.

The SIC will provide hardware and software, subsystems, all other equipment to implement and maintain the system; and provide all resources in the specified New Orleans and other lower Mississippi River VTSAs (other than equipment and services that are expressly stated as Government furnished) to conduct the OT&E.

B. Critical Operational Issues. The following are COIs that must be resolved during OT&E as specified in the ORD.

1. **COI Effectiveness Issues.**

a. **Management Support.** Does the system support a safe and orderly flow of traffic commensurate with environmental conditions and traffic volume so as to facilitate commerce, reduce the risks of accidents and protect the environment without placing an added burden on the user or the operator?

b. **Data Sharing.** Does the system permit data sharing with Coast Guard and other external information systems to support Port area decision makers in a timely manner?

c. **Analysis and Recording.** Does the system automatically record and archive vessel information, track data, communications and other maritime activity for analysis and reporting?

d. **Coast Guard National Security Support.** Does the system support Coast Guard National Security and Captain of the Port Missions?

2. **COI Suitability Issues.**

a. **Reliability, Maintainability and Availability.** Does the reliability, maintainability and availability of the system support completion of its mission during all expected weather conditions?

b. **Interoperability.** Is the system interoperable with the ship based systems with which it interfaces?

c. **Logistic Supportability.** Is the system supportable with existing equipment and personnel?

d. **Documentation and Training.** Is system documentation and training adequate to support the mission?

e. **Human Factors.** Do human factors aspects of the system support completion of its mission?

f. **Security.** Does the system provide sufficient security safeguards to protect system integrity and sensitive data?

g. **Safety.** Are components safe to operate and maintain?

h. **Personnel.** Are the appropriate number of personnel assigned, at the right skill and grade levels to allow the system to operate as designed?

C. **OT&E to Date.** No OT&E has been conducted to date.

D. **Future OT&E.** OT&E at New Orleans will start no earlier than 4QFY99.

1. **System Configuration Description.** The configurations will be the same system configurations accepted after the system installation and completion of DT&E first at Gretna Light and second at the VTC.

2. **OT&E Objectives:** OT&E is used to ensure that the system meets operational effectiveness and suitability requirements. Accomplishment of OT&E will support KDP 4 and will determine whether VTS systems will be installed in other ports. OT&E objectives are stated in Table 4-1.

Table 4-1 OT&E Objectives

OT&E Objectives	Related COIs
Assess the system capability to support a regulated, safe traffic flow pattern for the boundary thresholds as well as the nominal and extremes environmental conditions and traffic volume expected for the range of port conditions. This assessment will determine projected operability of the system for detection, track and advisory capabilities for mandatory participant commerce to advise of expected encounters, hazards to navigation, etc.	Vessel Traffic Management Support
Assess the system capability to interface with and respond to port area decision makers in a timely manner by sharing data and situation assessments.	Data Sharing
Assess the system capability to automatically collect, record, archive, and integrate pertinent vessel information, track data, communications, and other maritime activity for analyses and reporting.	Analyses and Recording
Assess the system capability to support Coast Guard National Security and Captain of the Port missions through appropriate situation reporting and responsive interaction connections.	Coast Guard National Security Support
Assess the reliability, maintainability, and availability of the system.	Reliability, Maintainability, and Availability
Assess the system interoperability with ships, port authorities and other expected system interfaces.	Interoperability
Assess the system logistic supportability	Logistic Supportability
Assess the system capability to support the mission through the documentation and training.	Documentation and Training
Assess the human factors aspects of the system.	Human Factors
Assess the security aspects of the system.	Security
Assess system safety	Safety
Assess number of personnel assigned at the right skill and grade level to allow the system to operate as designed	Personnel

3. **OT&E Events, Scope of Testing, and Scenarios.** As discussed above, OT&E will be conducted iteratively after successful completion of DT&E for the corresponding system increment. Testing of DSC/AIS will focus on evaluating ship-to-ship transfer of information, ship-to-shore transfer, and shore-to-ship transfer, and obtain data to assist in determining requirements for watchstander staffing. OT&E will focus on resolving COIs and ensuring system operational functionality for New Orleans and other lower Mississippi riverine environments, e.g. open ocean and open bays. Future

OT&E may include environments particular to other port operations, e.g. enclosed harbors.

