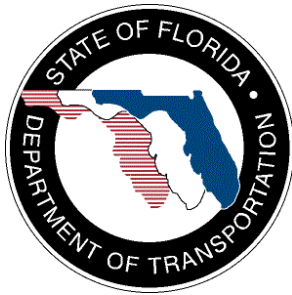


Technical Memorandum

Statewide Advanced Traveler Information System Project

Project Systems Engineering Management Plan

August 4, 2006
Version 2



Prepared for:

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*Technical Memorandum – Statewide ATIS Project
Project Systems Engineering Management Plan*

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^a Note that this document is considered a living document. As the Statewide ATIS project progresses, this *Project Systems Engineering Management Plan* will be revised accordingly.

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List of Acronyms

ATIS.....	Advanced Traveler Information System
<i>CFP</i>	<i>Cost Feasible Plan</i>
CMB.....	Change Management Board
CPM	Critical Path Method
FDOT	Florida Department of Transportation
FIN	Financial Identification Number
ICD.....	Interface Control Document
ITS.....	Intelligent Transportation System
IVR.....	Interactive Voice Response
<i>NITSA</i>	<i>National ITS Architecture</i>
PIO	Public Information Office
<i>PSEMP</i>	<i>Project Systems Engineering Management Plan</i>
QCAP.....	Quality Control and Assurance Plan
Rev.	Revised
RI.....	Responsible Individual
RTM.....	Requirements Traceability Matrix
TEOO.....	(FDOT) Traffic Engineering and Operations Office
TPM	Technical Performance Measure
WBS.....	Work Breakdown Structure

1. Scope

1.1 Project Identification

Table 1.1 – Project Identification Table

TITLE	REFERENCE
Florida Department of Transportation (FDOT) Traffic Engineering and Operations Office (TEOO) Intelligent Transportation Systems (ITS) Section Project Name	Statewide Advanced Traveler Information System (ATIS) Project
<i>Ten-Year ITS Cost Feasible Plan (CFP)</i> ¹ Financial Identification Number (FIN)	4181951
Current FDOT TEOO ITS General Consultant Contract Assignment Number	C-8175

1.2 Purpose

This document serves as the initial *Project Systems Engineering Management Plan (PSEMP)* for the FDOT's Statewide ATIS project, and provides planning guidance for the technical management, procurement, installation, and acceptance of the Statewide ATIS project. Along with the *Project Concept Report*, which is identified in *Section 2* herein, this document provides the foundation for the development of the next-generation statewide traveler information system to be implemented in the 2008 to 2013 timeframe.

The PSEMP is the planning process for implementing the systems engineering management processes provided in *Florida's Statewide Systems Engineering Management Plan* identified in *Section 2* of this document.

¹ *Central Office Ten-Year ITS Cost Feasible Plan* (Rev. January 2005). Available online at http://floridaitis.com/cfp_maintenance.htm.

1.3 Summary Schedule

The initial project schedule is contained in the *Project Concept Report* identified in *Section 2* of this document. Key milestones are summarized in Table 1.2 below.

Table 1.2 – Key Milestone Summary

MILESTONE	DATE
Key Contracts in Place	April 2007
System Acceptance	June 2008
Operations	November 2008

1.4 Relationship to Other Plans

1.4.1 Relationship to the FDOT *Intelligent Transportation Systems Plan*

The *Ten-Year ITS Cost Feasible Plan*, hereinafter referred to as the *ITS CFP*, is a 10-year program and resource plan that identifies ITS projects that are within the context of Florida's overall *ITS Plan* and *ITS Corridor Master Plans*.^{2, 3} The *ITS CFP* represents a commitment of state- and District-managed funds over a 10-year period to provide ITS funds in a coordinated statewide program for development of the ITS infrastructure on Florida's major intrastate highways. The Statewide Advanced Traveler Information System project is included in the *ITS CFP*.

² *Intelligent Transportation Systems Plan: Saving Lives, Time, and Money* (Version 2, January 2003). Available online at http://www.dot.state.fl.us/trafficoperations/ITS/Projects_Deploy/CFP/CFP_Legacy.htm.

³ The *ITS Corridor Master Plans* are available online at http://www.dot.state.fl.us/trafficoperations/ITS/Projects_Deploy/CFP/CFP_Legacy.htm.

1.4.2 Relationship to National and Statewide ITS Architectures

This project directly relates to two market packages defined in both the *Florida Statewide and Regional ITS Architectures Update* and the *National ITS Architecture*, including:

- ATIS 1: Broadcast Traveler Information
- ATIS 2: Interactive Traveler Information

1.5 Document Overview

This *Technical Memorandum* contains the project's initial *PSEMP*, and provides the initial planning guidance for the technical management, procurement, installation, and acceptance of the Statewide ATIS project. This report will be refined during the concept development phase.

Note that the project's operational concept, initial high-level requirements, initial project schedule, and initial budget are contained in the *Project Concept Report*.

The topics covered in this report include:

- *Section 1 – Scope*
- *Section 2 – Applicable Documents*
- *Section 3 – Technical Program Planning and Control*
- *Section 4 – Systems Engineering Process*

2. Applicable Documents

The following documentation, of the exact issue shown, form a part of this document to the extent specified herein.

