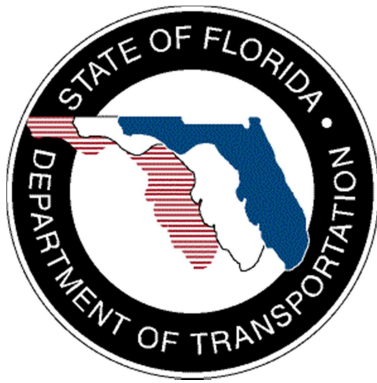


SunGuide[®]:

Software Development Plan

SunGuideSMD-SDP-5.0.0 (Draft)



Prepared for:

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List of Acronyms

AVLRR.....	Automatic Vehicle Location Road Ranger
C2C.....	Center to Center
CAP.....	Corrective Action Plan
CCTV.....	Closed Circuit Television
CM.....	Configuration Management
CMP.....	Configuration Management Plan
CONOPS.....	Concept of Operations
COO.....	Concept of Operations
DB.....	Databus
DBDD.....	Database Design Document
DCP.....	Data Collection Process
DMS.....	Dynamic Message Sign
DOT.....	Department of Transportation
EM.....	Event Management
FAT.....	Factory Acceptance Test
FDOT.....	Florida Department of Transportation
FL-ATIS.....	Florida-Advanced Traveler Information System
HAR.....	Highway Advisory Radio
I595PPP.....	I-595 Private Public Partnership
ICD.....	Interface Control Document
IDE.....	Integrated Development Environment
IDS.....	Incident Detection System
IMS.....	Inventory Management System
IN.....	Installation Notes
IP.....	Internet Protocol
ITS.....	Intelligent Transportation Systems
LOA.....	Letter of Authorization
MAS.....	Message Arbitration System
MDX.....	Miami Dade Expressway Authority
MSDN.....	Microsoft Developer Network
NTCIP.....	National Transportation Communication for ITS Protocol
NTP.....	Notice to Proceed
PM.....	Project Manager
PPP.....	Public Private Partnership
PS.....	Pricing Subsystem
PSP.....	Project Staffing Plan
PTZ.....	Pan Tilt Zoom
QA.....	Quality Assurance
QAP.....	Quality Assurance Plan
ReqPro.....	Requisite Pro
RMP.....	Risk Management Plan
RR.....	Road Rangers
RS.....	Reporting Subsystem
RWIS.....	Roadway Weather Information Station
SB.....	Safety Barrier

Software Development Plan

SDD.....	Software Design Document
SDLC	Software Development Lifecycle
SDP	Software Development Plan
SICP	Software Integration Case Procedures
SIP.....	Software Integration Plan
SMP.....	Subcontractor Management Plan
SPM.....	Software Project Manager
SQL	Structured Query Language
SRS	Software Requirements Specification
SSP	Software Security Plan
SUM.....	Software User Manual
SWA.....	Standard Written Agreement
SwRI	Southwest Research Institute [®]
TERL.....	Test Engineering Research Laboratory
TMC	Traffic Management Center
TP	Training Plan
TSS.....	Traffic Sensor Subsystem
TvT.....	Travel Time
TX	Texas
TxDOT	Texas Department of Transportation
VDD	Version Description Document
VS	Video Switching
VSL	Variable Speed Limit
VW.....	Video Wall
WBS.....	Work Breakdown Structure
XML.....	eXtensible Markup Language

Revision History

Revision	Date	Changes
LOA 1	July 21, 2010	Initial Release (DRAFT).
1.0.0 (Working Final)	August 13, 2010	Revised in response to FDOT comments.
3.0.0	September 15, 2010	Added LOA002 WBS & Schedule Added LOA003 WBS, Schedule, SDLC, Review Plan
4.0.0	November 3, 2010	Added LOA004 WBS, Schedule
5.0.0 (Draft)	November 10, 2010	Added LOA005 WBS, Schedule

1. Scope

1.1 Document Identification

This document serves as the Software Development Plan (SDP) for the SunGuide® Support, Maintenance and Development contract. This document describes the baseline items, the project management approach and the authorized activities. Other supporting project information is documented in the following deliverables:

- Project Staffing Plan (PSP)
- Configuration Management Plan (CMP)
- Quality Assurance Plan (QAP)
- Risk Management Plan (RMP)
- Subcontractor Management Plan (SMP)
- Software Security Plan (SSP)

The initial version addresses the support activities of LOA001, but also addresses development of SunGuide enhancements in a general manner. As additional Letters of Authorization (LOAs) are issued and the work scope expands, sections will be added to address those activities. It is expected that this document will be revised as Southwest Research Institute® (SwRI®) receives additional LOAs; it is not possible to address those future LOAs without knowing the specific content of them.

1.2 Project Overview

The Florida Department of Transportation (FDOT) SunGuide Support, Maintenance and Development Contract, contract number BDQ69, addresses the necessity of supporting, maintaining and performing enhancement development efforts to the SunGuide software. The SunGuide software was developed by the FDOT in a contract from October 2003 through June 2010. The SunGuide software is a set of Intelligent Transportation System (ITS) software that allows the control of roadway devices as well as information exchange across a variety of transportation agencies and is deployed throughout the state of Florida. The SunGuide software is based on ITS software available from the state of Texas, with significant customization and development of new software modules to meet the needs of the FDOT. Figure 1 provides a graphical view of the SunGuide software architecture:

Software Development Plan

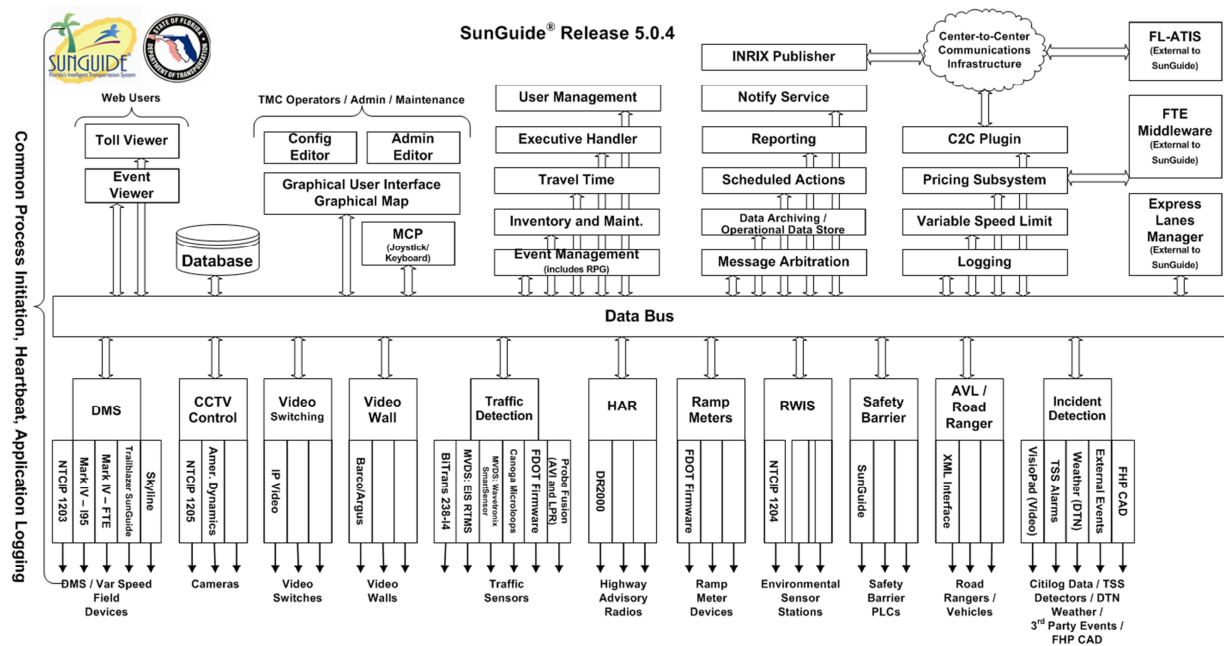


Figure 1 – High-Level Architectural Concept

1.3 Related Documents

Additional information regarding the SunGuide project can be found in the following documents and electronic publications:

- FDOT Scope of Services: *BDQ69, Standard Written Agreement for SunGuide Software Support, Maintenance, and Development, Exhibit A: Scope of Services*. July 1, 2010.
- Notice to Proceed: Letter to SwRI for BDQ69, July 1, 2010
- Letter of Authorization 001: Letter to SwRI for BDQ69, July 1, 2010.
- Letter of Authorization 002: Letter to SwRI for BDQ69, August 3, 2010.
- Letter of Authorization 003: Letter to SwRI for BDQ69, August 19, 2010.
- Letter of Authorization 004: Letter to SwRI for BDQ69, October 20, 2010.
- Letter of Authorization 005: Letter to SwRI for BDQ69, November 9, 2010.
- SunGuide Project website: <http://sunguide.datasys.swri.edu>.

