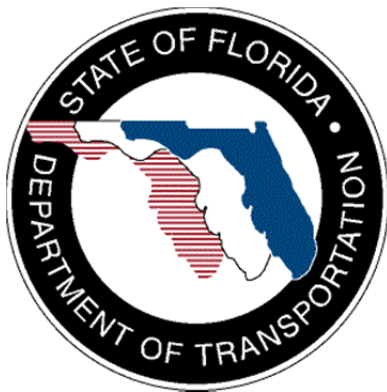


**SunGuide®:**

# **Software Integration Plan**

**SunGuide-SIP-6.0**



Prepared for:

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## **List of Acronyms**

AVL .....	Automatic Vehicle Location
C2C.....	Center to Center
CCTV .....	Closed Circuit Television
Data.....	Data Requirements
DMS.....	Dynamic Message Sign
EM.....	Event Management
FAT.....	Factory Acceptance Test
FDOT .....	Florida Department of Transportation
FP.....	Footprints
GUI .....	Graphical User Interface
IC.....	Integration Case
ICD.....	Interface Control Document
ITN.....	Invitation to Negotiate
ITS.....	Intelligent Transportation Systems
MUTCD .....	Manual on Uniform Traffic Control Devices
NTCIP .....	Nation Transportation Communication for ITS Protocol
SAS .....	Scheduled Action Subsystem
SICP .....	Software Integration Case Procedures
SIP.....	Software Integration Plan
SPARR.....	Smartphone Application for Road Rangers
SQL.....	Structured Query Language
SRS .....	Software Requirements Specification
SwRI .....	Southwest Research Institute
TCP.....	Transmission Control Protocol
TDU.....	Transcore Driver Update
TMC.....	Transportation Management Center
TSS.....	Traffic Sensor Subsystem
TVT.....	Travel Times Subsystem

**REVISION HISTORY**

<b>Revision</b>	<b>Date</b>	<b>Changes</b>
6.0-Draft	March 1, 2013	Initial release for Release 6.0 functionality

# 1. Scope

## 1.1 Document Identification

This document serves as the Software Integration Plan (SIP) for Release 6.0 of the SunGuide® software. This version is implementing:

- SQL Server/Oracle dual support
- Scheduled actions (camera control, travel times, DMS, schedules)
- NTCIP v2 including graphics support
- Various small approved enhancements
- Footprints bug fixes

The SIP contains an outline of the Integration Cases (IC) that will be used as a basis to develop a detailed set of test procedures that will be contained in the Software Integration Case Procedures (SICP) document.

## 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. The following figure provides a graphical view of the SunGuide software:

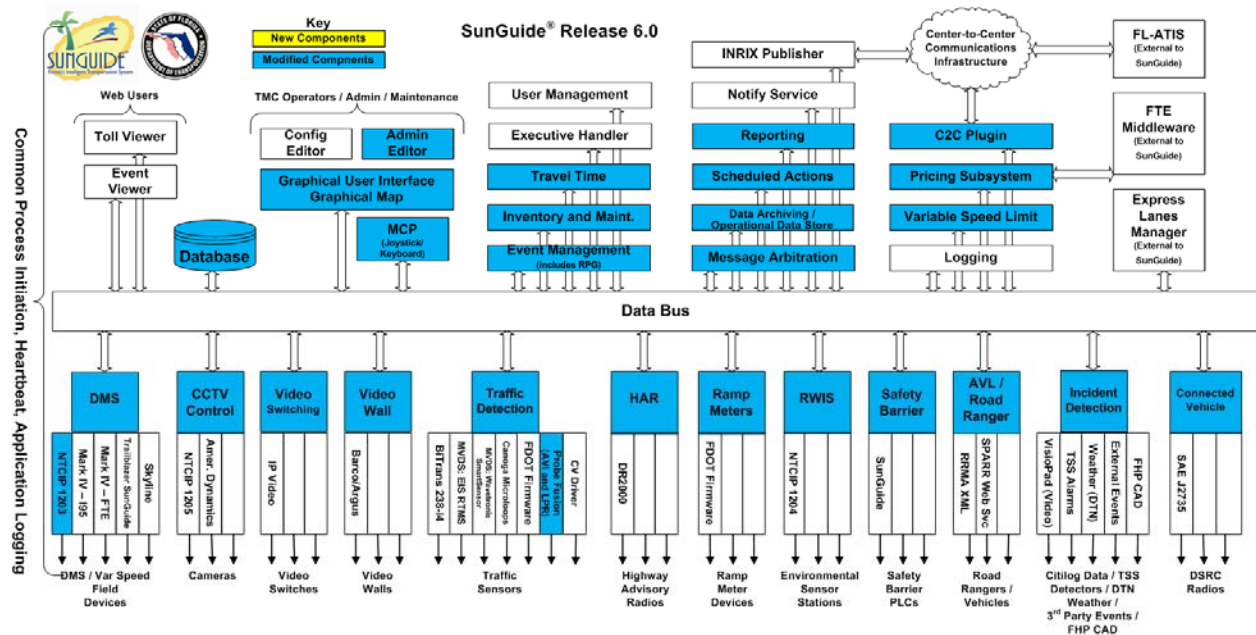


Figure 1-1 - High-Level Architectural Concept

The SunGuide development effort began in October 2003; six major releases have been developed and this document is addressing an incremental update of release six of the software. After the development, the software will be deployed to a number of Districts and Expressway Authorities throughout Florida and support activities will be performed.

### **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 Southwest Research Institute® (SwRI®) for BDQ69, July 1, 2010
- Letter of Authorization 007: Letter to SwRI for BDQ69, December 22, 2011.
- SunGuide Project website: <http://sunguide.datasys.swri.edu>.

### **1.4 Contacts**

The following are contact persons for the SunGuide software project:

- Elizabeth Birriel, ITS Section, Traffic Engineering and Operations Office Central Office, [elizabeth.birriel@dot.state.fl.us](mailto:elizabeth.birriel@dot.state.fl.us), 850-410-5606
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## **2. Integration Cases**

The requirements contained in the following sections were extracted from the Software Requirements Specification (SRS).

The test cases are organized by the integration cases. As the Software Integration Case Procedures (SICP) is developed, specific test cases will be identified. Each test case is given both a descriptive name and a test case number. The test case number has a prefix which denotes which SunGuide subsystem is being tested. The Release 6.0 Integration Cases include:

- IC-1: Scheduled Actions (SAS)
- IC-2: Color DMS (DMS)
- IC-3: Misc GUI (GUI)
- IC-4: Misc Link Data (TSS)
- IC-5: Bulk Update (AVL)
- IC-6: Transcore Driver Update (TDU)
- IC-7: SQL Server (SQL)
- IC-8: Footprints (FP)

The requirements to be tested are presented in tables with the following headings:

- SunGuide ID: unique Id given to all requirements
- Requirement Number: the requirement number assigned in the SRS
- Requirement Name: the name of the requirement assigned in the SRS
- Requirements Text: text of the requirement

These test procedures are designed to be generic for any SunGuide testing activity. The tests that will be performed at SwRI during the Factory Acceptance Test (FAT) will utilize the Operator Map, XML Test Client, and various simulators to feed data into SunGuide. Figure 2-1 provides a high-level overview of the software/hardware that will be used to perform the Release 6.0 testing. Note that each integration case uses the same hardware setup so this diagram is not duplicated at the beginning of each test case.

