SunGuide^{SM}:
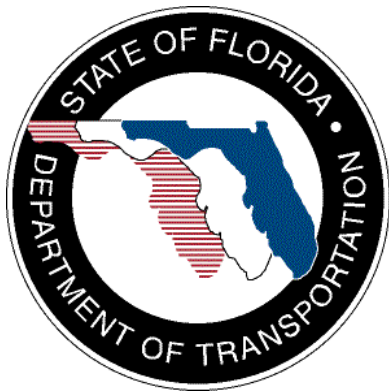
Software Integration Plan

SunGuide-SIP-2.0.0-Draft

Prepared for:

Florida Department of Transportation
Traffic Engineering and Operations Office
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450
(850) 410-5600

September 8, 2005

Document Control Panel			
File Name:	SunGuide-SIP-2.0.0-Draft.doc		
File Location:	SunGuide CM Repository		
CDRL:	3-1.3		
	Name	**Initial**	**Date**
Created By:	Steve Dellenback, SwRI	SWD	9/2/04
Reviewed By:	Stephen E. Novosad	SEN	9/2/04
	Stephen E. Novosad	SEN	10/5/04
	Stephen E. Novosad	SEN	4/26/05
	Stephen E. Novosad	SEN	9/8/05
Modified By:	Steve Dellenback, SwRI	SWD	10/4/04
	Steve Dellenback, SwRI	SWD	4/25/05
	Steve Dellenback, SwRI	SWD	9/8/05
Completed By:			

Table of Contents

List of Tables

List of Acronyms

API .... Application Program Interface
ASCII .... American Standard Code for Information Interchange
C2C .... Center-to-Center
CCTV .... Closed Circuit Television
DA.............................. Data Archive
DD.............................. Data Distribution
DMS........................... Dynamic Message Sign
EE............................... Emergency Evacuation
EIS............................. Electronic Integrated Systems, Inc
EH .... Executive Handler
ESRI........................... Environmental Systems Research Institute, Inc.
FDOT .... Florida Department of Transportation
GIS .... Geographic Information System
GUI .... Graphical User Interface
HAR .... Highway Advisory Radio
IC................................ Integration Case
ICD............................. Interface Control Document
IM............................... Incident Management
IMS .... Inventory and Maintenance Subsystem
IP................................ Internet Protocol
ITS.............................. Intelligent Transportation Systems
MPEG-2 .... Moving Picture Experts Group-2
NTCIP........................ National Transportation Communications for ITS Protocol
PTZ .... Pan, Tilt, Zoom
RMS .... Ramp Metering Subsystem
RTMS......................... Remote Traffic Microwave Sensor
RWIS.......................... Road Weather Information System
SATP.......................... Software Acceptance Test Plan
SB............................... Safety Barrier
SICP........................... Software Integration Case Procedures
SIP............................. Software Integration Plan
SL............................... Status Logger
SRS .... Software Requirements Specification
SVG............................ Scalable Vector Graphics
SwRI .... Southwest Research Institute
TCP .... Transport Control Protocol
TCP/IP........................ Transmission Control Protocol/Internet Protocol

TMC .... Transportation Management Center
TSS .... Traffic Sensor Subsystem
TvT .... Travel Time
WSDOT .... Washington Department of Transportation
XML .... Extensible Markup Language

REVISION HISTORY

Revision	Date	Changes
1.0.0-Draft	September 2, 2004	Initial Release.
1.0.0	October 6, 2004	Updated based on comments received on the draft
1.1.0	April 26, 2005	Updated based on ECO 1.1 requirements
2.0.0-Draft	September 8, 2005	Updated for Release ECO 2.0

1. Scope

1.1 Document Identification

This document serves as the Software Integration Plan (SIP) for the SunGuide^{SM} software.

1.2 Project Overview

The Florida Department of Transportation (FDOT) is conducting a program that is developing SunGuide^{SM} software. The SunGuide^{SM} software is a set of Intelligent Transportation System (ITS) software that allows the control of roadway devices as well as information exchange across a variety of transportation agencies. The goal of the SunGuide^{SM} software is to have a common software base that can be deployed throughout the state of Florida. The SunGuide^{SM} software development effort is based on ITS software available from both the states of Texas and Maryland; significant customization of the software is being performed as well as the development of new software modules. The following figure provides a graphical view of the software to be developed:
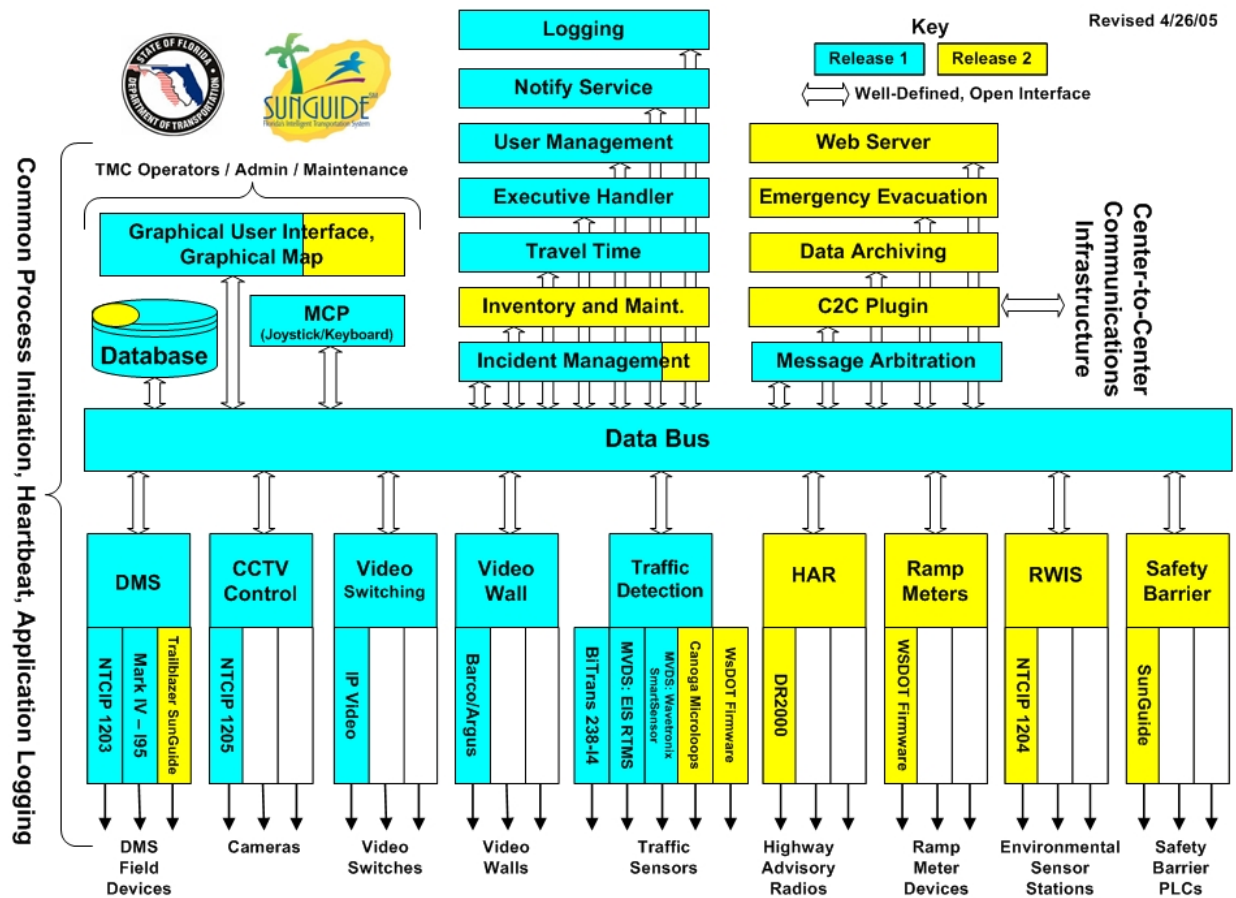
Figure 1.1 - High-Level Architectural Concept

The SunGuide^{SM} development effort spans approximately two years. 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

The following documents were used to develop this document:

- SwRI Qualification Response: *Response to the Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: November 18, 2002.

