SunGuide[SM]:

Implementation Plan – I-95 in District 5

SunGuide-IP-D5-I95-1.0.1

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List of Acronyms

ARQ .....Advanced Ramp Queue
C2C .....Center-to-Center
CCTV .....Closed Circuit Television
ConOps .....Concept of Operations
CSE .....Computer Sizing Estimates
DASH.....Daytona Area Smart Highways
DMS .....Dynamic Message Sign
EH .....Executive Handler
FDOT .....Florida Department of Transportation
GUI .....Graphical User Interface
HAR .....Highway Advisory Radio
IIS.....Internet Information Server
IM.....Incident Management
IP .....Implementation Plan
ITS.....Intelligent Transportation Systems
IV&V .....Independent Verification and Validation
MCP .....Manual Control Panel
ML.....Main Lane
NTCIP .....National Transportation Communications for ITS Protocol
RMS .....Ramp Metering Subsystem
RWIS.....Roadway Weather Information System
SATP.....Software Acceptance Test Plan
SDD.....Software Design Document
SICP .....Software Integration Case Procedures
SIP.....Software Integration Plan
SRS .....Software Requirements Specification
SUM.....Software User's Manual
SwRI .....Southwest Research Institute
TCP/IP.....Transmission Control Protocol/Internet Protocol
TMC.....Transportation Management Center
TSS.....Transportation Sensor Subsystem
TvT.....Travel Time
VDD.....Version Description Document

REVISION HISTORY

Revision	Date	Changes
1.0.0-Draft	September 28, 2006	Initial Release.
1.0.0	October 2, 2006	Updated with FDOT comments
1.0.1	October 16, 2006	Updated with FDOT comments regarding configuration and training

1. Scope

1.1 Document Identification

This document serves as the Implementation Plan (IP) for the SunGuide[SM] software specific to District 5. This plan is covering the deployment of SunGuide[SM] for devices located in the Daytona Area Smart Highways (DASH) deployment and three construction projects: DASH 1, DASH2 and DASH 3.

1.2 Project Overview

The Florida Department of Transportation (FDOT) is conducting a program that is developing SunGuide[SM] software. The SunGuide[SM] 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. The goal of the SunGuide[SM] software is to have a common software base that can be deployed throughout the state of Florida. The SunGuide[SM] software development effort is based on ITS software available from both the states of Texas and Maryland; significant customization of the software is being performed as well as the development of new software modules. The following figure provides a graphical view of the software to be developed:

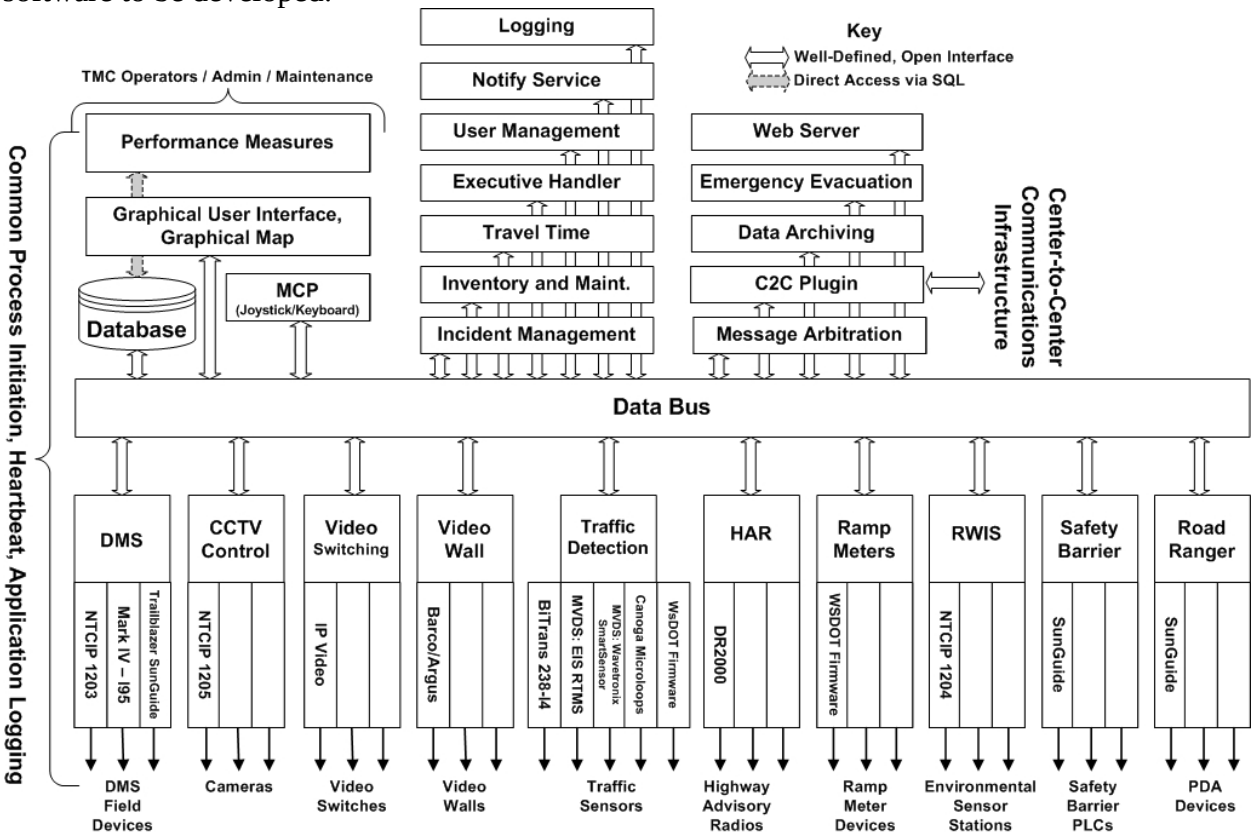

Figure 1.1 - High-Level Architectural Concept

The SunGuide[SM] development effort was initiated in October 2003. The software has been deployed in multiple locations and enhancements are being implemented to expand the functionality of the software.

1.3 Related Documents

The following documents were used to develop this document:

- SwRI Qualification Response: *Response to the Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: November 18, 2002.
- SwRI Technical Proposal: *Technical Proposal for Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: January 31, 2003.
- SwRI Cost Proposal: *Cost Proposal for Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: January 31, 2003.
- SwRI BAFO letter: *Southwest Research Institute® Proposal No. 10-35924, "Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System", Reference: Negotiation Number: ITN-DOT-02/03-9025-RR,* dated: May 5, 2003.
- FDOT procurement document: *Invitation To Negotiate (ITN), Negotiation Number: ITN-DOT-02/03-9025-RR, Statewide Transportation Management Center Software Library System,* dated: October 21, 2002.
- FDOT Scope of Services: *Statewide Transportation Management Center Software Library System: Scope of Services,* September 22, 2003.
- FDOT Requirements Document: *Statewide Transportation Management Center Software Library System: Requirements Specification,* June 3, 2003.
- Southwest Research Institute, *TMC Software Study,* November 15, 2001.
- Southwest Research Institute, *Introduction to an Operational Concept For the Florida Statewide Library,* FDOT – OCD – 1.0, March 31, 2002.
- World Wide Web Consortium (W3) website: http://www.w3.org.
- SunGuide℠ Project website: http://sunguide.datasys.swri.edu.

1.4 Contacts

The following are contact persons for the SunGuide℠ software project:

- Elizabeth Birriel, ITS Central Office, elizabeth.birriel@dot.state.fl.us, 850-410-5606
- Trey Tillander, FDOT SunGuide℠ Project Manager, trey.tillander@dot.state.fl.us, 850-410-5617
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- David Chang, ITS Specialist, David.Chang@dot.state.fl.us, 850-410-5622
- Steve Dellenback, SwRI Project Manager, sdellenback@swri.org, 210-522-3914
- Robert Heller, SwRI Software Project Manager, rheller@swri.org, 210-522-3824

The following are contacts that will be used by the SunGuide[SM] software project team to assure consistency with other FDOT projects and FDOT procedures:

- Liang Hsia, FDOT TERL, liang.hsia@dot.state.fl.us, 850-410-5615
- John Fain, FDOT, Comptroller, john.fain@dot.state.fl.us, 850-921-7332

2. Deployment Details

The following documents should be available to FDOT staff as they prepare for a SunGuide[SM] deployment (the most recent versions are available on the project web site):

- Computer Sizing Estimates (CSE)
- Concept of Operations (ConOps)
- Software Requirements Specification (SRS)
- Software Design Document (SDD)
- Version Description Document (VDD)
- Software User's Manual (SUM)
- Software Integration Plan (SIP)
- Software Acceptance Test Plan (SATP)
- Software Integration Case Procedures (SICP)

2.1 Subsystems To Be Installed

The following Release 2.1.2 SunGuide[SM] subsystems will be installed for the initial deployment at District 5:

- Administrative Editor
- Executive Handler
- Status Logger
- Data Bus
- Graphical User Interface/Map (GUI)
- Closed Circuit Television (CCTV)
- Dynamic Message Sign (DMS)
- Travel Time (TvT)
- Transportation Sensor Subsystem (TSS)
- Incident Management (IM)
- Center-to-Center (C2C)
- Web Server (WS)

As additional hardware is installed at District 5, additional subsystems will be added to the base deployment.

2.2 FDOT: Before Software Installation

The following sections describe the activities that FDOT staff needs to perform prior to the SunGuide[SM] software deployment.