- Florida Department of Transportation, *Technical Memorandum – Statewide Advanced Traveler Information System Project – Draft Project Concept Report* (Version 1, April 2006). FDOT Contract No. C-8I75. The *Project Concept Report*, along with other project documentation, is available online at http://floridaitis.com/Travel Info-ConOps_Dev.htm.
- Quality Control and Assurance Plan (QCAP) – The QCAP ensures quality conformance on all system elements.
- A procurement management plan for the project is currently being developed.⁴
- A system test plan for the project is currently being developed.⁴
- Florida Department of Transportation, *Deliverable 1-10: Technical Memorandum – Florida's Statewide Systems Engineering Management Plan* (Version 2, March 2005). *Florida's Statewide SEMP* is a reference manual for Districts to use when developing systems engineering plans for specific ITS projects. *Florida's Statewide SEMP* is available online at <http://floridaitis.com/SEMP/Index.htm>.
- United States Department of Transportation, *National ITS Architecture, Version 5.1* (April 2005). The *National ITS Architecture (NITSA)* provides a framework for planning, defining, and integrating intelligent transportation systems. The current version of the *NITSA* is available online at <http://www.iteris.com/itsarch/>.
- Florida Department of Transportation, *Florida Statewide and Regional ITS Architectures Update* (Rev. March 2006). The original *Florida Statewide Intelligent Transportation System (ITS) Architecture and Standards*, commonly referenced as the *SITSA*, was developed by Jaffe Engineering and Development Industries under subcontract to Kimley-Horn and Associates.⁵ The *SITSA* was recently updated and is available online at <http://www.consystec.com/florida/default.htm>. The point of contact for the *Florida SITSA* is Liang Hsia, FDOT ITS Engineering Administrator, who can be contacted at (850) 410-5600.

⁴ These plans are currently being developed. More information is available from Erik Gaarder, FDOT ITS General Consultant Project Manager, at (407) 647-7275.

⁵ More information regarding the original *SITSA* is available online at <http://www.consystec.com/html/florida/default.htm>.

3. Technical Program Planning and Control

3.1 Engineering Organization and Responsibilities

A responsibility chart will be used in this project to identify project team member names, roles, responsibilities, and member contact information. The chart will be created in an electronic format using Microsoft® Word or Excel® software.⁶

3.2 Technical Program Management

3.2.1 Work Breakdown Structure

A work breakdown structure (WBS) will be developed that describes all project deliverables. A project network diagram that includes and depicts all project tasks and task dependencies will be used to depict the project schedule. The critical path method (CPM) shall be used to manage the project schedule. The WBS will be created and maintained in an electronic format using Microsoft Visio® and Microsoft Project®.⁷

3.2.2 Specification Tree

The system specification is the top-level technical requirements document and is used as the acceptance source for testing. The first iteration of these requirements is contained in the *Project Concept Report* identified in *Section 2* of this document.

The requirements will be created and maintained electronically in FileMaker® Pro and Microsoft Word.⁸

⁶ Microsoft and Excel are registered trademarks of Microsoft Corporation in the United States and/or other countries.

⁷ Microsoft Visio and Microsoft Project are registered trademarks of Microsoft Corporation in the United States and/or other countries.

⁸ FileMaker is a registered trademark of FileMaker, Inc.

3.2.3 Risk Management

The project manager is responsible for interrogating all applicable sources for timely risk identification. The project leads will elevate technical risks to the project manager, who will review the new risks. Once identified, risks will be assessed for impact and risk responses will be created for each identified risk. This information will be entered and maintained in a risk matrix throughout the project. The project manager will evaluate the risk matrix on a regular basis and, at a minimum, after every milestone.

The risks will be created and maintained electronically using Microsoft Word or Excel.

3.2.4 System Test Planning

At a minimum, the following subsystems will be tested:

- Data fusion subsystem
- Video aggregation subsystem
- Information dissemination subsystem
 - Web site component
 - Interactive voice response (IVR) component
- Interfaces (to be further defined)

The system test plan will provide more detail on which system components will be tested and the test method. The procedures will describe in detail how the tests will be conducted to ensure that all the system requirements identified are tested. Finally, the reports will summarize the results of the tests.

3.2.5 Decision and Control Process

The project manager has full responsibility for the technical, cost, and schedule performance of all engineering tasks. Reviews will be conducted as a management tool for the timely assessment of the project and its technical status; early initiation of problem area resolution; and to assist in the integration process.

3.2.6 Technical Performance Measures

Technical performance measures (TPMs) will be used for technical performance tracking and reporting during the project. The following quantitative measurement areas have been defined for this project:

- Schedule performance – data relating to the completion of major milestones and individual work products
- Cost performance – data relating to any deviations from the initial budget (i.e., cost baseline)
- Product performance – data relating to the ability of the delivered products specified to satisfy requirements

3.2.7 Technical Reviews and Audits

Project tasks will be reviewed weekly. Reviews will primarily consist of teleconferences/emails. During the teleconferences and through emails, the status for hours worked, percent of task completion, and the expected hours required to complete the tasks in the work packages contained in the WBS will be communicated. Any potential issues will be tracked in the project action item list.