- SwRI Technical Proposal: *Technical Proposal for Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: January 31, 2003.

- SwRI Cost Proposal: *Cost Proposal for Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System, Negotiation Number: ITN-DOT-02/03-9025-RR,* SwRI Proposal No. 10-35924, dated: January 31, 2003.

- SwRI BAFO letter: *Southwest Research Institute® Proposal No. 10-35924, "Invitation to Negotiate (ITN): Statewide Transportation Management Center Software Library System", Reference: Negotiation Number: ITN-DOT-02/03-9025-RR*, dated: May 5, 2003.

- FDOT procurement document: *Invitation To Negotiate (ITN), Negotiation Number: ITN-DOT-02/03-9025-RR, Statewide Transportation Management Center Software Library System*, dated: October 21, 2002.

- FDOT Scope of Services: *Statewide Transportation Management Center Software Library System: Scope of Services,* September 22, 2003.

- FDOT Requirements Document: *Statewide Transportation Management Center Software Library System: Requirements Specification,* June 3, 2003.

- Southwest Research Institute, *TMC Software Study*, November 15, 2001.

- Southwest Research Institute, *Introduction to an Operational Concept For the Florida Statewide Library*, FDOT – OCD – 1.0, March 31, 2002.

- World Wide Web Consortium (W3) website: http://www.w3.org.

- SunGuide^{SM} Project website: http://sunguide.datasys.swri.edu.

1.4 Contacts

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

- Elizabeth Birriel, ITS Central Office, elizabeth.birriel@dot.state.fl.us, 850-410-5606
- Liang Hsia, FDOT Project Manager, liang.hsia@dot.state.fl.us, 850-410-5615
- John Bonds, Senior ITS Specialist, jbonds@pbsj.com, 408-873-2514
- David Chang, ITS Specialist, David.Chang@dot.state.fl.us, 850-410-5622
- Steve Dellenback, SwRI Project Manager, sdellenback@swri.org, 210-522-3914
- Robert Heller, SwRI Software Project Manager, rheller@swri.org, 210-522-3824

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

- David Lambert, University of North Florida, RWIS, jlambert@unf.edu, 904-620-3881
- Bob Colins, PBS&J, Emergency Evacuation, bobcolins@pbsj.com, 850-575-1800
- John Fain, FDOT, Comptroller, john.fain@dot.state.fl.us, 850-921-7332
- Leslie Jacobson, PB Farradyne, Ramp Metering, jacobsonl@pbworld.com, 206-382-5290

2. Integration Cases

The requirements contained in the following sections were extracted from the Release 1 Software Requirements Specification (SRS), identifier: SunGuide-SRS-2.0.1 dated May 4, 2005.

Five integration cases have been created for the purposes of acceptance testing for Release 1.1, these include (these test cases were described in detail in the SIP for Release 1.1 (SunGuide-SIP-1.1.0) :

- IC-1: Core Processes, this is comprised of:
    - User (Administrative)
    - Status Logger
    - Executive Handler
    - Data Distribution
- IC-2: Dynamic Message Sign (DMS)
- IC-3: Video
- IC-4: Transportation Sensor Subsystem (TSS)

IC-5: Incident Management (IM)

The following integration cases have been created for the purposes of acceptance testing for Release 2.0, these include:

- IC-6: Subsystem Updates - GUI, CCTV and IM
- IC-7: Trailblazer
- IC-8: Safety Barrier (SB)
- IC-9: Roadway Weather Information System (RWIS)
- IC-10: Highway Advisory Radio (HAR)
- IC-11: Ramp Metering Subsystem (RMS)
- IC-12: Center-to-Center (C2C)
- IC-13: Web Server (WS)
- IC-14: Emergency Evacuation (EE)
- IC-15: Inventory and Maintenance Subsystem (IMS)
- IC-16: Data Archiving (DA)
- IC-17: Travel Times (TvT)

General Requirements (not attributed to any one IC)

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

- Subsystem: which section of the SRS the subsystem requirement was extracted from
- Requirement Number: the requirement number assigned in the SRS
- Requirement Name: the name of the requirement assigned in the SRS

Test Method: the test method that was identified in the SRS

A number of simulators were developed to generate simulated device data streams – these simulators will be discussed in the Software Integration Case Procedures (SICP) document. The following sections detail what integration cases will be tested

2.1 IC-1: Core Processes

2.1.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation

Specific configurations of the computers will be specified in the Software Acceptance Test Plan.

2.1.2 Objectives

The objective of this integration case is to test the core processes that are used by all SunGuide^{SM} processes. The processes in this integration test provide the core software that is the base of the software framework in which SunGuide^{SM} processes operate.

2.1.3 Requirements to be Tested

Table 2.1 contains a list of the requirements for the SunGuide^{SM} Core Processes that will be tested as part of the acceptance testing of the SunGuide^{SM} software.

Table 2.1 - Core Processes Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
User (Administration) Oriented Requirements			
General	FEAT1.1.4	Operating system workstation security	Demonstration
General	FEAT1.1.5	User and user group assignments	Demonstration
General	FEAT1.1.6	Encrypted passwords	Inspection
General	FEAT1.1.7	User/group functionality	Demonstration
General	FEAT1.2.8	User and device tables	Inspection
General	FEAT1.2.9	Database table update permission	Demonstration
General	FEAT1.2.10	Device communication database update	Demonstration
General	FEAT1.2.11	Device specification	Demonstration
User	FEAT1.1.5	User and user group assignments	Demonstration
User	FEAT1.1.6	Encrypted passwords	Inspection
User	FEAT1.1.7	User/group functionality	Demonstration
User	SUB15.1	Default group levels	Demonstration
User	SUB15.2	Modify individual user privileges	Demonstration
User	SUB15.3	Modify default group levels	Demonstration
GUI	FEAT7.3.1	Automatic logoff	Demonstration
GUI	FEAT7.3.2	Username display	Demonstration
Status Logger Oriented Requirements			
GUI	SUB5.1.1	Configuration editor	Inspection
GUI	SUB5.1.3	Security Levels	Inspection
General	FEAT1.4.5	Separate log files	Demonstration
General	FEAT1.4.6	Time and origin	Demonstration
SL	SUB14.1.1	Configurable parameters	Inspection

