

**SunGuide<sup>®</sup>:**

# **Software Integration Plan**

**SunGuide-SIP-6.1 Draft**



Prepared for:

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## **List of Acronyms**

AVL .....	Automatic Vehicle Location
BMS.....	Beacon Management Subsystem
C2C.....	Center to Center
CCTV .....	Closed Circuit Television
CF.....	Configuration File
DMS.....	Dynamic Message Sign
EH.....	Executive Handler
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
IDS.....	Incident Detection Subsystem
IN.....	Installer
ITN.....	Invitation to Negotiate
ITS.....	Intelligent Transportation Systems
NTCIP.....	Nation Transportation Communication for ITS Protocol
ONVIF.....	Open Network Video Interface Forum
RWIS.....	Roadside Weather Information Sensor
SAA.....	Software Administration Application
SAS.....	Scheduled Action Subsystem
SE.....	Small Enhancements
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
TMC.....	Transportation Management Center
TSS.....	Traffic Sensor Subsystem
TVT.....	Travel Times Subsystem
WWD.....	Wrong Way Driving

**REVISION HISTORY**

<b>Revision</b>	<b>Date</b>	<b>Changes</b>
6.1-Draft	Sept 6, 2013	Initial release for Release 6.1 functionality

## **1. Scope**

### **1.1 Document Identification**

This document serves as the Software Integration Plan (SIP) for Release 6.1 of the SunGuide® software. This version is implementing:

- System Administration Application (SAA)
- Executive Handler (EH)
- Configuration File Editor (CF)
- Beacon Management (BMS)
- RWIS Version 2 Compliance (RWISv2)
- RWIS Version 3 Compliance (RWISv3)
- RWIS Simulator API (RWIS-Sim)
- RWIS
- IDS
- Nokia
- ONVIF CCTV Driver (ONVIF)
- Installer (IN)
- Small Enhancements (SE)
- Wrong Way Driver (WWD)
- Footprints (FP)

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:



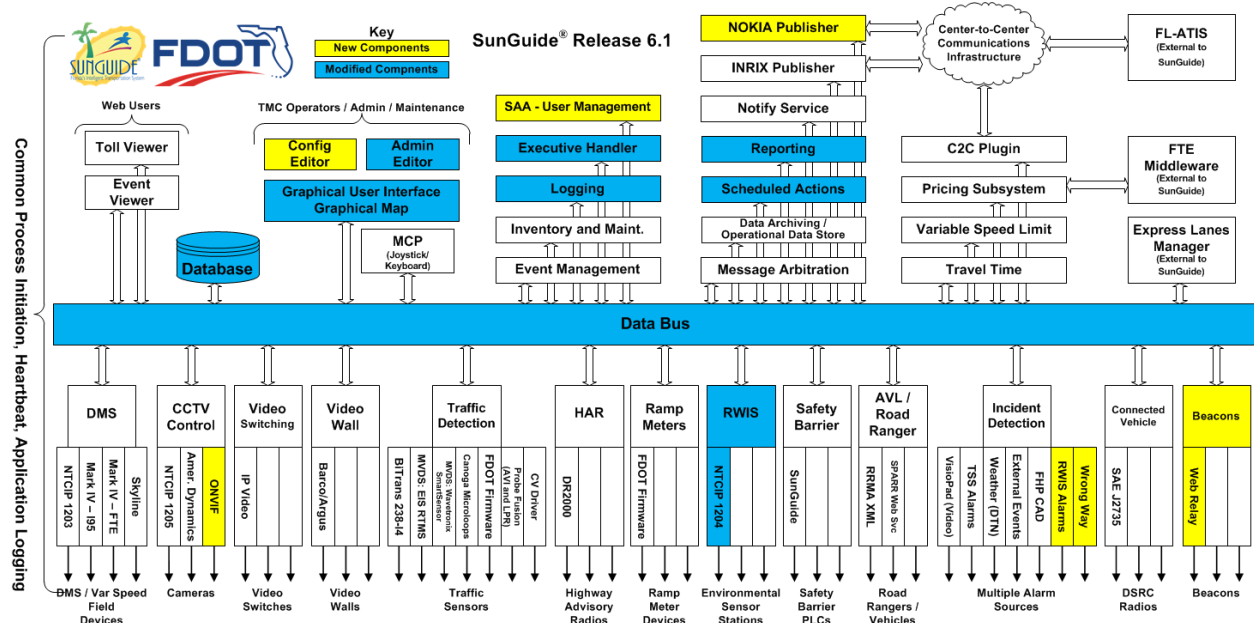


Figure 1-1 - High-Level Architectural Concept

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 009: Letter to SwRI for BDQ69, May 30, 2013.
- Letter of Authorization 009 Supplement #1: Letter to SwRI for BDQ69, June 23, 2014.
- Letter of Authorization 009 Supplement #2: Letter to SwRI for BDQ69, August 12, 2014.
- Letter of Authorization 011: Letter to SwRI for BDQ69, January 3, 2014.
- SunGuide Project website: <http://www.sunguidesoftware.com>.

### 1.4 Contacts

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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 6.1 Integration Cases include:

- System Administration Application (SAA)
- Executive Handler (EH)
- Configuration File Editor (CF)
- Beacon Management (BMS)
- RWIS Version 2 Compliance (RWISv2)
- RWIS Version 3 Compliance (RWISv3)
- RWIS Simulator API (RWIS-Sim)
- RWIS
- IDS
- Nokia
- ONVIF CCTV Driver (ONVIF)
- Installer (IN)
- Small Enhancements (SE)
- Wrong Way Driving (WWD)
- 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 6.1 testing. Note that each integration case uses the same hardware setup so this diagram is not duplicated at the beginning of each test case.



## 2.1 IC-1: System Administration Application (SAA)

### 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

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 the SunGuide System Administration Application.

### 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: SAA Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
SAA-SYS-1	FEAT65.1	Protocol	SAA shall communicate with clients via Transmission Control Protocol/Internet Protocol (TCP/IP)
SAA-SYS-2	FEAT65.2	Logging	SAA shall use Status Logger to log activity messages.
SAA-SYS-3	FEAT65.3	Process Control	SAA shall interface with Executive Handler to provide process control and monitoring.
SAA-SYS-4	FEAT65.4	Service	SAA shall run as a windows service.
SAA-UC-1	FEAT65.5	Manage User Information	SAA shall manage user information.
SAA-UC-1.1	FEAT65.5.1	Add Users	SAA shall allow an authorized user to add users to the system.
SAA-UC-1.2	FEAT65.5.2	Modify Users	SAA shall allow an authorized user to modify users in the system.
SAA-UC-1.3	FEAT65.5.3	Delete Users	SAA shall allow an authorized user to delete a user from the system.
SAA-UC-1.4	FEAT65.5.4	Retrieve Users	SAA shall allow a user to be retrieved.
SAA-UC-1.5	FEAT65.5.5	Change Password	A user shall be able to change his/her own password.
SAA-UC-1.5.1	FEAT65.5.5.1	Password Expiration Notification	Upon login, SAA shall notify users of whether or not a password change is required.

