SunGuide®:

Software Integration Plan

SunGuide-SIP-8.2

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
CAN .....Contact Notification Application
DMS.....Dynamic Message Sign
EH .....Executive Handler
EM.....Event Management
FAT .....Factory Acceptance Test
FDOT .....Florida Department of Transportation
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
MLS .....Managed Lanes Subsystem
NTCIP .....Nation Transportation Communication for ITS Protocol
ONVIF .....Open Network Video Interface Forum
RISC.....Rapid Incident Scene Clearance
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
TCS .....Traffic Control Subsystem
TMC.....Transportation Management Center
TPS.....Truck Parking Subsystem
TSS.....Traffic Sensor Subsystem
TVT.....Travel Times Subsystem
WWD .....Wrong Way Driving

REVISION HISTORY

Revision	Date	Changes
8.2	July 10, 2022	Initial release for Release 8.2 functionality

1. Scope

1.1 Document Identification

This document serves as the Software Integration Plan (SIP) for Release 8.2 of the SunGuide® software. This version is implementing:

- SG-3926 - Assign CCTV to DMS and provide shortcut in DMS dialog
- SG-4891 - Rewrite the CCTV NTCIP driver in C#
- SG-5143 - Make Chronology report be able to be generated entirely or only in sections of interest.
- SG-5456 - "TMC Notified" for all notified times regardless of whether notified box is checked
- SG-5557 - Ability to Set WWD Sites to Maintenance Mode via SG
- SG-5706 - Add timestamp in SunGuide incident when Executive Notification Emails are sent
- SG-5806 - Adding multiple activities to a responder at one time instead of only one at a time.
- SG-5810 - Copy a SAS Plan
- SG-5875 - Issue 564 Phase 2 Ceased Use Implementation
- SG-6015 - TPAS prompt for verifying available spaces for CO reporting
- SG-6120 - Allow saving configuration of items without errors despite errors in other items of the same type.
- SG-6142 - Add a "Submit Crash Report" option for Operator Map Failures

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

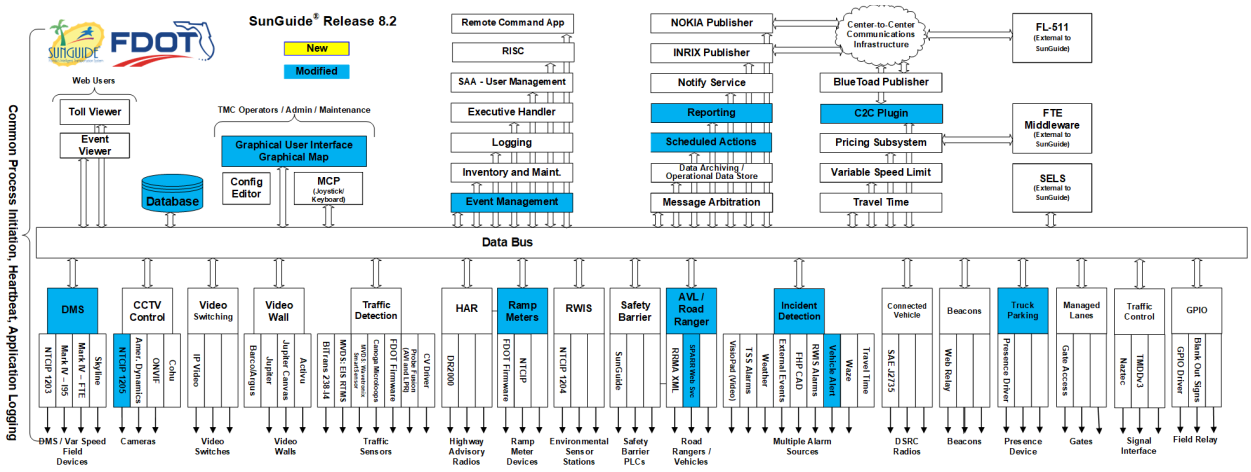

Figure 1-1 - High-Level Architectural Concept

1.3 Related Documents

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

- FDOT Scope of Services: *BE492, Standard Written Agreement for SunGuide Software Support, Maintenance, and Development, Exhibit A: Scope of Services.* December 14, 2017.
- Notice to Proceed: Letter to Southwest Research Institute® (SwRI®) for BE492, December 14, 2017
- Letter of Authorization 013: Letter to SwRI for BE492, March 4, 2022.
- SunGuide Project website: http://sunguide.datasys.swri.edu.