Subsystem	Requirement Number	Requirement Name	Test Method
SL	SUB14.1.2	Message level	Inspection
SL	SUB14.1.3	Log fields	Demonstration
SL	SUB14.2.1	Connect	Demonstration
SL	SUB14.2.2	Multiple clients	Demonstration
SL	SUB14.3.1	View files	Demonstration
SL	SUB14.3.2	Filter messages	Demonstration
SL	SUB14.3.3	ASCII export	Demonstration
SL	SUB14.3.4	Refresh	Demonstration
SL	FEAT3.13	Query multiple files	Demonstration
SL	FEAT3.14	Remove log files	Demonstration
Executive Handler Oriented Requirements			
General	FEAT1.4.3	Executive Handler error logging	Demonstration
General	FEAT1.4.4	Logging levels	Demonstration
General	FEAT1.5.5	Monitor processes	Demonstration
General	FEAT1.6.16	Software versions	Demonstration
EH	FEAT3.1	Executive handler function	Demonstration
EH	FEAT3.2	Minimum functionality	Demonstration
EH	FEAT3.3	Start, stop, and restart processes	Demonstration
EH	FEAT3.4	Scheduled process control	Demonstration
EH	FEAT3.5	Group dependencies	Demonstration
EH	FEAT3.6	Process start order	Demonstration
EH	FEAT3.7	Restart safeguards	Demonstration
EH	FEAT3.8	Initialize individual components	Demonstration
EH	FEAT3.9	Monitor, report and display status	Demonstration
EH	FEAT3.10	Hierarchal view	Demonstration
EH	FEAT3.11	Monitor key data	Demonstration
EH	FEAT3.12	Database storage of information	Inspection
EH	SUB1.1.1	Configurable parameters	Inspection
EH	SUB1.1.2	Log level	Inspection
EH	SUB1.2.1	Control processes	Demonstration
EH	SUB1.2.2	Heartbeat	Demonstration
EH	SUB1.3.1	Visibility of processes	Demonstration
EH	SUB1.3.2	Process health	Demonstration
EH	FEAT3.15	Restart configuration	Demonstration
EH	FEAT3.16	Viewer startup credentials	Demonstration
Data Distribution Oriented Requirements			
General	FEAT1.2.1	Modular abstraction layer	Inspection
General	FEAT1.2.2	Input and output separated	Inspection
General	FEAT1.2.4	Data formats	Inspection
General	FEAT1.2.7	Databus architecture	Demonstration
General	FEAT1.6.9	Future capabilities	Inspection
General	FEAT1.6.10	Flexible and expandable	Inspection
DD	FEAT1.2.1	Modular abstraction layer	Inspection

Subsystem	Requirement Number	Requirement Name	Test Method
DD	FEAT1.2.2	Input and output separated	Inspection
DD	FEAT1.2.7	Databus architecture	Demonstration
DD	FEAT6	Data Distribution (DD)	
DD	FEAT6.1	Distribute data in real time.	Demonstration
DD	FEAT6.2	Retrieving real time data from the database	Demonstration
DD	FEAT6.3	Data selection	Demonstration
DD	SUB4.1	Subsystem requests	Demonstration
DD	SUB4.2	Route requests to subsystems	Demonstration
DD	SUB4.3	Subscribe	Inspection
DD	SUB4.4	ICD	Inspection
DD	SUB4.5	Provider template	Inspection
DD	SUB4.6	Status request	Demonstration

2.1.4 Test Procedure

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

- Utilize the SunGuide^{SM} administrative software to perform the following actions on users:
    - o Create
    - o Modify
    - o Delete
- Utilize the SunGuide^{SM} administrative software to perform the following actions on ITS devices:
    - o Create
    - o Modify
    - o Delete
- Exercise the features of the Status Logger service and the Status Viewer application to demonstrate the SunGuide^{SM} logging features
- Exercise the features of the Executive Handler service and the Executive Handler Viewer application to demonstrate the SunGuide^{SM} process management features
- Exercise the features of the SunGuide^{SM} Data Bus to demonstrate the data distribution capabilities of the SunGuide^{SM} software

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

2.2 IC-2: Dynamic Message Sign

2.2.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- Two SunGuide^{SM} workstations

- One NTCIP DMS device
- One Mark IV device

Specific configurations of the computers and ITS devices will be specified in the Software Acceptance Test Plan.

2.2.2 Objectives

The objective of this integration case is to test the requirements associated with the development, display, and management of messages on DMS devices.

2.2.3 Requirements to be Tested

Table 2.2 contains a list of the Dynamic Message Sign (DMS) requirements that will be tested during the formal acceptance testing of the SunGuide[SM] software.

Table 2.2 - Dynamic Message Sign Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
GUI	SUB5.2.2	Map icons	Inspection
GUI	SUB5.2.3	Device status	Demonstration
GUI	SUB5.2.4	Device control	Demonstration
GUI	FEAT7.5.1	Message library sorting	Demonstration
GUI	FEAT7.5.2	Message library selection	Demonstration
GUI	FEAT7.5.3	Status poll errors	Demonstration
GUI	FEAT7.5.4	Extended poll status display	Demonstration
GUI	SUB5.4.2	DMS Error messages	Demonstration
GUI	SUB5.4.3	DMS Display all data	Demonstration
General	FEAT1.6.1	TMC software monitoring	Demonstration
General	FEAT1.7.8	Interface to Amber Alert ITS Devices	Inspection
General	FEAT1.7.9	Interface to portable DMS and CCTV.	Inspection
DMS	FEAT9.1	DMS drivers	Demonstration
DMS	FEAT9.2	DMS control	Demonstration
DMS	FEAT9.3	Sending database messages	Demonstration
DMS	FEAT9.4	Save messages	Demonstration
DMS	FEAT9.5	Acceptable words/messages	Demonstration
DMS	FEAT9.6	System configuration	Demonstration
DMS	SUB7	DMS - Dynamic Message Signs	
DMS	SUB7.1.1	Send message	Demonstration
DMS	SUB7.1.2	Terminate message	Demonstration
DMS	SUB7.1.3	Set operational status	Demonstration
DMS	SUB7.1.4	Set brightness	Demonstration
DMS	SUB7.1.5	Control mode	Demonstration
DMS	SUB7.1.6	Exercise shutters	Demonstration
DMS	SUB7.1.7	Reset controller	Demonstration
DMS	SUB7.1.8	Synchronize clock	Demonstration
DMS	SUB7.2.1	Status poll	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
DMS	SUB7.2.2	Echo message	Demonstration
DMS	SUB7.2.3	Fan status	Demonstration
DMS	SUB7.2.4	Lamp status	Demonstration
DMS	SUB7.2.5	Pixel status	Demonstration
DMS	SUB7.3.1	Configure messages	Demonstration
DMS	SUB7.3.2	Approved words	Demonstration
DMS	SUB7.3.3	System defaults	Demonstration
DMS	SUB7.3.4	Automatic polls	Demonstration
DMS	SUB7.3.5	Logging	Demonstration
DMS	SUB7.3.6	Timed messages	Demonstration
DMS	FEAT9.8	Status poll data	Demonstration
DMS	FEAT16.1.1	Message Arbitration Subsystem (MAS)	Demonstration
DMS	FEAT16.1.2	Priority levels	Demonstration
DMS	FEAT16.2.1	Display order	Demonstration
DMS	FEAT16.2.2	Message removal	Demonstration
DMS	FEAT16.2.3	Equal priority	Demonstration
DMS	FEAT16.2.4	Blank queue	Demonstration
DMS	FEAT7.6.1	User specified priority	Demonstration
DMS	FEAT7.6.2	Manual message default priority	Demonstration
DMS	FEAT7.6.3	Sequence message default priority	Demonstration
DMS	FEAT7.6.4	Device queue display	Demonstration
DMS	FEAT9.10	Spelling conflict resolution	Demonstration