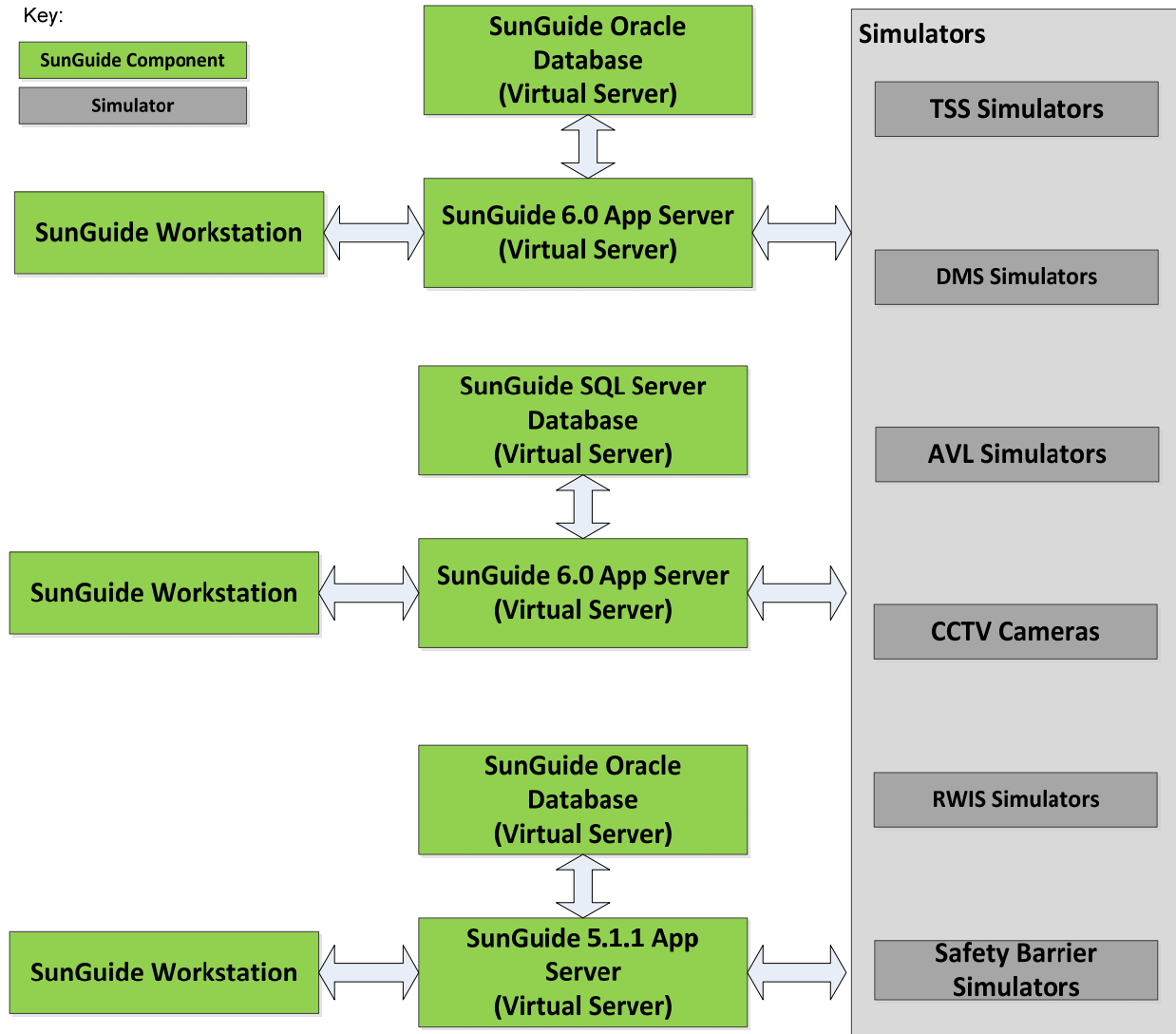


Figure 2-1: Hardware/Software Testing Environment

## 2.1 IC-1: Scheduled Actions (SAS)

### 2.1.1 Equipment Needed

To test this integration case the following equipment will be required:

- One SunGuide application server
- One SunGuide database server
- One SunGuide workstation
- Various DMS, CCTV, and TSS devices operational

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.1.2 Objectives

The objective of this integration case is to test the requirements associated with configuration and use of the SAS subsystem. Configuration of schedules will be tested along with the actions initiated by those schedules.

### 2.1.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-1: Scheduled Action Subsystem Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
SAS004	FEAT20.4	Travel Time Message Scheduling	The software shall allow the scheduling of the enabling and disabling of travel time messages.
SAS004A	FEAT20.4.1	Scope of Enable/Disable	The travel time message scheduling shall allow for the invocation of a disable travel times messaging command and an enable travel times messaging command on a per DMS basis as well as a system wide basis.
SAS005	FEAT20.5	Schedules	The software shall allow the user to schedule a series of predefined actions within the system.