SAA-UC-1.6	FEAT65.5.6	Admin Password Reset	SAA shall allow an authorized user to reset another user's password.
SAA-UC-1.7	FEAT65.5.7	Store User Credentials	SAA shall store user credentials.
SAA-UC-1.7.1	FEAT65.5.7.1	User Permission Storage	SAA shall be able to store an application or subsystem's true/false permissions for a user.
SAA-UC-1.7.2	FEAT65.5.7.2	Equipment Permissions	SAA shall be able to store a subsystem's equipment permissions for a user.
SAA-UC-1.7.3	FEAT65.5.7.3	Metadata Information	SAA shall be able to store subsystem or application's metadata information for a user.
SAA-UC-1.7.4	FEAT65.5.7.4	IDB Schema	SAA shall use the IDB user schema to store and retrieve user credentials.
SAA-UC-1.7.6	FEAT65.5.7.5	Combined group and user permissions	SAA shall provide a mode of operation where a user's group and individual permissions are combined to obtain permissions.
SAA-UC-1.7.7	FEAT65.5.7.6	Group Membership permissions	SAA shall provide a mode of operation where only a user's group membership is used to obtain permissions.
SAA-UC-1.7.8	FEAT65.5.7.7	Authorized User Changes	SAA shall allow authorized users to subscribe to changes in user credentials.
SAA-UC -1.9	FEAT65.5.8	Manage User Groups	SAA shall be able to manage user groups
SAA-UC -1.9.1	FEAT65.5.8.1	List of Group Permissions	User groups shall contain a list of the permissions for users in the group
SAA-UC -1.9.2	FEAT65.5.8.2	Unlimited Group Membership	Users shall be allowed to be members of any number of groups.
SAA-UC -1.9.3	FEAT65.5.8.3	Add Users	SAA shall allow a user group to be added.
SAA-UC -1.9.4	FEAT65.5.8.4	Modify Users	SAA shall allow a user group to be modified.
SAA-UC -1.9.5	FEAT65.5.8.5	Delete Users	SAA shall allow a user group to be deleted.
SAA-UC -1.9.6	FEAT65.5.8.6	Retrieve Users	SAA shall allow a user group to be retrieved.
SAA-UC -1.9.7	FEAT65.5.8.7	Retrieve Group Users	SAA shall allow a list of users to be retrieved for a group.
SAA-UC -1.10	FEAT65.5.9	Retrieve Permissions	SAA shall allow the list of permissions for a process to be retrieved.
SAA-UC -1.11	FEAT65.5.10	Retrieve All Users	SAA shall allow a list of all users in the system to be retrieved.
SAA-UC -1.12	FEAT65.5.11	Retrieve User Groups	SAA shall allow a list of all user groups in the system to be retrieved.

SAA-UC -1.13	FEAT65.5.12	User Types	SAA shall associate a user type (normal, system, remote) with each user.
SAA-UC -1.14	FEAT65.5.13	Optional Email	The email field for users shall be optional.
SAA-UC -1.15	FEAT65.5.14	Bulk Equipment Permissions	SAA shall allow equipment permissions for multiple users to be sent as one operation.
SAA-UC -1.16	FEAT65.5.15	First Name Field	The first name field for users shall be optional.
SAA-UC -1.17	FEAT65.5.16	Last Name Field	The last name field for users shall be optional.
SAA-UC -1.18	FEAT65.5.17	Description Field	The description field for users shall be optional.
SAA-UC-3	FEAT65.6	See Users Logged In	SAA shall allow a user to view all users currently logged into the system.
SAA-AC-1	FEAT65.7	Allow config data to be retrieved	SAA shall allow SAA configuration data to be retrieved.
SAA-AC-4	FEAT65.8	Permission Model	An authorized user shall be able to configure the permission model used to determine user permissions.
SAA-AC-5	FEAT65.9	Password Expiration	An authorized user shall be able to configure the duration for expiring passwords.

#### *2.1.4 Test Procedure*

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

- TOAD will be used to view the Database for those steps that require viewing database information.
- Operator Map will be used to interact with SAA as well as test credentials and access subsystems.
- Status Logger will be used to view status updates and messages from Operator Map and SAA.
- A text editor will be used to view the SunGuide configuration file.

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

## 2.2 IC-2: Executive Handler (EH)

### 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

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 with the Executive Handler components of SunGuide, including the Executive Handler service and the Executive Handler Viewer.

### 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: Executive Handler Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
FEAT1.4.4	EX001L	Executive Handler error logging	The executive handler shall log error conditions as they are detected.
FEAT3.1	S008	Executive handler function	The SunGuide system shall have an executive function that handles all monitoring and reporting of the status of internal processes.
FEAT3.2	EX001	Minimum functionality	As a minimum the executive handler shall provide: Process initiation/termination; Process status and monitoring; Error logging.
FEAT3.3	EX002	Start, stop, and restart processes	The executive handler shall be capable of automatic and manual initiation, manual termination and automatic re-initiation of system processes.
FEAT3.6	EX001F	Process start order	In the case of a failure, the executive handler shall start processes in the same order that they originally started.
FEAT3.7	EX002F	Restart safeguards	In the case of a process failure due to unavailable resources, the executive handler shall have safeguards to prevent the unrestrained cyclical restart of failed applications.
FEAT3.8	EX005	Initialize individual components	The executive handler shall have the ability to initialize individual.