2.2.1 Servers

The following table is extracted from the SunGuide[SM] *Computer Sizing Estimates* document and is used to quantify the number of SunGuide[SM] application servers required based on the subsystems to be installed. District 5 has procured two blade servers (each with 10 blades, each with dual CPUs and dual disk drives). The intent is to have one blade server in the Orlando control center and the other serving as a backup in the FDOT Deland facility. The intent is to allow the Deland server to server as a "warm" backup for the Orlando server with the data in the database being stored in both locations. Currently, final deployment plans for the second server

are still being finalized but it is envisioned that both servers will be identically configured so that they can serve as a backup for the other.

The first installation of SunGuide[SM] is going to focus on devices along the I-95 corridor. As a result, the sizing and configuration will be based on the number of devices that will be controlled in both the near and long term. As plans are made to convert the entire District to SunGuide[SM], some additional computer capacity will be required. For the short term, based on the current equipment in the field (and currently in construction) along the I-95 corridor, the following estimated number of devices was used in this document:

- DMS devices: approximately 150
- CCTV devices: approximately 175 (each has a video encoder)
- TSS detectors: approximately 20 McCain and approximately 75 Wavetronix

SunGuide[SM] Subsystem	Number of Servers Required	District 5 Deployment
Status Logger	0.1	0.1
Data Bus		
Base system up to 500 ITS devices	0.5	0.5
Over 500 devices	0.5	0
User Interface		
For every 10 users simultaneously logged in	0.5	0.5
DMS (includes MAS)		
Base subsystem	0.5	0.5
For every 100 TCP/IP connected signs	0.5	1
For every 50 dialup signs (assumes 5 modems)	0.5	0
CCTV Control (includes Manual Control Panel [MCP])		
Base subsystem	0.25	0.25
For every 10 users simultaneously controlling cameras	0.25	0.25
Video Switching		
Base subsystem	0.50	0
For every 10 users simultaneously switching video	0.1	0
Video Wall		
Base subsystem	0.25	0
For each Barco/Argus Controller	0.1	0
TSS		
Base subsystem	0.25	0.25
For every 300 detectors	0.5	0.5
Incident Management		
Base subsystem for up to 20 concurrent incidents	0.25	0.25
For each 20 concurrent incidents over the base amount	0.25	0
Ramp Metering		
Base subsystem	0.50	0
For every 20 ramps	0.25	0
Roadway Weather Information System (RWIS)		
Base subsystem	0.25	0

SunGuide℠ Subsystem	Number of Servers Required	District 5 Deployment
For every 50 TCP/IP connected sensors	0.25	0
Highway Advisory Radio (HAR)		
Base subsystem	0.25	0
For every 50 HARs	0.1	0
Archive		
Base subsystem	0.5	0.5
Safety Barrier		
Base Subsystem	.1	0
For every 50 Barriers	.1	0
Travel Time (TvT)		
Base Subsystem	.0.5	0.5
Web Servers (should be protected with a firewall)		
General Web server	1.0	1.0
Center-to-Center interface server	0.5	0.5
Emergency Evacuation	0.5	0
Maintenance Management Systems	0.5	0
Total SunGuide℠ Application Servers Needed		**6.6**

The above analysis suggests that 6.6 servers would be needed to support the SunGuide℠ installation as has been discussed with FDOT. Two additional machines will be required to support the Oracle Fail Safe database implementation. The sizing estimates in the *Computer Sizing Estimates* were based on best engineering judgment. After several installations it is clear that the estimates were extremely conservative; Southwest Research Institute® (SwRI®) believes that given the number of devices and based on the number of subsystems being initially deployed in District 5 that the existing blade server (10 blades, each blade with 2 CPUs and 2 disk drivers) that is to be located in the District 5 Orlando control center will be more than enough to support the SunGuide℠ deployment.

The following software needs to be installed on the servers before the software installation team arrives on-site:

- Database servers (2 blades): Microsoft Enterprise Server 2003 with all current updates from Microsoft. Microsoft Enterprise Server 2003 is required for the clustered database environment that District 5 is planning to deploy and for support of Oracle Fail Safe.
- Application servers (8 blades): Microsoft Standard Server 2003 with all current updates from Microsoft

The software installation team assumes that FDOT will have licenses and installation media available for the following products:

- Microsoft Standard Server 2003
- Oracle 10g, version 10.1.0.2.0

The SunGuide[SM] software will be installed and configured on the blade server (10 separate dual processor machines) in the following configuration:

- D5ITSSRV28
  - SL Viewer and Service
  - EH Viewer and Service
  - Notify Manager
  - Map Generator
  - Web Admin
  - Operator Map
- D5ITSSRV29
  - SL Viewer
  - EH Viewer
  - DataBus
  - Data Archive
- D5ITSSRV30
  - SL Viewer
  - EH Viewer
  - DMS Subsystem, Polling, and Driver
  - MAS
- D5ITSSRV31
  - SL Viewer
  - EH Viewer
  - CCTV
- D5ITSSRV32
  - SL Viewer
  - EH Viewer
  - TSS
  - RMS
- D5ITSSRV33
  - SL Viewer
  - EH Viewer
  - Incident Management
  - TVT
- D5ITSSRV34
  - SL Viewer
  - EH Viewer
  - C2C
  - Web Server
- D5ITSSRV35
  - Oracle Server / Database SGD5
- D5ITSSRV36
  - Oracle Failsafe (future)
- D5ITSSRV37
  - SL Viewer and Service
  - EH Viewer and Service

- Notify Manager
- Map Generator
- Web Admin
- Operator Map
- DataBus
- Data Archive
- DMS Subsystem, Polling, and Driver
- MAS
- CCTV
- TSS
- RMS
- Incident Management
- TVT
- C2C
- Web Server

Notes:

1. The deployment team may choose to "split device drivers and subsystem" across different servers based on the expected availability of field devices when the software is initially configured.
2. D5ITSSRV37 contains a complete copy of the installed SunGuide system. In the event that servers within the configuration fail, the complete system can be started on D5ITSSRV37. Alternatively, the config.xml file for the system can be edited and the subsystems on the failed server started on D5ITSSRV37. This provides redundancy within the server set.
3. When the system is converted to Oracle Failsafe, it should be installed on D5ITSSRV36 and D5ITSSRV37, the database can then be copied from D5ITSSRV35 and the config.xml file re-pointed to the failsafe database. The complete system can then be re-installed on D5ITSSRV35.

2.2.2 Workstations

The following software must be installed on each workstation that will access the SunGuide[SM] software:

- Microsoft Windows XP, Service Pack 2
- Microsoft Internet Explorer 6.01 or greater
- Adobe SVG Viewer 3.0 (can be downloaded at no charge from the Adobe website)

2.2.3 Device Protocol Compliance

For the devices being deployed, FDOT needs to verify that the protocol used by the devices to be controlled by the SunGuide[SM] software is compliant to the following protocols:

Subsystem	Protocol Reference
DMS	NTCIP 1203, FDOT MIB (Sep 2001)
CCTV Control	NTCIP 1205 v01.08 Amendment 1 v01.08 (August 2004)

Subsystem	Protocol Reference
Video Switching	MPEG-2: VBrick 4200/5200
Traffic Detection	BiTrans B238-I4 (runs on a 170 controller)
Traffic Detection	Wavetronix RTMS: SS105 SmartSensor Data Protocol V2.02

In addition to verifying the protocols are compliant, the FDOT staff needs to verify the TCP/IP connectivity to the field devices prior to the on-site installation activities being performed. This can most simply be accomplished by using "ping" to verify that the device is accessible from the server room using the network that the SunGuide[SM] servers will be utilizing.

2.2.4 Network Infrastructure

The following sections described the network infrastructure that must be in place prior to installation of the SunGuide[SM] software.

2.2.4.1 Hardware

Due to the client/server nature of the SunGuide[SM] software, TCP/IP is used to exchange data between application servers. Due to the web based implementation of the SunGuide[SM] user interface, each SunGuide[SM] workstation requires TCP/IP access to the SunGuide[SM] application servers. FDOT needs to verify that TCP/IP connectivity exists between all SunGuide[SM] application severs and SunGuide[SM] workstations.

Early in the development of requirements for SunGuide[SM], FDOT made the decision that the devices should be connected via TCP/IP to the SunGuide[SM] application servers. There are a number of techniques to connect traditional serial ITS devices so that they can be accessed via TCP/IP, these techniques include the use of a terminal server (a box that has a TCP/IP connection and has multiple serial ports) or a port server (a box that has a TCP/IP connection and a single serial port). The only exception to the use of TCP/IP access is that DMS devices can be accessed via a modem or directly through a serial port if the connection is made through a Windows "COM" port on the SunGuide[SM] application server running the DMS device driver.

It is FDOT's responsibility to provide all necessary network hardware and cables to provide the required connectivity.

2.2.4.2 Software

As the SunGuide[SM] software is configured, it will need access to various network servers that may be installed as part of the SunGuide[SM] installation or may be available as part of the greater FDOT network. The following network services need to be available and the details (e.g., host names, addresses) need to be available during the SunGuide[SM] software configuration:

- SMTP Mail Server: The SunGuide[SM] notify manager needs to be able to send emails on major system events so SMTP mail server access is required.
- DNS Server (optional): The SunGuide[SM] applications utilize TCP/IP to exchange data and the applications can use either IP addresses or host names in their configuration files. Note that the use of DNS is preferred because using explicit IP addresses is less flexible than using hostnames.