SAS005A	FEAT20.5.1	Schedule Parameters	<p>The schedule shall have the following parameters:</p> <ol style="list-style-type: none"> <li>1. The start and end time of the schedule shall be a date and time of day</li> <li>2. The default value of the start time shall be the clock time ending in 0 or 30 minutes immediately after the current system time and the end time will default to one hour after the start time</li> <li>3. When the start time is adjusted, the end time shall preserve the current duration of the event</li> <li>4. The duration shall be displayed as a non-editable value near the end time</li> <li>5. An all-day event button shall be displayed near the start time and when clicked shall set the start time to 12:00:00 AM and the end time to 11:59:59 PM</li> <li>6. The schedule shall allow the user to select the days on the week the schedule should execute when the schedule is active.</li> </ol>
SAS006	FEAT20.6	Sequences	The software shall allow for sequences, or a set of actions, to be configured within the schedule configuration
SAS006A	FEAT20.6.1	Available Camera Actions	The software shall support the following actions against a user selected camera: pan for a user specified amount of time, tilt for a user specified amount of time, zoom for a user specified amount of time, and move to a user specified preset.
SAS006B	FEAT20.6.2	Available options for travel time scheduling	<p>The software shall support the following actions for travel time message generation:</p> <ol style="list-style-type: none"> <li>1. Enabling or disabling travel time message generation for a single DMS</li> <li>2. Enabling or disabling travel time message generation for all DMS signs</li> </ol>
SAS006C	FEAT20.6.3	Enable/Disable Schedule within a Schedule	The software shall support an action of invoking an enable command and a disable command on a user selected schedule, not including the schedule itself
SAS006D	FEAT20.6.4	Pausing schedule during execution of next item	The software shall support an action of pausing for a specified number of hours, minutes and seconds before performing the next action.

SAS007	FEAT20.7	Schedule Naming	The software shall allow the user to specify a name for the schedule
SAS007A	FEAT20.7.1	Unique Name	The name shall be required to be unique
SAS007B	FEAT20.7.2	Storing Schedule Name	The name shall be able to be modified and not be used as a primary key
SAS007C	FEAT20.7.3	Default Name	The name shall initially default to "New Schedule"
SAS007C1	FEAT20.7.3.1	If default name is in use	If the name "New Schedule" is in use, a space and the number one or the next available whole number will be appending to the default schedule name in order to make the name unique
SAS008	FEAT20.8	Schedule Copying	The software shall allow the user to copy a schedule from an existing schedule
SAS008A	FEAT20.8.1	Copied Schedule Default Naming	The name shall default to the exiting schedule's name appended with a space and the text "Copy"
SAS008A1	FEAT20.8.1.1	If default name is in use	If the default name is in use, a space and the number one or the next available whole number will be appending to the default schedule name in order to make the name unique
SAS009	FEAT20.9	Enable/Disable Schedule	The software shall allow the schedule to be enabled or disabled by the user
TMT039	FEAT18.3.9	Enable/Disable Systemwide	The software shall accept a command from a user that will enable or disable travel time message generation on a system-wide basis
TMT0310	FEAT18.3.10	Enable/Disable for a single DMS	The software shall accept a command from a user that will enable or disable travel time message generation for a specified DMS

#### 2.1.4 Test Procedure

The following is a brief description of the test procedures that will be used to test this integration case:

- A workstation will use the Operator map to configure SAS schedules and allow them to execute scheduled actions within the system. The tester will also view the configurable parameters within the SunGuide configuration file.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

## 2.2 IC-2: Color DMS (DMS)

### 2.2.1 Equipment Needed

To test this integration case the following equipment will be required:

- One SunGuide application server
- One SunGuide database server
- One SunGuide workstation
- NTCIPv2 compliant DMS simulator

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.2.2 Objectives

The objective of this integration case is to test the requirements associated configuring graphics and sending them to an NTCIPv2 compliant sign.

### 2.2.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-2 – Color DMS Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
DMS016	FEAT9.16	Color DMS	The software shall support the use of color DMSs.
DM017	FEAT9.17	Color DMS through C2C	The software shall support the transmission of the color DMS status via Center to Center.
DM018	FEAT9.18	Archival of Color DMS	The software shall support the archival of the transmission of color DMS messages in the database
DMS041	SUB7.4.1	NTCIPv2 Support	The software shall additionally support the NTCIP version 2 protocol
DMS042	SUB7.4.2	Color DMS Templates	The software shall have a standard color DMS layout for creating color DMS messages and templates
DMS042A	SUB7.4.2.1	Standard DMS layout	The standard color DMS layout shall include one graphic and one text message per phase
DMS042B	SUB7.4.2.2	Graphic Height	The graphic shall occupy the entire height of the sign
DMS042C	SUB7.4.2.3	Graphic Aspect Ratio	The graphic shall maintain its aspect ratio
DMS042D	SUB7.4.2.4	Graphic Left Justified	The graphic shall be left justified within the layout