FEAT3.9	EX006	Monitor, report and display status	The executive handler shall be capable of monitoring, reporting, and displaying the status of all SunGuide processes.
FEAT3.10	EX001D	Hierarchical view	The executive handler shall provide a hierarchical view of the system allowing the user to drill down from a subsystem level to an individual component level.
FEAT3.11	EX001M	Monitor key data	Monitoring shall include pertinent system information such as the current system state, such as system performance, uptime, and error logs.
FEAT3.15	EX003F	Configurable number of restarts	It shall be possible to configure the maximum number of retries that the executive handler shall perform when attempting to restart a failed application. It shall also be possible to configure the number of minutes over which the retry counter is maintained.
FEAT3.16	EX010	Use windows credentials	The executive handler application shall utilize windows credentials to verify rights to execute.
FEAT3.17	EX001G	Internal status data	The SunGuide shall gather internal status data concerning its operation and make this information available to the user.
SUB1.1.1	N/A	Configurable parameters	The following shall be configurable parameters of the EH process:- Host name- TCP port number
SUB1.1.2	N/A	Log level	The system shall allow the logging level to be modified.
SUB1.2.1	N/A	Control processes	The system shall be able to stop and start processes running on machines reachable on the local network.
SUB1.2.2	N/A	Heartbeat	The system shall be capable of receiving a heartbeat from the system processes.
SUB1.3	N/A	Visibility of processes	The system viewer shall be capable of viewing the status of processes for computers on the local network.
SUB1.3.2	N/A	Process health	The system viewer shall display the health of the various processes in a configurable manner.

#### *2.2.4 Test Procedure*

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

- The Executive Handler service will be running

- A workstation will use Executive Handler viewer to view and modify the status of the Executive Handler processes.
- A workstation will use Status Logger to view status updates from Executive Handler service, Executive Handler viewer and other processes.

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

## 2.3 IC-3: Configuration File Editor (CF)

### 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 associated with the configuration file editor standalone application.

### 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: Configuration File Editor Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
INS-1G	FEAT62.7	GUI Tool	The software shall provide a GUI tool that allows users to modify the SunGuide configuration file.
INS-1G1	FEAT62.7.1	Validation	The SunGuide configuration editor will validate the SunGuide configuration file.
INS-1G1A	FEAT62.7.1.1	File editing	If the user specified configuration file is not valid, the installer shall allow the user to correct the file using the configuration file editor tool.
INS-1G2	FEAT62.7.2	Suggest values	The SunGuide configuration editor shall present to the user valid options for missing or invalid configuration values.
INS-1G3	FEAT62.7.3	Default values	The SunGuide configuration editor shall suggest default values for missing or invalid configuration values when presenting the options to the user if the appropriate default values exist.

### 2.3.4 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 configuration file editor to edit a configuration file for use with the SunGuide software.

- Test cases will be run against different configuration files. In order to pass the test step, both systems must successfully execute the test step. Notes will be made if a test step fails indicating the system and type of failure.

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

## 2.4 IC-4: Beacon Management (BMS)

### 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
- Beacon 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 configuration and use of the Beacon Management Subsystem. Configuration of beacons will be tested along with the control options available to beacons.

### 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: Beacon Management Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
BMS001	FEAT66.1	Web Relay Protocol	The software shall support the web relay device protocol to control beacons described by the X-301-Manual located here: <a href="http://www.controlbyweb.com/x301/X-301_Manual-v1.4.pdf">http://www.controlbyweb.com/x301/X-301_Manual-v1.4.pdf</a>
BMS002	FEAT66.2	Configure Beacons	The software shall allow the user to add new beacons, modify existing beacons, and delete existing beacons.
BMS002A	FEAT66.2.1	Assign Beacons To a Sign	As part of the beacon configuration, the software shall allow the operator to associate beacons to a static sign message.
BMS003	FEAT66.3	Sign Types	The software shall allow the operator to associate beacons to an operational purpose that can be mapped to an event type. Available types shall include Visibility and Weather.
BMS003A	FEAT66.3.1	Beacon Activation Request	The software shall allow a user to create a beacon activation request.
BMS004	FEAT66.4	Beacon Deactivation Request	The software shall allow a user to terminate a beacon activation request.
BMS005	FEAT66.5	Deactivate All Beacons	The software shall allow a user to terminate all activation requests for a beacon.

BMS006	FEAT66.6	Beacon Activation	The beacon shall activate when there are one or more activation requests for the beacon.
BMS007	FEAT66.7	Beacon Deactivation	The beacon shall deactivate when there are zero activation requests for the beacon.

#### *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 workstation will use the Operator Map to configure beacons for use within the system. The tester will also view the configurable parameters within the SunGuide configuration file.
- Test cases will be run against a system with an Oracle database and a SQL Server database. In order to pass the test step, both systems must successfully execute the test step. Notes will be made if a test step fails indicating the system and type of failure.

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

## 2.5 IC-5: RWIS Version 2 Compliance (RWISv2)

### 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
- RWIS Simulator

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 with updates to the RWIS components of SunGuide, including the RWIS User Interface components, the RWIS Subsystem, the RWIS NTCIP driver, and the RWIS device simulator to support version 2 of the NTCIP specification.

### 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: RWIS Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
RW006	FEAT12.11	NTCIP v2	The RWIS interface shall support the NTCIP 1204 v02.18 – NTCIP Object Definitions for Environmental Sensor Stations (ESS) Interface Protocol.
RW0010	FEAT12.15	RWIS Simulator	The software shall include an RWIS simulator.
RW0012	FEAT12.15.2	Multiple Devices	The RWIS driver XML protocol simulator shall be capable of simulating multiple devices concurrently.
RW0013	FEAT12.15.3	API	The simulator shall have a graphical user interface.

### 2.5.4 Test Procedure

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

- The RWIS Subsystem will be running.
- The RWIS Driver will be running.
- The RWIS NTCIP Simulator will be used to simulate multiple devices and adjust the settings of those devices.
- A workstation will use the RWIS Station Status dialog within Operator Map to view the status of the simulated RWIS devices.

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



## 2.6 IC-6: RWIS Version 3 Compliance (RWISv3)

### 2.6.1 Equipment Needed

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

- One SunGuide application servers
- OneSunGuide Database servers
- OneSunGuide workstations
- RWIS Simulator

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 updates to the RWIS components of SunGuide, including the RWIS User Interface components, the RWIS Subsystem, the RWIS NTCIP driver, and the RWIS device simulator to support version 3 of the NTCIP specification.

### 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: RWIS Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
RW007	FEAT12.12	NTCIP v3	The RWIS interface shall support the NTCIP 1204 v03 – NTCIP Object Definitions for Environmental Sensor Stations (ESS) Interface Protocol, available from <a href="http://www.ntcip.org">www.ntcip.org</a> with filename: 1204v0308r2.pdf, released October, 2009.
RW0010	FEAT12.15	RWIS Simulator	The software shall include an RWIS simulator.
RW0011	FEAT12.15.1	NTCIP v3	The simulator shall be capable of simulating the NTCIP1204v03 protocol.
RW0012	FEAT12.15.2	Multiple Devices	The RWIS driver XML protocol simulator shall be capable of simulating multiple devices concurrently.
RW0013	FEAT12.15.3	API	The simulator shall have a graphical user interface.

