SunGuide℠ Library System:

Software Requirements Specification Document

SunGuide-SRS-1.0.2-Final

Prepared for:

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List of Acronyms

ATMS .....Advanced Traffic Management System
C2C .....Center-to-Center
CCTV.....Closed Circuit Television
DA.....Data Archiving
DD.....Data Distribution
DMS.....Dynamic Message Sign
DOT .....Department of Transportation
FDOT .....Florida Department of Transportation
FEAT.....Feature Requirement
HAR .....Highway Advisory Radio
IM.....Incident Management
IMS .....Inventory Maintenance System
ITS.....Intelligent Transportation Systems
ITN.....Invitation to Negotiate
RWIS.....Road Weather Information System
SRS .....Software Requirements Specification
SUB.....Subsystem Requirement
SwRI .....Southwest Research Institute
TMC.....Traffic Management Center
TSS.....Transportation Sensor System
XML.....eXtensible Markup Language

REVISION HISTORY

Revision	Date	Changes
1.0.0-Draft	December 22, 2003	Initial Release.
1.0.1-Draft	January 27, 2004	Updated based on SRR input and discussion with ITS Central Office.
1.0.2	April 2, 2004	Incorporated FDOT comments.

1. Scope

1.1 Document Identification

The Software Requirements Specification (SRS) details the requirements for the Statewide Transportation Management Center Software Library System. The requirements are separated into two types; features (FEAT) that were specified in the Invitation to Negotiate (ITN) and new subsystem (SUB) requirements determined during initial system design.

The requirements for the system are maintained in a database using Rational RequisitePro. This document serves as a starting point for the requirements and discusses how to access, view, and maintain the requirements database. This document is not intended to be a user manual for RequisitePro. For information on using RequisitePro, refer to the hard copy documentation accompanying the product, the RequisitePro online help, or the Rational web site at http://www.rational.com.

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 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:

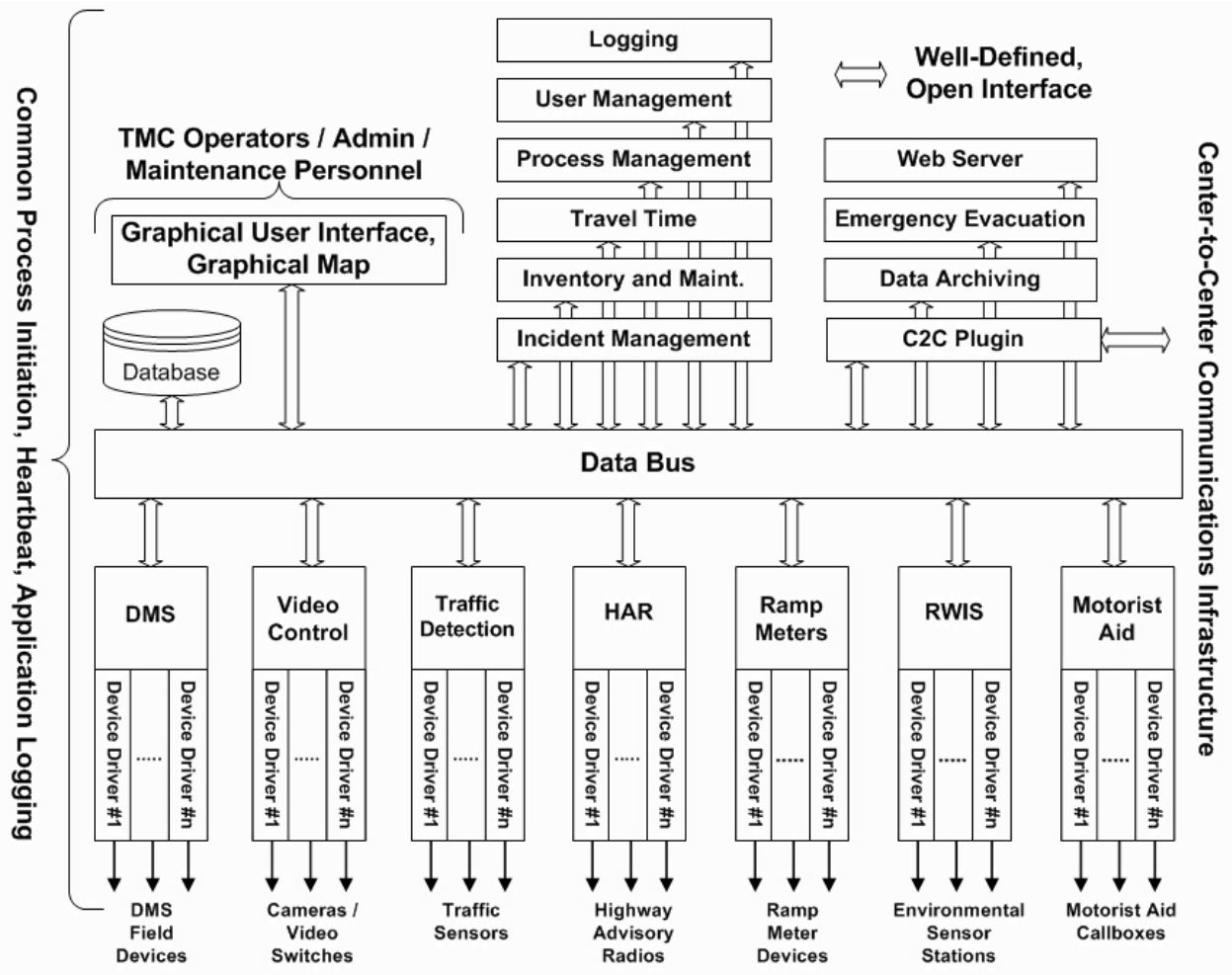

Figure 1.1 - High-Level Architectural Concept

The SunGuide 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 Project website: http://sunguide.datasys.swri.edu.

1.4 Contacts

The following are contact persons for the SunGuide software project:

- Chester Chandler, ITS Central Office, chester.chandler@dot.state.fl.us, 850-410-5600
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- Steve Dellenback, SwRI Project Manager, sdellenback@swri.org, 210-522-3914
- Robert Heller, SwRI Software Project Manager, rheller@swri.org, 210-522-3824
- Charlie Wallace, PBF Deputy Project Manager, WallaceC@pbworld.com, 352-374-6635
- John Schumitz, PBF Software Project Manager, schumitz@pbworld.com, 301-816-1852

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

- Dan Baxter, PB Farradyne, FDOT C2C Project, baxter@pbworld.com, 407-587-7809
- 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
- Jerry Bloodgood, McCain, Ramp Metering
- Leslie Jacobson, PB Farradyne, Ramp Metering, jacobsonl@pbworld.com, 206-382-5290

2. Requirements

The following sections describe how to access, view, and update the requirements for the SunGuide system.

2.1 Accessing and Viewing the Requirements

To access the database using RequisitePro, select the "Project->Open" menu option. Select "SunGuide" from the projects list. If "SunGuide" does not appear on the list of projects, select "Add…" to add the "SunGuide.RQS" project. The database views can be accessed by selecting the "Views workplace" button.

The RequisitePro database has a default Attribute Matrix View defined for each type of requirement. The requirements can be viewed directly from the database views or from this file. This file is intended to allow those who do not have RequisitePro access to the requirements. The RequisitePro database contains more detailed information than can be displayed in this file.

There are two types of requirements that are used for the SunGuide system. Table 2.1 describes each requirement type and lists the RequisitePro view name from which the requirements for that type can be viewed.

Table 2.1 - Requirement types for the SunGuide system

Requirement Type	Requirement Type Description	RequisitePro View Name
Functional	Requirements that are features of the system.	FEAT
Functional	Requirements for the individual subsystems.	SUB

Each requirement in the database has associated attributes. Table 2.2 describes each attribute, acceptable values for the attribute, and the requirement types in which the attribute is used.