1.4 Contacts

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- David Chang, PBS&J Project Advisor, David.Chang@dot.state.fl.us, 850-410-5622
- Robert Heller, SwRI Project Manager, rheller@swri.org, 210-522-3824
- Tucker Brown, SwRI Software Project Manager, tbrown@swri.com, 210-522-3035

2. PROJECT BASELINE ITEMS

The following sections contain tables listing the baseline items and baseline documents for each category of baseline material. The tables also indicate, where appropriate, which items will be delivered to the customer, which items will be peer reviewed, which items will be placed under configuration management, and the estimated size of the baseline item.

2.1 LOA001 Baseline

2.1.1 LOA001 Baseline Items

Table 2-1 lists the baseline items that may be developed or updated during the project. Each LOA for development enhancement will identify specific baseline items that will be updated and new baseline items that will be created. All baseline items are deliverable to the FDOT.

Table 2-1 – Project Baseline Items

Baseline Item ¹	Current Version ²
Admin Editor	5.0.3
Automated Vehicle Location/Road Ranger Driver	5.0.3
Automated Vehicle Location /Road Ranger Subsystem	5.0.3
Center-to-Center	5.0.3
Center-to-Center Collector	5.0.3
Center-to-Center Command Receiver	5.0.3
Center-to-Center Extractor	5.0.3
Center-to-Center Provider	5.0.3
Center-to-Center Publisher	5.0.3
Center-to-Center Subscriber	5.0.3
Closed Circuit Television Subsystem	5.0.3
Closed Circuit Television American Dynamics Driver	5.0.3
Closed Circuit Television NTCIP Driver	5.0.3
Config Editor	5.0.3
Data Archive Subsystem	5.0.3
Databus	5.0.3
Dynamic Message Sign Subsystem	5.0.3
Dynamic Message Sign Mark IV Driver (D4)	5.0.3
Dynamic Message Sign Mark IV Driver (FTE)	5.0.3
Dynamic Message Sign NTCIP Driver	5.0.3
Dynamic Message Sign Skyline Driver	5.0.3
Dynamic Message Sign Trailblazer Driver	5.0.3
Event Management Subsystem	5.0.3
Event Viewer	5.0.3
Executive Handler	5.0.3

¹ This is a summary list of the “SunGuide Processes.” Including a complete list of the source code files in this table would be prohibitive in length (approximately 20,000 files).

² Source code files are “versioned” with each new release.

Baseline Item¹	Current Version²
Graphical User Interface	5.0.3
Highway Advisory Radio	5.0.3
Highway Advisory Radio DR 2000 Driver	5.0.3
Incident Detection Subsystem	5.0.3
Incident Detection External Events Driver	5.0.3
Incident Detection FHP CAD Driver	5.0.3
Incident Detection TSS Alarms Driver	5.0.3
Incident Detection VisioPad Driver	5.0.3
Incident Detection Weather Driver	5.0.3
Inventory and Management Subsystem	5.0.3
Message Arbitration Subsystem	5.0.3
Notify Service	5.0.3
Pricing Subsystem	5.0.3
Ramp Metering Subsystem	5.0.3
Ramp Metering FDOT Firmware Driver	5.0.3
Ramp Metering Firmware	5.0.3
Reporting Subsystem	5.0.3
Roadway Weather Information Station Subsystem	5.0.3
Roadway Weather Information Station NTCIP Driver	5.0.3
Safety Barrier Subsystem	5.0.3
Safety Barrier SunGuide Driver	5.0.3
Scheduled Actions Subsystem	5.0.3
Status Logger	5.0.3
Toll Viewer	5.0.3
Traffic Detection Subsystem	5.0.3
Traffic Detection Probe Fusion Driver (AVI & LPR)	5.0.3
Traffic Detection FDOT Firmware Driver	5.0.3
Traffic Detection RTMS Driver (Canoga, Wavetronix, EIS)	5.0.3
Traffic Detection BiTrans 238-I4 Driver	5.0.3
Travel Time Subsystem	5.0.3
Variable Speed Limit Subsystem	5.0.3
Video Switching Subsystem	5.0.3
Video Switching IP Driver	5.0.3
Video Wall Subsystem	5.0.3
Video Wall Barco-Argus Driver	5.0.3

2.1.2 LOA001 Baseline Documents

Table 2-2 lists the baseline documents that will be generated or updated during the project. All baseline documents are deliverable to the FDOT.

Table 2-2 – Project Baseline Documents

Document	Document Identifier	New / Update
Concept of Operations	SunGuideSMD-COO-x.y.z	New
Configuration Management Plan	SunGuideSMD-CMP-x.y.z	New
Database Design Document	SunGuide-DBDD- x.y.z	Update

Software Development Plan

Document	Document Identifier	New / Update
Installation Notes	SunGuide-IN-5.0.3	Update
Interface Control Document		
AVL RR	SunGuide-AVLRR-ICD-3.0.1	Update
Center to Center	SunGuide-C2C-ICD-4.0.11	Update
CCTV	SunGuide-CCTV-ICD- 3.0.1	Update
Databus	SunGuide-DB-CIM-1.0.01	Update
Databus	SunGuide-DB-PT-ICD-1.0.01	Update
DMS	SunGuide-DMS-ICD-3.0.1	Update
General	SunGuide-General-ICD-3.0.1	Update
Event Management	SunGuide-EM-ICD-3.0.1	Update
Highway Advisory Radio	SunGuide-HAR-ICD-1.0.01	Update
Incident Detection	SunGuide-IDS-ICD-4.2.0	Update
Inventory Mangement	SunGuide-IMS-ICD-1.0.01	Update
Message Arbitration	SunGuide-MAS-ICD- 3.0.1	Update
Pricing	SunGuide-PS-ICD-4.3.0	Update
Reporting	SunGuide-RS-ICD-3.0.1	Update
Safety Barrier	SunGuide-SB-ICD-1.0.01	Update
Traffic Sensor	SunGuide-TSS-ICD-4.1.0	Update
Travel Time	SunGuide-TvT-ICD-4.1.0	Update
Video Switching	SunGuide-VS-ICD-3.0.1	Update
Video Wall	SunGuide-VW-ICD-1.0.2	Update
Variable Speed Limit	SunGuide-VSL-ICD-3.0.1	Update
Output from Requisite Pro	SunGuide-ReqPro-x.y.x.zip	Update
Project Staffing Plan	SunGuideSMD-PSP-x.y.z	New
Quality Assurance Plan	SunGuideSMD-QAP-x.y.z	New
Risk Management Plan	SunGuideSMD-RMP-x.y.z	New
Software Design Document	SunGuide-SDD-5.0.0	Update
Software Development Plan	SunGuideSMD-SDP-x.y.z	New
Software Integration Case Procedure	SunGuide-SICP-5.0.0	Update
Software Integration Procedure	SunGuide-SIP-5.0.0	Update
Software Requirements Specification	SunGuide-SRS-5.0.0	Update
Software Security Plan	SunGuideSMD-SSP-x.y.z	New
Software Users Manual	SunGuide-SUM-5.0.1	Update
Subcontract Management Plan	SunGuideSMD-SMP-x.y.z	New
Training Plan and Training Materials	SunGuide-TP-	New
Version Description Document	SunGuide-VDD-5.0.3	Update

2.2 LOA002 Baseline

SwRI will not create new or modify existing baseline items or documents in response to LOA002.

2.3 LOA003 Baseline

2.3.1 LOA003 Baseline Items

Table 2-3 lists the baseline items that may be developed or updated in response to LOA002. All baseline items are deliverable to the FDOT.

Table 2-3 – LOA003 Baseline Items

Baseline Item³	Updated Version
Admin Editor	5.0.4
Center-to-Center	5.0.4
Center-to-Center Extractor	5.0.4
Center-to-Center Provider	5.0.4
Center-to-Center Publisher	5.0.4
Center-to-Center Subscriber	5.0.4
Data Archive Subsystem	5.0.4
Databus	5.0.4
Graphical User Interface	5.0.4
INRIX Center-to-Center Publisher	5.0.4 (New)
Travel Time Subsystem	5.0.4

2.3.2 LOA003 Baseline Documents

Table 2-4 lists the baseline documents that will be generated or updated in response to LOA003. All baseline documents are deliverable to the FDOT.