DMS042E	SUB7.4.2.5	DMS Text Area	The text area shall be the remaining portion of the layout not occupied by the graphic
DMS042F	SUB7.4.2.6	Centered Text	The text message shall be centered within the text area
DMS042G	SUB7.4.2.7	Text Too Large	In the event that the text is too large to fit in the text area, text will be placed on the next phase on the DMS message.
DMS042H	SUB7.4.2.8	Removing the Graphic	When generating a response plan, if the text is too large to fit in the text area after abbreviations are applied a response plan shall remove the image and the text area will occupy the entire layout.
DMS042H1	SUB7.4.2.8.1	Adding sign to a response plan	If a message generated using templates within a response plan is unable to fit on the DMS sign, the user shall have the option of adding the sign to the response plan and manually specifying the message.
DMS043	SUB7.4.3	Graphics Library	The software shall have a graphics library with add and delete functionality for color DMS images to be used in the messages or templates.
DMS043A	SUB7.4.3.1	Icon type	The graphics shall have information stored with them to indicate if they are a shield of a roadway or are an icon associated with an event type
DMS043B	SUB7.4.3.2	Content of message to sign	The software shall verify images and messages each time a message is activated on the sign using a cyclic redundancy check on the message and on each image
DMS043C	SUB7.4.3.3	Deleting graphics in use	The software shall handle the scenario of a user attempting to delete a graphic that is associated to one or more travel time messages.
DMS043C1	SUB7.4.3.3.1	User Notification	The user will be notified of the list of messages that have the graphic associated to them. The user will be warned that those messages will no longer be associated to the graphic
DMS043C2	SUB7.4.3.3.2	User Confirmation	The software will confirm that the user still wants to delete the graphic.

DMS043C3	SUB7.4.3.3.3	Disassociate Graphic	If the user confirms to delete the graphic, the software will first disassociate all references to the graphic and then delete the graphic.
DMS043C3A	SUB7.4.3.3.3.1	Unable to Disassociate Notification	If the Travel Times Subsystem is not running when a graphic is deleted, the user shall be notified this check cannot be performed.
DMS043C4	SUB7.4.3.3.4	Notification of graphic use	If the graphic is in use at the time the user tries to delete the graphic, the user shall be unable to delete the graphic and be notified of the locations where the graphic is in use.
DMS044	SUB7.4.4	Color DMS message template generation	The software shall support color DMS message and color DMS message template generation
DMS044A	SUB7.4.4.1	Background and Text Color	The software shall allow the user to change the default background and default text color of messages and message templates.
DMS044A1	SUB7.4.4.1.1	MUTCD Colors	For user defined color schemes, the software shall present the user with options of color that are allowed by the MUTCD.
DMS044A1A	SUB7.4.4.1.1.1	Text Color Options	Text color options are red, white, yellow, orange, fluorescent yellow-green, fluorescent pink, and amber.
DMS044A1B	SUB7.4.4.1.1.2	Background Color Options	Background color options are black, blue, green
DMS044A2	SUB7.4.4.1.2	Default Colors for EM templates	The software shall provide a default background color of black and default text color of yellow for event management templates.
DMS044A3	SUB7.4.4.1.3	Background Colors other than EM	The software shall provide a default background color of black and default text color of amber for all templates other than event management templates.
DMS044A4	SUB7.4.4.1.4	Using graphics in templates	The software shall generate color DMS messages from templates for events using graphics available in the graphic library
DMS044A4A	SUB7.4.4.1.4.1	Using Event Type Graphic	If the event type graphic is available, it shall be used



DMS044A4B	SUB7.4.4.1.4.2	Using Shield Graphic	If the event type graphic is not available and the shield corresponding to the incident's location is available, the shield graphic shall be used
DMS044A5	SUB7.4.4.1.5	Travel time template shield graphic	The software shall allow the user to select the appropriate shield graphic for a device's travel time template.
DMS045	SUB7.4.5	Color DMS Display	The software shall support color DMS message status display showing a visual representation of each pixel of the sign that shall appear in the short status, detailed status, and hover over of the DMS sign from the operator map.