Table 2.2 - SunGuide Requirement Attributes

Attribute Name	Description	Requirement Types Where Used
SunGuide ID	The original requirement number as listed in the ITN.	FEAT
Status	The current status of the requirement. Status values include: • Proposed – The requirement has been proposed but has not been approved. • Approved – The requirement has been approved. • FDOT – The satisfaction of the	FEAT, SUB

Attribute Name	Description	Requirement Types Where Used
	requirement is the responsibility of the FDOT. • Future – The requirement has been relegated to a future allocation of funds. • Validated – The requirement has been validated as being part of the working system. • Not approved – The requirement has been rejected by FDOT. • District request—The requirement has been requested by one or more districts.	
Test case	The acceptance test plan test case which validates this requirement.	FEAT, SUB
Traced-to	The SUB requirements that can be traced from this requirement.	FEAT
Traced-from	The requirements that can be traced to this requirement from a FEAT requirement.	SUB
Test Method	How the Requirement would be tested. Qualification methods include: • Demonstration – The functionality would be demonstrated (possibly during an acceptance test.) • Inspection – The software would be inspected by an Independent Verification and Validation (IV&V) team to confirm the requirement has been met. • Test – A test program will confirm the requirement has been met.	FEAT, SUB

2.2 Updating the Requirements

The requirements database can be updated by adding, modifying, and deleting requirements directly from the RequisitePro database views. When the database has been modified, this document should be regenerated.

2.3 Requirements Tables

Requirements listed in Table 2.3 will be satisfied by the FDOT and will not be the responsibility of the software contractor.

Table 2.3 - FDOT Feature Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status
FEAT1.1.2	Firewall security policy	A firewall shall provide EAL-4+ certification employing a "default deny" security policy. Both ASCII and binary logging shall be available and enabled on the firewall.	NW001	FDOT
FEAT1.1.3	DMZ model to segment LAN traffic	A multi-layer DMZ model shall be used to segment traffic coming into the transaction server(s) from public LAN connections (if any) by being able to access the database layer.	NW002	FDOT
FEAT1.2.14	RPO shall be less than 0.1%	The SunGuide system shall have a recovery point objective of having less than one-tenth percent (0.1%) difference between the master database and the recovery copy of the database at all times.	DB003	FDOT
FEAT1.2.15	RTO shall be less than 1 hour	The recovery time objective shall be one hour or less.	DB001R	FDOT

Table 2.4 lists the the software requirements as interpreted from the original system requirements outlined in the ITN. These requirements have been reorganized to allow subsystem requirements to be better grouped. The original SunGuide requirement identifier is noted as an attribute in the table.