- Time Server (optional): It is recommended that all SunGuide[SM] computers be synchronized to a common time source as it is desirable during diagnostics to have the same time on all SunGuide[SM] systems.

2.2.5 Device Worksheets

The following sections describe the information that must be collected about each device that is to be utilized by the SunGuide[SM] software.

2.2.5.1 CCTV Worksheet

The following data needs to be collected for each CCTV to be configured:

Camera Name	Unique name of camera
Center Id	Unique name of center where camera resides
Protocol	Specifies the protocol (values: SNMP, SNMP(PMPP)) for camera
Poll Process	Name of driver for camera
Manufacturer	Manufacturer of camera
Location Description	Description of where camera resides
Roadway	Roadway of where camera resides
Direction	Direction of roadway where camera is installed
Latitude	Latitude of where camera resides
Longitude	Longitude of where camera resides
Op Status	Operational status (values: Active, Error, Failed, OutOfService) of camera
Address Type1	Address type (values: pmppAddress, commAddress) for camera, if pmppAddress then camera uses SNMP (PMPP); if commAddress then camera uses SNMP
Address Type2	Specific address type (values: portServerAddress) of Address Type 1
Address	Device address of camera
Port Server IP	IP address for the port server where camera resides
Port Server Port Number	Port number for the port server where camera resides
Community Name	Community name for camera (SNMP)
Attach to Video Device	If selected, additional IP video parameters must be supplied.

The following data need to be provided for IP video:

Video Device IP Address	IP address for encoder
Blackout	Determines if camera restricted
Video Device Type	Type (IP video device) of video device for encoder
IP Streaming Driver ID	Unique IP video switch driver name
Card Number	Card number for VBrick encoder
Manufacturer	Manufacturer (values: Coretec, iMpath, Teleste, VBrick) of encoder
Model	Model of encoder

Streaming Type	Streaming type (values: elementary, transport, program) for encoder
Secondary Interface	Secondary interface for VBrick encoder which enables users to maximize number of inputs for encoder
Snapshot Requested	Determines if snapshots are generated for encoder

2.2.5.2 DMS Worksheet

The following data needs to be collected for each DMS to be configured:

Sign Name	Unique name of DMS
Center Id	Unique name of center where DMS resides
Protocol	Specifies the protocol (values: SNMP, SNMP(PMPP), MarkIV, SunGuide (for Trailblazers)) for DMS
Connection Type	Specifies how the DMS is connected to the network (values: Direct, Modem, Long Distance Modem)
Poll Process	Name of driver for DMS
Packet Timeout	Amount of time the driver will wait on a response from a DMS before timing out (recommended time is 5 seconds)
Packet Retry Limit	How many times a packet is attempted before it errors out, for most signs the recommended number is 2, for signs prone to errors, this can be increased
Command Retry Limit	How many times a command is attempted before it errors out, a command consists of multiple packets. Recommended number is 1
Op Status	Operational status (values: Active, OutOfService) of DMS
Type	Values: Fiber Optic, LED, Flip-Disk, Shutter
Manufacturer	Values: FDS, IDI, MarkIV, Telespot, Skyline
Number of Lines	Number of displayable lines
Beacons	Whether the sign has beacons, if so, specify the beacon address
Day Brightness Level	The numeric value for brightness setting in the daytime
Night Brightness Level	The numeric value for brightness setting in the nighttime
Location Description	A text field describing the location of the DMS
Roadway	Roadway on which this DMS resides
Direction	The direction of the roadway on which this DMS resides
Latitude	Latitude of where this DMS resides
Longitude	Longitude of where this DMS resides
Number of Columns	Number of characters that can be displayed using a normal font

Beacon Address	The address on which the sign receives activate/deactivate beacon requests
Address Type 1	Address type (values: PMPP, SunGuide, MarkIV) for DMS, if PMPP then DMS protocol should be SNMP (PMPP); if SunGuide or MarkIV, then DMS uses same protocol name
Address Type 2	Specific address type (values: Direct, PortServer, Dialup) of Address Type 1
Address	Device address of DMS
Community Name	Community name for DMS (SNMP)

The following data need to be provided for DMSs connected via a TCP/IP connection:

IP Address	IP address for the port server where DMS resides
Port Number	Port number for the port server where DMS resides

The following data need to be provided for DMSs connected directly via a serial port:

Communications port	Communications port to which the DMS is connected
Baud Rate	This should match the baud rate of the DMS
Data Bits	This should match the data bits the DMS is expecting
Stop Bits	This should match the stop bits the DMS is expecting
Parity	This should match the parity the DMS is expecting

The following data need to be provided for DMSs connected via a modem:

Phone Number	Phone number for the DMS, should include any prefix needed for dialing
Baud Rate	This should match the baud rate of the DMS

2.2.5.3 TSS Worksheet

The following data need to be provided for each Highway (Route) to be in the deployment:

Roadway Description	Textual description of the roadway (route)
Short Name	Short text name that will be seen by the operators
Directions	The directions that the roadway runs (can be multiple directions)
Cross Streets (multiple entries)	Textual descriptions of cross streets (that intersect the roadway); typically a roadway will have multiple cross streets
Lat Lon	Latitude and longitude of the intersection between the roadway and the cross street

The following data needs to be collected for each TSS detector to be configured:

Detector Name	Unique name of detector
Center Id	Unique name of center where detector resides
Driver Name	Name of driver for the detector (e.g., BiTrans, RTMS)
Poll Cycle	Time in seconds between device polls
Type	Type of detector (e.g., Loop or Radar)
Protocol	Specifies the protocol (values: EIS, Wavetronix, BiTrans)
Op Status	Operational status (values: Available or Offline)
Location Description	Description of where detector resides
Roadway	Roadway of where detector resides
Direction	Direction of roadway where detector is installed
Latitude	Latitude of where detector resides
Longitude	Longitude of where detector resides
Address	Device address of detector
Port Server IP	IP address for the port server where detector resides
Port Server Port Number	Port number for the port server where detector resides

The following data needs to be collected for each lane that is to be configured:

TSS Link	The name of the links that will be defined in the system; links will have an association to detectors.
TSS Lanes	For each link, the name of each lane associated with the link; for each lane the zone number and description needs to be identified (e.g., which detection zone is associated with a lane).

The following data needs to be collected for each link that will have an alarm threshold to be configured:

TSS Link	The name of the links that will be defined in the system.
Threshold Value(s)	What the speed and occupancy values should be for each threshold (this includes a start and end time) value to be defined.

2.2.5.4 TvT Worksheet

The following data need to be provided for each travel time destination to be in the deployment:

Destination name	Used for displaying the name on a device for a travel time message.

The following data need to be provided for each travel time message template to be in the deployment:

Template name	Describes the template.
Number of destinations	Number of destinations represented in this template.
Message template text	The message template contains tags and free text used to describe the travel time message. For example: [DEST1] [NEW LINE] [DIST1] [TVT1][NEW LINE] AT [TIME] would translate to this message: PALMETTO-EXIT 7 7 MI 13-16 MIN AT 2:46 PM

The following data needs to be collected for each travel time link to be configured:

Travel time link name	Name of the travel time link.
Link description	Description of the link.
Associated TSS links	TSS links that supply data for this travel time link.

The following data needs to be collected for each device template that is to be configured:

Device id	Name of the device for which to setup the template.
Message template	The template to use for this device.
Destination data	Which destinations and travel time links are used for this device template.
Enabled	Whether travel times should be enabled for this device.

The following data needs to be collected for travel time options:

Frequency	How often travel time messages should be generated.
Message priority	What message priority should be used for the messages.

2.3 SwRI: Software Installation

The following sections describe the activities that SwRI staff will perform to install the SunGuide[SM] software. SwRI will need administrative level access to any computer on which SunGuide[SM] software or Oracle is to be installed. FDOT staff should be available to monitor and observe the software installation process.

2.3.1 Server Preparation

The blade chassis with servers on which SwRI has previously installed SunGuide should be connected to the Orlando RTMC network and configured for operation on that network. No other preparation is necessary.

Note that the second rack of 10 blade servers that District 5 has targeted for deployment in the District 5 Deland offices will be configured at a later point in time by FDOT personnel.

2.3.2 Workstation Preparation

The following software needs to be installed on the workstations before the software installation team arrives on-site:

- Adobe SVG Viewer (must be acquired from Adobe.com)
- Roadgeek font (this is provided on the SunGuide[SM] install CD)

2.3.3 Software Installation

In order to install the SunGuide[SM] application software, the following steps will be performed by the software installation team:

- Upgrade the SunGuide[SM] R2.1.2 database to R2.2
- Upgrade the SunGuide[SM] R2.1.2 software to R2.2

Two SunGuide[SM] system administration applications do not execute in a browser environment. These applications should be installed on workstations that may be used to diagnose the health and status of the system; details of the application are contained in the SUM. SwRI will install the following applications on workstations as directed by FDOT:

- Executive Handler viewer: provides an overview of currently operating SunGuide[SM] applications
- Status Logger viewer: provides the ability to review the SunGuide[SM] application log files

2.3.4 Software Configuration

After the SunGuide[SM] software is installed, various configuration activities need to occur; the software installation team will perform the following configurations:

- Install and configure Status Logger on a single SunGuide[SM] application server (the SunGuide[SM] applications will log to this one instance of Status Logger)
- Install and configure Executive Handler server on all SunGuide[SM] application servers
- Modify the IIS to restrict access to the SunGuide[SM] Admin utility to users specified by FDOT

The SunGuide[SM] GUI is designed to load GUI components for the SunGuide[SM] applications. The loading (and overall performance) of the GUI can be improved if the GUI components associated

with subsystems not installed is removed. The software installation team will remove the GUI components for the subsystems that were not installed.