1.4 Contacts

The following are contact persons for the SunGuide software project:

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- AJ Skillern, SwRI Software Project Manager, askillern@swri.org, 210-522-5207

For current contact information please refer to this link: http://sunguidesoftware.com/contact-us

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 8.2 Integration Cases include:
- IC-1: SG-3926 - Assign CCTV to DMS and provide shortcut in DMS dialog
- IC-2: SG-4891 - Rewrite the CCTV NTCIP driver in C#
- IC-3: SG-5143 - Make Chronology report be able to be generated entirely or only in sections of interest.
- IC-4: SG-5456 - "TMC Notified" for all notified times regardless of whether notified box is checked
- IC-5: SG-5557 - Ability to Set WWD Sites to Maintenance Mode via SG
- IC-6: SG-5706 - Add timestamp in SunGuide incident when Executive Notification Emails are sent
- IC-7: SG-5806 - Adding multiple activities to a responder at one time instead of only one at a time.
- IC-8: SG-5810 - Copy a SAS Plan
- IC-9: SG-5875 - Issue 564 Phase 2 Ceased Use Implementation
- IC-10: SG-6015 - TPAS prompt for verifying available spaces for CO reporting
- IC-11: SG-6120 - Allow saving configuration of items without errors despite errors in other items of the same type.
- IC-12: SG-6142 - Add a "Submit Crash Report" option for Operator Map Failures
- IC-13: JIRA issues

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

- Requirement Number: the requirement number 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 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 8.2 testing. All testing will be completed against a SunGuide server with a SQL Server database. Note that each integration case uses the same hardware setup so this diagram is not duplicated at the beginning of each test case.