Table 2-4 – LOA003 Baseline Documents

Document	Document Identifier	New / Update
Installation Notes	SunGuide-IN-5.0.3	Update
Interface Control Document		
Center to Center	SunGuide-C2C-ICD-4.0.11	Update
Traffic Sensor	SunGuide-TSS-ICD-4.1.0	Update
Travel Time	SunGuide-TvT-ICD-4.1.0	Update
Output from Requisite Pro	SunGuide-ReqPro-x.y.x.zip	Update
Project Staffing Plan	SunGuideSMD-PSP-1.0.0	Update
Software Design Document	SunGuide-SDD-5.0.0	Update
Software Development Plan	SunGuideSMD-SDP-1.0.0	Update
Software Requirements Specification	SunGuide-SRS-5.0.0	Update
Software Users Manual	SunGuide-SUM-5.0.1	Update
Training Plan and Training Materials	SunGuide-TP-x.y.z	New
Version Description Document	SunGuide-VDD-5.0.3	Update

³ This is a summary list of the “SunGuide Processes.” Including a complete list of the source code files in this table would be prohibitive in length (approximately 20,000 files).

2.4 LOA004 Baseline

2.4.1 LOA004 Baseline Items

Table 2-5 lists the baseline items that may be developed or updated in response to LOA004. All baseline items are deliverable to the FDOT.

Table 2-5 – LOA004 Baseline Items

Baseline Item⁴	Updated Version
Admin Editor	5.0.5
AVLRR Server Application for SPARR Application	5.0.5 (New)
AVL Android Application	5.0.5 (New)
Center-to-Center	5.0.5
DMS Subsystem	5.0.5
Event Management Subsystem	5.0.5
Probe Fusion Driver	5.0.5

2.4.2 LOA004 Baseline Documents

Table 2-6 lists the baseline documents that will be generated or updated in response to LOA004. All baseline documents are deliverable to the FDOT.

Table 2-6 – LOA004 Baseline Documents

Document	Document Identifier	New / Update
Installation Notes	SunGuide-IN-5.0.4	Update
Interface Control Document		
SPARR	SunGuide-C2C-ICD-5.0.4	New
Output from Requisite Pro	SunGuide-ReqPro-x.y.x.zip	Update
Project Staffing Plan	SunGuideSMD-PSP-4.0.0	Update
Software Design Document	SunGuide-SDD-5.0.0	Update
Software Development Plan	SunGuideSMD-SDP-4.0.0	Update
Software Requirements Specification	SunGuide-SRS-5.0.0	Update
Version Description Document	SunGuide-VDD-5.0.4	Update

2.5 LOA005 Baseline

2.5.1 LOA005 Baseline Items

Table 2-7 lists the baseline items that may be developed or updated in response to LOA005. All baseline items are deliverable to the FDOT.

⁴ This is a summary list of the “SunGuide Processes.” Including a complete list of the source code files in this table would be prohibitive in length (approximately 20,000 files).

Table 2-7– LOA005 Baseline Items

Baseline Item⁵	Updated Version
Admin Editor	5.1
Center-to-Center Publisher	5.1
Event Management Subsystem	5.1
IntelliDrive Driver	5.1 (New)
IntelliDrive Subsystem	5.1 (New)
Operator Map	5.1

2.5.2 LOA005 Baseline Documents

Table 2-8 lists the baseline documents that will be generated or updated in response to LOA005. All baseline documents are deliverable to the FDOT.

Table 2-8 – LOA005 Baseline Documents

Document	Document Identifier	New / Update
Installation Notes	SunGuide-IN-5.1	Update
Interface Control Document		
C2C	SunGuide-C2C-ICD-5.1	Update
IntelliDrive	SunGuide-ID-ICD-5.1	New
Output from Requisite Pro	SunGuide-ReqPro-x.y.x.zip	Update
Project Staffing Plan	SunGuideSMD-PSP-5.0.0	Update
Software Design Document	SunGuide-SDD-5.1	Update
Software Development Plan	SunGuideSMD-SDP-5.1	Update
Software Integration Case Procedures	SunGuide-SICP-5.1	New
Software Integration Plan	SunGuide-SIP-5.1	New
Software Requirements Specification	SunGuide-SRS-5.1	Update
Software User Manual	SunGuide-SUM-5.1	Update
Version Description Document	SunGuide-VDD-5.1	Update

⁵ This is a summary list of the “SunGuide Processes.” Including a complete list of the source code files in this table would be prohibitive in length (approximately 20,000 files).

3. PROJECT MANAGEMENT

3.1 Work Breakdown Structure (WBS)

Each LOA may result in modifications to the Project WBS. Individual paragraphs will address each LOA.

3.1.1 LOA001 WBS

LOA001 authorizes SwRI to provide support through Fiscal Year 2011 (July 1, 2010 to June 30, 2011 inclusive). The FDOT Program Manager verbally authorized SwRI to perform SunGuide Release 5.0 Installations under this LOA as well. The WBS for this support follows.

- FY 2011 Support
 - o Central Office
 - o Test Engineering Research Laboratory (TERL)
 - o D1
 - o D2
 - o D3
 - o D4
 - o D5
 - o D6
 - o D7
 - o FTE
 - o MDX
 - o FL-ATIS
 - o I595PPP
 - o Lee County
 - o City of Tallahassee

3.1.2 LOA002 WBS

LOA002 authorizes SwRI to perform on-site installations of SunGuide Release 5.0. The WBS for these deployments is as follows

- Release 5.0 Installations
 - o D2 - SG R5.0 INSTALL
 - o D5 - SG R5.0 INSTALL
 - o D6 - SG R5.0 INSTALL
 - o D7 - SG R5.0 INSTALL
 - o FTE - SG R5.0 INSTALL
 - o MDX - SG R5.0 INSTALL
 - o Lee County - SG R5.0 INSTALL

3.1.3 LOA003 WBS

LOA003 authorizes SwRI to perform on-site installations of SunGuide Release 5.0. The WBS for these deployments is as follows

- Pensacola – SG R5.0 INSTALL
- Orlando-Orange County Expressway Authority (OOCEA) – SG R5.0 INSTALL

LOA003 also authorizes SwRI to a new subsystem for inclusion of INRIX data into SunGuide.

- Update Process Documents
- Concept, Requirements, Design Review
- SunGuide Updates (GUI)
- Inrix Interface Service (C2C Publisher)
- Inrix TMC Path Library
- Inrix GIS Library
- Integration Testing
- SunGuide Documentation Updates

3.1.4 LOA004 WBS

LOA004 authorizes SwRI for 5 different development tasks

- 1) Road Ranger Smart Phone Application
 - a. Update Process Documents
 - b. Smartphone GUI Prototyping
 - c. Driver/Device ICD
 - d. SPARR Driver
 - e. Smart Phone Application
 - f. Integration Testing
- 2) DMS Multithreading
 - a. DMS Subsystem Update
 - b. Integration Testing
- 3) EM Location Publish
 - a. EM Subsystem Update
 - b. C2C Subsystem Update
 - c. Admin Editor Update
 - d. Integration Testing
- 4) Transcore Driver
 - a. TSS Driver Update
 - b. Integration Testing
- 5) DMS Miles Ahead Enhancement
 - a. EM Subsystem Update
 - b. Admin Editor Update
 - c. Integration Testing

3.1.5 LOA005 WBS

LOA005 authorizes SwRI to develop a new subsystem, a new driver, and GUI modifications in preparation for inclusion of IntelliDrive data into SunGuide.

- Update Process Documents
- Concept, Requirements, Design Review
- Support BSM Data
- Support Probe Vehicle Data
- Support Traveler Advisory Messages
- Integration Testing

- SunGuide Documentation Updates
- FAT
- IVV
- Deployments

3.2 Project Schedule

Each LOA may result in modifications to the Project Schedule. Individual paragraphs will address each LOA.

3.2.1 LOA001 Schedule

The draft schedule showing teleconferences and deliverables for LOA001 is in Attachment A.

3.2.2 LOA002 Release 5.0 Installation Schedule

A draft schedule showing installations for SunGuide Release 5.0 is in Attachment B.

3.2.3 LOA003 INRIX Data Enhancement, Orlando-Orange County Expressway Authority (OOCEA), and Pensacola SunGuide Deployments

A draft schedule showing installations for OOCEA and Pensacola for SunGuide Release 5.0 can be seen in Attachment C. A draft schedule for development of the INRIX Data Enhancement can be seen in Attachment D.