### 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 RWIS NTCIP Simulator will be used to simulate multiple devices and adjust the settings of those devices.

- A workstation will use the RWIS Station Status dialog within Operator Map to view the status of the simulated RWIS devices.

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

## 2.7 IC-7:RWIS Simulator API (RWIS-Sim)

### 2.7.1 Equipment Needed

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

- One SunGuide application servers
- One SunGuide Database servers
- One SunGuide workstations
- RWIS Simulator

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 RWIS device simulator to support an application programmable interface (API).

### 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: RWIS Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
RW0010	FEAT12.15	RWIS Simulator	The software shall include an RWIS simulator.
RW0012	FEAT12.15.2	Multiple Devices	The RWIS driver XML protocol simulator shall be capable of simulating multiple devices concurrently.
RW0013	FEAT12.15.3	API	The simulator shall have an application programmable interface

### 2.7.4 Test Procedure

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

- The RWIS NTCIP Simulator will be used to simulate multiple devices.
- The RWIS Simulator Client Test application will be used to communicate with the simulator
- A workstation will use the RWIS Station Status dialog within Operator Map to view the status of the simulated RWIS devices.

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

## 2.8 IC-8:RWIS

### 2.8.1 Equipment Needed

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

- One SunGuide application servers
- OneSunGuide Database servers
- One SunGuide workstations
- RWIS Simulator

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 the requirements associated with new RWIS device functionality, as well as configuring alarm conditions for roadway information sensors. Configuration of alarm thresholds for device values will be tested along with the correct operations of devices with the new protocols.

### 2.8.3 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 2-8: RWIS Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
FEAT12.11	NTCIP v2	NTCIPv2 Support	The RWIS interface shall support the NTCIP 1204 v02.23 – NTCIP Object Definitions for Environmental Sensor Stations (ESS) Interface Protocol, available from <a href="http://www.ntcip.org">www.ntcip.org</a> with filename: 1204v02-23.pdf, released July, 2005.
FEAT12.12	NTCIP v3	NTCIPv3 Support	The RWIS interface shall support the NTCIP 1204 v03 – NTCIP Object Definitions for Environmental Sensor Stations (ESS) Interface Protocol, available from <a href="http://www.ntcip.org">www.ntcip.org</a> with filename: 1204v0308r2.pdf, released October, 2009.
FEAT12.13	RW008A	RWIS Alarms	The software shall produce RWIS alarms based on RWIS data exceeding thresholds.

FEAT12.13.1.1	RW008A1	Supported Types	The software shall support the following RWIS data types; Atmospheric Pressure in inches of Mercury, Average Wind Sped in miles per hour, Current Wind Speed in miles per hour, Max Wind Gusts Speed for the last 10 minutes in miles per hour, Temperature in Fahrenheit, Dew Point in Fahrenheit, Water Depth in inches, Relative Humidity in percentage, Adjacent Snow Depth in inches, Roadway Snow Depth in inches, Roadway Packed Snow Depth in inches, Precipitation Rate inches per hour, Snow Accumulation Rate in inches per hour, Ice Deposit in inches, Visibility in miles, Exposure in percentage, Surface Temperature in Fahrenheit, Salinity in parts per thousand, Pavement Freezing Point in Fahrenheit, Conductivity in mhos, and Pavement Ice/Water Depth in inches.
FEAT12.13.1	RW008A	Set Alarm Thresholds	The software shall allow the user to set recovery thresholds for each RWIS device configured in the system for each data type available in the software.
FEAT12.13.2	RW008B	Recovery Thresholds	The software shall allow the user to set recovery thresholds for each device configured in the system for each data type available in the software.
FEAT12.13.3	RW008C	Thresholds Disabled by Default	The software shall originally set thresholds to be disabled by default.
FEAT12.13.4	RW008D	Alarm Direction	The software shall statically define if the greater than numeric direction or lesser than numeric direction exceeds an alarm threshold.
FEAT12.13.5	RW008E	Enforce Correct Threshold Recovery	The software shall require a recovery threshold value to be set that is in the opposite numeric direction of the corresponding alarm threshold's configured numeric direction.
FEAT12.13.6	RW008F	Show Threshold Direction	The software shall present to the user the numeric direction of the thresholds in each place the thresholds are presented to the user.
FEAT12.13.7	RW008G	Generate Alarms	The software shall generate an RWIS alarm for any data received that exceeds the alarm threshold.

FEAT12.13.8	RW008H	Remove Recovered Alerts	The software shall automatically recover/remove an alarm when the data that had exceeded the alarm threshold exceeds the recovery threshold in the opposite numeric direction.
FEAT12.14	RW009	Distance Radius	The software shall allow the user to configure the distance radius away from each RWIS device for determining which beacons will be included in a response plan suggestion.
FEAT12.13.9	RW008J	Automatically Create Events	Using a configuration option in the SunGuide configuration file, an option shall be provided to determine if the software should automatically create events and activate response plans when a new RWIS alert is generated.

#### *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 use the Operator Map to configure RWIS devices and alarm thresholds for use 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.

## 2.9 IC-9: IDS

### 2.9.1 Equipment Needed

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

- One SunGuide application servers
- One SunGuide Database servers
- One SunGuide workstations
- RWIS Simulator

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

### 2.9.2 Objectives

The objective of this integration case is to test the requirements associated with new IDS alarm functionality. Creation and handling of alarms related to RWIS sensors will be tested.

### 2.9.3 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 2-9: IDS Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
FEAT23.2.4	IDS001	RWIS Alerts	The software shall produce an operator alert with the RWIS alarm information when the RWIS data produces an alarm.
FEAT23.2.4.1	IDS001A	Associate Alerts	The software shall automatically dismiss an alert by associating the alert to an active event if the event was created on behalf of an earlier alert from the same RWIS device for the same data type.
FEAT23.2.4.2	IDS001B	Response Plan Activation	The software shall allow the user to configure the software to use a pre-defined response plan or an automatically suggested response plan for each RWIS device to be automatically activated when that event is automatically created due to an alert.
FEAT23.2.4.2.1	IDS001B1	Message Does Not Fit	The software shall remove DMS signs from the response plan before automatically activating the response plan if the message is too large for the sign.
FEAT23.2.4.2.2	IDS001B2	Beacons In Response Plans	The software shall include a set of beacons in an automatically activated response plan suggestion for an event triggered by an RWIS alarm where the event type matches the beacon operational purpose.

FEAT23.2.4.3	IDS001C	Optionally Use Beacons	The software shall allow the user to configure the software to include beacons in an automatically activated response plan with a system-wide setting.
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#### *2.9.4 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 RWIS device simulator to trigger alarms to be generated.
- A workstation will use the Operator Map to view the results of the alarm creation. 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.