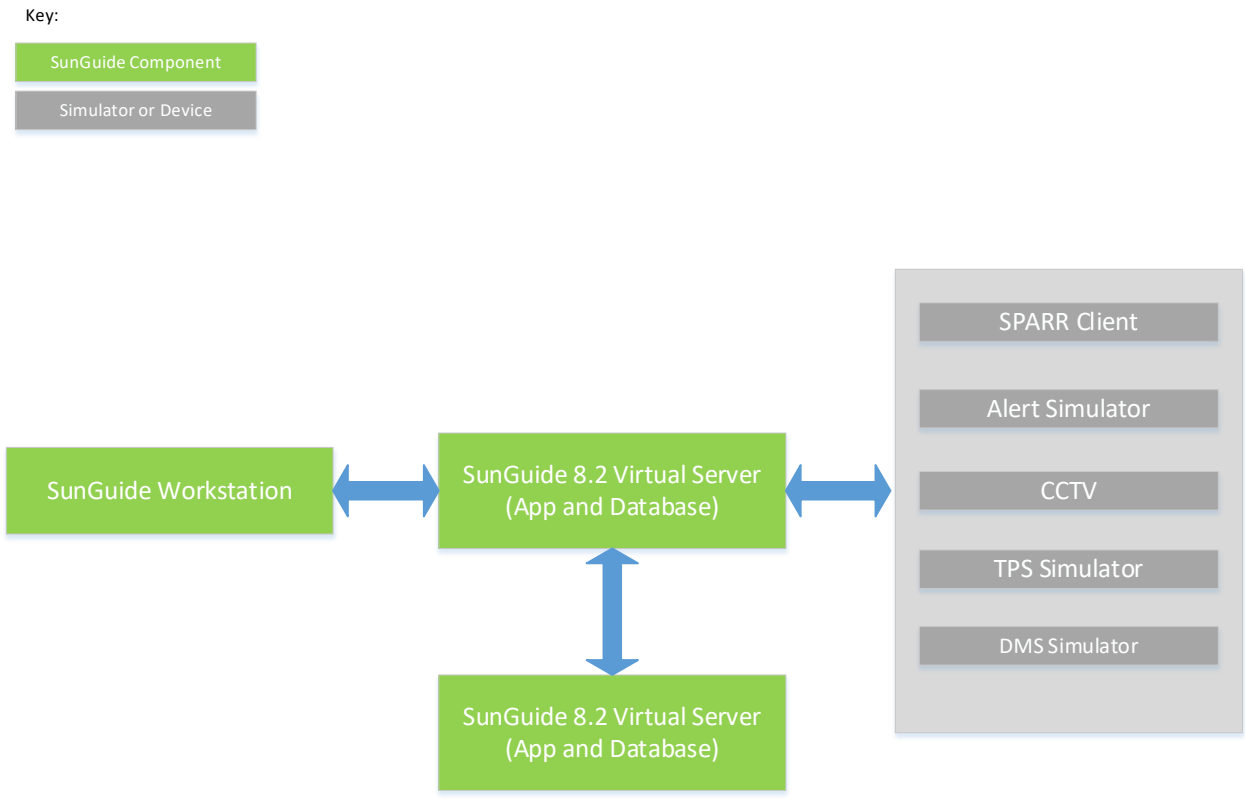

Figure 2-1: Hardware/Software Testing Environment

3. *IC-1: SG-3926 Assign CCTV to DMS and provide shortcut in DMS dialog*

3.1 Objectives

The objective of this integration case is to test the requirements associated with assigning CCTV cameras to equipment and providing shortcuts to viewing them in related dialogs.

3.2 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.

Requirement Number	Requirement Text
SRT-829	The software will allow a user to configure an optional camera and optional preset for a DMS sign of any Sign Use.
SRT-830	The software will allow a user to configure an optional camera and optional preset for a Ramp Meter device.
SRT-831	The list of cameras available to associate with a DMS sign or Ramp Meter will include the list of local cameras, C2C cameras, and RCA cameras that have an available video stream to view in Video on Desktop.
SRT-832	If a C2C camera is selected, the software will not allow the user to save an associated preset.
SRT-833	When viewing DMS in the DMS Status Dialog, the software will allow the user to select a DMS and launch the associated camera in a new or existing Video on Desktop dialog.
SRT-834	If a preset is configured, the software will send a request to the camera to move to the configured preset.
SRT-835	When viewing a DMS in the Response Plan Dialog, the software will allow the user to select a DMS and launch the associated camera in a new or existing Video on Desktop dialog.
SRT-836	If a preset is configured, the software will send a request to the camera to move to the configured preset.
SRT-837	When viewing a ramp meter device in the RMS Status Dialog, the software will allow the user to select a ramp meter and launch the associated camera in a new or existing Video on Desktop dialog.
SRT-838	If a preset is configured, the software will send a request to the camera to move to the configured preset.

3.3 Test Procedure

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

- For each device type, a verification camera will be configured.
- Each named dialog in the requirements will be tested to ensure a camera can be used to verify, including the preset

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

4. *IC-2: SG-4891 Rewrite the CCTV NTCIP driver in C#*

4.1 Objectives

The objective of this integration case is to test the requirements associated with testing the new C# NTCIP CCTV driver.

4.2 Requirements to be tested

This enhancement does not add any new requirements to the system

4.3 Test Procedure

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

- Regression tests will be run against the driver to ensure the PTZ, Zoom, Focus, and Iris functionality are behaving as expected.

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

5. *IC-3: SG-5143 Make Chronology report be able to be generated entirely or only in sections of interest.*

5.1 Objectives

The objective of this integration case is to test the requirements associated with filtering chronology entries in the event chronology filter.

5.2 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.

Requirement Number	Requirement Text
SRT-823	The software will have a reporting filter containing a list of all event chronology types known to the system at the last restart of Event Management.
SRT-824	The software will allow a user to choose a whitelist or a blacklist for use when using the event chronology types filter.
SRT-825	The software will update the Event Chronology report to filter chronology entries by the chronology type filter.
SRT-826	If a whitelist is chosen, only event chronology types matching the selected types will be shown in the event chronology portion of the report.
SRT-827	If a blacklist is chosen, only event chronology types NOT matching the selected types will be shown in the event chronology portion of the report.
SRT-828	The software will allow users to return all parameters to their default selection state.