3.2.4 LOA004 Road Ranger Smart Phone Application, DMS Multithreading, EM Location Publish, Transcore Driver Update, DMS Miles Ahead

A draft schedule showing the development of the Road Ranger Smart Phone Application can be seen in Attachment E. A draft schedule for the other developments of this LOA can be seen in Attachment F. The schedule shown in Attachment F reflects the calendar time needed to complete the task and does not necessarily represent the actual start date.

3.2.5 LOA005 IntelliDrive Application Development

A draft schedule showing the development schedule for IntelliDrive can be seen in Attachment G.

3.3 Project Plan Revisions

Each new LOA may require modifications to this SDP. Those LOAs may modify existing LOAs (authorize additional expenditure for existing tasks, authorize new tasks, etc.). As each new LOA is received, SwRI will modify this SDP to reflect the new LOA.

4. ENGINEERING PLAN

The following sections contain the engineering procedures that will be used on the project. These include the following: development environment and resources, the development lifecycle, analysis and design methods, coding standards, and testing methods.

4.1 Environment and Resources

The following sections describe the hardware and software resources that will be used during the project.

4.1.1 Project Resources

SwRI provides an extensive development environment for the SunGuide project including a “server farm” (30+ servers), Oracle tools, Microsoft Visual Studio, AccuRev, Footprints and other development tools, ITS devices including physical and simulated cameras, signs, detectors, weather stations, codecs, and video switches. Recently, SwRI has introduced a virtual server into the development laboratory capable of emulating over 100 virtual servers or workstations with varying operating systems and software.

Additionally, SwRI provides a project web-site for dissemination of project deliverables and an FTP site for exchange of information with FDOT that will not pass the FDOT email system.

4.1.2 Developer Resources

All developers have SwRI-provided Microsoft Developer Network (MSDN) or Visual Studio licenses providing access to Microsoft toolsets for use in development. Each developer has at least one dedicated computer, used for development and unit testing. All computers have dual monitors, development tools including Integrated Development Environments (IDEs), source control software, database tools (SQL Developer or Toad), schema creation tools (XMLSpy), and other productivity tools. SwRI uses different IDEs depending upon the type of code; some examples are Visual Studio 2010, IntelliJ, Eclipse, and Dreamweaver. SwRI uses AccuRev (stream-based source control tool) which allows us to easily manage multiple release versions in development and maintenance at one time.

4.2 LOA001 Support and Maintenance

SwRI is providing support and maintenance under LOA001. SwRI provides support and maintenance by providing staff in San Antonio, TX and on-site staff in locations specified by the FDOT. The following paragraphs describe the activities of staff in San Antonio and Florida.

4.2.1 San Antonio Staff Activities

The SwRI staff members in San Antonio perform three general types of project support activities at the request of FDOT.

1. Project Management (PM) staff (see staffing plan for the list of PM staff) members manage the LOA001 effort, personally oversee support tasks deemed “critical”, prepare various administrative reports (periodic status reports, periodic support performance reports, inputs for Configuration Management Board [CMB] meetings, etc.), respond to information requests from FDOT, and participate in various teleconferences.

2. On-Call Support staff members respond to telephone requests for service in the event of Critical Failures, Failures and External System Failures.
3. General Support staff members respond to user requests in the form of Footprints Issues with issue types Deployment / Configuration, Defects and Enhancements.

The following paragraphs describe in more detail the latter two types of activities.

4.2.1.1 On-Call Support Staff

In the event that a SunGuide installation suffers from a Critical Failure, Failure or External Interface failure, the issue is to be reported via telephone call to the SunGuide support telephone line. The support line is answered 24 hours per day, 7 days per week (24 x 7). Issue category, required initial response times, initial response type, escalation times and on-site responses are noted in Table 4-1.

Table 4-1 – Telephone Response Times

Category	Required Initial Response Time	Initial Response	Escalation Time	On-site Response
Critical Failure	One hour	Return the phone call	2 hours	4 Hours from FDOT PM Approval
Failure	One hour	Return the phone call	8 hours	1 Business Day from FDOT PM Approval
External Failure	One hour	Return the phone call	12 Hours of contact with external POC	1 Business Day from FDOT PM Approval

SwRI telephone support follows the following process; these actions are logged into the Footprints reporting tool for record keeping purposes.

1. The line rings on the desk of a SunGuide On-Call Support Staff member at SwRI.
2. Upon the first ring the call is logged via text messages and email messages to internal phone lists for record keeping and monitoring purposes.
3. If the call is answered, then the support staff member begins work to resolve the reported issue.
4. If the call is not answered, then the support line is answered by a 24 x 7 answering service.
5. If the answering service answers the call, the operator records the following key information and begins a process of calling a list of on-call SwRI staff members.
 - a. Name of user reporting issue
 - b. Call back number
 - c. TMC
 - d. Failure priority
 - e. Name of components failing
6. Once a staff member is reached, the staff member calls the support line to record that a response is in progress. This action will trigger an email and text message to internal phone lists for timestamp tracking purposes. The support staff then returns the call to the user reporting the issue.

7. The staff member begins work to resolve the reported issue.
8. If the system is not returned to functionality within an escalation interval, the issue is escalated to either the PM or Software Project Manager (SPM). The PM/SPM mobilize other resources to work on the problem if the initial responder cannot resolve the issue.
9. The support member will log the issue into the Footprints using the timestamp generated through the call log as the basis for initial call time and initial response time.

4.2.1.2 Non-Telephone Issue Support Staff

SwRI has a number of other developers available to process issues reported through the Footprints reporting tool. Issue category, required initial response times, initial response type, escalation times and on-site responses are noted in Table 4-2.

Table 4-2 – Non-Telephone Response Times

Category	Required Initial Response Time	Initial Response	Escalation Time	On-site Response
Defect	1 business day	Email to submitter	1 business day	No
Deployment / Configuration	1 business day	Email to submitter	1 business day	1 Business Day from FDOT PM Approval
Enhancement	3 business day	Email to submitter	2 business weeks	No

SwRI non-telephone support follows the following process; these actions are logged into the Footprints reporting tool for record keeping purposes.

1. The Footprints tool is checked daily for new issues.
2. New issues are assigned to a SwRI staff member for resolution.
3. The Footprints tool automatically sends notifications to the user who reported the problem when any changes are made to the Footprints issue.
4. Footprints issues are addressed in order of their priority⁶, within the time and funds available on the contract.
5. Once an issue has been “resolved” it is updated with a status of “Awaiting Release” and marked with the version of SunGuide that will include this change.
6. Once a resolved issue has been released, status is changed to “Waiting for District Confirmation”.
7. Once a released issue has been confirmed by the user who reported the issue initially, the Footprint issue is closed.
8. If FDOT finds an issue of sufficient priority (SwRI and FDOT PM conferring), the issue may be released using a Hotfix to the reporting user’s Traffic Management Center (TMC) or Patch to all SunGuide deployments.

⁶ Footprints issue priority has multiple meanings and is based first on the actual priority of the issue in Footprints, then by criticality to operations, number of districts affected, and may be ranked higher or lower depending on discussions between the FDOT Program Manager and the SwRI PM.

4.2.2 Florida Based Staff Activities

Florida based SwRI⁷ support staff provide support to TMCs and their operational staff. In this manner, a higher level of service can be provided using on-site staff. These staff will augment the San Antonio based staff by being assigned Footprints issues for preliminary investigation in TMCs located close to their home base. In the event that San Antonio staff cannot readily diagnose problems remotely, these staff members may be called upon to do additional testing within the TMC where they can more closely monitor test results. They may be called upon to help resolve either issues reported via telephone (Critical, Failures, External) or Footprints (Defects, Deployment / Configuration, Enhancements).

4.3 General Software Development Lifecycle (SDLC)

BDQ69 Exhibit A 'Scope of Services' identifies a waterfall SDLC which is consistent with the development utilized on the previous SunGuide software contract BD826. The Waterfall SDLC has been applied in an iterative manner for all SunGuide development including Release 1.0, 1.1, 2.0, 2.1, 2.2, 3.0, 3.1, 4.0, 4.1, 4.2, 4.3 and 5.0. The Scope of Services describes a full waterfall lifecycle with provisions for tailoring depending on enhancement size, complexity, time constraints, etc. Activities that comprise the Waterfall SDLC are described in the following paragraphs. Specific SDLC modifications will be described in sections of this SDP for each LOA requiring development.

4.3.1 Concept of Operations

Depending on the magnitude of the enhancement to be implemented, a Concept of Operations may be required. SwRI will utilize the FDOT's Concept of Operations (ConOps) baseline document as the starting point.