2.2.4 Test Procedure

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

- Access DMS devices from the SunGuide^{SM} map
- Utilize the SunGuide^{SM} DMS GUI to perform the following actions on DMS messages:
    - Create
    - Modify
    - Delete
- Demonstrate communication to DMS devices using the following protocols:
    - NTCIP
    - Mark IV
- Utilize the SunGuide^{SM} DMS GUI to perform the following actions on DMS message libraries:
    - Create
    - Modify
    - Delete
- Utilize the SunGuide^{SM} DMS GUI to perform high level status checks of DMS devices

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

2.3 IC-3: Video

2.3.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstations
- One NTCIP CCTV device (version: NTCIP 1205 v01.08 Amendment 1 v01.08)
- Four IP Video codecs (one encoder/decoder from each supported vendors)
- One video capture card
- One Barco/Argus video wall

Specific configurations of the computers and ITS devices will be specified in the Software Acceptance Test Plan.

2.3.2 Objectives

The objective of this integration case is to test the requirements associated with the use and management of CCTV camera, video monitors and video walls.

2.3.3 Requirements to be Tested

Table 2.3 contains a list of the Closed Circuit Television (CCTV) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.3 - Video Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
GUI	SUB5.2.2	Map icons	Inspection
GUI	SUB5.2.3	Device status	Demonstration
GUI	SUB5.2.4	Device control	Demonstration
GUI	SUB5.3.2	CCTV Error messages	Demonstration
General	FEAT1.6.1	TMC software monitoring	Demonstration
CCTV	FEAT8.1.1	Video surveillance	Demonstration
CCTV	FEAT8.1.2	Interface with CCTV cameras	Demonstration
CCTV	FEAT8.1.4	Lock CCTV	Demonstration
CCTV	FEAT8.1.5	Camera menu	Demonstration
CCTV	FEAT8.1.6	Interface to portable CCTV	Demonstration
CCTV	FEAT8.1.7	Real-time video display and control	Demonstration
CCTV	FEAT8.2.1	Pan/Tilt/Zoom (PTZ) systems	Demonstration
CCTV	FEAT8.2.2	Camera system types	Demonstration
CCTV	FEAT8.2.3	IP based controls	Demonstration
CCTV	FEAT8.2.5	Device driver types	Demonstration
CCTV	FEAT8.2.6	NTCIP standard	Demonstration
CCTV	FEAT8.3.1	Range objects	Demonstration
CCTV	FEAT8.3.2	Timeout objects	Demonstration
CCTV	FEAT8.3.3	Preset objects	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
CCTV	FEAT8.3.4	System feature control objects	Demonstration
CCTV	FEAT8.3.5	Alarm objects	Demonstration
CCTV	FEAT8.3.6	Discrete input objects	Demonstration
CCTV	FEAT8.3.7	Discrete output objects	Demonstration
CCTV	FEAT8.3.8	Zone parameters	Demonstration
CCTV	FEAT8.3.9	Label objects	Demonstration
CCTV	FEAT8.3.10	On-Screen camera menu objects	Demonstration
CCTV	FEAT8.4.1	MPEG2 displayed on monitors	Demonstration
CCTV	FEAT8.4.2	View image multiple locations	Demonstration
CCTV	FEAT8.4.3	Multiple video images from multiple sources on single monitor	Demonstration
CCTV	FEAT8.4.5	Control video	Demonstration
CCTV	SUB6.1.1	Lock camera	Demonstration
CCTV	SUB6.1.2	Unlock camera	Demonstration
CCTV	SUB6.1.3	Breaking locks	Demonstration
CCTV	SUB6.2.1	Camera accessibility	Demonstration
CCTV	SUB6.2.2	Blackout button	Demonstration
CCTV	SUB6.3.1	Set preset	Demonstration
CCTV	SUB6.3.2	Select preset	Demonstration
CCTV	SUB6.4.1	Configure video tours	Demonstration
CCTV	SUB6.4.2	Video tour parameters	Demonstration
CCTV	SUB6.5.1	Logging	Demonstration
CCTV	FEAT8.1.9	Lock acquisition	Demonstration
CCTV	FEAT8.1.10	AD keyboard support	Demonstration
CCTV	FEAT8.1.11	AD keyboard capabilities	Demonstration
CCTV	FEAT8.1.12	Automatic camera lock on motion	Demonstration
CCTV	FEAT8.1.13	Lock timeout	Demonstration

2.3.4 Test Procedure

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

- Add CCTV camera device to the SunGuide database
- Access CCTV camera devices from the SunGuide^{SM} map
- Utilize the SunGuide^{SM} CCTV GUI to perform the following actions on cameras:
  - Acquire (lock)
  - Reposition direction (using keyboard and joystick)
- Demonstrate communication to devices using the following protocols:
  - NTCIP for CCTV cameras
  - Apollo API for Barco/Argus Unit
  - SNMP for IP video devices
- Demonstrate video switching of IP Video devices
- Demonstrate video switching on the Barco/Argus unit

- Demonstrate video capturing of video (snapshots)
- Utilize the SunGuide^{SM} CCTV GUI to perform high level status checks of CCTV devices

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

2.4 IC-4: Transportation Sensor Subsystem

2.4.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstations
- One 170 device running BiTrans B288-I4 firmware or BiTrans simulator
- One EIS RTMS devices
- One Wavetronix RTMS devices
- TSS Simulator

Specific configurations of the computers and ITS devices will be specified in the Software Acceptance Test Plan.

2.4.2 Objectives

The objective of this integration case is to test the requirements associated with the use and management of the graphical map and vehicle detectors.

2.4.3 Requirements to be Tested

Table 2.4 contains a list of the Transportation Sensor System (TSS) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.4 - Transportation Sensor System Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
General	FEAT1.7.4	Traffic and delay prediction	Demonstration
GUI	SUB5.2.2	Map icons	Inspection
GUI	SUB5.2.3	Device status	Demonstration
GUI	SUB5.2.4	Device control	Demonstration
GUI	FEAT7.1	Entry of location and direction of travel data	Demonstration
GUI	FEAT7.2.1	GIS software interface	Demonstration
GUI	FEAT7.2.2	GIS data	Demonstration
GUI	FEAT7.2.4	SVG technology and ESRI shape file	Inspection
GUI	FEAT7.2.5	Remote viewing	Demonstration
GUI	SUB5.2.1	Map-based primary GUI	Inspection
GUI	FEAT7.4.1	Congestion alerts	Demonstration
GUI	FEAT7.7.4	Event relocation	Demonstration
GUI	FEAT7.4.2	Detector icons	Demonstration
GUI	FEAT7.4.4	Unacknowledged alarm alert	Demonstration
GUI	SUB5.9.2	TSS Error messages	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
General	FEAT1.6.1	TMC software monitoring	Demonstration
TSS	FEAT10.1	Data collection	Demonstration
TSS	FEAT10.2	Predict traffic conditions	Demonstration
TSS	FEAT10.3	Data sources	Demonstration
TSS	FEAT10.4	Data time intervals	Demonstration
TSS	FEAT10.6	Serial connections	Demonstration
TSS	FEAT10.7	Non NTCIP drivers	Demonstration
TSS	FEAT10.10	Control Data elements	Demonstration
TSS	SUB8.1	Raw data	Demonstration
TSS	SUB8.2	Smoothed data	Demonstration
TSS	SUB8.3	Smoothing algorithm	Inspection
TSS	SUB8.4	Automatic polls	Demonstration
TSS	SUB8.5	Logging	Demonstration