## 2.10IC-10:Nokia

### 2.10.1 Equipment Needed

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

- One SunGuide application servers
- One SunGuide Database servers
- One SunGuide workstations

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

### 2.10.2 Objectives

The objective of this integration case is to test the requirements associated with the Nokia Publisher subsystem.

### 2.10.3 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 2-10: Nokia Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
NOK00711A	FEAT64.1.1.1	Mark as Non-distribution	When publishing TSS traffic condition data records, the Nokia C2C Publisher component shall mark such data records as not for redistribution to third parties.
NOK00711B	FEAT64.1.1.2	Network and Center Id	The Nokia C2C Publisher component shall include as the network or center ID of each record a configurable value specified in the SunGuide configuration file.
NOK00711C	FEAT64.1.1.3	Confidence Value	If the confidence value received from the Nokia data source for a C2C link is below a minimum confidence level specified in the SunGuide configuration file, the Nokia C2C Publisher will not publish a update for that C2C link.
NOK00711D	FEAT64.1.1.4	Configurable Level	The Nokia C2C Publisher component shall retrieve data from the Nokia traffic data source at a configurable interval determined in the SunGuide configuration file.
NOK00712	FEAT64.1.2	County List	The Nokia C2C Publisher component shall only publish data from links within a configurable list of counties.
NOK00712A	FEAT64.1.2.1	Retrieve County List	The Nokia C2C Publisher component shall retrieve the list of counties from which to publish data from the SunGuide configuration file.
NOK00712B	FEAT64.1.2.2	Publish Configured	The Nokia C2C Publisher component shall

		Counties	publish link data for each link provided by the Nokia traffic data source which is identified as belonging to a county included in the list of counties from which to publish data.
NOK00713	FEAT64.1.3	Traffic Condition Data	The Nokia C2C Publisher component shall publish C2C Traffic Condition data.
NOK00713A	FEAT64.1.3.1	Publish Most Recent Mean Speed	While the connection to the Nokia traffic data source is established, the Nokia C2C Publisher component shall publish the most recently provided averaged speed data from the Nokia traffic data source for each published link.
NOK00714	FEAT64.1.4	Speed Data	The Nokia C2C Publisher component shall publish C2C Speed data.
NOK00714A	FEAT64.1.4.1	Periodic Publish of Data	While the connection to the Nokia traffic data source is established, the Nokia C2C Publisher component shall periodically publish the averaged speed data from the Nokia traffic data source for each published link.
NOK00715	FEAT64.1.5	Link and Node Data	The Nokia C2C Publisher component shall publish a list of C2C Nodes containing the start and end locations of each Nokia link being published.
NOK00715A	FEAT64.1.5.1	Publish C2C Nodes	The Nokia C2C Publisher component shall publish a list of C2C Nodes containing the start and end locations of each Nokia link being published.
NOK00715B	FEAT64.1.5.2	Unique Node Ids	The Nokia C2C Publisher component shall assign each published node an identifier unique to that instance of the Publisher.
NOK00715C	FEAT64.1.5.3	Publish Lat Lon Data	The Nokia C2C Publisher component shall publish the latitude and longitude from the Nokia traffic data source for each published node.
NOK00715D	FEAT64.1.5.4	Link Identifier	The Nokia C2C Publisher component shall assign each published link a unique identifier based on the Nokia link identifier, roadway, direction, county, or other identifying information.
NOK00715E	FEAT64.1.5.5	Required Link Data	The Nokia C2C Publisher component shall publish the most recently provided roadway name, direction, county, distance, start node, and end node from the Nokia traffic data source for each published link.
NOK00715F	FEAT64.1.5.6	Midpoint Data	The Nokia C2C Publisher component shall publish link midpoints for each published link where midpoints could be determined.
NOK00716	FEAT64.1.6	NAVTEQ Source Data	The Nokia C2C Publisher component shall

			publish link midpoints based on known map information in a NAVTEQ map source.
NOK007I6A	FEAT64.1.6.1	Matching TMC Ids	The Nokia C2C Publisher component shall publish midpoints for any published links which have a TMC Path ID that can be accurately matched to a link in the SunGuide map source.
NOK007I6B	FEAT64.1.6.2	Minimum Midpoint Spacing	The Nokia C2C Publisher component shall read a minimum midpoint spacing parameter from the SunGuide configuration file.
NOK007I6C	FEAT64.1.6.3	Publish All Midpoints	When publishing midpoints for a published link, the Nokia C2C Publisher shall publish each midpoint defined by the SunGuide map source for the link, unless that midpoint violates the spacing requirements of NOK007I6D and NOK007I6E.
NOK007I6D	FEAT64.1.6.4	Sequential Midpoint evaluation	When determining which midpoints may be published, the Nokia C2C Publisher shall sequentially evaluate each midpoint, beginning with the midpoint nearest the start node of the link.
NOK007I6E	FEAT64.1.6.5	Midpoint Exclusion Criteria	When determining which midpoints may be published, the Nokia C2C Publisher shall publish the midpoint if and only if it is at least the minimum midpoint spacing parameter from the start node, the end node, and all other midpoints already selected for publication.
NOK007I7	FEAT64.1.7	Comm Failures	The Nokia C2C Publisher component shall notify SunGuide of Nokia data source communication failures.
NOK007I7A	FEAT64.1.7.1	Databus Connection	The Nokia C2C Publisher component shall connect to Databus as other SunGuide providers do.
NOK007I7B	FEAT64.1.7.2	Nokia Permissions	The Nokia C2C Publisher shall allow a client with appropriate permissions to subscribe to communication alert notifications.
NOK007I7C	FEAT64.1.7.3	Disconnection Alert	If the connection to the Nokia data source is determined to be lost, the Nokia C2C Publisher shall send an alert message to all subscribed clients indicating a loss of communication to the Nokia data source.
NOK007I7D	FEAT64.1.7.4	Alert Frequency	While the connection to the Nokia data source is lost, the Nokia C2C Publisher shall send additional alert messages to all subscribed clients indicating the ongoing loss of communication at a frequency specified in

			the SunGuide configuration file.
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#### *2.10.4 Test Procedure*

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

- The Nokia Publisher subsystem will be running and providing data to the C2C Provider web service.
- The C2C Provider web service's internal webpage (accessible from the server that is hosting the web service) will be used to view the incoming data sent to it from the Nokia Provider
- The C2C Subscriber subsystem will subscribe to the appropriate data from the C2C system.
- Operator Map will be used to view a graphical representation of the data retrieved by the C2C Subscriber.