Table 2.4 - All Feature Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1	General	General requirements not relating to particular subsystems or components.			
FEAT1.1	Network security				
FEAT1.1.1	Allow firewall usage	The SunGuide system shall not prohibit the use of a firewall and the identification of what ports and hostnames are used to communicate between processes shall be provided so allowances can be made to pass through a firewall.	S026	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.1.4	Operating system workstation security	The SunGuide software shall use windows domain authentication for user login.	S012	Approved	Demonstration
FEAT1.1.5	User and user group assignments	The workstation security function shall provide the capability to assign specific users and groups to categories that have specific access to levels of the software functionality.	WS001	Approved	Demonstration
FEAT1.1.6	Encrypted passwords	The workstation security function shall use encrypted passwords to identify which users or groups can access what levels of software functionality.	WS002	Approved	Inspection
FEAT1.1.7	User/group functionality	Each user added to a group shall inherit the functionality of the group.	WS003	Approved	Demonstration
FEAT1.1.8	Workstations not user-specific	In the event of a workstation failure, users shall be able to log into other workstations and have the same functionality as they would if they were at their own workstation.	WS004	Approved	Demonstration
FEAT1.1.9	System administrator access	The SunGuide software shall not prevent system administrators from access to the security of the operating system and operating system functionality (access to disk drives, system configuration, etc.)	WS005	Approved	Demonstration
FEAT1.1.10	Software module access	As the SunGuide GUI is browser-based, no .EXE files shall be placed upon user workstations.	WS006	Approved	Inspection
FEAT1.1.11	Call box cycling	The SunGuide workstation operator shall have the capability to cycle the call box icon on and off.	GS006	Future	
FEAT1.2	Database and Databus				
FEAT1.2.1	Modular abstraction layer	The databus shall be a modular abstraction layer to allow subsystems to retrieve data.	DB001	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.2.2	Input and output separated	The databus shall have an Interface Control Document (ICD) for client data exchange and an ICD for subsystem data exchange.	DB001A	Approved	Inspection
FEAT1.2.3	Non-compliant SQL databases	The SunGuide software shall not require third party subsystems to access an SQL database.	DB002	Approved	Inspection
FEAT1.2.4	Data formats	eXtensible Markup Language (XML) shall be used to transmit data to and from the central data repository (databus).	DB002A	Approved	Inspection
FEAT1.2.5	Database reports	Reports shall be generated by accessing data in the database directly.	DB003A	Approved	Demonstration
FEAT1.2.6	Historical data	An option shall be provided for FDOT to store historical data for traffic management devices for a specified amount of time programmable at the system administrator level.	DB004	Approved	Demonstration
FEAT1.2.7	Databus architecture	Each subsystem shall ensure the central data repository (databus) contains the most recent data, including equipment status.	S003	Approved	Demonstration
FEAT1.2.8	User and device tables	Tables shall exist in the Oracle database for entry of GUI workstation users and parameters to set up, control and communicate with devices such as DMSs, CCTVs, cameras, loop controllers, and other devices.	UT001	Approved	Inspection
FEAT1.2.9	Database table update permission	The SunGuide system shall support the specification of field device parameters for the creation and control of field devices such as camera control, DMS message content, video wall control, ramp meters, and other devices.	UT002	Approved	Demonstration
FEAT1.2.10	Device communication database update	Data collected from device communications software shall update the database tables as soon as data is received.	UT003	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.2.11	Device specification	The SunGuide system shall support the specification of field device parameters for the creation and control of field devices such as camera control, DMS message content, video wall control, ramp meters, and other devices.	UT004	Approved	Demonstration
FEAT1.2.12	Device status	Table parameters shall provide for current status of such devices and allow for the creation of status lists based on device.	UT005	Approved	Demonstration
FEAT1.2.13	Database clustering	The SunGuide software shall be capable of running in a clustered database configuration.	S007	Approved	Demonstration
FEAT1.2.16	System support jobs	The system support function shall store the history information pertaining to the status of a job inside the Oracle database table for the future references.	SS001	Approved	Inspection
FEAT1.2.17	Database backup	The backup component shall shutdown the database and take the complete backup of all the database related files unless a RAID system is used that allows mirroring.	SS002B	Approved	Demonstration
FEAT1.2.18	Automated backup	The system support function shall provide an automated backup component that can be programmed to perform one or more backups throughout the day at a specific clock time.	SS001B	Approved	Demonstration
FEAT1.2.19	Database parameters	The SunGuide software shall use configurable parameters for connecting to the database.	S007	Approved	Inspection
FEAT1.3	Test Plans				
FEAT1.3.1	Provide test plans and procedures	The SunGuide system shall be provided with test plans and test procedures for integration cases and the system acceptance test to ensure that each test is comprehensive and verifies all the features of the function to be tested.	QA001	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.3.2	Test Plans contents	The following information shall be included in the test plan: · An implementation plan and detailed schedule (PERT and GANTT Microsoft Word format); · Record-keeping procedures and forms; · Procedures for monitoring, correcting, and retesting variances; ·Procedures for controlling and documenting all changes made to the SunGuide system after the start of testing; · Block diagram(s) of the hardware test configuration, including Contract Vendor and Department supplied equipment, external communication channels, and any test or simulation hardware; · A list of individual tests to be performed, the purpose of each test segment, and the appropriate functional design specification reference describing the feature being tested; ·Identification of special hardware or software tools or test equipment to be used during the test; · Techniques and scenarios used to simulate ultimate system sizings, especially during the peak loading tests; · Copies of any certified test data (i.e. environmental data) to be used in lieu of testing; and; ·Alpha and beta test plans (as appropriate);	QA001P	Approved	Inspection
FEAT1.3.3	Test procedure objective	Each test procedure shall list the objective of the testing and the specific SunGuide software system requirement(s) that are being verified along with pass/fail criteria for each.	QA002P	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.3.4	Test procedures content	Test procedures shall include the following items: · Function(s) to be tested; · Purpose of each test segment; · Set-up and conditions for testing including ambient conditions; · Step-by-step procedures to be followed; · Pass/Fail criteria for each requirement tested including measurement tolerances; · All inputs and expected results outputs for each test segment; and · Descriptions of all simulation tools and techniques used during the test.	QA003P	Approved	Inspection
FEAT1.3.5	Test result formats	All SunGuide test results, notes, and observations shall be maintained in both hard copy and softcopy.	QA002	Approved	Inspection
FEAT1.3.6	Test records	The test records shall be keyed to the steps enumerated in the test procedures and reported in the test report for each integration case.	QA001R	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.3.7	Test record content	The following items shall be included in the test records: · Test names and Paragraph numbers; · Dates; · Test locations; · Test specimen serial numbers or other identification; · Additional equipment used; · Test engineers name; · Start and stop times; · Log of events; · Observed test results, including specified computer printouts, photographs, and plots, as applicable, that will be attached to the data sheets; · Description of test anomalies (as applicable), · Recommendations for resolution of any test anomalies; · Provision for comments by FDOT's representative; and · A copy of the master test procedure.	QA002R	Approved	Inspection
FEAT1.3.8	Requirement verification	All hardware and software units, elements, components or subsystems shall be tested to verify they meet the specified requirements prior to statewide deployment.	S025	Approved	Inspection
FEAT1.4	Event Logging				
FEAT1.4.1	Event notification	Reporting functions shall include the ability to send event notifications via email and/or pager, and/or telephone as well as visual and audio notifications at the user console.	EX001R	Approved	Demonstration
FEAT1.4.2	Event notifications stored in database	All event notifications shall be stored in the central database and be tagged with the system time to the nearest second and date of occurrence.	EX002R	Approved	Demonstration
FEAT1.4.3	Executive Handler error logging	The executive handler shall log error conditions as they are detected.	EX007	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.4.4	Logging levels	The amount of data logged for an error condition shall be able to be adjusted in real time by the user through the GUI without having to restart the application.	EX001L	Approved	Demonstration
FEAT1.4.5	Separate log files	Separate log files shall be used for each application monitored.	EX002L	Approved	Demonstration
FEAT1.4.6	Time and origin	Each log file message shall be time stamped and shall provide some indication as to the origin of the message (e.g. what process reported or detected the error).	EX003L	Approved	Demonstration
FEAT1.4.7	Contact list	Event notifications including alarms shall be sent to a configurable list of people through a primary and secondary contact medium including electronic-mail, telephone, and pager. The contact list shall be tailored to the event or alarm.	EX003R	Approved	Demonstration
FEAT1.5	TMC				
FEAT1.5.1	Traffic management	The SunGuide software shall support the collection, assessment and management of real-time traffic data and video for delivery of traffic management information to the motoring public and commercial vehicle operators.	S005	Approved	Demonstration
FEAT1.5.2	Management of freeway traffic	The SunGuide software shall support the management of traffic along the State freeway system.	A024	Approved	Demonstration
FEAT1.5.3	Exchange requests between centers	The SunGuide software shall support the exchange of traffic management requests among centers running the SunGuide software.	A025	Approved	Demonstration
FEAT1.5.4	Software reliability	The SunGuide software shall not require any regularly scheduled down time.	A026	Approved	Demonstration
FEAT1.5.5	Monitor processes	The SunGuide software shall provide a mechanism for monitoring the health and status of SunGuide software.	S028	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.5.6	Unattended operation	The SunGuide software shall be capable of running unattended for a minimum of eight hours.	A027	Approved	Test
FEAT1.5.7	Data exchange	The SunGuide software shall support the exchange of data using the center-to-center ICD.	A030	Approved	Demonstration
FEAT1.5.8	Work zone	The SunGuide software shall support traffic management in a work zone via communication to wireless or wired devices.	A031	Approved	Demonstration
FEAT1.5.9	TMC categories	The SunGuide software shall support running in multiple TMC configurations.			
FEAT1.5.9.1	RTMC	The SunGuide software shall support running in a regional TMC.	A029	Approved	Demonstration
FEAT1.5.9.2	STMC	The SunGuide software shall support a secondary TMC sending command and control requests via center-tocenter.	A029	Approved	Demonstration
FEAT1.5.9.3	VTMC	The SunGuide software shall support operating the center from a remote location.	A029	Approved	Demonstration
FEAT1.5.9.4	PTMC	The SunGuide software shall support deployment of the system on a laptop.	A029	Approved	Demonstration
FEAT1.6	Software & Documentation Management				
FEAT1.6.1	TMC software monitoring	The SunGuide software shall log communication errors and ITS field device failures.	A013	Approved	Demonstration
FEAT1.6.2	Architecture standards	The SunGuide system shall adhere to open architecture standards.	S027	Approved	Inspection
FEAT1.6.3	Configuration management of devices	A configuration management template shall be provided to capture information needed to control ITS devices.	A014	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.6.4	Baseline of software for configuration management	Before any software development begins, off-the-shelf software that will serve to be the foundation of the SunGuide system shall be documented to establish a baseline for configuration management of what software is developed specifically for the SunGuide project including what software is modified and to what degree it has been modified for the project.	S029	Approved	Inspection
FEAT1.6.5	Public domain/sector software	The SunGuide system shall consist of public domain/public sector software (object and source code) wherever possible.	S002	Approved	Inspection
FEAT1.6.6	Documentation requirements	The SunGuide system shall be provided with a complete documentation package that shall include, but not be limited to, detailed functional and interface description, user/operator manuals, software standards manuals, software test plans and procedures, and all other documentation required to complete the SunGuide project.	S024	Approved	Inspection
FEAT1.6.7	Software library modules	The SunGuide system shall provide for a centrally managed set of software modules that completely support all functionality of the RTMCs.	S001	Approved	Inspection
FEAT1.6.8	Recommended responses	The SunGuide system shall provide intelligent software that presents a list of recommended responses in time ordered sequence to different event conditions to the workstation operator.	EX008	Approved	Demonstration
FEAT1.6.9	Future capabilities	The SunGuide software shall provide an ICD for the databus to allow additional subsystems to be added.	A028	Approved	Inspection
FEAT1.6.10	Flexible and expandable	The SunGuide software shall provide ICDs for subsystem device drivers to be added.	S004	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.6.11	Automation of system support tasks	The SunGuide software shall support the automation of system support tasks through the use of user modifiable scripts for the following functions: · System scheduler; · System backup; · Data archiving; · Maintenance of system integrity; and · Data links to other FDOT computer systems.	S011	Approved	Inspection
FEAT1.6.12	Software function	The SunGuide system shall provide each TMC with the software tools that can be used to reduce congestion and delays while responding to traffic incidents in a rapid, accurate, and effective manner.	S006	Approved	Inspection
FEAT1.6.13	Limited access facilities	The SunGuide software shall provide for the management and operations of limited-access facilities during incident management, and peak demand periods and one-way operations during evacuations including control of detour signage.	A003	Approved	Inspection
FEAT1.6.14	Traveler information	The SunGuide software software shall provide software for the collection and dissemination of traveler information using dynamic message signs (DMS), trail blazer signs, highway advisory radio (HAR), and advanced traveler information system (ATIS) services (511 telephone services, Internet, commercial radio, television, text messaging, etc.) for freeway operations and where available along other arterial routes independently or through an information service provider (ISP contractor) contract vendor for ATIS. The ATIS capability shall support disseminating information by the Amber Alert program.	A004	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.6.15	FDOT legacy device drivers	The SunGuide system shall interface with FDOT legacy device drivers through standardized device interfaces documented in SunGuide Interface Control Documents.	S018	Approved	Inspection
FEAT1.6.16	Software versions	The SunGuide software shall provide a mechanism to display the versions of the various SunGuide software applications.	A014	Approved	Demonstration
FEAT1.7	System Misc.				
FEAT1.7.1	Video wall software	The SunGuide system shall not preclude the operation of video wall control software from a workstation that also has the SunGuide software on it.	S013	Approved	Inspection
FEAT1.7.2	Motorist aid call box system	The SunGuide software shall provide software for management and operations in support of the motorist aid call box system if a remote interface (via either TCP/IP or RS-232) exists on the motorist aid call box system and the interface provides status of the call box.	A016	Future	
FEAT1.7.3	Data reporting	The SunGuide software shall provide for the reporting of data; data to be included in the reports shall be provided by FDOT by March 15, 2004.	A017	Approved	Demonstration
FEAT1.7.4	Traffic and delay prediction	The SunGuide software shall provide software for traffic and delay prediction to support incident management and performance monitoring (including travel times and travel speeds).	A018	Approved	Demonstration
FEAT1.7.5	Action checklist	The operator workstation shall display a list of actions to be taken in response to specific events that require TMC operator response and can be checked off as they are completed.	WS001A	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.7.6	Interactive response procedures	The list of actions to be taken in response to a specific event detected by the SunGuide software shall be interactive and shall tailor itself to the specific situation. For example, if a major traffic incident is detected on a limited access facility, the operator at a workstation at the RTMC that has responsibility for that sector would be presented with a list in time ordered sequence of who to notify, the proper contact number(s) or other appropriate response. As each step is completed, the software shall highlight the next step.	WS002A	Approved	Demonstration
FEAT1.7.7	Use operating system schedulers	All other backups, background, batch and performance evaluation jobs shall be documented and be able to be used as operating system schedulers such as "cron" jobs.	SS002	Approved	Inspection
FEAT1.7.8	Interface to Amber Alert ITS Devices	The SunGuide system shall provide an interface to ITS devices that are used in the Amber Alert program including portable dynamic message signs and the communications links to operate them.	TB002	Approved	Inspection
FEAT1.7.9	Interface to portable DMS and CCTV.	The SunGuide system shall provide an interface to portable changeable message signs (CMSs) and CCTVs that support work zone management through a minimum of two drivers supporting: · Florida MIB (subset of the NTCIP standard); · Mark IV	S030	Approved	Inspection
FEAT1.7.10	Report creation	The SunGuide system shall support the creation of reports by authorized users.	S009	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.7.11	Print report utility	All reports shall be selected from a print menu on the operator's workstation and shall contain location parameters that indicate roadway segment links. The report will be printed with controls for page setup and for how many copies are printed.	WS007	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.7.12	General device driver	Device drivers shall communicate to the field devices through FDOT networks and perform the following: · Set or check the date and time; · Poll the device on a periodic basis as specified in the database and retrieve device status; · Check the cyclic redundancy check of the device operating parameters and message library against the cyclic redundancy check parameters of the database; ·Download operating parameters; ·Upload the current operating parameters and display on user's workstation; ·Display all database parameters and attributes on the user's workstation as appropriate to the device; ·All uploaded information from the device shall be displayed at the user's workstation; ·The operator, with proper security, shall be able to display/change database messages and parameters; ·A log of all changes shall be maintained by time and operator identification; ·Provide test mode set of commands; ·Provide a method for restricted access to selected devices based upon incident management criteria; ·Provide a log of all communcation events to and from the device including the report of device errors; and ·Provide the capability to stop and restart the device driver via operator control.	EX009	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.8	Coordination of agencies	The SunGuide software shall provide software for coordination with all law enforcement, fire/rescue, and emergency management personnel, coordination with local traffic operation centers, and coordination with county emergency management centers and the State Emergency Operations Center (SEOC) when appropriate. The data will be either available through the Center-to-center interface or through the use of a remote interface terminal.	A011	Approved	Inspection
FEAT2	Web server				
FEAT2.1	Web server function	The SunGuide system shall provide a web server for private and public dissemination of TMC information.	S020	Approved	Demonstration
FEAT2.2	Video server	The web server shall capture and publish video from analog and digital video devices within the system for private and public dissemination via LAN, WAN, and the World Wide Web. The video server shall refresh and update the image at a rate set via parameters by the workstation operator.	PA001	Approved	Demonstration
FEAT2.3	Access to camera system control functions	The web server shall provide secure access to system control functions of selected cameras as determined by the system administrator for users with high-speed Internet access.	PA002	Approved	Demonstration
FEAT2.4	Map elements: congestion, incidents, cameras, DMSs	The web server shall provide a map showing the congestion levels and all current incidents on the highway. The map shall show where cameras and DMSs are located.	PA004	Approved	Demonstration
FEAT3	Executive Handler (EH)				