2.4.4 Test Procedure

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

- Access TSS data (i.e. speed, occupancy, volume) devices from the SunGuide^{SM} map
- Verify the following data from the TSS subsystem:
    - o Speed
    - o Occupancy
    - o Volume
- Demonstrate communication to the following devices:
    - o Wavetronix RTMS
    - o EIS RTMS
    - o 170 controller running BiTrans B238-I4 firmware
- Utilize the TSS subsystem to generate alarms (an XML test tool will be used to verify the alarm generation)

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

2.5 IC-5: Incident Management

2.5.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstations
- Two NTCIP DMS devices
- Two Mark IV devices

Specific configurations of the computers and ITS devices will be specified in the Software Acceptance Test Plan.

2.5.2 Objectives

The objective of this integration case is to test the requirements associated with the creation and management of SunGuide^{SM} incidents.

2.5.3 Requirements to be Tested

Table 2.5 contains a list of the Incident Management (IM) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.5 - Incident Management Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
General	FEAT1.4.1	Event notification	Demonstration
General	FEAT1.4.2	Event notifications stored in database	Demonstration
General	FEAT1.4.7	Contact list	Demonstration
General	FEAT1.6.8	Recommended responses	Demonstration
GUI	FEAT 7.7.1	Response time	Demonstration
GUI	FEAT7.7.3	Date/time entry	Demonstration
GUI	FEAT7.7.9	Un-owned incident alerts	Demonstration
GUI	FEAT7.7.10	Audible alarm configuration	Demonstration
IM	FEAT5.1.1	Minimum functionality	Demonstration
IM	FEAT5.1.2	Incident type	Demonstration
IM	FEAT5.1.3	Video verification	Demonstration
IM	FEAT5.1.4	Minimize keystrokes	Demonstration
IM	FEAT5.2.1	Incident detection	Demonstration
IM	FEAT5.2.2	Automatic detection of incident or congestion	Demonstration
IM	FEAT5.2.3	View congestion report	Demonstration
IM	FEAT5.2.4	View incident or congestion raw data	Demonstration
IM	FEAT5.2.5	Manual incident entry	Demonstration
IM	FEAT5.2.6	Graphical displays	Demonstration
IM	FEAT5.3	Manage	
IM	FEAT5.3.1	Geographic personnel lists	Demonstration
IM	FEAT5.3.2	Messaging	Demonstration
IM	FEAT5.3.3	Cataloging of incident management teams/resources	Demonstration
IM	FEAT5.3.4	Recommend DMS/HAR locations and messages	Demonstration
IM	FEAT5.3.5	Recommend a set of HAR messages	Demonstration
IM	FEAT5.3.6	Recommend alternate routes	Demonstration
IM	FEAT5.3.7	Select alternate maps	Demonstration
IM	FEAT5.3.9	Hierarchy of traffic management activities	Demonstration
IM	FEAT5.3.10	Personnel lists and contact numbers	Demonstration
IM	FEAT5.3.11	Distribute information	Demonstration
IM	FEAT5.3.12	Format for dissemination	Demonstration
IM	FEAT5.3.13	Quick click interface to GIS	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
IM	FEAT5.3.14	Incident status GUI	Demonstration
IM	FEAT5.3.15	Traffic control procedures	Demonstration
IM	FEAT5.3.16	Incident removal resources	Demonstration
IM	FEAT5.3.17	Catalog of FDOT resources	Demonstration
IM	FEAT5.3.18	Construction work zones	Demonstration
IM	FEAT5.3.19	Map display	Demonstration
IM	FEAT5.3.23	Diversion routes	Demonstration
IM	FEAT5.3.25	Severity levels	Demonstration
IM	FEAT5.3.26	Milepost entry	Demonstration
IM	FEAT5.3.27	Roadway associations	Demonstration
IM	FEAT5.3.28	Device selection	Demonstration
IM	FEAT7.7.2	Auto fill fields	Demonstration
IM	FEAT5.3.29	Incident number	Demonstration
IM	FEAT5.3.30	Message priority	Demonstration
IM	FEAT5.3.31	Cancel response plan	Demonstration
IM	FEAT5.3.32	Message removal	Demonstration
IM	FEAT5.4.1	Incident ownership	Demonstration
IM	FEAT5.4.2	Release ownership on logoff	Demonstration
IM	FEAT5.4.3	Log ownership changes	Demonstration
IM	FEAT5.4.4	Ownership privileges	Demonstration
IM	FEAT7.7.5	Read-only access	Demonstration
IM	FEAT5.4.5	Take ownership	Demonstration
IM	FEAT7.7.6	Ownership display	Demonstration
IM	FEAT7.7.7	Ownership filtering	Demonstration
IM	FEAT7.7.8	Un-owned incident alerts	Demonstration

2.5.4 Test Procedure

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

- Demonstrate creation of incident based on the following approaches:
  - Manual creation (user initiating from the map)
  - Automatic creation (as the result of an alarm being generated – the alarm will be generated using an XML test tool)
- Once an incident is created, demonstrate the following functions:
  - Response plan creation
  - Response plan modification
  - Contact list modification
  - Executing response plan (this includes sending messages to DMS devices)
  - Monitor the response plan

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

2.6 IC-6: Subsystem Updates - GUI, CCTV and IM

2.6.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation

Specific configurations of the computers will be specified in the detailed software test procedures.

2.6.2 Objectives

The objective of this integration case is to test the enhancements that were added to the subsystems tested as part of the initial SunGuide^{SM} release.

2.6.3 Requirements to be Tested

Table 2.6 contains a list of the requirements for the SunGuide^{SM} GUI, CCTV, and IM subsystems that will be tested.