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

## 2.11 IC-11: ONVIF CCTV Driver (ONVIF)

### 2.11.1 Equipment Needed

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

- One SunGuide application servers
- One SunGuide Database servers
- One SunGuide workstations
- ONVIF Compliant Camera

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

### 2.11.2 Objectives

The objective of this integration case is to test the requirements associated with configuration and use of the ONVIF driver. Configuration of CCTV devices that utilize the ONVIF protocol will be tested along with the controls available through the driver.

### 2.11.3 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 2-11: ONVIF Driver Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
TV003	FEAT8.1.6	Interface to portable CCTV	The SunGuide system shall provide an interface to portable CCTVs that support work zone management through drivers with the following protocols:· NTCIP, Florida MIB, ONVIF
A008	FEAT8.1.7	Real-time video display and control	The SunGuide software shall provide software for real-time video display and real-time video control.
TV001D	FEAT8.2.1	Pan/Tilt/Zoom (PTZ) Systems	The device drivers shall be capable of controlling pan/tilt/zoom camera systems manufactured by a number of different manufacturers.
TV002D	FEAT8.2.2	Camera system types	The CCTV function shall be capable of controlling cameras (e.g., pan/tilt/zoom). The following protocols will be used to issue command/control requests to the cameras.· NTCIP· ONVIF· SunGuide
TV017D	FEAT8.2.3	IP based controls	The CCTV driver shall also support cameras with IP based controls.

TV001	FEAT8.2.5	Device driver types	At a minimum the CCTV function shall provide device drivers for the following camera types: · NTCIP compliant cameras · ONVIF compliant cameras · Sunguide protocol
TV018D	FEAT8.5	ONVIF	The SunGuide software shall provide the capability to control (e.g. pan, tilt, zoom, focus, iris) any ONVIF compliant camera as certified by the ONVIF organization, i.e. an ONVIF Network Video Client.
TV019D	FEAT8.5.1	Functionality	Functionality will be provided through the ONVIF driver for services that are available through ONVIF and implemented by the device
TV020D	FEAT8.5.2	Range objects	The CCTV range objects shall be implemented in the ONVIF device driver and shall include all of the following information if available: · A maximum number of presets parameters; · Pan left limit parameters; · Pan right limit parameters; · Pan home position parameters; · Tilt up limit parameters; · Tilt down limit parameters; · Zoom limit parameters; · Focus limit parameters; · Iris limit parameters; · Maximum pan step angle parameters; and · Maximum tilt step angle parameters.
TV021D	FEAT8.5.3	Timeout objects	The ONVIF device driver shall contain the CCTV timeout objects and shall include all of the following information if available: · Pan timeout parameter; · Tilt timeout parameter; · Zoom timeout parameter.
TV022D	FEAT8.5.4	Preset objects	The ONVIF device driver shall contain CCTV preset objects and shall include all of the following information if available: · Go to preset position parameters; · Store preset position parameters; · Pan position parameters; · Tilt position parameters; · Lens zoom position parameter.
TV023D	FEAT8.5.5	System feature control objects	The ONVIF device driver shall contain CCTV system feature control objects and shall include all of the following information if available: · System lens feature control parameter; · System lens feature status parameter; and · System lens equipment availability parameter.

N/A	SUB6.3.1	Set preset	The system shall allow a preset to be saved for a camera containing the pan, tilt, and zoom positions.
N/A	SUB6.3.2	Select preset	The system shall allow saved preset information to be sent to a particular camera.

#### *2.11.4 Test Procedure*

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

- Through a workstation, a tester will utilize the Operator Map to open a camera control and test an ONVIF device. 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.

## 2.12IC-12: Installer (IN)

### 2.12.1 Equipment Needed

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

- Four SunGuide application servers

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

### 2.12.2 Objectives

The objective of this integration case is to test the requirements associated with the SunGuide installer and the installer management portion of the SunGuide Toolset.

### 2.12.3 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 2-12: Installer Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
INS-1	FEAT62	Installer	The release package shall include an installer and an installer manager to configure application servers to execute the SunGuide software.
INS-1A	FEAT62.1	Other software packages	The installer shall install software packages which are required for execution of the selected components.
INS-1B	FEAT62.2	Disallow web site component without web server	The installer shall disallow installation of web site components on servers which do not have a compatible web server installed.
INS-1C	FEAT62.3	Verify valid configuration file	The installer shall verify the configuration file is valid prior to performing an installation of the software.
INS-1D	FEAT62.4	Deployment environment description file	The installer manager shall use a deployment environment description file that describes the target environment in which to deploy the software.
INS-1D1	FEAT62.4.1	Deployment file	The deployment environment description file shall contain installation templates and server information.
INS-1D1A	FEAT62.4.1.1	Deployment file contents	Installation templates shall describe the target machine architecture, modules to install, and configuration information.
INS-1D1B	FEAT62.4.1.2	Template and user	Server information shall specify an



		credentials	installation template and optionally user credentials for use during installation.
INS-1D2	FEAT62.4.2	Load Deployment Description File	The installer manager shall load information about the deployment environment from a user specified deployment environment description file.
INS-1E	FEAT62.5	Command line execution	The installer manager shall allow command line execution of the SunGuide installer without using a standard installation GUI.
INS-1E1	FEAT62.5.1	Read Deployment Configuration File	The command line installation tool shall read installation parameters from a system deployment configuration file.
INS-1E2	FEAT62.5.2	No Human Interaction	The command line installation tool shall run the SunGuide installer without requiring human intervention when launched with parameters specifying an installation template and a system deployment environment configuration file.
INS-1E3	FEAT62.5.3	Remote Installation	The command line installation tool shall deploy the software to a target application server which is remote to the computer the tool runs on.
INS-1E3A	FEAT62.5.3.1	Remote Installation via command line	The command line installation tool shall allow a remote application server to be specified as a command line option.
INS-1E3B	FEAT62.5.3.2	Remote installation via GUI	The installer manager shall deploy the software to a set of selected target application servers which are remote to the computer the GUI runs on.
INS-1F	FEAT62.6	GUI Installation Tool	The installer manager shall provide a GUI tool to assist users with the installation of the SunGuide software.
INS-1F1	FEAT62.6.1	Installation templates	The installer manager shall allow a user to configure the installation templates.
INS-1F2	FEAT62.6.2	Write deployment configuration file	The installer manager shall provide the ability to write the installation configuration into a system deployment configuration file.
INS-1F3	FEAT62.6.3	Target Application Servers	The installer manager shall allow the user to manage a list of possible target application servers.
INS-1F4	FEAT62.6.4	Deployment Servers entry	The installer manager shall allow the user to manually enter one or more hostnames or IP addresses on which to