The scenarios will emphasize realism and will allow for tests to be conducted under various environmental conditions. Scenarios will be developed to examine the system's capabilities during a variety of maritime situations. Scenarios developed for New Orleans will be modularized to maximize reusability for follow-on port deployments. Specific details of the scenario architectures will be determined after a detailed evaluation of the New Orleans site test area, environmental profiles (nominal and expected), and overall traffic footprint.

4. **Limitations.** There may be some particular New Orleans site unique conditions which will not be testable due to limitations of the test site which are not known at this time. Also, all environmental limitations specified in Table 1-1 may not be observed.

E. OT&E Plans and Reports.

1. **OT&E Plan.** G-MOV will be responsible for preparing an OT&E Plan which will detail the planned OT&E testing from the Sponsor's point of view. G-MOV will prepare the OT&E Plan using inputs from the DT&E Report, the Program Manager and the TMOT. The OT&E Plan will be approved by the AAE.

2. **OT&E Report.** G-MOV will be responsible for preparing an OT&E Report for G-M's signature which will summarize and evaluate the results of the system operational testing from the Sponsor's point of view. The report will be forwarded to the CGARC with justification to proceed to KDP 4 and further system deployment.

3. **IOA Report.** Local maritime and port representatives from LMRWSAC observing the Gretna Light DSC/AIS transponders evaluation will be asked to submit an IOA report of their assessment on operational suitability and operational effectiveness.

4. **IOTO Report.** Local maritime and port representatives from LMRWSAC observing OT&E activities will be asked to submit a report to the Coast Guard of their IOTO findings and observations after completion of operational test activities.

Chapter 5 TEST AND EVALUATION RESOURCE SUMMARY

A. **SUMMARY.** The following is a summary of projected test and evaluation resources to be used during the SIC DT&E and the G-MOV OT&E to be conducted at New Orleans and other lower Mississippi River VTSAs.

Article	Test	Site	Date	Support Equip.
System Technical Performance Acceptance and RMA Evaluation	DT&E	New Orleans -Gretna Light -Governor Nicholls Light -VTC -Other areas	4QFY99	TBD Any SIC Test support equipment used will be tested for adequacy
System Operational Evaluation	OT&E	New Orleans -Gretna Light -Governor Nicholls Light -VTC -Other areas	4QFY99	TBD Government provided DSC/AIS transponders Test equipment used will be tested for adequacy

1. **Test Articles.** In order to perform the evaluation of DSC/AIS transponder performance at Gretna Light, the Coast Guard will acquire and provide up to 100 transponders to local mariners to provide vessel data input to the system. The SIC will be responsible to provide the Gretna Light system as defined in Task Order #1 of the contract for the DSC/AIS transponder performance evaluation. The SIC system installed in the VTC will serve as the production representative system for all other tests.

2. T**est Sites.** Limited DT&E will first be conducted by the SIC at the New Orleans Gretna Light facility to verify the technical performance of the initial baseline system prior to acceptance. An evaluation of DSC/AIS

transponder performance will be conducted using the baseline Gretna system. After the VTS system is installed into the VTC, DT&E for system technical acceptance will be conducted at New Orleans, including Governor Nicholls Light and other communication and sensor sites. A follow-on uninterrupted two week period of operation to demonstrate RMA will ensure that the system performs as specified. After system technical acceptance, OT&E will be conducted at New Orleans and other lower Mississippi River VTSAs, as required.

3. **Test Support Equipment.** Test support equipment requirements will be listed when identified.

4. **Test Targets.** Test targets in the specified New Orleans and other lower Mississippi River VTSAs will be representatives of mandatory participants and other targets of opportunity. It is possible that Government assets, especially for DSC/AIS transponder and other sensor testing, may also be used in DT&E and OT&E efforts. The Government will provide transponders to all of the above test representatives.