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT3.1	Executive handler function	The SunGuide system shall have an executive function that handles all monitoring and reporting of the status of external devices and internal processes.	S008	Approved	Demonstration
FEAT3.2	Minimum functionality	As a minimum the executive handler shall provide: · Process initiation/termination; · Process status and monitoring; · Error logging.	EX001	Approved	Demonstration
FEAT3.3	Start, stop, and restart processes	The executive handler shall be capable of automatic and manual initiation, termination and re-initiation of system processes.	EX002	Approved	Demonstration
FEAT3.4	Scheduled process control	The executive handler shall have the capability to add scheduled process control for subsystems and drivers	EX003	Approved	Demonstration
FEAT3.5	Group dependencies	The executive handler shall notify personnel if an application fails or is restarted.	EX004	Approved	Demonstration
FEAT3.6	Process start order	In the case of a failure, the executive handler shall start processes in the same order that they originally started.	EX001F	Approved	Demonstration
FEAT3.7	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.	EX002F	Approved	Demonstration
FEAT3.8	Initialize individual components	The executive handler shall have the ability to initialize individual components as well as subsystem groups.	EX005	Approved	Demonstration
FEAT3.9	Monitor, report and display status	The executive handler shall be capable of monitoring, reporting, and displaying the status of all subsystems, subsystem components, and network communications links and components.	EX006	Approved	Demonstration
FEAT3.10	Hierarchal 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.	EX001D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT3.11	Monitor key data	Monitoring shall include pertinent system information such as the current system state, as well as historical information such as system performance, uptime, and error logs.	EX001M	Approved	Demonstration
FEAT3.12	Database storage of information	All information collected shall be capable of being stored in the database.	EX002M	Approved	Inspection
FEAT4	Inventory Management System (IMS)				
FEAT4.1	System				
FEAT4.1.1	Interface to maintenance and inventory tracking software	The SunGuide system shall be provided with an interface to a software system that tracks the inventory of all ITS equipment and the status of equipment repair(s) and maintenance (i.e. life-cycle asset management software system).	S022	Approved	Demonstration
FEAT4.1.2	Index by equipment type	The inventory/maintenance software database shall index by equipment type for the purpose of reporting and updating the inventory.	IM002	Approved	Demonstration
FEAT4.1.3	Vendor name referenced by equipment type ID.	The vendor name shall be referenced by the equipment type identification.	IM001D	Approved	Demonstration
FEAT4.1.4	Reports provided by type ID	Reports shall be provided by type identification for all equipment according to equipment status.	IM001R	Approved	Demonstration
FEAT4.1.5	View and print vendor table	The workstation operator shall be capable of viewing and printing the complete vendor table or the vendors according to a specific type identification.	IM002D	Approved	Demonstration
FEAT4.1.6	Location data	The inventory/maintenance software shall maintain warehouse locations, repair shop locations, and installation locations, with a GUI screen to add/edit/delete such locations.	IM003D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.1.7	Equipment status catagories	The equipment status shall be: · In inventory; · Installed; or · In repair/test.	IM005D	Approved	Demonstration
FEAT4.1.8	Record status of equipment	The inventory/maintenance software shall provide the operator the capability to record the status of equipment that has failed and is in the process of being repaired.	IM004	Approved	Demonstration
FEAT4.1.9	Equipment status tracking	The inventory/maintenance software shall support tracking the status of the equipment being tracked as follows: · Failed at site; · At repair depot; · In repair at depot; · In testing at depot; and · In inventory.	IM006D	Approved	Demonstration
FEAT4.1.10	Save repair information	The inventory/maintenance software shall contain repair information on the equipment to include the dates of failure and repair, the repair technician, the time to repair, parts utilized by part number and comments.	IM005	Approved	Demonstration
FEAT4.1.11	Repair history	The inventory/maintenance software shall maintain a history of the equipment repairs and may be reported via GUI to the operator or may be printed.	IM006	Approved	Demonstration
FEAT4.2	GUI				