			deploy the software.
INS-1G	FEAT62.7	GUI Config file verification Tool	The software shall provide a GUI tool that allows users to modify the SunGuide configuration file.
INS-1G1	FEAT62.7.1	Validate the Config File	The SunGuide configuration editor will validate the SunGuide configuration file.
INS-1G1A	FEAT62.7.1.1	Correcting the configuration	If the user specified configuration file is not valid, the installer shall allow the user to correct the file using the configuration file editor tool.
INS-1G2	FEAT62.7.2	Present valid options for configuration	The SunGuide configuration editor shall present to the user valid options for missing or invalid configuration values.
INS-1G3	FEAT62.7.3	Default Values	The SunGuide configuration editor shall suggest default values for missing or invalid configuration values when presenting the options to the user if appropriate default values exist.
INS-1H	FEAT62.8	Centrally maintained reports	The installer shall deploy a set of centrally maintained reports.
INS-1H1	FEAT62.8.1	Execute Centrally Maintained reports	The software shall allow the user to execute reports from the set of centrally maintained reports provided by the installer.
INS-1H2	FEAT62.8.2	Execute Deployment Specific Reports	The software shall allow the user to execute reports from the set of deployment specific reports that are configured by the system administrator post installation.
INS-1J	FEAT62.9	Configuration data hosting	The configuration and operational data that is dynamic or deployment specific shall all be contained in the SunGuide database or capable of being hosted on the deployment's application network shared folder

#### 2.12.4 Test Procedure

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

- The SunGuide Toolset application includes the installation manager which will be used to manage the different installer configurations.
- The SunGuide Installer will be used to install the SunGuide application software onto multiple different servers.
- Some of the components of SunGuide require the use of Microsoft IIS and may be installed only if those services are available.

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

## 2.13IC-13: Small Enhancements (SE)

### 2.13.1 Equipment Needed

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

- Two SunGuide application servers
- Two SunGuide Database servers
- One SunGuide workstation

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

### 2.13.2 Objectives

The objective of this integration case is to test the requirements associated with smaller enhancements to the SunGuide subsystem.

### 2.13.3 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 2-13: Small Enhancements Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
SE001	FEAT26.5.7	Terminate Response Plan from Event Details	The software shall allow the user to terminate the response plan from the event details dialog.
SE002	FEAT26.5.8	Response Plan Activation Status on Response Plan Dialog	The software shall indicate if the current response plan is active from the response plan dialog.
SE003	FEAT26.5.9	Active Response Plan Prompt on Close	When a user attempts to close an event with an active response plan, the software shall present the user with the following options: 1) Terminate the response plan and close the event 2) Cancel and do not close the event.
SE004	FEAT7.15.7	Populate Event Selection Lists with Open Events	When re-publishing an event to the FLATIS system, the list of events to select from shall only contain events which are currently active.
SE005	FEAT20.10	Scheduled Response Plans	The software shall allow response plans from an open event to be activated on a schedule.
SE006	FEAT26.3.9	Automatic Response Plan Activation Chronology Entry	The software shall include an event chronology entry of automatic response plan activations.
SE007	FEAT26.3.10	Automatic Response Plan Terminate Chronology Entry	The software shall include an event chronology entry of automatic response plan terminations.
SE008	FEAT7.21.23	Login and Subsystem	The software shall embed the user login

		Dialog	and the list of currently connected subsystems into the operator map.
SE009	FEAT7.21.24	Subsystem Dialog Stand Alone	The software shall allow the list of currently connected subsystems to be launched as a stand-alone dialog.
SE010	FEAT7.21.25	Logion Dialog Functionality	The login to subsystems control will include the ability to login to the system, logout of the system, login to specific subsystems, log out of specific subsystems, display login status to each subsystem, display subsystem availability status, and save default behavior to login to specific subsystems for the current user.
SE011	FEAT7.27.43	Video on Desktop for Remote Centers	The Video on Desktop shall allow streaming of video streams from C2C remote centers.
SE012	FEAT7.27.44	Local and Remote URL Configuration	The software shall allow each video stream to be configured with a local and a remote URL.
SE013	FEAT9.19	DMS Groups	When a DMS group is updated, the software shall use the updated group.
SE014	FEAT7.5.8	DMS Group Locations	The software shall present DMS groups as selectable items in schedules, predefined plans, response plans, and manual messaging.

#### 2.13.4 Test Procedure

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

- Response Plan status will be viewed and different scenarios will be run while response plans are activated and deactivated.
- Response Plans will be scheduled, activated, and deactivated.
- Login and Subsystem dialogs will be viewed
- Video on Desktop will be tested with remote camera feeds
- DMS groups will be tested as changes are made to the DMS Groups

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

## 2.14IC-14: Wrong Way Driving (WWD)

### 2.14.1 Equipment Needed

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

- One SunGuide application servers
- One SunGuide Database servers
- One SunGuide workstations
- Click!512 Device

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

### 2.14.2 Objectives

The objective of this integration case is to test the requirements associated with the configuration of a Wrong Way Detection Device as well as the alerts and response associated with that detection.

### 2.14.3 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 2-14: Wrong Way Driving Requirements**

SunGuide ID	Requirement Number	Requirement Name	Requirement Text
WWD-001	FEAT23.3.1	Click!512	The software shall interface with the Wavetronix Click!512 module
WWD-001A	FEAT23.3.1.1	Click!512 Protocol	The software shall interpret a wrong way driving detection event from the Click!512 module using the protocol defined by TBD.
WWD-001A1	FEAT23.3.1.1.1	WWD Timestamp	The software shall interpret the time at which the wrong way driver was detected according to the timestamp reported by the device
WWD-001A2	FEAT23.3.1.1.2	Heartbeat	The software shall interpret a heartbeat message from the Click!512 module
WWD-002	FEAT23.3.2	Device Configuration	The software shall allow a user to add, modify, and delete wrong way detection devices in the system
WWD-003	FEAT23.3.3	Email Addresses	The software shall allow a user to configure a list of email addresses for notification of wrong way driving detection alarms
WWD-004	FEAT23.3.4	Status Change Logging	The software shall log operational status changes of the device in the database.
WWD-004A	FEAT23.3.4.1	Status Change	The software shall provide a device