4.3.2 Requirements Analysis

Whether or not a ConOps is required, a set of system requirements will be developed for the enhancement. The FDOT will develop the system requirements and provide them to SwRI. SwRI will develop software requirements based on the system requirements and provide traceability of the software requirements to the system requirements. After the initial software requirements have been developed, they will be provided to the FDOT for review. SwRI may schedule a meeting to review the software requirements and the FDOT's comments. SwRI will maintain requirements, both System Requirements and derived Software Requirements, in the tool Requisite Pro as required by the contract. SwRI will utilize Requisite Pro to generate a Software Requirements Specification (SRS) for transmittal to the FDOT with the Requisite Pro database files.

4.3.3 Design

SwRI will identify a design method to be used in high level and detailed design for an enhancement in updates to this SDP. A preliminary design review will be conducted with the FDOT to ensure that the design meets the requirements (both system and derived software

⁷ May be either SwRI employees or employees of a SwRI subcontractor (e.g. Lucent Group) supplying support staff in Florida; for purposes of this document they should be viewed as the same.

requirements) and the understanding that the FDOT has for the enhancement. Depending on the size and criticality of the enhancement, the FDOT will require, at a minimum, an informal design review where the FDOT will review materials provided by SwRI or a formal critical design review. At the conclusion of the design, SwRI will update the Software Design Document (SDD), Database Design Document (DBDD) and Interface Control Documents (ICDs).

4.3.4 Development and Unit Testing

SwRI will perform development and unit testing of the enhancement in accordance with its software development procedures. SwRI will utilize the coding standards that are part of the QAP. SwRI will conduct internal peer reviews throughout the development effort. SwRI will utilize automated testing tools distributed as part of Visual Studio in cases SwRI deem appropriate⁸.

4.3.5 Integration Testing

SwRI will perform integration testing of the enhancement and identify those specific methods in the enhancement proposal. SwRI will perform regression testing as part of the integration testing.

SwRI will develop the Software Integration Plan (SIP). The SIP will group requirements into logical subsets for development of test cases. The test cases within a group share common test setups and are a method of introducing test efficiency.

From the SIP, SwRI will develop Software Integration Case Procedures (SICP) which will include detailed test setups and test steps to verify the software meets System Requirements and Software Requirements. The SICP will contain traceability from System Requirements, Software Requirements to individual test steps.

SwRI will construct an “installer” for the software and a working Version Description Document (VDD) for this release. SwRI will utilize the installer and VDD to install the software for final integration testing and preparation for Factory Acceptance Testing (FAT). All installers will be run and tested at SwRI prior to delivery to the FDOT.

SwRI will update the Software User’s Manual (SUM) and have those updates available prior to FAT.

4.3.6 Acceptance Testing

SwRI will conduct FAT in its facilities (or other facilities mutually agreed upon with the FDOT). The test team, consisting of a SwRI operator, SwRI reader and a FDOT monitor, will execute each test step in the SICP and determine if that test passes or fails the tested requirement. The SwRI reader and FDOT monitor will sign and indicate time and date the test was completed as well as pass or failure status.

If, during the testing, anomalous behavior of the software is observed, SwRI will have paper forms available upon which the anomalous behavior may be noted. Observers may use these same forms to note and describe other facets of the software behavior that they would like considered for change or enhancement.

⁸ The cost to develop automated testing can be significant; informally SwRI will evaluate the cost versus the return in the evaluation.

SwRI will provide a record of the FAT results, consisting of a copy of the annotated SICP and collection of other forms, to the FDOT following conclusion of the FAT.

SwRI and FDOT will participate in a “Hot Washup” post FAT meeting during which the FAT results, anomalous behavior (if any) and change or enhancement requests will be discussed. At the conclusion of the “Hot Washup,” SwRI will provide a SICP Corrective Action Plan (CAP) listing defects identified during FAT and the SwRI proposed solutions. When agreement is reached between the FDOT and SwRI, SwRI will implement the CAP. If enhancements are requested, then SwRI will provide cost and schedule estimate for FDOT approval and authorization (through an LOA). SwRI and FDOT may decide to retest the software through execution of another FAT.

4.3.7 IVV & Deployment

Following satisfactory completion of FAT, the FDOT may choose to conduct IVV testing in an independent facility. If IVV testing identifies issues the FDOT may task SwRI to make modifications to the software. Following satisfactory completion of the IVV testing, SwRI will provide the FDOT with updated Release media (installer materials) and documentation (IN and VDD).

4.4 LOA003 INRIX Development

The following sections describe the process for the INRIX development.

4.4.1 Minor Development SDLC

SwRI will utilize the general SDLC described in the Scope of Services as modified by the Minor Development described in the CMP. The activities and deliverables of that process are shown in Table 4-3.

Table 4-3 – LOA003‘Minor’ Development Waterfall SDLC Activities and Deliverables

Activity	Minor
Requirements Elicitation	
ConOps	Y
FDOT System Requirement	Y
Software Requirements	Y
Requirements Review	
SRS Delivery	
Requirement Database Delivery	
Design	
Preliminary Design Review	
Detail Design Review	
SDD Delivery	
ICD Delivery	Y

DBDD Delivery	
Development Unit Test	
FDOT in process code review	
Integration Testing	
SIP	
SICP	
FDOT Dry Run	
VDD	Y
IN	Y
Acceptance Testing	
PCA	
SUM	
FAT	
IVV	

4.4.2 INRIX Development Review Plan

Table 4-4 identifies peer review method, rationale, and method of reporting and tracking the results of the reviews of created or updated baseline items (see QAP for definitions of review types).

Table 4-4 – LOA003 Work Product Review Plans

Baseline Item or Portion of Baseline Item	Buddy Check	Walk-through	Management Review	Customer Review	Rationale	Reporting and Tracking Method for Review Results
PSP	☐	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
SDP	☐	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
VDD	☒	☐	☐	☒	Required by Process & Contract	Document Control Panel, Email Comments

Baseline Item or Portion of Baseline Item	Buddy Check	Walk-through	Management Review	Customer Review	Rationale	Reporting and Tracking Method for Review Results
IN	☒	☐	☐	☒	Required by Process & Contract	Document Control Panel, Email Comments
ICD	☒	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
CONOPS, Requirements, Design	☐	☐	☒	☒	CONOPS, Requirements Design Review Meeting	Minutes, Email Comments
INRIX Publisher	☐	☒	☐	☐	Recommendation from development staff	Minutes
TSS	☐	☒	☐	☐	Recommendation from development staff	Minutes
TVT	☐	☒	☐	☐	Recommendation from development staff	Minutes
GUI	☐	☒	☐	☐	Recommendation from development staff	Minutes

4.5 LOA004 Road Ranger Smart Phone Application Development

The following sections describe the process for the Road Ranger Smart Phone Application development as well as the additional development described in LOA004.

4.5.1 Minor Development SDLC

SwRI will utilize the general SDLC described in the Scope of Services as modified by the Minor Development described in the CMP. The activities and deliverables of that process are shown in Table 4-5.

Table 4-5 – LOA004 ‘Minor’ Development Waterfall SDLC Activities and Deliverables

Activity	Minor
Requirements Elicitation	
ConOps	Y
FDOT System Requirement	Y
Software Requirements	Y
Requirements Review	
SRS Delivery	
Requirement Database Delivery	
Design	
Preliminary Design Review	
Detail Design Review	
SDD Delivery	
ICD Delivery	Y
DBDD Delivery	
Development Unit Test	
FDOT in process code review	
Integration Testing	
SIP	
SICP	
FDOT Dry Run	
VDD	Y
IN	Y
Acceptance Testing	
PCA	
SUM	
FAT	
IVV	

4.5.2 LOA004 Development Review Plan

Table 4-6 identifies peer review method, rationale, and method of reporting and tracking the results of the reviews of created or updated baseline items (see QAP for definitions of review types).