#### *2.2.4 Test Procedure*

The following is a brief description of the test procedures that will be used to test this integration case:

- A workstation will use the Operator map to configure graphics and full-color messages and send them to an NTCIPv2 compliant controller for display.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

## 2.3 IC-3: Misc GUI (GUI)

### 2.3.1 Equipment Needed

To test this integration case the following equipment will be required:

- One SunGuide application server
- One SunGuide database server
- One SunGuide workstation

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.3.2 Objectives

The objective of this integration case is to test the requirements that introduce new or enhanced functionality to the Operator Map.

### 2.3.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-3 – Misc GUI Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
EM030A	FEAT26.2.6	Construction Event Type	EM shall have an event type of "Construction"
EM040	FEAT7.14.29	Affected Area head/tail	When a Construction, Special Event, Bridge Work, Visibility, Weather or Flooding event is created, the user shall have the ability to set the head and tail of the affected area.
EM041	FEAT7.14.30	Populate Event Contact Phone Number	When an event contact is selected and a phone number for that contact has been configured, the software shall automatically populate the contact phone number field
EM042	FEAT7.14.31	Nearest CCTV Camera	When an event location is selected, the Nearest CCTV Camera will be set to the geographically closest camera to the event.
EM042A	FEAT7.14.31.1	Changing Nearest CCTV Camera	When changing an event location, if the Nearest CCTV Camera is not the geographically closest camera, the Nearest CCTV selection will not change.
CC006	FEAT13.20	Head/Tail Location sent to FLATIS	When an "affected area" event is selected and the user has set the head and tail of the event, the head of the event shall be sent as the primary event location and the tail of the event shall be sent as the secondary event

			location
EM030B	FEAT26.2.7	Amber Alert Event Type	EM shall have an event type of "Amber Alert"
EM030C	FEAT26.2.8	Leo Alert Event Type	EM shall have an event type of "Leo Alert"
EM030D	FEAT26.2.9	Silver Alert Event Type	EM shall have an event type of "Silver Alert"
EM031A	FEAT27.2.7	Device Message Ownership	If an operator activates a response plan, the operator shall be the owner of any device messages posted due to the response plan
EM032A	FEAT27.4.3	Amber Alert template	When configuring a device template or a default device template, the user shall be able to configure a template for events with the event type of "Amber Alert"
EM032B	FEAT27.4.4	Leo Alert Template	When configuring a device template or a default device template, the user shall be able to configure a template for events with the event type of "Leo Alert"
EM032C	FEAT27.4.5	Silver Alert Template	When configuring a device template or a default device template, the user shall be able to configure a template for events with the event type of "Silver Alert"
EM026	FEAT27.2.6	Abbreviating Messages	The software shall support the abbreviation of phrases when automatically generating messages for a response plan
EM026A	FEAT27.2.6.1	Multi Word Abbreviations	The software shall allow the user to configure a multiple word abbreviations
EM026B	FEAT27.2.6.2	Abbreviation Priority Precedence	If two abbreviations have the same priority, abbreviations with multiple words shall take precedence over abbreviations consisting of a single word
DM002A	FEAT9.4.1	DMS Priority	When creating a DMS library message, the user shall be able to configure a message priority.

### 2.3.4 Test Procedure

The following is a brief description of the test procedures that will be used to test this integration case:

- Each new feature of the Operator Map will be demonstrated using the workstation and any simulator necessary to see the behavior of the added feature.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

## 2.4 IC-4: Misc Link Data (TSS)

### 2.4.1 Equipment Needed

To test this integration case the following equipment will be required:

- One SunGuide application server
- One SunGuide Database server
- One SunGuide workstation
- TSS link simulators

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.4.2 Objectives

The objective of this integration case is to test the requirements associated with TSS and TVT.

### 2.4.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-4 – Misc Link Data Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
TD020	FEAT10.25	EIS G4	The software shall allow the user to configure a detector to use the EIS G4 protocol
TD020A	FEAT10.25.1	Data Collection	The software shall support communicating to the detector using the EIS G4 protocol including receiving speed, volume, occupancy, and classification data.
TD021	FEAT10.26	Volume Weighted Average	TSS shall produce the average speed based on a volume weighted averaging method.
TD021A	FEAT10.26.1	Lane Average	The rolling average for a lane shall weight the speed on each vehicle in the rolling average period equally.
TD021B	FEAT10.26.2	Link Average	For a given poll cycle, the TSS link speed average shall weight the speed of each vehicle in each lane equally.
TD021C	FEAT10.26.3	Link Rolling Average	The rolling average for a TSS link shall weight the speed on each vehicle in the rolling average period equally.
TD021D	FEAT10.26.4	No Volume Condition	For a given poll cycle, if the volume reported 0, the lane shall not report a speed for that period