Table 2.6 – GUI, CCTV and IM Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
Graphical User Interface (GUI)			
GUI	FEAT7.5.5	Manual DMS message permission	Demonstration
GUI	FEAT7.10.1	Manual HAR message permission	Demonstration
GUI	FEAT7.6.5	Edit MAS message permission	Demonstration
GUI	FEAT7.7.11	Edit IM message permission	Demonstration
GUI	FEAT7.2.7	Color selection dialog	Demonstration
GUI	FEAT7.3.3	Status icon color configuration	Demonstration
GUI	SUB5.3.1	CCTV Icon colors	Demonstration
GUI	SUB5.4.1	DMS Icon colors	Demonstration
GUI	SUB5.5.1	HAR Icon colors	Demonstration
GUI	SUB5.6.1	RWIS Icon colors	Demonstration
GUI	SUB5.7.1	RMS Icon colors	Demonstration
GUI	SUB5.8.1	SB Icon colors	Demonstration
GUI	SUB5.9.1	TSS Icon colors	Demonstration
GUI	FEAT7.3.5	View color selections	Demonstration
GUI	FEAT7.3.6	Device driver display	Demonstration
GUI	SUB5.3.3	CCTV Display all data	Demonstration
GUI	SUB5.5.3	HAR Display all data	Demonstration
GUI	SUB5.6.3	RWIS Display all data	Demonstration
GUI	SUB5.7.3	RMS Display all data	Demonstration
GUI	SUB5.8.3	SB Display all data	Demonstration
GUI	SUB5.9.3	TSS Display all data	Demonstration
GUI	FEAT7.3.4	Error messages	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
GUI	SUB5.5.2	HAR Error messages	Demonstration
GUI	SUB5.6.2	RIWS Error messages	Demonstration
GUI	SUB5.7.2	RMS Error messages	Demonstration
GUI	SUB5.8.2	SB Error messages	Demonstration
Closed Circuit Television (CCTV)			
CCTV	FEAT8.3.5	Alarm objects	Demonstration
CCTV	FEAT8.3.6	Discrete input objects:	Demonstration
CCTV	FEAT8.3.7	Discrete output objects:	Demonstration
CCTV	FEAT8.3.8	Zone parameters:	Demonstration
CCTV	FEAT8.3.9	Label objects	Demonstration
CCTV	FEAT8.3.10	On-Screen camera menu objects	Demonstration
CCTV	FEAT7.8.1	Camera menu activation	Demonstration
CCTV	FEAT7.8.2	Joystick configuration	Demonstration
Incident Management (IM)			
IM	FEAT5..5	Configure one phase messages	Demonstration
IM	FEAT5.1.6	Replacement words for messages	Demonstration

2.6.4 Test Procedure

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

- Utilize the SunGuide^{SM} GUI to determine:
    - o Limit the generation of ad-hoc messages included
    - o Display user configurable colors from the various subsystems
    - o View the detailed data from the device drivers
    - o View the error messages from various device drivers
    - o Utilize the CCTV GUI to display detailed data from the device driver
- Utilize the CCTV subsystem to manipulate the menus on a CCTV device
- Evaluate the recommended response plans from the IM subsystem to determine if one phased messages with abbreviations are being recommended to the user.

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

2.7 IC-7: Trailblazer

2.7.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation
- One Trailblazer simulator

Specific configurations of the computers 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 the use and management of Trailblazer devices.

2.7.3 Requirements to be Tested

Table 2.7 contains a list of the Trailblazer requirements that will be tested during the formal acceptance testing of the SunGuide[SM] software.

Table 2.7 – Trailblazer Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
DMS	FEAT9.7	Trail blazer signs	Demonstration
DMS	FEAT5.3.8	Communicate with detour message signs	Demonstration

2.7.4 Test Procedure

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

- Utilizing the GUI, exercise the features of the Trailblazer by setting different values and observe the results on the simulator.

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

2.8 IC-8: Safety Barrier

2.8.1 Equipment Needed

To test the SunGuide[SM] Safety Barrier (SB) subsystem the following equipment will be required:

- One SunGuide[SM] application server
- One SunGuide[SM] database server
- Safety Barrier device simulator

Specific configurations of the computers 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 the use and management of the Safety Barrier subsystem.

2.8.3 Requirements to be Tested

Table 2.8 contains a list of the requirements for the Safety Barrier (SB) requirements that will be tested during the formal acceptance testing of the SunGuide[SM] software.

Table 2.8 – Safety Barrier Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
SB	FEAT17.4	SB protocol	Demonstration
SB	FEAT17.5.1	Monitor SB status	Demonstration
SB	FEAT17.5.2	SB status information	Demonstration
SB	FEAT17.6.1	Detect SB incidents	Demonstration
SB	FEAT17.6.2	SB switch alert	Demonstration
SB	FEAT17.6.3	Log timestamp of switch activation	Demonstration
SB	FEAT17.6.4	Log timestamp of switch restoration	Demonstration

2.8.4 Test Procedure

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

- Utilize the SunGuideSM GUI to observe the status of safety barrier devices as the device state is modified using the SB simulator

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

2.9 IC-9: RWIS

2.9.1 Equipment Needed

To test the SunGuide^{SM} RWIS subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation
- One RWIS device
- RWIS Simulator

Specific configurations of the computers 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 the use and management of the Roadway Weather Information System (RWIS) subsystem.

2.9.3 Requirements to be Tested

Table 2.9 contains a list of the RWIS requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.9 – RWIS Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
RWIS	FEAT12.1	Detection of road weather conditions	Demonstration
RWIS	FEAT12.2	Report weather and surface conditions	Demonstration
RWIS	FEAT12.3	NTCIP protocol	Inspection
RWIS	FEAT12.4	Physical communication	Demonstration
RWIS	FEAT12.5	Object definitions	Demonstration
RWIS	FEAT12.6	Data fields	Demonstration
RWIS	FEAT12.7	NTCIP protocol standard	Demonstration
RWIS	FEAT12.8	RWIS Interface	Demonstration
RWIS	FEAT12.9	User interface display	Demonstration
RWIS	FEAT12.10	Statewide data display	Demonstration

2.9.4 Test Procedure

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

- Utilize the SunGuide^{SM} GUI to observe the status of the various RWIS fields as they are modified in the RWIS simulator.
- Utilize the SunGuide^{SM} GUI to observe the status of the various RWIS fields as they are updated from the NTCIP RWIS device (the fields to be viewed will be limited based on the sensors actually connected and operational on the RWIS device).

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

2.10 IC-10: HAR

2.10.1 Equipment Needed

To test the SunGuide^{SM} HAR subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation
- One DR2000 HAR controller

Specific configurations of the computers 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 use and management of the HAR subsystem.

2.10.3 Requirements to be Tested

Table 2.10 contains a list of the Highway Advisory Radio (HAR) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.10 – HAR Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
HAR	SUB13.1.1	Automatic polls	Demonstration
HAR	SUB13.1.2	Logging	Demonstration
HAR	SUB13.1.3	HAR Interface	Demonstration
HAR	SUB13.2.1	Send message	Demonstration
HAR	SUB13.2.2	Terminate message	Demonstration
HAR	SUB13.2.3	Set operational status	Demonstration
HAR	SUB13.2.4	Activate/deactivate beacon	Demonstration
HAR	SUB13.3.1	Status poll	Demonstration

2.10.4 Test Procedure

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

- Utilize the HAR GUI to send messages to HAR device
- Utilize the HAR GUI to observe the status of the HAR device

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

2.11 IC-11: Ramp Metering

2.11.1 Equipment Needed

To test the SunGuide^{SM} RMS subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation
- Two 170 controllers running the WSDOT Ramp Metering firmware
- One 170 controller running the BiTrans loop simulator software

Specific configurations of the computers 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 the use and management of the Ramp Meter subsystem.