5.3 Test Procedure

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

- The chronology report will be run in a variety of ways with a variety of parameters to view the behavior of the report.

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

6. *IC-4: SG-5456 "TMC Notified" for all notified times regardless of whether notified box is checked*

6.1 Objectives

The objective of this integration case is to test the requirements associated with chronology entries related to notification of, or to, responding agencies.

6.2 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.

Requirement Number	Requirement Text
SRT-815	When the "Notified by TMC?" checkbox in the Responders section of the Event Details dialog is checked, and the Notified time for a Responder is changed, the software will add an Event Chronology entry indicating the TMC Notified the Agency with a unique Chronology Type.
SRT-816	When the "Notified by TMC?" checkbox in the Responders section of the Event Details dialog is not checked, and the Notified time for a Responder is changed, the software will add an Event Chronology entry indicating the Agency Notified the TMC with a unique Chronology Type.

6.3 Test Procedure

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

- Events will be saved with and without the TMC Notified checkbox checked and the Event Chronology will be monitored for log messages.

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

7. IC-5: SG-5557 Ability to Set WWD Sites to Maintenance Mode via SG

7.1 Objectives

The objective of this integration case is to test the requirements associated with disabling alerts for vehicle alert devices placed in maintenance mode.

7.2 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.

Requirement Number	Requirement Text
SRT-858	The software will have an option to set a vehicle alert device to maintenance mode.
SRT-859	If the device is in maintenance mode, the time the device is supposed to come out of maintenance mode will be displayed to the user.
SRT-860	When a device is in maintenance mode, the device will continue to be polled by the software.
SRT-861	When the device is in maintenance mode, any alerts from the device will be logged, but immediately resolved by the system.
SRT-862	When a device is placed in maintenance mode, the software will allow the user to set a duration in either hours or the date and time to set the device out of maintenance mode.
SRT-863	When the duration of maintenance mode expires, users with permission will receive a popup to either change the device out of maintenance mode or give a new duration for how long the device should remain in maintenance mode.
SRT-864	When a device is in maintenance mode, the icon for the device will visually indicate the device is in maintenance mode.

7.3 Test Procedure

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

- Vehicle alert device will be placed in Maintenance Mode.
- Wrong way driving alerts will be triggered in both regular and Maintenance Mode to observe the system behavior.

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

8. *IC-6: SG-5706 Add timestamp in SunGuide incident when Executive Notification Emails are sent*

8.1 Objectives

Test the requirements associated with adding a chronology record when an executive notification is sent.

8.2 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.

Requirement Number	Requirement Text
SRT-857	When an operator sends an Executive Notification, the software will log an Event Chronology message indicating an Executive Notification was sent and the user who sent the message.

8.3 Test Procedure

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

- Executive Notifications will be generated and sent to observe the log messages associated with the notification.

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

9. *IC-7: SG-5806 Adding multiple activities to a responder at one time instead of only one at a time.*

9.1 Objectives

The objective of this integration case is to test the requirements associated with adding multiple activities performed by a dispatch vehicle at one time.

9.2 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.

Requirement Number	Requirement Text
SRT-855	When adding activities for a Road Ranger in the Event Details dialog, the software will allow a user to select one or more activities to add to the event.
SRT-856	When adding activities for a Road Ranger in the SPARR app, the software will allow a user to select one or more activities to add to the event.

9.3 Test Procedure

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

- Multiple activities will be added to the event from within SunGuide as well as from the SPARR application.

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

10. *IC-8: SG-5810 Copy a SAS Plan*

10.1 Objectives

The objective of this integration case is to test the requirements associated with copying SAS schedules and items.

10.2 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.