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.2.1	Add/edit/delete equipment GUI	The inventory/maintenance software shall provide a GUI display screen for the operator to add/edit/delete inventory equipment information. The equipment information shall at a minimum include: · Type identification and description; · Model identification and description; · Manufacturer information; · Serial number; · Firmware version; · Location description; · Date installed; · Status (inventory/installed/repair); · Location geographic reference; and · Quantity by Type identification on hand.	IM001	Approved	Demonstration
FEAT4.2.2	Add/edit/delete vendor information GUI	The inventory/maintenance software shall provide a GUI for the operator to add/edit/delete vendor information. The vendor information shall at a minimum include the following: · Vendor name; · Vendor contact; · Address/ information including city, state, and zip code; · Telephone and facsimile numbers; and · Web address for purchase.	IM003	Approved	Demonstration
FEAT4.2.3	Print reports GUI	All printed reports of the inventory software shall be selected via a GUI menu.	IM002R	Approved	Demonstration
FEAT4.2.4	Equipment history GUI	History of the equipment transfer and its inventory status shall be maintained and reported via GUI to the workstation operator or printed.	IM004D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.2.5	Displays	The congestion report display shall result from a comparison between all possible sources of data derived from real-time data, operator input or historical data as determined by the algorithm.	ID001W	Approved	Demonstration
FEAT4.2.6	Repair status display	The repair status of a specific piece of equipment shall be displayed to the operator.	IM007	Approved	Demonstration
FEAT5	Incident Management (IM)				
FEAT5.1	General				
FEAT5.1.1	Minimum functionality	The incident management subsystem shall acquire data from the vehicle detection subsystem and include the following functionality at a minimum: · Incident verification; · Motorist information; · Response; · Site management; · Traffic management; and · Incident clearance.	TM002	Approved	Demonstration
FEAT5.1.2	Incident type	The incident management function shall support operator entry of the incident type such as HAZMAT spills.	TM003W	Approved	Demonstration
FEAT5.1.3	Video verification	The SunGuide software shall provide software for video verification of messages posted on DMS to the extent possible due to physical configuration in the field of the camera and sign.	A009	Approved	Demonstration
FEAT5.1.4	Minimize keystrokes	The SunGuide system's incident management function shall minimize the number of key strokes for the entry of traffic incidents while providing drop-down menus, check boxes, and data interfaces with subsystems such as the road weather information systems (RWIS), vehicle detection, motorist aid, vehicle detection, motorist aid (AVI), DMSs, and CCTVs.	TM001	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.2	Detect				
FEAT5.2.1	Incident detection	The SunGuide software shall provide software for incident detection along the limited-access facilities.	A001	Approved	Demonstration
FEAT5.2.2	Automatic detection of incident or congestion	The SunGuide system shall support the detection of incidents or congestion, via a software algorithm, that determines occupancy, volume, or speed and makes a determination based on user-defined thresholds.	ID001	Approved	Demonstration
FEAT5.2.3	View congestion report	The SunGuide system shall provide the ability to view a congestion report for all roadway segments in the system. The congestion report shall include a graphical display and the following information for each roadway segment in the system: · Roadway segment identifications; · Source of the incident or congestion information; · Reported speeds [in miles per hour (MPH)] · Historic speeds (in MPH); · FDOT's LOS; · Congestion cases (i.e. closed, heavy, moderate, none, or free flow); and · Other recommended parameters.	ID002	Approved	Demonstration
FEAT5.2.4	View incident or congestion raw data	The workstation operator shall have the ability to view an incident or congestion raw data report for all links in the system.	ID003	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.2.5	Manual incident entry	The workstation operator shall have the ability, via a menu and the selection of a link on a map, to enter manual incident or congestion information. The incident or congestion information the user may enter shall include: · Congestion case (i.e. closed, heavy, moderate, none, or free flow); · Incident types; · Roadway weather conditions; and · Incident duration (i.e., the amount of time incident the will last).	ID004	Approved	Demonstration
FEAT5.2.6	Graphical displays	The congestion report shall include graphical displays and the following information for each roadway segment in the system · Roadway segment identifications; · Roadway segment geometries; · Source names (determined by the algorithms); · Reported speed, volume, and occupancy; and · Congestion case.	ID002W	Approved	Demonstration
FEAT5.3	Manage				
FEAT5.3.1	Geographic personnel lists	The personnel list shall be on a geographic basis and, at a minimum, shall include. · Response personnel/and contacts; · Geographic agency responsibilities; · Talk list (i.e., responders contact list); · Radio frequencies; · Phone/ and facsmiles numbers; and · Pager numbers.	TM001R	Approved	Demonstration
FEAT5.3.2	Messaging	The incident management software will provide the ability to redirect incident information to standard message services (such as FAX, email, pagers).	TM002R	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.3	Cataloging of incident management teams/ resources	The incident Management function shall support the cataloging of incident management teams and resources with a listing of equipment, material, and the available personnel who possess special skills.	TM003R	Approved	Demonstration
FEAT5.3.4	Recommend DMS/HAR locations and messages	The incident management response function shall recommend a set of DMS locations and messages for the workstation operator to select. In addition, HAR messages shall be activated.	TM005R	Approved	Demonstration
FEAT5.3.5	Recommend a set of HAR messages	The incident management response function shall recommend a set of HAR messages to be activated.	TM006R	Approved	Demonstration
FEAT5.3.6	Recommend alternate routes	The incident management response function shall recommend alternate routes in response to incidents that are blocking roadways.	TM007R	Approved	Demonstration
FEAT5.3.7	Select alternate maps	In response to incidents requiring alternate route(s), the workstation operator shall be able to select alternate maps via drop down menus.	TM008R	Approved	Demonstration
FEAT5.3.8	Communicate with detour message signs	When appropriate, the incident management response function shall communicate with detour message signs that are supported by the SunGuide software and TMC communications network capability indicating recommended alternate routes.	TM009R	Approved	Demonstration
FEAT5.3.9	Hierarchy of traffic management activities	The incident management response function shall support a hierarchy of traffic management activities and display these activities for review by RTMC managers.	TM010R	Approved	Demonstration
FEAT5.3.10	Personnel lists and contact numbers	The incident management function shall provide the workstation operator with personnel lists and contact numbers as well as a catalog of agency resources via drop-down menus.	TM005	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.11	Distribute information	The incident management function shall distribute video feeds, traffic flow, and incident information, and traffic event data until the incident is cleared and the traffic flow is back to normal.	TM004	Approved	Demonstration
FEAT5.3.12	Format for dissemination	The incident management function shall format information for distribution to the following dissemination media: · HAR; · Commercial radio broadcast; · Internet Web servers; · DMSs; · 511 Telephone systems; · Commercial and public televisions; · Facsmile machines and pagers; and · Additional dissemination mechanisms provided by the dissemination function.	TM001I	Approved	Demonstration
FEAT5.3.13	Quick click interface to GIS	The incident management function shall provide a quick click interface to the GIS maps for the display and location of resources, i.e. fire hydrants.	TM004R	Approved	Demonstration
FEAT5.3.14	Incident status GUI	The incident management function shall provide the workstation operators with GUI screens that record accurate information regarding the incident's current status, the overall progress towards clearance and the equipment required to complete the process.	TM006	Approved	Demonstration
FEAT5.3.15	Traffic control procedures	The incident management function shall support the RTMC with traffic control procedures that include, at a minimum, point traffic control at the scene, managing the roadway space, and deploying personnel to better manage the traffic by improving traffic flow past incident sites and on alternate routes.	TM007	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.16	Incident removal resources	The incident management function shall provide support to the incident clearance process by the cataloging of resources for the removal of the all types of incidents.	TM008	Approved	Demonstration
FEAT5.3.17	Catalog of FDOT resources	Included in the catalog shall be the resource, location, cost of service, and availability of related equipment and resources.	TM011R	Approved	Demonstration
FEAT5.3.18	Construction work zones	The SunGuide software shall provide for the identification of construction work zones and activities to support operations and management of these work zones and, where smart work zone management is provided, integration of the smart work zone management into freeway management systems (FMS) and incident management systems (IMS).	A006	Approved	Demonstration
FEAT5.3.19	Map display	The system shall have a map display of the current incident or congestion for each segment. The map shall change the color of the roadway segment based on the current condition. An algorithm will determine the congestion case.	ID005	Approved	Demonstration
FEAT5.3.20	Incident data archiving	The SunGuide software shall provide software for incident data archiving. The data archived currently includes; -Location -Start and end times -Response plan	A010	Approved	Demonstration
FEAT5.3.21	Management, dispatch, and coordination of RR Service Patrols.	The SunGuide software shall provide software for the management, dispatch, and coordination of Road Rangers Service Patrols.	A012	Future	
FEAT5.3.22	Coordination of freeway incident management team	The SunGuide software shall provide software for coordination with a freeway incident management team involving major stakeholders.	A015	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.23	Diversion routes	The SunGuide software shall provide software for the maintenance of a list of diversion routes for management of traffic during incidents and evacuations. The software shall tie in with construction updates to avoid detours into construction areas.	A022	Approved	Demonstration
FEAT5.3.24	Lane or road closures	The SunGuide software shall provide software for the management of lane or road closures during natural or manmade disasters or evacuations and integration with computer-aided dispatch (CAD) systems for incident detection with regional communications centers (RCCs) and emergency operations centers (EOCs) through co-location, Center to Center Communications or the provision of operator stations in the TMC.	A023	Approved	Demonstration
FEAT6	Data Distribution (DD)				
FEAT6.1	Distribute data in real time.	The SunGuide system shall provide a function to distribute data in real time. Data shall include but not be limited to: · Travel time data; · Speed data; · Video images; and · Amber Alert data.	S010	Approved	Demonstration
FEAT6.2	Retrieving real time data from the database	The data distribution function shall be capable of retrieving data from the database and updating user workstations with the data as soon as it is received into the database.	DD001	Approved	Demonstration
FEAT6.3	Data selection	The user shall be capable of selecting the data to be displayed by the data distribution function.	DD002	Approved	Demonstration
FEAT7	Graphical User Interface - General (GUI)				