TD021E	FEAT10.26.5	Types of Link Averages	TSS links shall provide an average link speed based on raw data and an average based on a rolling average.
TD021E1	FEAT10.26.5.1	Discard Lane Average for 0 Volume	For a given poll cycle, if the volume reported 0, the lane shall not be included in the raw data link average
TD021E2	FEAT10.26.5.2	Discard Link Average for 0 Volume	For the rolling data link average, if the link reports 0 volume for a given poll cycle, that cycle shall not be include in the rolling data link average.
TD021E3	FEAT10.26.5.3	No Data Condition	If no data is available for the link average, the link average shall not report a speed for that period
TD022	FEAT10.27	Minimum Volume Threshold for alert generation	The software shall have a configuration parameter specifying the minimum volume needed for a lane in order to produce an alert.
TD022A	FEAT10.27.1	Non-alert Conditions	The software shall not generate an alert if the poll cycle reports a volume less than the minimum volume needed to produce an alert.
TMT040	FEAT18.3.11	No Units	The software shall have a configuration parameter that will allow travel times to be posted to DMS without including the units.
DA03D1	SUB12.3.4.1	Rollup - Volume Weighted Speed Average	The rollup average for a TSS link shall weight the speed on each vehicle in the rollup interval equally.

#### *2.4.4 Test Procedure*

The following is a brief description of the test procedures that will be used to test this integration case:

- A simulator will publish link data into the system.
- Different scenarios of volume will test the different cases involved with these requirements.
- Published link speeds will be monitored as they are used throughout the system.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

## 2.5 IC-5: Bulk Update (AVL)

### 2.5.1 Equipment Needed

To test this integration case the following equipment will be required:

- One SunGuide application server
- One SunGuide Database server
- One SunGuide workstation
- SPARR and RRXML simulators

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.5.2 Objectives

The objective of this integration case is to test the requirements associated the Bulk Update for both the SPARR and RRXML drivers.

### 2.5.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-5 – Bulk Update Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
AV014A	FEAT24.6.6	Bulk Updates	AVL shall log vehicle positions messages sent in bulk directly to the database without generating updates to the Operator Map.
AV014C	FEAT24.11	Logging Alerts	The software shall log stop alerts and geofence alerts including operator responses to the database
SPARR031	SUB27.2.10	SPARR Bulk Update	The driver will support a web service method for sending multiple position updates as a single request.
AV014B	FEAT24.10	RRXML Bulk Update	The RRXML driver will support a method for sending multiple position updates as a single request.

### 2.5.4 Test Procedure

The following is a brief description of the test procedures that will be used to test this integration case:

- Simulated data from both drivers will be sent via the regular position reporting method as well as the bulk reporting method.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

## 2.6 IC-6: Transcore Drive Update (TDU)

### 2.6.1 Equipment Needed

To test this integration case the following equipment will be required:

- One SunGuide application servers
- One SunGuide Database servers
- One SunGuide workstations
- Configured Transcore device with TCP protocol firmware

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.6.2 Objectives

The objective of this integration case is to test the requirements associated with the TCP protocol change for the Transcore device.

### 2.6.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-6 – Transcore Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
TM005S7	FEAT10.16.3.11	Support IT2020 and Sirit Identity Flex AVI protocols	The AVI data collection function shall be able to process AVI tag data from the existing AVI readers used for travel time data collection applications in the State of Florida: TransCore IT2020 (via UDP and TCP) and Sirit Identity Flex.

### 2.6.4 Test Procedure

The following is a brief description of the test procedures that will be used to test this integration case:

- The Transcore device will be set up and read tags via a TCP protocol.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.



## 2.7 IC-7: SQL Server (SQL)

### 2.7.1 Equipment Needed

To test this integration case the following equipment will be required:

- Three SunGuide application servers
- Three SunGuide Database servers
- Three SunGuide workstations

Specific configuration of the components will be specified in the detailed software test procedures.

### 2.7.2 Objectives

The objective of this integration case is to test the requirements associated with SQL Server integration. It will show configuration and changes as well as the renaming enhancement functionality.