Table 4-6 – LOA004 Work Product Review Plans

Baseline Item or Portion of Baseline Item	Buddy Check	Walk-through	Management Review	Customer Review	Rationale	Reporting and Tracking Method for Review Results
PSP	☐	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
SDP	☐	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
VDD	☒	☐	☐	☒	Required by Process & Contract	Document Control Panel, Email Comments
IN	☒	☐	☐	☒	Required by Process & Contract	Document Control Panel, Email Comments
ICD	☒	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
CONOPS, Requirements, Design	☐	☐	☒	☒	CONOPS, Requirements Design Review Meeting	Minutes, Email Comments
AVL Driver	☐	☒	☐	☐	Recommendation from development staff	Minutes
Smart Phone Application	☐	☒	☐	☐	Recommendation from development staff	Minutes
EM	☐	☒	☐	☐	Recommendation from development staff	Minutes
C2C	☐	☒	☐	☐	Recommendation from development staff	Minutes
Admin Editor	☐	☒	☐	☐	Recommendation from development staff	Minutes
DMS	☐	☒	☐	☐	Recommendation from development staff	Minutes

Baseline Item or Portion of Baseline Item	Buddy Check	Walk-through	Management Review	Customer Review	Rationale	Reporting and Tracking Method for Review Results
Probe Fusion Driver	☐	☒	☐	☐	Recommendation from development staff	Minutes

4.6 LOA005 IntelliDrive Development

The following sections describe the process for the IntelliDrive development.

4.6.1 Moderate Development SDLC

SwRI will utilize the general SDLC described in the Scope of Services as modified by the Moderate Development described in the CMP. The activities and deliverables of that process are shown in Table 4-7.

Table 4-7 – LOA005 ‘Moderate’ Development Waterfall SDLC Activities and Deliverables

Activity	Minor
Requirements Elicitation	
ConOps	Y
FDOT System Requirement	Y
Software Requirements	Y
Requirements Review	Y
SRS Delivery	Y
Requirement Database Delivery	Y
Design	
Preliminary Design Review	Y
Detail Design Review	
SDD Delivery	Y
ICD Delivery	Y
DBDD Delivery	
Development Unit Test	
FDOT in process code review	
Integration Testing	
SIP	Y

SICP	Y
FDOT Dry Run	
VDD	Y
IN	Y
Acceptance Testing	
PCA	Y
SUM	Y
FAT	Y
IVV	Y

4.6.2 LOA005 Development Review Plan

Table 4-8 identifies peer review method, rationale, and method of reporting and tracking the results of the reviews of created or updated baseline items (see QAP for definitions of review types).

Table 4-8 – LOA005 Work Product Review Plans

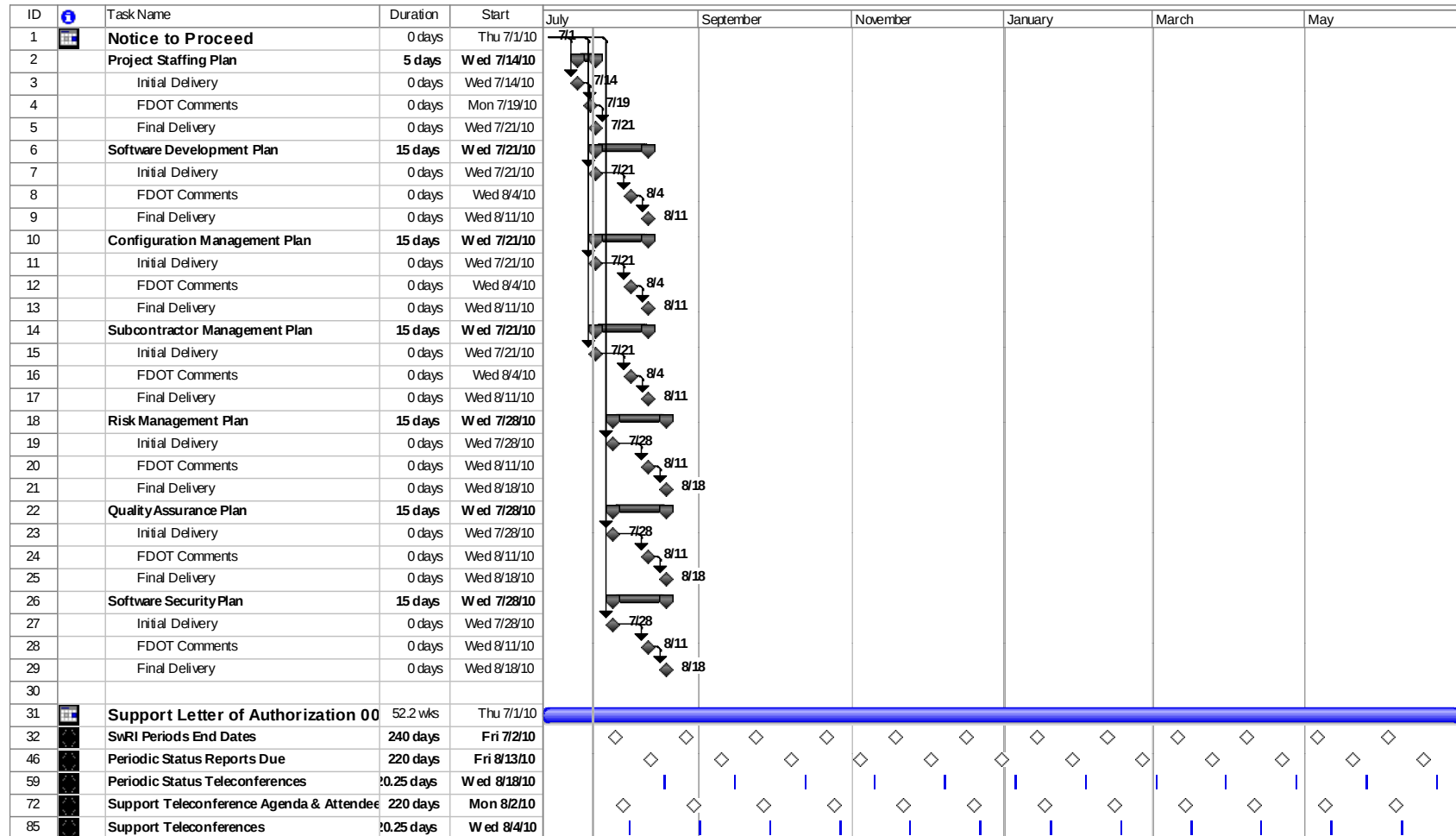
Baseline Item or Portion of Baseline Item	Buddy Check	Walk-through	Management Review	Customer Review	Rationale	Reporting and Tracking Method for Review Results
PSP	☐	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
SDP	☐	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
VDD	☒	☐	☐	☒	Required by Process & Contract	Document Control Panel, Email Comments
IN	☒	☐	☐	☒	Required by Process & Contract	Email Comments
ICD	☒	☐	☒	☒	Required by Process & Contract	Email Comments

Baseline Item or Portion of Baseline Item	Buddy Check	Walk-through	Management Review	Customer Review	Rationale	Reporting and Tracking Method for Review Results
SRS	☒	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
SIP	☒	☐	☒	☒	Required by Process & Contract	Email Comments
SICP	☒	☐	☒	☒	Required by Process & Contract	Email Comments
SUM	☒	☐	☒	☒	Required by Process & Contract	Document Control Panel, Email Comments
SDD	☒	☐	☒	☒	Required by Process & Contract	Email Comments
CONOPS, Requirements, Design	☐	☐	☒	☒	CONOPS, Requirements Design Review Meeting	Minutes, Email Comments
IntelliDrive Driver	☐	☒	☐	☐	Recommendation from development staff	Minutes
IntelliDrive Subsystem	☐	☒	☐	☐	Recommendation from development staff	Minutes
GUI	☐	☒	☐	☐	Recommendation from development staff	Minutes
C2C	☐	☒	☐	☐	Recommendation from development staff	Minutes
EM	☐	☒	☐	☐	Recommendation from development staff	Minutes
DMS	☐	☒	☐	☐	Recommendation from development staff	Minutes