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT7.1	Entry of location and direction of travel data	Workstation GUI screens shall support the entry of the exact location and direction of travel data as efficiently as possible.	TM003	Approved	Demonstration
FEAT7.2	Map based				
FEAT7.2.1	GIS software interface	The SunGuide system shall provide a GIS interface that displays shape files.	S014	Approved	Demonstration
FEAT7.2.2	GIS data	The SunGuide GIS function shall translate shape files containing GIS-formatted data such as traffic speed, incidents, message sign data, and device status.	GS001	Approved	Demonstration
FEAT7.2.3	Viewable from PTMCs, VTMCs, RTMCs and FDOT central office	Data such as traffic speed, incidents, message sign data, device status, and other data shall be viewable from PTMCs, VTMCs, RTMCs and the FDOT Central Office.	GS002	Approved	Demonstration
FEAT7.2.4	SVG technology and ESRI shape file	The GIS map shall be a browser-based map using Scalable Vector Graphics (SVG) technology and Environmental Systems Research Institute (ESRI) shape files.	GS003	Approved	Inspection
FEAT7.2.5	Remote viewing	The GIS function shall support remote viewing of data through a TCP/IP connection at a minimum speed of 1.544 million bits per second.	GS004	Approved	Demonstration
FEAT7.2.6	Call box activation icon	The GIS map covering the FIHS segment where a call box with remote communications that is accessible by the SunGuide software is activated shall display an icon indicating the call box activation until acknowledged by the SunGuide operator of the workstation that is displaying the GIS map.	GS005	Future	
FEAT8	Closed Circuit Television (CCTV)				
FEAT8.1	General				

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.1.1	Video surveillance	The SunGuide software shall provide software for video surveillance along the limited-access facilities and the interchange areas (along the mainline and crossroads).	A002	Approved	Demonstration
FEAT8.1.2	Interface with CCTV cameras	The SunGuide software shall interface with CCTV used for traffic surveillance.	S015	Approved	Demonstration
FEAT8.1.3	Analog video switch	The SunGuide system shall communicate with CCTV cameras through an analog video switch.	TV006D	Deleted	Demonstration
FEAT8.1.4	Lock CCTV	The CCTV function shall incorporate software logic to allow only one workstation at a time to control a particular CCTV unit.	TV003S	Approved	Demonstration
FEAT8.1.5	Camera menu	A selectable menu of cameras shall be provided to the user.	PA001U	Approved	Demonstration
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	TV003	Approved	Demonstration
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.	A008	Approved	Demonstration
FEAT8.2	Camera types				
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.	TV001D	Approved	Demonstration
FEAT8.2.2	Camera system types	The CCTV function shall be capable of controlling camers (e.g., pan/tilt/zoom). The following protocols will be used to issue command/control requests to the cameras. -NTCIP -SunGuide	TV002D	Approved	Demonstration
FEAT8.2.3	IP based controls	The CCTV driver shall also support cameras with IP based controls.	TV017D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.2.4	Technologies supported	The CCTV function shall provide an interface that supports the following technologies for the transmission of video and data between field hardware, subsystems, TMCs and additional remote locations · Fiber optic transceivers; · Fiber optic video/data multiplexers; · MPEG encoders/decoders; and · Wireless.	TV002	Approved	Demonstration
FEAT8.2.5	Device driver types	At a minimum the CCTV function shall provide device drivers for the following camera types: -NTCIP compliant cameras -Sunguide protocol	TV001	Approved	Demonstration
FEAT8.2.6	NTCIP standard	Whenever possible, the NTCIP protocol standard shall be utilized for camera control and communication.	TV003D	Approved	Demonstration
FEAT8.2.7	Alternate SunGuide	An alternate to the NTCIP protocol shall be developed that is the SunGuide protocol.	TV004D	Deleted	
FEAT8.2.8	Functionality equal to NTCIP	Manufacturer-specific drivers shall, at a minimum, provide functionality equal to that provided via NTCIP mandatory objects provided the manufacturer's protocol supports the functionality.	TV005D	Approved	Demonstration
FEAT8.3	Functionality	Functionality will be provided if the protocol supports the particular function.			