2.4 FDOT: Post Software Installation

The following sections describe the activities that FDOT staff need to perform after the SunGuide[SM] software deployment. SwRI staff will be available to assist and work with FDOT staff to accomplish these activities.

2.4.1 Populate Tables

Most of the SunGuide[SM] device database has previously been configured for the I-95 deployment. These tables were populated using the SunGuide[SM] Administration tool:

- User Management:
  - Users
  - Groups
  - Workstations
- DMS:
  - Device Tables
  - Approved Words
- CCTV:
  - Device Tables
- TSS:
  - Device Tables
  - Detector Maps
- Incident Management:
  - Contacts
- Miscellaneous:
  - Centers

The SunGuide[SM] *Software User's Manual* (SUM) should be consulted on use of these editors.

2.4.2 Create Map Links

Each implementation of SunGuide[SM] must have a Map Link layer created; this layer is used by the operator map to display instrumented sections of roadway as well as highway shields. This layer is displayed in conjunction with the DynaMap shape file data to provide a complete looking map on the operator workstation. The SUM has a section titled "Map Administration with Link Editor" that explains the use of this software. Additionally, the Map Link Editor should be used to create the shields that should be displayed.

2.5 FDOT/SwRI: Testing

The following sections describe the testing that will be performed once the software is installed. The FDOT staff that will be testing the software should review the SunGuide[SM] testing documentation.

2.5.1 Test Cases To Be Run

The SunGuide[SM] *Software Integration Case Procedures (SICP)* document contains a set of step-by-step test procedures that are used to test the SunGuide[SM] software. Since a limited number of

subsystems will be deployed in District 5, only the following tests will be executed during the SunGuide[SM] deployment:

- IC-1: Core Processes:
  - User Administration (AS-1)
  - Display Software Version / System Health (SL-5)
  - Starting and Stopping SunGuide[SM] Services (EH-1)
  - SunGuide[SM] Auto Restart (EH-3)
- IC-2: Dynamic Message Sign:
  - Map Access to DMS (DMS-1)
  - Send DMS Message (DMS-2)
  - Support Message Libraries (DMS-4)
  - High Level DMS Status Support (DMS-5)
  - DMS Sequences. (DMS-8)
  - Message Priority Queue (DMS-10)
  - Alphabetized Message Library Management (DMS-11)
  - Multi Page Message Timing (DMS-13)
- IC-3: Video:
  - Map Access to Cameras (CCTV-1)
  - CCTV GUI High Level Status (CCTV-3)
  - NTCIP Driver Support (CCTV-4)
  - CCTV Auto Lock Request (CCTV-8)
  - Device Failure and Device Status Reporting (CCTV-10)
- IC-4: Transportation Sensor Subsystem comprised of the following test cases:
  - TSS Data Updates (TSS-2)
  - TSS Generated Alarms (TSS-4)
- IC-5: Incident Management:
  - Event Creation (IM-1)
  - Event Management (IM-2)
  - Response Plan Implementation (IM-5)
  - Response Plan Generation (IM-7)
  - Decreasing IM Message Priority with Distance (IM-10)
  - Incident Closure and Response Plan Cancellation (IM-11)
- IC-12: Center-to-Center:
  - C2C Status (C2C-2)
  - C2C Command and Control (C2C-3)
- IC-13: Web Server:
  - Web Server View (WS-2)
- IC-16: Data Archiving:
  - Archive Device Status (DA-2)
  - Incident Archive (DA-2)
  - Detector Archive (DA-2)

  - Travel Time Archive (DA-2)
  - RWIS Archive (DA-2)
- IC-17: Travel Time:
  - TvT Message Generation (TvT-1)

2.5.2 Test Process

During the testing process FDOT will be the lead tester and SwRI will be an observer. During testing, the following schedule will be followed:

- Short meeting to discuss which tests will be performed
- Testing performed
- Short meeting at the end of the day to discuss the testing results

2.5.3 FDOT Independent Verification and Validation (IV&V) Procedures

The FDOT plans to have a set of IV&V procedures that will be executed as part of the installation. The purpose of the IV&V procedures is to provide verification of the System Requirements. This test will be run by FDOT personnel (or their designees) and witnessed by SwRI. It is anticipated that this testing will occur during the same week as the installation.