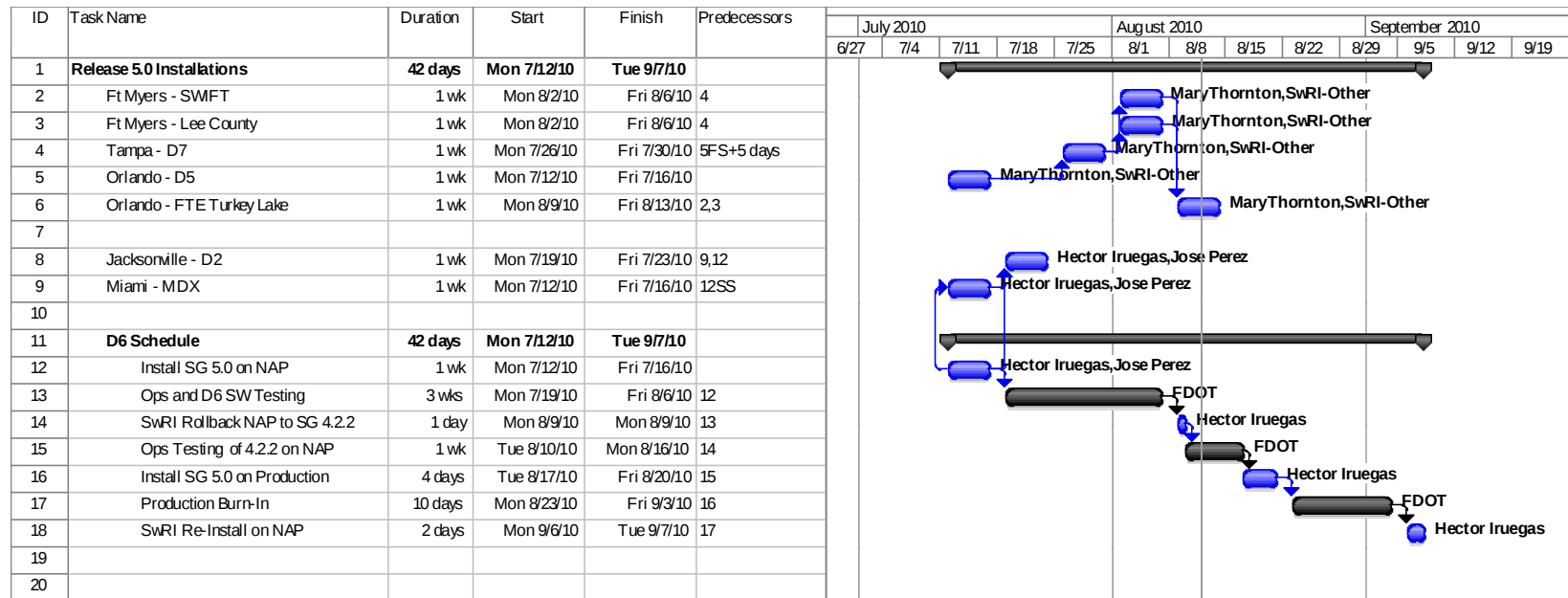
5. NOTES

ATTACHMENT A LOA001 SCHEDULE

Software Development Plan

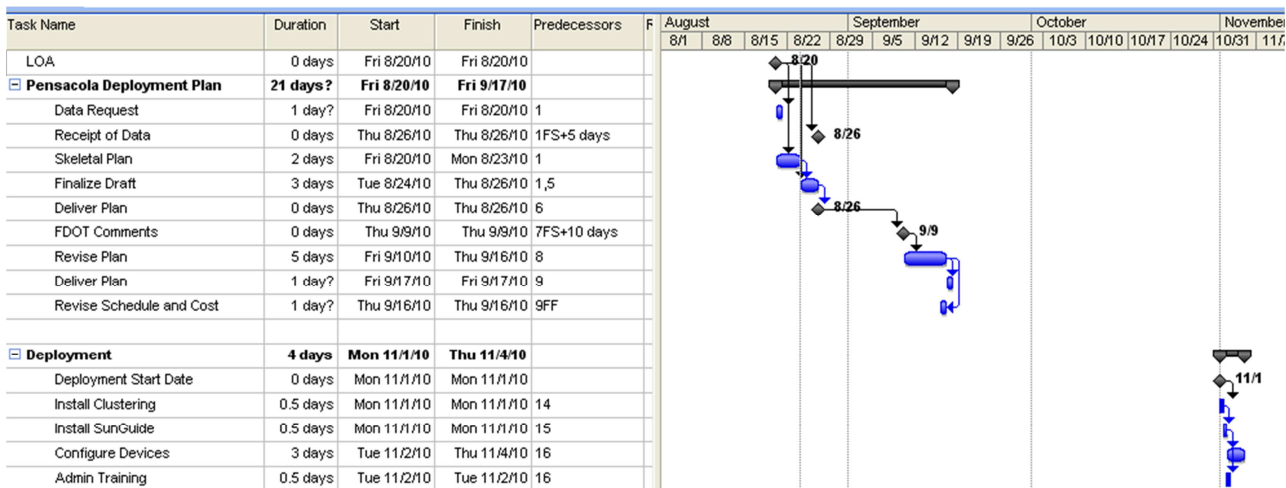


**ATTACHMENT B
LOA002 SCHEDULE
RELEASE 5.0 DEPLOYMENT**

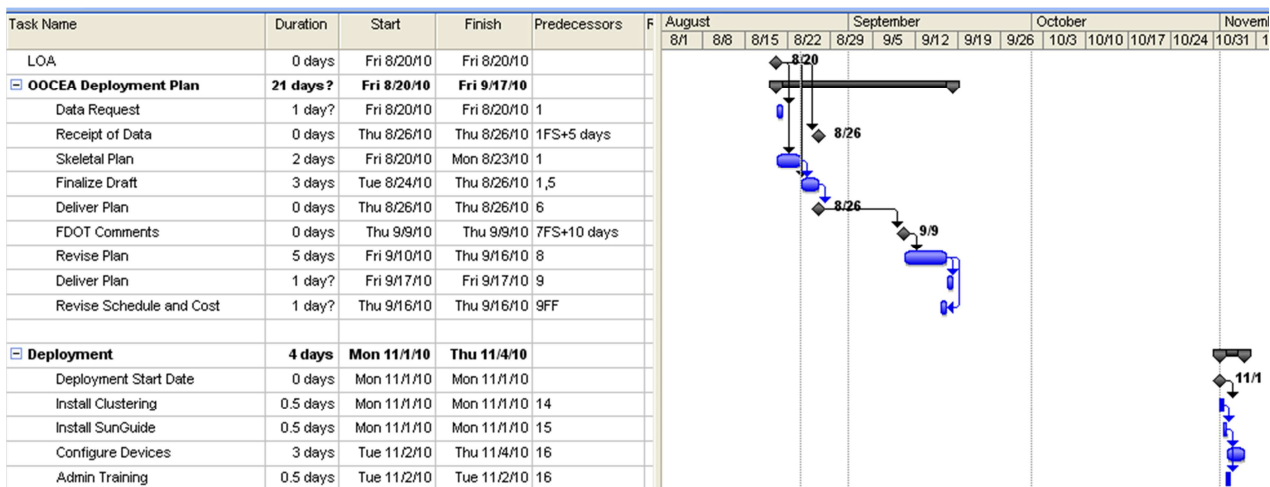


**ATTACHMENT C
LOA003 SCHEDULE
RELEASE 5.0 DEPLOYMENT
FOR OOCEA AND PENSACOLA**

Pensacola Deployment

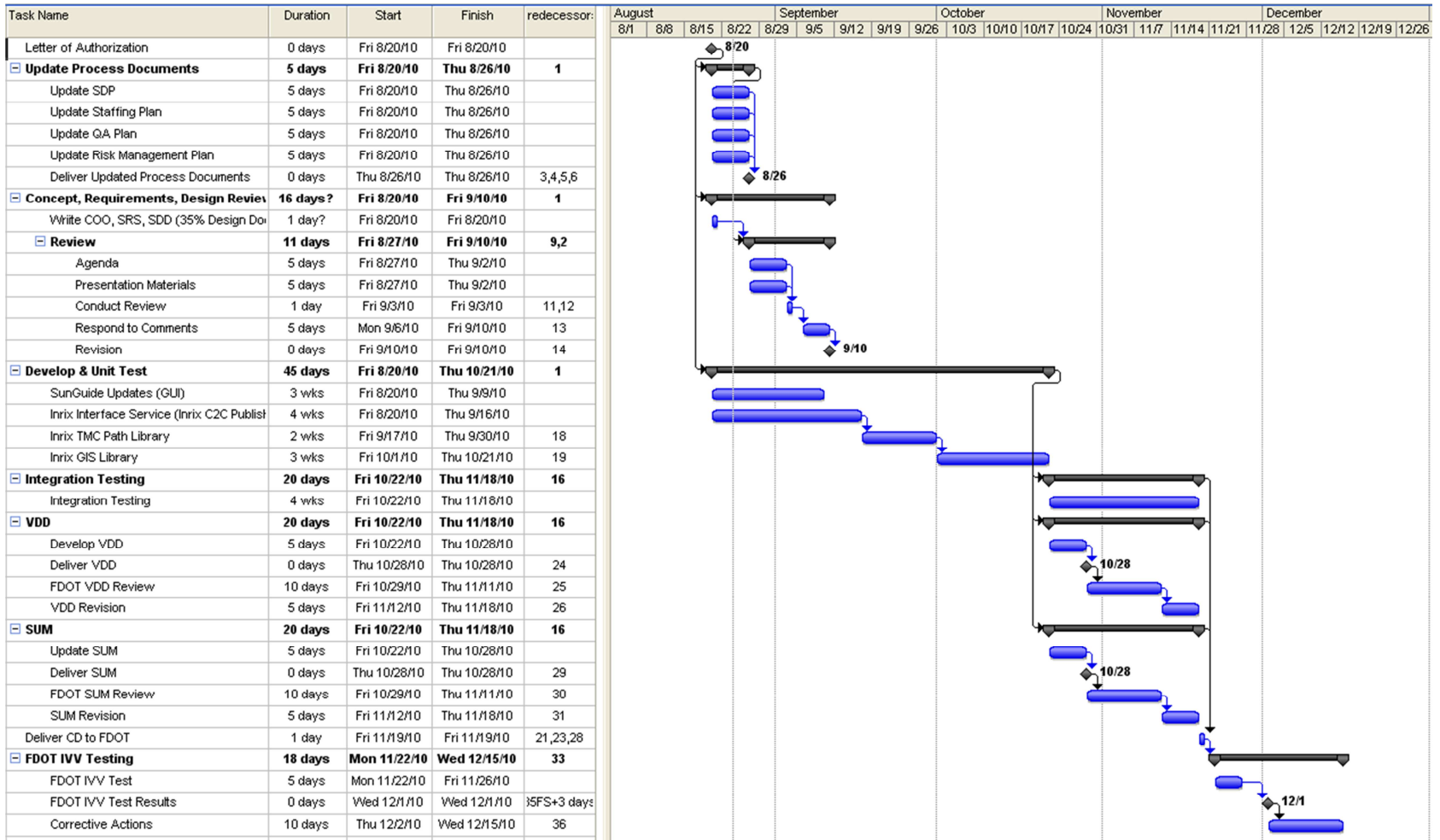