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.3.1	Range objects	The CCTV range objects shall be implemented in the device drivers and at a minimum shall include: · A maximum number of presets parameters; · Pan left limit parameters; · Pan right limit parameters; · Pan home position parameters; · True north offset 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.	TV007D	Approved	Demonstration
FEAT8.3.2	Timeout objects	The device drivers shall contain the CCTV timeout objects and shall include the following parameters at a minimum · Pan timeout parameter; · Tilt timeout parameter; · Zoom timeout parameter; · Focus timeout parameter; and · Iris timeout parameter.	TV008D	Approved	Demonstration
FEAT8.3.3	Preset objects	The device driver shall contain CCTV preset objects and shall include the following parameters at a minimum: · Go to preset position parameters; · Store preset position parameters; · Pan position parameters; · Tilt position parameters; · Lens zoom position parameter; · Lens focus position parameter; and · Lens iris Position Parameter.	TV009D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.3.4	System feature control objects	The device drivers shall contain CCTV system feature control objects and shall contain the following parameters and characteristics: · System camera feature control parameter; · System camera feature status; · System camera equipment availability parameter; · System lens feature control parameter; · System lens feature status parameter; and · System lens equipment availability parameter.	TV010D	Approved	Demonstration
FEAT8.3.5	Alarm objects	The device driver shall contain the following CCTV alarm objects: · Alarm status parameters; · Alarm latch status parameters; · Alarm latch clear parameters; · Temperature alarm high-low threshold; · Temperature alarm current value parameters; · Pressure alarm high-low threshold parameters; · Pressure alarm current value; · Washer fluid alarm high-low threshold parameters; · Washer fluid alarm current value parameters; and · Alarm label index parameter.	TV011D	Approved	Demonstration
FEAT8.3.6	Discrete input objects:	The device driver shall contain the following CCTV discrete input objects: · Discrete input status parameters; · Discrete input latch status parameters; · Discrete input latch clear parameters; and · Discrete input label index parameters.	TV012D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.3.7	Discrete output objects:	The device driver shall contain the following CCTV discrete output objects: · Discrete output status parameters; · Discrete output control parameters; and · Discrete output label indexes.	TV013D	Approved	Demonstration
FEAT8.3.8	Zone parameters:	The device driver shall contain the following CCTV zone parameters: · Maximum number of zones parameter; and · Zone tables.	TV014D	Approved	Demonstration
FEAT8.3.9	Label objects	The device driver shall contain the following CCTV label objects: · Maximum number of labels parameters; · Label tables; · Label location parameters; and · Enable label text displays.	TV015D	Approved	Demonstration
FEAT8.3.10	On-Screen camera menu objects	The device driver shall contain CCTV On-Screen Camera Menu Objects to the extent supported by NTCIP: · Activate menu parameters; · Menu control parameters.	TV016D	Approved	Demonstration
FEAT8.4	Display				
FEAT8.4.1	MPEG2 displayed on monitors	The CCTV function shall support the switching of video signals to any video monitor or desktop workstation that is connected with a similar technology and has physical connectivitiy. Protocols to be supported by the software include: -None currently identified	TV001S	Approved	
FEAT8.4.2	View image multiple locations	The CCTV switching function shall support the switching of video signals to multiple workstations if the underlying video hardware provides the functionality.	TV002S	Approved	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.4.3	Multiple video images from multiple sources on single monitor	The SunGuide system shall provide the capability for a single workstation monitor to display multiple video images from multiple sources to the extent possible provided by availability of digital video images on the network or the control capabilities of the video switch if the necessary switching, display, conversion and connectivity functionality is supported in the TMC video system.	TV004S	Approved	Demonstration
FEAT8.4.4	Route video frames to FDOT Central Office.	The SunGuide system shall be capable of routing the maximum number of video frames per second over the FDOT network to the FDOT Central Office that can be supported by the hardware video switch or the network.	TV005S	Approved	
FEAT8.4.5	Control video	A browser-based control mechanism shall allow an authorized user to control and view video from any video device so long as the user has a high-speed Internet connection defined as an upstream connection speed greater than 256 thousand (256,000) bits per second (user to device).	PA003	Approved	Demonstration
FEAT9	Dynamic Message Signs (DMS)				
FEAT9.1	DMS drivers	The SunGuide system shall provide an interface to dynamic message signs (DMSs) through a minimum of three drivers supporting: · NTCIP protocol (Florida MIB) and · Mark IV (I95 protocol).	S019	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT9.2	DMS control	The DMS device driver shall communicate to the DMS and perform the following: · Set or check date and time; · Poll the DMS on a periodic basis as specified in the database and retrieve DMS status. · Check the cyclic redundancy check of the DMS operating parameters and message library against the cyclic redundancy check parameters of the database; ·Download operating parameters and DMS command messages; ·Upload the current operating parameters and display on user's workstation; ·Download all message text and its attributes; ·Display all message text, database parameters and attributes on the user's workstation(s); ·Command the particular DMS message be stored in the message library; ·All uploaded information from the DMS shall be displayed at the user's workstation(s); ·The operator, with proper security, shall be able to display/change database messages and parameters. A log of all changes shall be maintained by time and operator identification; ·Provide a DMS test mode set of commands; ·Provide a method for restricting overwriting an essential (e.g., incident related) message on a DMS; ·Provide a log of all communication events to and from the DMS including the report of device errors; and ·Provide the capability to stop and restart the DMS device driver via operator control.	DM003D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT9.3	Sending database messages	The DMS software device driver shall be capable of sending all messages as defined in the DMS message database.	DM001	Approved	Demonstration
FEAT9.4	Save messages	The DMS software shall implement a database of standard messages.	DM002	Approved	Demonstration
FEAT9.5	Acceptable words/messages	The DMS database shall contain a list of acceptable messages and words/or messages that are unacceptable.	DM001D	Approved	Demonstration
FEAT9.6	System configuration	The DMS database shall contain DMS internal operating parameters and internal messages.	DM002D	Approved	Demonstration
FEAT9.7	Trail blazer signs	The SunGuide system shall provide an interface to the dynamic and blank-out trail blazer signs.	TB001	Approved	Demonstration
FEAT10	Transportation Sensor System (TSS)				
FEAT10.1	Data collection	The SunGuide software shall provide software for traffic data collection and support incident detection.	A007	Approved	Demonstration
FEAT10.2	Predict traffic conditions	The SunGuide system shall utilize real-time and archived data from a variety of sources to determine and report current and predicted traffic conditions for any segment of roadway within the scope of system coverage.	S016	Approved	Demonstration
FEAT10.3	Data sources	The SunGuide system shall be capable of collecting traffic data from a variety of in-ground and above-ground traffic NTCIP compliant detection technologies including, but not limited to, inductive loop systems, radar systems, and video detection systems.	TD001	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT10.4	Data time intervals	The SunGuide system shall be able to receive and process traffic data in time intervals including but not limited to: . Ten (10) seconds; . Twenty (20) seconds; . Thirty (30) seconds; . One (1) minute; . Five (5) minutes; . Ten (10) minutes; . Fifteen (15) minutes; . Thirty (30) minutes; and . Sixty (60) minutes.	TD002	Approved	Demonstration
FEAT10.5	Bitrans WashDOT standard	To the maximum extent possible, the Bitrans WashDOT standard for transportation sensor systems shall be utilized for traffic detector communications.	TD003	Approved	Demonstration
FEAT10.6	Serial connections	The SunGuide system shall provide protocol software to communicate with the Bitrans 238I-95 traffic detection unit using serial and/or Ethernet connections over a variety of transmission media (i.e. fiber optic, copper, and wireless) that are capable of baud rates equal to or greater than 1200 bits per second.	TD004	Approved	Demonstration
FEAT10.7	Non NTCIP drivers	For traffic detectors within the system that do not support NTCIP, control of these devices shall be supported through device drivers that can be selectively loaded and unloaded by the system's traffic detector application on an as-needed basis.	TD005	Approved	Demonstration
FEAT10.8	Data element categories	The device driver for vehicle detectors shall contain the following categories of data elements: · System setup data elements; · Control data elements; and · Inductive loop detector data elements.	TD006	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT10.9	System setup data elements	The transportation sensor system setup data elements shall at a minimum contain the following: · Sensor system reset parameters; · Sensor system status parameters; · Sensor system occupancy type parameters; · Maximum number of sensor zones parameters; · Sensor zone tables; · Clock available parameters.	TD001D	Approved	Demonstration
FEAT10.10	Control Data elements	The transportation sensor system control data element shall at a minimum contain the following: · Maximum number of outputs parameters; · Output configuration tables; · Maximum number of output groups parameters; · Output group tables; · Data collection tables; · Data buffer tables.	TD002D	Approved	Demonstration
FEAT10.11	Loop detector data elements	The transportation sensor system inductive loop detector data element shall at a minimum contain the following data elements · Loop system setup tables; · Loop output conditioning tables; and · Loop system status tables.	TD003D	Approved	Demonstration
FEAT11	Evacuation Coordination (EC)				
FEAT11.1	Definition	The SunGuide system shall provide an evacuation coordination subsystem to provide for management of traffic during evacuations.	S023	Future	
FEAT11.2	Manage evacuation	The evacuation coordination subsystem shall provide the capability to efficiently manage an evacuation and provide evacuees with information they need during the evacuation, as well as the reentry.	EC001	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.3	Functionality	The evacuation coordination subsystem shall consist of five (5) major functions: (1) evacuation guidance, (2) evacuation travel information, (3) evacuation traffic management, (4) evacuation planning support and, (5) resource sharing.	EC002	Future	
FEAT11.4	Evacuation Guidance (EG)				
FEAT11.4.1	Determine evacuation necessity	The evacuation guidance component shall provide the capability to enter, review, update and distribute basic information to assist potential evacuees in determining whether evacuation is necessary.	EC001G	Future	
FEAT11.4.2	Multiple distributed locations	The evacuation guidance component shall be accessible to users from multiple distributed locations, including, but not limited to, (a) homes, (b) media, (c) public buildings, (d) evacuation shelters, (e) other evacuation destinations, (f) rest areas along evacuation routes, (g) hotels, (h) restaurants, (i) airports and other mode terminals, and (j) wireless devices.	EC002G	Future	
FEAT11.4.3	Shelter-in-place information for non-evacuation	The evacuation guidance component shall provide shelter-in-place information if evacuation is not necessary.	EC003G	Future	