2.11.3 Requirements to be Tested

Table 2.11 contains a list of the Ramp Metering Subsystem (RMS) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.11 – Ramp Metering Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
RMS	FEAT15.1.1	Download parameters	Demonstration
RMS	FEAT15.1.2	Online status	Demonstration
RMS	FEAT15.1.3	Associate detectors	Demonstration
RMS	FEAT15.1.4	Modify vehicle release mode	Demonstration
RMS	FEAT15.1.5	Responsive mode	Demonstration
RMS	FEAT15.1.6	Manual override	Demonstration
RMS	FEAT15.2.1	System operating parameters	Demonstration
RMS	FEAT15.2.2	Controller groups	Demonstration
RMS	FEAT15.2.3	Central overrides	Demonstration
RMS	FEAT15.2.4	Monitoring status	Demonstration
RMS	FEAT15.2.5	Metering on/off	Demonstration
RMS	FEAT15.2.6	Logging	Demonstration
RMS	FEAT15.3.1	Automatic polls	Demonstration
RMS	FEAT15.3.2	Manual poll	Demonstration
RMS	FEAT15.3.3	Synchronize clock	Demonstration

2.11.4 Test Procedure

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

- Utilize the SunGuide^{SM} administrative editor to configure RMS devices
- Utilize the SunGuide^{SM} GUI to alter the operational state of the RMS devices
- Utilize the SunGuide^{SM} GUI to observe the status of the RMS devices

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

2.12 IC-12: Center-to-Center

2.12.1 Equipment Needed

To test the SunGuide^{SM} C2C subsystem the following equipment will be required:

- Two SunGuide^{SM} application servers
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation

Specific configurations of the computers 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 use and management of the C2C subsystem.

2.12.3 Requirements to be Tested

Table 2.12 contains a list of the Center-to-Center (C2C) requirements that will be tested during the formal acceptance testing of the SunGuide[SM] software.

Table 2.12 – Center-to-Center Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
C2C	FEAT13.1	Center-to-center communications	Demonstration
C2C	FEAT13.2	Coordination and delegation	Demonstration
C2C	FEAT13.3	Center-to-Center functions	Demonstration
C2C	FEAT13.4	Approve C2C messages	Demonstration
C2C	SUB11.1.1	Network ID	Inspection
C2C	SUB11.1.2	Retrieve data	Demonstration
C2C	SUB11.1.3	Incidents	Demonstration
C2C	SUB11.1.4	Traffic data	Demonstration
C2C	SUB11.1.5	Roadway segments	Demonstration
C2C	SUB11.2.1	DMS	Demonstration
C2C	SUB11.2.2	HAR	Demonstration
C2C	SUB11.2.3	CCTV	Demonstration
C2C	SUB11.2.4	Snapshots	Demonstration
C2C	SUB11.2.5	RWIS	Demonstration
C2C	SUB11.3.1	DMS	Demonstration
C2C	SUB11.3.2	HAR	Demonstration
C2C	SUB11.3.3	CCTV	Demonstration

2.12.4 Test Procedure

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

- Configure two different application servers to represent two different SunGuide[SM] deployments
- Utilize the C2C subsystem on both application servers to exchange status information, view the status information on the SunGuide[SM] GUI
- Utilize the SunGuide[SM] GUI to send command requests to the other SunGuide[SM] application server

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

2.13 IC-13: Web Server

2.13.1 Equipment Needed

To test the SunGuide^{SM} WS subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} web server
- One SunGuide^{SM} workstation
- One RWIS simulator

Specific configurations of the computers 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 the use and management of the Web Server subsystem.

2.13.3 Requirements to be Tested

Table 2.13 contains a list of the Web Server (WS) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.13 – Web Server Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
WS	FEAT2.1	Web server function	Demonstration
WS	FEAT2.2	Video server	Demonstration
WS	FEAT2.3	Access to camera system control functions	Demonstration
WS	FEAT2.4	Map elements: congestion, incidents, cameras, DMSs	Demonstration
WS	SUB16.1.1	Operating system	Demonstration
WS	SUB16.1.2	HTML content	Inspection
WS	SUB16.1.3	Data source	Inspection
WS	SUB16.2.1	Snapshot configuration	Demonstration
WS	SUB16.2.2	Snapshot availability	Demonstration
WS	SUB16.3.1	Web CCTV control	Demonstration
WS	SUB16.3.2	Web access to SunGuide	Demonstration
WS	SUB16.4.1	Map GIS source	Inspection
WS	SUB16.4.2	SunGuide web data	Demonstration
WS	SUB16.4.3	Map icons	Demonstration
WS	SUB16.4.4	Map configuration	Demonstration
WS	SUB16.4.5	Data updates	Demonstration
WS	SUB16.4.6.1	DMS	Demonstration
WS	SUB16.4.6.2	RWIS	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
WS	SUB16.4.6.3	Speeds	Demonstration
WS	SUB16.4.6.4	Incident data	Demonstration
WS	SUB16.4.6.5	Video snapshots	Demonstration

2.13.4 Test Procedure

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

- Utilize a web browser to access the SunGuide^{SM} web server to view the SunGuide^{SM} data from a SunGuide^{SM} deployment
- Utilize SunGuide^{SM} GUI to change various data fields and observe the changes on the web server
- Utilize RWIS simulator to change various data fields and observe the changes on the web server

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

2.14 IC-14: Emergency Evacuation

2.14.1 Equipment Needed

To test the SunGuide^{SM} EE subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} EE web server
- One SunGuide^{SM} workstation

Specific configurations of the computers 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 use and management of the Emergency Evacuation subsystem.

2.14.3 Requirements to be Tested

Table 2.14 contains a list of the Emergency Evacuation (EE) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.14 – Emergency Evacuation Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
EE	FEAT11.1	Definition	Demonstration
EE	FEAT11.2	Manage evacuation	Demonstration
EE	FEAT11.3	Functionality	Demonstration
EE	FEAT11.4.1	Determine evacuation necessity	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
EE	FEAT11.4.2	Multiple distributed locations	Demonstration
EE	FEAT11.4.3	Shelter-in-place information for non-evacuation	Demonstration
EE	FEAT11.4.4	List and graphical depiction of evacuation zones	Demonstration
EE	FEAT11.4.5	Alternative evacuation destinations	Demonstration
EE	FEAT11.4.7	Recommended evacuation and reentry start time	Demonstration
EE	FEAT11.4.8	Evacuation shelters	Demonstration
EE	FEAT11.4.9	Zones and categories	Demonstration
EE	FEAT11.5.1	Evacuation travel information	Demonstration
EE	FEAT11.5.2	Multiple distributed locations	Demonstration
EE	FEAT11.5.3	Information about traffic conditions	Demonstration
EE	FEAT11.5.4	Current and forecast weather conditions	Demonstration
EE	FEAT11.5.5	Transportation modes	Demonstration
EE	FEAT11.5.6	Evacuation guidance information	Demonstration
EE	FEAT11.5.7	Lodging availability	Demonstration
EE	FEAT11.6.1	Evacuation traffic management	Demonstration
EE	FEAT11.6.2	Real-time data collection	Demonstration
EE	FEAT11.6.5	Control of devices	Demonstration
EE	FEAT11.6.6	Manual override	Demonstration
EE	FEAT11.6.7	Incident management for evacuation routes.	Demonstration

2.14.4 Test Procedure

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

- Utilize a web browser to access the SunGuide^{SM} EE web server to view the SunGuide^{SM} data from a SunGuide^{SM} deployment
- Utilize a web browser to access the SunGuide^{SM} EE web server to view the web sites provided as information links

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

2.15 IC-15: Inventory and Maintenance Subsystem

2.15.1 Equipment Needed

To test the SunGuide^{SM} IMS subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation

Specific configurations of the computers will be specified in the detailed software test procedures.

2.15.2 Objectives

The objective of this integration case is to test the requirements associated with the use and management of the IMS subsystem.

2.15.3 Requirements to be Tested

Table 2.15 contains a list of the Inventory and Maintenance Subsystem (IMS) requirements that will be tested during the formal acceptance testing of the SunGuide[SM] software.