OOCEA Deployment

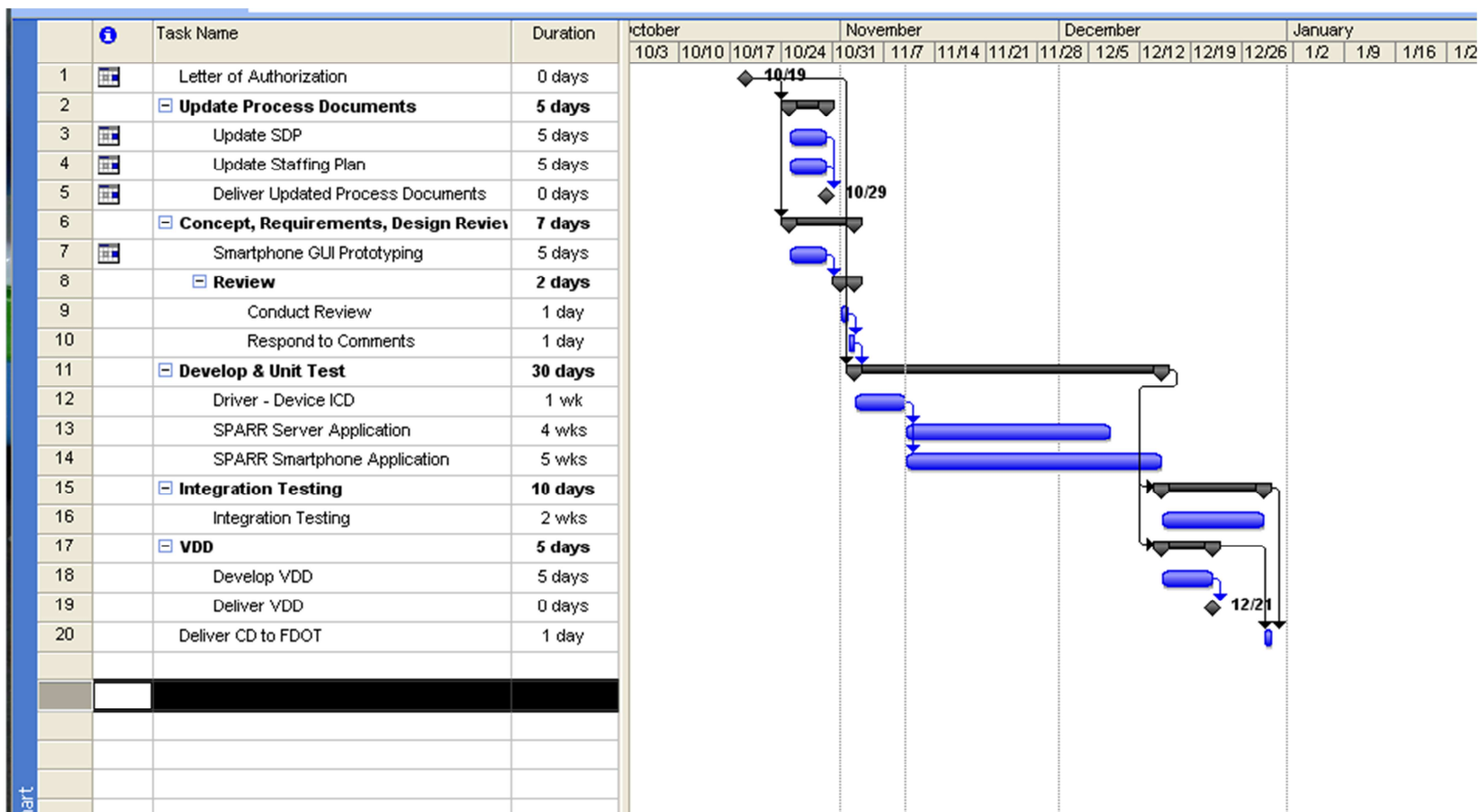


**ATTACHMENT D
LOA003 SCHEDULE
INRIX DEVELOPMENT**

Software Development Plan

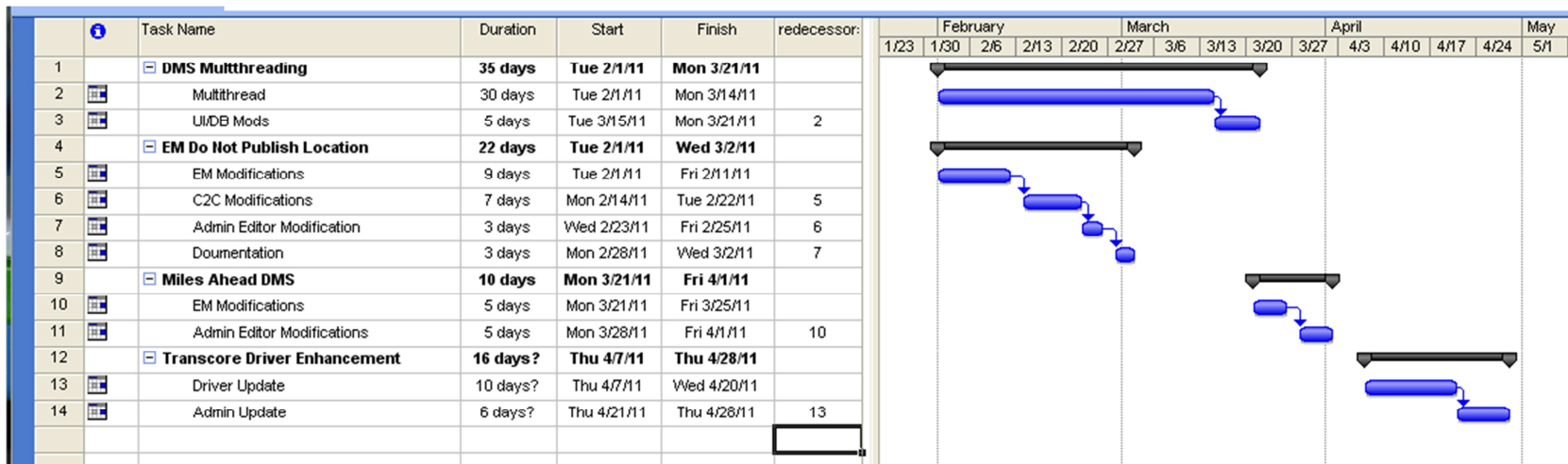


ATTACHMENT E
LOA004 SCHEDULE ROAD RANGER
SMART PHONE APPLICATION DEVELOPMENT



ATTACHMENT F

LOA004 SCHEDULE ENHANCEMENTS DEVELOPMENT



ATTACHMENT G

LOA005 INTELLIDRIVE SCHEDULE