5. **Operational Program Test Support.** The initial operational program test support requirement is for the Coast Guard to acquire transponders for installation on Maritime/Port users vessels to be used for the testing/evaluation of DSC/AIS capabilities. Other operational program test support required are a combination of Coast Guard and Maritime/Port stakeholder personnel to conduct the operational testing.

6. **DT&E and OT&E Logistics Support.** DT&E and OT&E logistics support will be a combination of SIC and Coast Guard resources. The SIC will be responsible for providing a testable, operational system for both the DT&E and OT&E. Logistics documentation, maintenance, training, technical data, supply support, etc. will be provided by the SIC as stipulated in the contract.

7. **Staffing and Training.** The SIC will conduct DT&E activities using SIC staffing. G-MOV will conduct OT&E and will require personnel to conduct the tests. The Coast Guard will be responsible for providing watchstanders that may include representatives from the Maritime/Port stakeholder community as well as Coast Guard civilian/military personnel and technical evaluators for OT&E activities. System orientation training will be required in accordance with the SOW for Government witnesses/test personnel.

8. **Technical Interfaces.**

a. **Value Engineering.** Value Engineering is a contract requirement. Improvements to the system may be identified during Test and Evaluation that could be implemented through the Value Engineering clause of the contract. The Project Manager shall ensure any change will not alter the essential functions of the system or adversely affect life cycle cost, system performance, quality or safety.

b. **Warranty Management.** As the VTS system will be comprised of COTS, or Non-Developmental Items (NDI), as well as Government Off-The-Shelf (GOTS) equipment and software, warranties will vary considerably. The warranty of components will be in effect during all test activities.

9. **Special Requirements.** There are no known special requirements.

10. **T&E Funding Requirements.** See Chapter 2 for T&E Funding requirements

B. **Resource Summary Updates.** As the system acquisition progresses, test resource requirements will be reassessed and subsequent TEMP updates will reflect any changed system concepts or requirements.

APPENDIX A

BIBLIOGRAPHY

[1] Mission Need Statement for Vessel Traffic Services, September 1997

[2] Operational Requirements Document for Vessel Traffic Services, September 1997

[3] Project Management Plan for Ports and Waterways Safety System, September 1997

[4] PAWSS Project Developmental Test and Evaluation Plan, October 1997

[5] PAWSS Project Statement of Work, October 1997

[6] PAWSS Project System Specification, October 1997

[7] Systems Acquisition Manual, COMDTINST M4150.2D, 27 December 1994

APPENDIX B

ACRONYMS

AAE	Administration Acquisition Executive
AC&I	Acquisition Construction and Implementation
CGARC	Coast Guard Acquisition Review Council
CGAT	Coast Guard Acceptance Team
COIs	Critical Operational Issues
COTS	Commercial Off-The-Shelf
DSC/AIS	Digital Selective Calling/Automatic Identification System
DTD	Developmental Test Director
DT&E	Developmental Test and Evaluation
FY	Fiscal Year
GOTS	Government Off-The-Shelf
HR	Hour
HSI	Human-System Interface
IOA	Independent Operational Assessment
IOC	Initial Operational Capability
IOTO	Independent Operational Testing Oversight
IV&V	Independent Verification and Validation
KDP	Key Decision Point
LMRWSAC	Lower Mississippi River Waterway Safety Advisory Committee
M	Meters
MIN	Minute
NDI	Non-Development Item
NM	Nautical Mile
ORD	Operational Requirements Document
OTD	Operational Test Director
OT&E	Operational Test and Evaluation
PAWSS	Ports and Waterways Safety System Project

PMP	Project Management Plan
Q	Quarter
RMA	Reliability, Maintainability and Availability
RMS	Root Means Square
SE	System Engineer
SIC	System Integration Contractor
SOW	Statement of Work
SQT	System-Wide Qualification Training
TBD	To Be Determine
T&E	Test and Evaluation
TEMP	Test and Evaluation Master Plan
TEWG	Test and Evaluation Working Group
TMOT	Test Management Oversight Team
TO	Task Order
TSARC	Transportation Systems Acquisition Review Council
VTC	Vessel Traffic Center
VTS	Vessel Traffic Services
VTSA	Vessel Traffic Services Area

APPENDIX C

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