Table 2.15 – IMS Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
IMS	FEAT4.1.1	Interface to maintenance and inventory tracking software	Demonstration
IMS	FEAT4.1.2	Index by equipment type	Demonstration
IMS	FEAT4.1.3	Vendor name referenced by equipment type ID.	Demonstration
IMS	FEAT4.1.4	Reports provided by type ID	Demonstration
IMS	FEAT4.1.5	View and print vendor table	Demonstration
IMS	FEAT4.1.6	Location data	Demonstration
IMS	FEAT4.1.7	Equipment status categories	Demonstration
IMS	FEAT4.1.8	Record status of equipment	Demonstration
IMS	FEAT4.1.9	Equipment status tracking	Demonstration
IMS	FEAT4.1.10	Save repair information	Demonstration
IMS	FEAT4.1.11	Repair history	Demonstration

2.15.4 Test Procedure

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

- Utilize the SunGuide[SM] GUI to access the IMS data about devices
- Utilize the SunGuide[SM] GUI to add maintenance information about devices
- Utilize the SunGuide[SM] GUI to generate reports about devices

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

2.16 IC-16: Data Archiving

2.16.1 Equipment Needed

To test the SunGuide[SM] DA subsystem the following equipment will be required:

- One SunGuide[SM] application server
- One SunGuide[SM] database server

Specific configurations of the computers will be specified in the detailed software test procedures.

2.16.2 Objectives

The objective of this integration case is to test the requirements associated with the use and management of the Data Archive subsystem.

2.16.3 Requirements to be Tested

Table 2.16 contains a list of the Data Archive (DA) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.16 – Data Archiving Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
DA	FEAT14.1	Data warehousing	Demonstration
DA	FEAT14.2	Automated archiving	Demonstration
DA	FEAT14.3	Archive data minimums	Demonstration
DA	FEAT14.4	Format standards	Demonstration
DA	FEAT14.5	Export form	Demonstration
DA	SUB12.1.1	Archive frequency	Demonstration
DA	SUB12.1.2	Missing data	Inspection
DA	SUB12.1.3	Organization	Inspection
DA	SUB12.1.4	Formatting	Inspection
DA	SUB12.2.1	File duration	Inspection
DA	SUB12.2.2	File location	Demonstration
DA	SUB12.2.3	Filename specifications	Inspection
DA	SUB12.2.4	File header contents	Inspection
DA	SUB12.2.5	File detailed contents	Inspection
DA	SUB12.3.1	System log archives	Inspection
DA	SUB12.3.2	Device status archives	Inspection
DA	SUB12.3.3	Incident archives	Inspection
DA	SUB12.3.4	Detector data archives	Inspection
DA	SUB12.3.5	Travel time archives	Inspection
DA	SUB12.3.6	RWIS archives	Inspection
DA	SUB12.3.7	HAR archives	Inspection
DA	SUB12.3.8	DMS archives	Inspection
DA	SUB12.3.9	Ramp meter archives	Inspection
DA	SUB12.3.10	Ramp meter detector data archives	Inspection

2.16.4 Test Procedure

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

- Utilize the SunGuide^{SM} Status Logger to view data logged to the status log
- Utilize the Oracle console application to view data stored in the database
- Utilize the Windows Notepad to view the comma delimited files created by the DA subsystem

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

2.17 IC-17: Travel Times

2.17.1 Equipment Needed

To test the SunGuide^{SM} TvT subsystem the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation
- EIS RTMS simulator (to alter speeds)

Specific configurations of the computers will be specified in the detailed software test procedures.

2.17.2 Objectives

The objective of this integration case is to test the requirements associated with the use and management of the Travel Time subsystem.

2.17.3 Requirements to be Tested

Table 2.17 contains a list of the Travel Time (TvT) requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.17 – Travel Time Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
TvT	FEAT14.1	Compose and send travel time messages	Demonstration
TvT	FEAT14.2	Generate travel time messages	Demonstration
TvT	FEAT14.3	Travel time message template	Demonstration
TvT	FEAT14.4	Travel time message priority	Demonstration
TvT	FEAT14.5	Travel time generation method	Demonstration
TvT	SUB12.1.1	Travel time link setup	Demonstration

2.17.4 Test Procedure

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

- Utilize the SunGuide^{SM} Administrative editor to review and modify the TvT message template
- Utilize the Travel Time setup editor to create and alter travel time links
- Observe that the TvT subsystem generates messages to the MAS subsystem for display on DMS devices – utilize the EIS RTMS simulator to change report speeds to observe the changes in travel times

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

2.18 General Requirements (not attributed to any one IC)

2.18.1 Equipment Needed

To test the SunGuide^{SM} core processes the following equipment will be required:

- One SunGuide^{SM} application server
- One SunGuide^{SM} database server
- One SunGuide^{SM} workstation
- One SunGuide^{SM} configured laptop
- One firewall

Specific configurations of the computers will be specified in the detailed software test procedures.

2.18.2 Objectives

The objective of this integration case is to test requirements that are not attributable to a single subsystem; that is, the requirements apply to the SunGuide^{SM} software as a whole.

2.18.3 Requirements to be Tested

Table 2.18 contains a list of the general requirements that will be tested during the formal acceptance testing of the SunGuide^{SM} software.

Table 2.18 – General Requirements

Subsystem	Requirement Number	Requirement Name	Test Method
User (Administration) Oriented Requirements			
General	FEAT1.5.9.2	STMC	Demonstration
General	FEAT1.5.9.3	VTMC	Demonstration
General	FEAT1.5.9.4	PTMC	Demonstration
General	FEAT1.6.13	Limited access facilities	Inspection
General	FEAT1.6.14	Traveler information	Inspection
General	FEAT1.8	Coordination of agencies	Inspection
General	FEAT5.3.22	Coordination of freeway incident management team	Demonstration
General	FEAT1.7.12	General device driver	Demonstration
General	FEAT7.2.3	Viewable from PTMCs, VTMCs, RTMCs and FDOT central office	Demonstration
General	FEAT1.5.8	Work zone	Demonstration
General	FEAT1.1.1	Allow firewall usage	Demonstration
General	FEAT1.2.16	System support jobs	Inspection
General	FEAT14.2	Automated archiving	Demonstration
General	FEAT1.2.18	Automated backup	Demonstration
General	FEAT1.7.7	Use operating system schedulers	Inspection
General	FEAT1.2.6	Historical data	Demonstration
General	FEAT3.12	Database storage of information	Inspection
General	FEAT1.5.1	Traffic management	Demonstration

Subsystem	Requirement Number	Requirement Name	Test Method
General	FEAT1.2.13	Database clustering	Demonstration
General	FEAT1.6.11	Automation of system support tasks	Inspection
General	FEAT1.6.15	FDOT legacy device drivers	Inspection
General	SUB16.1.1	Operating system	Demonstration
Non-Testable Requirements			
	FEAT1.1.2	Firewall security policy	
	FEAT1.1.3	DMZ model to segment LAN traffic	

2.18.4 Test Procedure

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

- View the SunGuide^{SM} software running in various configurations
- View that SunGuide^{SM} does not inhibit a variety of operating system capabilities
- View that SunGuide^{SM} supports the use of a database in different modes
- View that SunGuide^{SM} can operate in an environment with a firewall

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

3. Notes

None.