2.5.4 Issue Resolution and Retesting

If during the testing process issues are identified, the installation team will attempt to resolve them while on-site and if they are resolved, the tests associated with the issue will be re-run at the discretion of FDOT.

2.6 Training

The following training classes will be provided to District 5 personnel once the hardware and software is installed and operational:

- Operator Training (will be offered twice) - the intent of the Operator/User Interface course is to prepare personnel to use the SunGuide^{SM} system on a daily basis in a typical operational mode. The course will include the following topics:
  - SunGuide^{SM} System Administration fundamentals
  - Executive Handler fundamentals
  - Status Logger fundamentals
  - Graphical User Interface (GUI)/Map fundamentals
  - Closed Circuit Television (CCTV) operations
  - Dynamic Message Sign (DMS) operations
  - Traffic Sensor Subsystem (TSS) fundamentals
  - Incident Management operations
  - Travel Time fundamentals
  - Center-to-Center (C2C) fundamentals
- Administrator Training (will be offered once) - the intent of the System Administration/Deployment course is to prepare personnel to install/configure the SunGuide^{SM} software and administer the SunGuide^{SM} system on a daily basis. The course will include the following topics:
  - Installation procedures
  - Backup procedures

- Recovery procedures
- Modifying hardware configurations
- Tailoring of the system environment
- Starting/stopping/restarting the system
- Troubleshooting:
  - Executive Handler
  - Status Logger
- Workstation installation

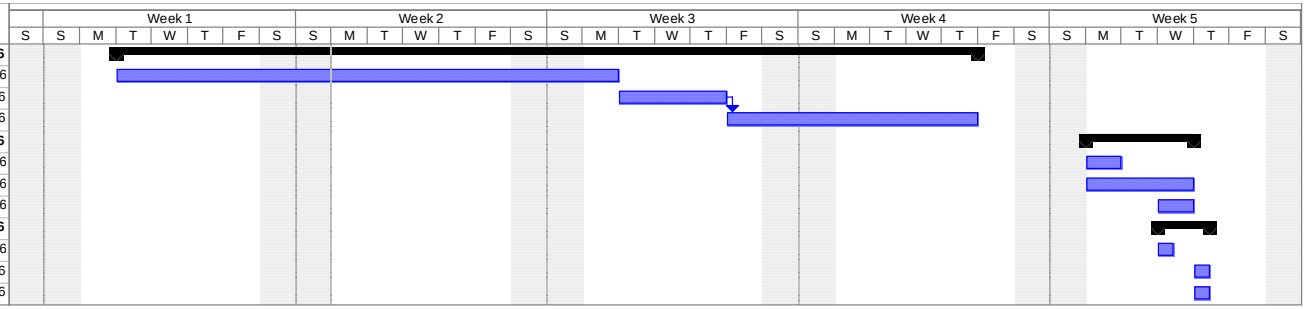
Both of the classes are "hands-on" and access to the SunGuide^{SM} software needs to be available to facilitate the training. All training will be conducted in the Orlando RTMC.

2.7 Deployment Schedule

The following schedule is proposed for the deployment. The installation team will need access to hardware devices throughout the implementation process. Note that if activities complete early then if FDOT and SwRI agree the timing for the following events may be modified to shorten the overall deployment schedule.

Note that the long term plan is to install a redundant blade server in the FDOT Deland facilities. Until the implementation team fully understands the technical implementation of a "redundant" database across the network the deployment activities will not be scheduled. The current plan is for District 5 personnel to perform the SunGuide^{SM} software installation with assistance from SwRI staff.

ID	Task Name	Duration	Start	Finish
1	**Server Configuration**	**18 days**	**Tue 9/26/06**	**Thu 10/19/06**
2	Preparation at SwRI (includes database)	10 days	Tue 9/26/06	Mon 10/9/06
3	Ship to District 5	3 days	Tue 10/10/06	Thu 10/12/06
4	Install in D5 (FDOT Activity)	5 days	Fri 10/13/06	Thu 10/19/06
5	**Site Installation and Checkout (Orlando)**	**3 days?**	**Mon 10/23/06**	**Wed 10/25/06**
6	Verify Software Operation	1 day?	Mon 10/23/06	Mon 10/23/06
7	Test Field Connectivity	3 days	Mon 10/23/06	Wed 10/25/06
8	Software Testing	1 day	Wed 10/25/06	Wed 10/25/06
9	**Training**	**1.38 days**	**Wed 10/25/06**	**Thu 10/26/06**
10	Operator Class (afternoon)	3 hrs	Wed 10/25/06	Wed 10/25/06
11	Operator Class (Morning)	3 hrs	Thu 10/26/06	Thu 10/26/06
12	Administrator Class (afternoon)	3 hrs	Thu 10/26/06	Thu 10/26/06



3. Notes

None.