### 2.7.3 Requirements to be Tested

The following table contains a list of the requirements associated with this integration case that will be tested during the formal acceptance testing of the SunGuide software.

**Table 2-7 – SQL Server Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
DB022	FEAT1.2.22	Database ID	Database objects that have an ID within the software shall have an internal numeric identifier that is not used for naming of objects by the users of the system
DB023	FEAT1.2.23	Business Logic	The software shall implement business logic (not sequences) within the Windows processes (not from within the Database itself)
DB023A	FEAT1.2.23.1	Business Logic Exceptions	Exceptions will be made for sequences of primary key/IDs and for exceptionally performance intense operations upon approval by Central Office.
DB024	FEAT1.2.24	Supported Databases	The software shall support the use of SQL Server 2012 Standard Edition and Oracle Database Server version 11.1.0.7.0.
DB025	FEAT1.2.25	Database Model	The software shall have a database model from which a blank SQL Server and Oracle database can be created using ERWIN, a Commercial off the shelf database modeling tool

DB026	FEAT1.2.26	Database Configuration Data	Static configuration data (such as subsystem permissions and system users) shall be included as a versioned data set.
DB027	FEAT1.2.27	Database Management	The software shall be equipped with tools to import or export data from any SunGuide database
DB027A	FEAT1.2.27.1	Configurable Options	The tool shall be configurable with the following optional parameters: 1) Database schemas to include in the import or export
DB028	FEAT1.2.28	High Availability and Disaster Recovery	The software shall support the use of high availability and disaster recovery solutions for both Oracle and SQL Server (i.e. Failsafe/RAC/clustering, and DataGuard, respectively and the SQL Server equivalents)
DB029	FEAT1.2.29	Batch Inserts	Periodic data archiving shall use batch inserts to insert data into the database, where possible and appropriate.
DB030	FEAT1.2.30	Database Performance	When running against a system with 10,000 detector links configured, with appropriate hardware, the SQL Server database server shall archive TSS data to the database no later than two batch insert time periods following the distribution of the data from TSS.
DB031	FEAT1.2.31	Regression Testing Oracle	A regression test of the software using Oracle will be performed after a change to the software is made
DB032	FEAT1.2.32	Regression Testing SQL Server	A regression test of the software using SQL Server will be performed after a change to the software is made

DB033	FEAT1.2.33	Ceased Use Flag	<p>A database object that can be deleted by a user shall include a flag that signifies the state of the object.</p> <p>This requirement shall apply to the following tables:  COUNTY  EM_LANEMAP  RS_REPORT_MENU  RS_COST  EM_VEHICLETYPE  EM_VEHICLEMODEL  EM_REFERENCEPOINT  EM_OFFSETTYPE  EM_MAILLIST  EM_LOOKUP  EM_LOCATION  EM_LANETYPE  EM_INJURYTYPE  EM_EVENTTYPE  EM_EVENTSTATUS  EM_CONTACT  EM_CONDITION  EM_AGENCY  EM_ACTIVITY</p>
DB033A	FEAT1.2.33.1	Ceased Use Not Deleted	Records no longer in use shall be flagged to indicate their usage as ceased, but they will not be deleted from the table

2.7.4 Test Procedure

The following is a brief description of the test procedures that will be used to test this integration case:

- Workstations running the 6.0 version of the software and database will show renaming functionality through Admin Editor.
- Regression testing will be done to verify both the Release 6.0 database (Oracle and SQL) will continue to log data into the database in the same manner as before, despite the changes made to the system.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

## **2.8 IC-8: Footprints (FP)**

### *2.8.1 Equipment Needed*

To test this integration case the following equipment will be required:

- One SunGuide application server
- One SunGuide database server
- One SunGuide workstation
- Various device simulators

Specific configuration of the components will be specified in the detailed software test procedures.

### *2.8.2 Objectives*

The objective of this integration case is to test Footprints issues fixed in this release.

### *2.8.3 Requirements to be Tested*

Since these are bug fixes that violate existing requirements, new requirements are not necessary.

### *2.8.4 Test Procedure*

The following is a brief description of the test procedures that will be used to test this integration case:

- A workstation will run through different scenarios to test issues Footprint Issues that have been resolved.

Detailed step-by-step test procedures will be provided in the detailed test procedures document.

### **3. Notes**