Requirement Number	Requirement Text
SRT-817	The system will allow the operator to select a Scheduled Item and make a copy of the item in the same schedule including the start and end dates, reoccurrence pattern, scheduled action(s), and any selected devices.
SRT-818	The new scheduled item will have a unique name among scheduled items and allow the user to modify the name of the item after creation.
SRT-819	The system will allow the operator to select a Schedule and make a copy of the schedule.
SRT-820	The new schedule will have a unique name among schedules and allow the user to modify the name of the item after creation.
SRT-821	The software will make a copy of each Scheduled Item in the original schedule including the start and end dates, reoccurrence pattern, scheduled action(s), and any selected devices.
SRT-822	The new scheduled items will have a unique name among scheduled items and allow the user to modify the name of the item after creation.

10.3 Test Procedure

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

- Both schedules and schedule items will be copied. The items will be activated to confirm they are functional.

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

11. *IC-9: SG-5875 Issue 564 Phase 2 Ceased Use Implementation*

11.1 Objectives

The objective of this integration case is to test the requirements associated with ceasing the use of active configurations.

11.2 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.

Requirement Number	Requirement Text
SRT-784	When an availability status is deleted, it will be removed from the running system but remain in the database.
SRT-785	When a beat is deleted, it will be removed from the running system but remain in the database.
SRT-786	When a geofence is deleted, it will be removed from the running system but remain in the database.
SRT-787	When an operator is deleted, it will be removed from the running system but remain in the database.
SRT-788	When a radio is deleted, it will be removed from the running system but remain in the database.
SRT-789	When a telephone is deleted, it will be removed from the running system but remain in the database.
SRT-790	When a vehicle is deleted, it will be removed from the running system but remain in the database.
SRT-791	When an abbreviation is deleted, it will be removed from the running system but remain in the database.
SRT-792	When an activity is deleted, it will be removed from the running system but remain in the database.
SRT-793	When an agency is deleted, it will be removed from the running system but remain in the database.
SRT-794	When an attribute type is deleted, it will be removed from the running system but remain in the database.
SRT-795	When a comment type is deleted, it will be removed from the running system but remain in the database.

Requirement Number	Requirement Text
SRT-796	When an event status is deleted, it will be removed from the running system but remain in the database.
SRT-797	When an injury type is deleted, it will be removed from the running system but remain in the database.
SRT-798	When an organization is deleted, it will be removed from the running system but remain in the database.
SRT-799	When a procedural error is deleted, it will be removed from the running system but remain in the database.
SRT-800	When a county is deleted, it will be removed from the running system but remain in the database.
SRT-801	When a lane map is deleted, it will be removed from the running system but remain in the database.
SRT-802	When a lane type is deleted, it will be removed from the running system but remain in the database.
SRT-803	When a location is deleted, it will be removed from the running system but remain in the database.
SRT-804	When a reference point is deleted, it will be removed from the running system but remain in the database.
SRT-805	When a roadway is deleted, it will be removed from the running system but remain in the database.
SRT-806	When a message template is deleted, it will be removed from the running system but remain in the database.
SRT-807	When a color is deleted, it will be removed from the running system but remain in the database.
SRT-808	When a state is deleted, it will be removed from the running system but remain in the database.
SRT-809	When a vehicle make is deleted, it will be removed from the running system but remain in the database.
SRT-810	When a vehicle model is deleted, it will be removed from the running system but remain in the database.

Requirement Number	Requirement Text
SRT-811	The software will allow the user to retrieve the list of responder agencies, vehicles, vehicle statuses, drivers, beats, radios, and phone numbers and use the ceased items as parameters when running reports.
SRT-812	The software will allow the user to retrieve the list of organizations, counties, roadways, directions, reference points, locations, event types, event attributes, event statuses, agencies, vehicle types, and injuries and use the ceased items as parameters when running reports.

11.3 Test Procedure

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

- For each type in AVL and EM, the system will confirm the type can be deprecated.
- Fear each type in AVL and EM, the system will confirm the older values can be retrieved, and a report can run against the deprecated values.

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

12. *IC-10: SG-6015 TPAS prompt for verifying available spaces for CO reporting*

12.1 Objectives

Test the requirements associated with verifying truck parking space availability.

12.2 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.