		Report	report that outputs the operational status log of the wrong way driving detection devices
WWD-006	FEAT23.3.5	Detect Status Changes	The software shall detect the operational status of the wrong way driving detection device
WWD-006A	FEAT23.3.5.1	Comm Loss	The software shall detect when communication is lost from the wrong way driving detection device
WWD-006B	FEAT23.3.5.2	No Heartbeat	The software shall detect when a heartbeat is not received from the wrong way driving detection device within a configured time period
WWD-007	FEAT23.3.6	Device Response Option	The software shall respond to wrong way driving detection events from the wrong way detection devices
WWD-007A	FEAT23.3.6.1	Email On Alert	When a detection is recieved from a wrong way driving detection device, the software shall immediately email the configured list of email notification recipients.
WWD-007A1	FEAT23.3.6.1.1	Email Contents	The email shall contain the location and direction of travel configured for the roadway segment or TSS link instrumented by the wrong way driving detection device, and the timestamp reported by the device of the wrong way driving detection alarm
WWD-007C	FEAT23.3.7	Store Alerts In Database	The software shall store the location, direction, timestamp, and associated event ID (if applicable) of the wrong way driving detection alert in the database
WWD-007C1	FEAT23.3.7.1	WWD Alerts Report	The software shall provide reports listing wrong way driving alerts that include the wrong way driving detection device, direction, timestamp reported by the device, and associated event ID
WWD-001	FEAT23.3.1	Click!512	The software shall interface with the Wavetronix Click!512 module
WWD-001A	FEAT23.3.1.1	Click!512 Protocol	The software shall interpret a wrong way driving detection event from the Click!512 module using the protocol defined by TBD.
WWD-001A1	FEAT23.3.1.1.1	WWD Timestamp	The software shall interpret the time at which the wrong way driver was detected according to the timestamp

			reported by the device
WWD-001A2	FEAT23.3.1.1.2	Heartbeat	The software shall interpret a heartbeat message from the Click!512 module
WWD-002	FEAT23.3.2	Device Configuration	The software shall allow a user to add, modify, and delete wrong way detection devices in the system
WWD-003	FEAT23.3.3	Email Addresses	The software shall allow a user to configure a list of email addresses for notification of wrong way driving detection alarms
WWD-004	FEAT23.3.4	Status Change Logging	The software shall log operational status changes of the device in the database.
WWD-004A	FEAT23.3.4.1	Status Change Report	The software shall provide a device report that outputs the operational status log of the wrong way driving detection devices
WWD-006	FEAT23.3.5	Detect Status Changes	The software shall detect the operational status of the wrong way driving detection device
WWD-006A	FEAT23.3.5.1	Comm Loss	The software shall detect when communication is lost from the wrong way driving detection device
WWD-006B	FEAT23.3.5.2	No Heartbeat	The software shall detect when a heartbeat is not received from the wrong way driving detection device within a configured time period
WWD-007	FEAT23.3.6	Device Response Option	The software shall respond to wrong way driving detection events from the wrong way detection devices
WWD-007A	FEAT23.3.6.1	Email On Alert	When a detection is recieved from a wrong way driving detection device, the software shall immediately email the configured list of email notification recipients.
WWD-007A1	FEAT23.3.6.1.1	Email Contents	The email shall contain the location and direction of travel configured for the roadway segment or TSS link instrumented by the wrong way driving detection device, and the timestamp reported by the device of the wrong way driving detection alarm
WWD-007C	FEAT23.3.7	Store Alerts In Database	The software shall store the location, direction, timestamp, and associated event ID (if applicable) of the wrong way driving detection alert in the database



WWD-007C1	FEAT23.3.7.1	WWD Alerts Report	The software shall provide reports listing wrong way driving alerts that include the wrong way driving detection device, direction, timestamp reported by the device, and associated event ID
WWD-001	FEAT23.3.1	Click!512	The software shall interface with the Wavetronix Click!512 module
WWD-001A	FEAT23.3.1.1	Click!512 Protocol	The software shall interpret a wrong way driving detection event from the Click!512 module using the protocol defined by TBD.
WWD-001A1	FEAT23.3.1.1.1	WWD Timestamp	The software shall interpret the time at which the wrong way driver was detected according to the timestamp reported by the device
WWD-001A2	FEAT23.3.1.1.2	Heartbeat	The software shall interpret a heartbeat message from the Click!512 module
WWD-002	FEAT23.3.2	Device Configuration	The software shall allow a user to add, modify, and delete wrong way detection devices in the system
WWD-003	FEAT23.3.3	Email Addresses	The software shall allow a user to configure a list of email addresses for notification of wrong way driving detection alarms
WWD-004	FEAT23.3.4	Status Change Logging	The software shall log operational status changes of the device in the database.
WWD-004A	FEAT23.3.4.1	Status Change Report	The software shall provide a device report that outputs the operational status log of the wrong way driving detection devices
WWD-006	FEAT23.3.5	Detect Status Changes	The software shall detect the operational status of the wrong way driving detection device
WWD-006A	FEAT23.3.5.1	Comm Loss	The software shall detect when communication is lost from the wrong way driving detection device
WWD-006B	FEAT23.3.5.2	No Heartbeat	The software shall detect when a heartbeat is not received from the wrong way driving detection device within a configured time period
WWD-007	FEAT23.3.6	Device Response Option	The software shall respond to wrong way driving detection events from the wrong way detection devices
WWD-007A	FEAT23.3.6.1	Email On Alert	When a detection is recieved from a wrong way driving detection device, the software shall immediately email the

			configured list of email notification recipients.
WWD-007A1	FEAT23.3.6.1.1	Email Contents	The email shall contain the location and direction of travel configured for the roadway segment or TSS link instrumented by the wrong way driving detection device, and the timestamp reported by the device of the wrong way driving detection alarm
WWD-007C	FEAT23.3.7	Store Alerts In Database	The software shall store the location, direction, timestamp, and associated event ID (if applicable) of the wrong way driving detection alert in the database
WWD-007C1	FEAT23.3.7.1	WWD Alerts Report	The software shall provide reports listing wrong way driving alerts that include the wrong way driving detection device, direction, timestamp reported by the device, and associated event ID
WWD-008	FEAT26.2.10	Wrong Way Driving Event Type	The software shall support a Wrong Way Driving Detection event type
WWD-008A	FEAT26.5.6	Wrong Way Driving Message Template	The Wrong Way Driving Detection event type shall have a DMS message template specific to the event type for generating response plan suggestion messages.

#### 2.14.4 Test Procedure

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

- SunGuide will be configured to interface with the Click!512 device
- Alerts will be generated and the response of the system to the alerts and Operator inputs will be tested.

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

## **2.15IC-15: Footprints (FP)**

### *2.15.1 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.

### *2.15.2 Objectives*

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

### *2.15.3 Requirements to be Tested*

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

### *2.15.4 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**