Monthly project status reviews will be conducted. These reviews will consist primarily of teleconferences where budget, schedule, risk, quality, and scope issues are reviewed. An action item list will be maintained to track all project issues.

Milestone reviews will be conducted at each milestone. Reviews will be conducted in person or by teleconference, and the milestone deliverables will be reviewed and accepted. Participants at milestone reviews will consist of representatives from each District and the FDOT TEOO.

The action item list, and a summary of both monthly and milestone reviews, will be developed and maintained electronically using Microsoft Word or Excel.

3.2.8 Action Item Resolution

The project manager will use an action item list to track the closure of technical issues. The project manager is responsible for ensuring that each technical issue has a responsible individual (RI) who has ownership of the issue and the closure date. The project manager will review the status of the action items on a regular basis.

3.2.9 Configuration Management

How and where all project data will be maintained is specified in the QCAP documentation. Major documents will be posted on the Internet for easy access and review.

3.2.10 Technical Advisory Groups

A project-specific change management board (CMB) will review and provide approval for major project changes.⁹ This CMB will consist of representatives from each District and the FDOT TEOO. The District representative will represent all offices in the District and the regional partners of said District. The frequency of the meetings will be determined as the project progresses. Major changes to the following will be reviewed by the CMB:

- Scope revisions, such as changes to the requirements; District ConOps; infrastructure; operations and maintenance; upgrades/improvements; etc.
- Budget
- Schedule
- Risks
- Quality
- Performance measures

It should be noted that a marketing subcommittee will be formed to handle specific marketing issues. This subcommittee will include representatives from the FDOT Central Office and District public information offices (PIOs).

Internal technical data not subject to control by the project-specific CMB will be reviewed and maintained by the project manager.

Minutes from the project-specific CMB meetings will be created and maintained electronically using Microsoft Word or Excel.

3.2.11 Subcontractor Monitoring and Control

The procurement management plan is currently under development.

⁹ As the project progress, a determination will be made as to what constitutes a major project change.

4. Systems Engineering Process

This section details how the project will apply the systems engineering processes described in *Florida's Statewide SEMP*.

4.1 Technical Program Planning

4.1.1 Source Material (Customer Documents / Requirements Interpretation)

Based on the ConOps, the *NITSA*, the *Florida SITSA* — specifically the ATIS1 and ATIS2 market packages — and stakeholder input,¹⁰ a set of high-level user requirements are being developed.

A requirements analysis will be performed to derive subsystem requirements, which the District representatives and the FDOT TEOO will concur on. Finally, a requirements allocation process will be performed on these subsystem requirements.

The initial project context diagram, or the project ITS architecture diagram, is contained in the ConOps. If deemed necessary, interface control documents (ICDs) will be created to maintain the system interfaces. These documents will describe the interface ConOps; define the message structure and protocols that govern the interchange of data; and identify the communication paths along which the data is expected to flow. District representatives and the FDOT TEOO will review the ICDs, if created.

Requirements will be uniquely identified, and, the requirements and the requirements traceability matrix (RTM) will be maintained throughout the project in a database for reference and access.

¹⁰ The stakeholder input originated from stakeholder interviews and 511 Working Group Meetings. For more information regarding the stakeholder interviews, refer to the *Stakeholder Input and User Needs Technical Memorandum*, which is available online at http://floridaitis.com/Travel_Info-ConOps_Dev.htm.

4.1.2 Definition of High-risk Areas

4.1.2.1 Risk Assessment

Risks are defined as low, medium, or high:

- “Low Risk” defines an area in which technical and project metrics are within plan or tolerances.
- “Medium Risk” defines an area in which one or more major technical or performance metrics are out of tolerance, but within the maximum established limits for low-impact recovery techniques.
- “High Risk” defines an area with potential serious failures in accomplishment that requires major milestone replanning, or intensive reallocations of personnel and resources.

4.1.2.2 Risk Mitigation

Effective mitigation plans are developed by the project manager with the assistance of other key individuals. These individuals initiate mitigation actions, continually monitor the mitigation progress, and perform follow-up activities, as required. Mitigation action plans, procedures, schedules, and responsibility definitions are maintained by the project manager.

Mitigation action plans are required for all medium- and high-risk items. These plans assign specific actions to specific individuals to achieve detailed and correct analyses of each addressed risk, and to execute corrective actions. The project manager formulates and issues these directive plans and intensely monitors progress against these directives.

The level ranking of identified risks determines the priority and urgency of attention given. Risk items are assigned to key individuals, who are responsible for developing and executing individual risk management plans, and reporting status. Identified medium and high risks, and risk mitigation status are reported at status meetings until each risk is resolved.

4.1.3 Systems Engineering Planning

The following systems engineering elements will be developed for this project:

- A statewide ConOps
- A ConOps for each District
- System requirements (i.e., specification, analysis, and allocation)
- A QCAP document
- A procurement management plan
- A system test plan