Requirement Number	Requirement Text
SRT-839	The software will have a configuration dialog to configure a schedule for performing Truck Parking verification counts.
SRT-840	The software will allow the user to select a verification time period including the day of week, time of day, and an interval to run the Truck Parking verification counts for each facility individually.
SRT-841	The software will allow the user to specify multiple verification time periods for each facility.
SRT-842	At the configured interval, the software will pop up a dialog to users with permission to handle Truck Parking verifications.
SRT-843	A single Truck Parking verification should contain a view of the associated cameras and current availability count for a Truck Parking area.
SRT-844	The dialog will allow the user to select an option indicating the current count is correct or input the correct count, and select an option indicating they have manually verified the count on FL511 matches the current Truck Parking area availability count in SunGuide only for the default area.
SRT-845	The dialog will have an option to skip the verification for a Truck Parking area.
SRT-846	If the option to skip a verification is selected, a popup will confirm the operator intended to select this option and require a comment to indicate why this option was selected.
SRT-847	When a facility is out of service, the verification will be automatically skipped and the comment shall indicate that it was skipped because of the facility status.

Requirement Number	Requirement Text
SRT-848	When an operator responds to a verification for a Truck Parking area, the verification for the Truck Parking area will be removed from all other Operator Maps.
SRT-849	The software will allow a user with permission to manually trigger the verification of all facilities to appear for all users with permission to handle Truck Parking verifications.
SRT-850	For each response to a Truck Parking area, the system will log the responding operator, time of response, facility, area, reported number of spaces, corrected number of spaces (if available), if the count was accurate, if the operator selected to skip the verification and the reason, and the result of the manual FL511 verification.
SRT-851	The verification dialog will have the option to snooze one or more Truck Parking verifications and dismiss the verification dialog for all users.
SRT-852	The system will allow the user to enter to amount of time to snooze.
SRT-853	When the snooze interval has elapsed, the verification dialog will reappear with the snoozed verifications.
SRT-854	If a verification is pending operator input at the time another verification is triggered, all pending verification will be skipped, and a comment will be entered that they were skipped due to no action from the operator.

12.3 Test Procedure

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

- Truck Parking Verification will be configured to run on set interval.
- Verification will be performed including skipped and snoozed verifications.
- Verifications will be performed manually.

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

13. *IC-11: SG-6120 Allow saving configuration of items without errors despite errors in other items of the same type.*

13.1 Objectives

The objective of this integration case is to test the requirements associated with allowing saving configuration of items without errors despite errors in other items of the same type.

13.2 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.

Requirement Number	Requirement Text
SRT-781	When an operator is using a configuration dialog and an added or modified item does not have a validation error, the software will allow the user to initiate the save action.
SRT-782	If there is a validation error on an added or modified item, the validation error will take precedence, prevent the save action, and be shown to the user over validation errors for other items in the dialog.
SRT-783	Validation errors unrelated to the item being added or modified will be displayed to the user.

13.3 Test Procedure

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

- Each configuration dialog will be able to open and valid and invalid configurations will be entered to test the response of the dialogs.

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

14. *IC-12: SG-6142 Add a "Submit Crash Report" option for Operator Map Failures*

14.1 Objectives

The objective of this integration case is to test the requirements associated with adding a feature for submitting crash reports for Operator Map failures.

14.2 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.

Requirement Number	Requirement Text
SRT-813	The software configuration file will contain connection information to a JIRA project for the software to automatically report issues.
SRT-814	When an Operator Map crashes, the system will attempt to get the error message for the crash, and automatically open a JIRA issue for a configured JIRA project.

14.3 Test Procedure

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

- Exceptions will be caused in the Map in order to generate an issue in the JIRA project to log exceptions that need to be resolved.

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

15. *IC-13: JIRA Issues*

15.1 Objectives

The objective of this integration case is to test JIRA issues that are resolved in the 8.2 Release.

15.2 Requirements to be tested

There are no requirements associated with the JIRA issues.

15.3 Test Procedure

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

- Each issue will be tested to show the corrected behavior of the defect.

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

16. Notes