FEAT11.4.4	List and graphical depiction of evacuation zones	EG shall provide a list and graphical depictions of mandatory and voluntary evacuation zones and the categories of people to be evacuated in each zone.	EC004G	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.4.5	Alternative evacuation destinations	The evacuation guidance component shall provide a list of alternative evacuation destinations on demand as appropriate based on the emergency condition requiring evacuation and shall provide: · Alternative evacuation destinations based on historical evaluation of the services available at the destinations; · Alternative evacuation destinations based on current and forecasted conditions at the destinations; · Alternative evacuation destinations based on current and forecasted availability of services at destinations and along the routes to these destinations; · Alternative evacuation destinations based on traveler specified parameters including the general location of the destinations and the desired services; and · Alternative evacuation destinations based on the current and forecasted conditions on evacuation routes.	EC005G	Future	
FEAT11.4.6	Recommended evacuation and reentry route(s)	The evacuation guidance component shall provide recommended evacuation and reentry route(s) for user-selected evacuation origin and destination pairs based on: · An evaluation of historical operational characteristics of the alternative routes. · Real-time and forecast route conditions. · Traveler-specified route parameters.	EC006G	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.4.7	Recommended evacuation and reentry start time	The evacuation guidance component shall provide the recommended evacuation and reentry start time for user-selected evacuation origin and destination pairs based on: · The travel time required for the trip, given existing and forecast conditions on those routes; · Capability of the evacuation network to handle evacuation demands based on a historical evaluation of the network and current and future network conditions; · Existing and forecasted conditions at evacuation origins; · Existing and forecasted conditions at evacuation destinations; and · Evaluation of the reentry time to ensure the safety and security of travelers and their properties.	EC007G	Future	
FEAT11.4.8	Evacuation shelters	The evacuation guidance component shall provide information regarding evacuation shelters in areas specified by users. The information shall provide: · Locations of evacuation shelters; · Time during which evacuation shelters are in operation; · Occupancy levels at evacuation shelters; and · Available facilities at evacuation shelters, including those shelters that will accommodate people with special needs, such as pets, disabilities, and the elderly.	EC008G	Future	
FEAT11.4.9	Zones and categories	The EG shall distribute the lists of mandatory and voluntary evacuation zones and the categories of people to be evacuated in each zone to FDOT's designated recipients.	EC009G	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.5	Evacuation Travel Information (ETI)				
FEAT11.5.1	Evacuation travel information	The evacuation coordination subsystem shall provide an evacuation travel information function.	EC003	Future	
FEAT11.5.2	Multiple distributed locations	The evacuation travel information function shall provide the capability for users to access information from multiple distributed locations, including, but not limited to, (a) homes, (b) vehicles, (c) rest areas along evacuation routes, (c) evacuation shelters, (d) hotels, (e) restaurants, (i) airports and other mode terminals, and (j) wireless devices.	EC001E	Future	
FEAT11.5.3	Information about traffic conditions	The evacuation travel information function shall provide information about traffic conditions on evacuation routes and shall provide: · Current speed/travel time on evacuation routes. · An estimate of future speed/travel time on evacuation routes, taking into consideration current evacuation decisions and traveler behavior. · Information regarding incident conditions on evacuation routes. · Real-time road, bridge and lane closure information. · A list of roads that should be avoided due to hazardous conditions, such as flooding, malfunctioning traffic signals, debris and falling objects.	EC002E	Future	
FEAT11.5.4	Current and forecast weather conditions	The evacuation travel information function shall provide the current and forecast weather conditions for evacuation origins, destinations and routes.	EC003E	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.5.5	Transportation modes	The evacuation travel information function shall provide information regarding transportation modes including buses, airlines, trains and ships. Specifically, ETI shall provide: · Information regarding the availability of transportation mode services; · Arrival and departure information, including location, for those services available.	EC004E	Future	
FEAT11.5.6	Evacuation guidance information	The evacuation travel information function shall provide general evacuation guidance information to travelers, including guidance/tips for trip preparation, trip duration and trip return.	EC005E	Future	
FEAT11.5.7	Lodging availability	The evacuation travel information function shall provide information regarding lodging available along evacuation routes and at evacuation destinations.	EC006E	Future	
FEAT11.5.8	Request and receive lodging information	The evacuation travel information function shall provide the capability for travelers to request and receive information regarding lodging, including (a) room availability, (b) facilities, (c) conditions, and (d) pricing information.	EC007E	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.5.9	Services along evacuation routes	The evacuation travel information function shall provide information regarding services available along evacuation routes, at evacuation origins and at evacuation destinations. The evacuation travel information function shall provide: · Real time information relating to (a) the conditions, (b)status, and (c) availability of traveler services described in this section; · Capabilities for travelers to request and receive information regarding restaurants and stores, including (a) hours of operation and any changes to these hours, (b) availability of special items (such as water, non-perishable foods, wood and batteries), and (c) pricing information; · Capabilities for travelers to request and receive information regarding local hospitals and other medical services; · Capabilities for travelers to request and receive information regarding gas stations, including (a) location, (b) operation status, (c) pricing information, and (d) the expected waiting time; and · Information regarding rest areas and telephone and restroom availability.	EC008E	Future	
FEAT11.5.10	School and office closures	The evacuation travel information function shall provide information regarding school and office closures.	EC009E	Future	
FEAT11.6	Evacuation Traffic Management				
FEAT11.6.1	Evacuation taffic management	The evacuation coordination subsystem will provide an evacuation traffic management function.	EC004	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.6.2	Real-time data collection	The evacuation traffic management function shall have a real-time data collection process to assist in the selection of evacuation strategies and to monitor the operations of the strategies selected .	EC001M	Future	
FEAT11.6.3	Demand forecasting	The evacuation traffic management function shall have a demand forecasting function that takes into consideration current traffic flows, current and historical evacuation trends, the size of the area to be evacuated and expected human responses.	EC002M	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.6.4	Strategy selection	The evacuation traffic management function shall include a strategy selection function that maximizes efficiency during evacuation and reentry operations. The strategy shall: · Integrate the control of freeways and surface streets; · Consider traffic movement over the entire evacuation network; · Be responsive to current demand as well as the forecasted demand; · Optimize the movement of emergency and law enforcement vehicles; · Allow easy access of emergency and law enforcement vehicles to traffic on evacuation routes; · Consider the operation of the access to and from the evacuation routes; · Consider the impacts to local traffic along evacuation routes; · Consider the time available for evacuation, time required for evacuation, and the time required for implementing the evacuation strategy; · Consider the availability of the resources required for the evacuation strategy; · Consider the severity of the expected disaster and the size of the area affected by the diesaster, and · Consider the feasibility of using transit and school bus fleets during mandatory evacuations.	EC003M	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.6.5	Control of devices	The evacuation traffic management function shall provide the control of devices as required by the evacuation management plan, including: (a) traffic signals, (b) DMSs, (c) ramp meters, (d) reversible lane signs, (e) turning restriction signs, (f) road closure devices, (g) lane closure devices, (h) HAR, (i) Traveler Information Radio Network TM (TiRN TM) (j) shoulder-use signs.	EC004M	Future	
FEAT11.6.6	Manual override	The evacuation traffic management function shall provide the operator with the capability to manually override the system's automatic control and confirm device changes.	EC005M	Future	
FEAT11.6.7	Incident management for evacuation routes.	The evacuation traffic management function shall have an incident management function for evacuation routes.	EC006M	Future	
FEAT11.6.8	Eliminate tolls upon command.	The evacuation traffic management function shall have the capability to eliminate tolls upon command.	EC007M	Future	
FEAT11.6.9	Lane reversal management	The evacuation traffic management function shall have a lane reversal management function that shall be able to collect real-time data for traffic moving in all traveling lanes, with and without lane reversal and shall have archiving capabilities.	EC008M	Future	
FEAT11.7	Evacuation Planning Support				
FEAT11.7.1	Evacuation planning support	The evacuation coordination subsystem shall provide an evacuation planning support function.	EC005	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.7.2	Archived evacuation data	The evacuation planning support function shall provide archived evacuation data, such as traffic flows, travel speed, vehicle occupancy, road closures, network geometry, traveler behavior, travel origins, travel destinations and evacuation traffic management strategies.	EC001P	Future	
FEAT11.7.3	Regional and multi-regional evacuation plans.	The evacuation planning support function shall support the development of regional and multi-regional evacuation plans.	EC002P	Future	
FEAT11.7.4	Required modifications to transportation network geometry	The evacuation planning support function shall assist in identifying required modifications to transportation network geometry to accommodate evacuation strategies.	EC003P	Future	
FEAT11.7.5	Required resources	The evacuation planning support function shall assist in defining the required resources for evacuation strategies.	EC004P	Future	
FEAT11.8	Resource Sharing				
FEAT11.8.1	Resource sharing	The evacuation coordination subsystem shall provide a resource sharing function.	EC006	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.8.2	Information sharing between agencies	The resource sharing function shall allow information sharing between agencies and shall: · Facilitate information sharing between various agencies at local, state and federal levels; · Provide communication capabilities among personnel of the agencies involved in the evacuation and between these personnel and the agency centers; · Provide coordination and information sharing between agencies from all states affected by the evacuation; · Provide information to assist evacuation management personnel in making evacuation decisions; · Provide information to assist evacuation management personnel in making decisions regarding shelter operations.	EC001R	Future	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT11.8.3	Deploying resources	The resource sharing function shall assist evacuation management personnel in making decisions regarding deployment of resources and sharing of resources based on existing and forecast demand for these resources and shall: · Identify the resources required for the current and forecasted evacuation scenarios. · Identify the resources required to implement alternative evacuation management strategies. · Identify the resource deployment stages, in time and space, for each evacuation scenario. · Assist local, state and multi-state agencies in sharing resources between agencies.	EC002R	Future	
FEAT12	Road Weather Information System (RWIS)				
FEAT12.1	Detection of road weather conditions	The SunGuide software shall provide software for detection of road weather conditions that may impact operations.	A005	Approved	Demonstration
FEAT12.2	Report weather and surface conditions	The SunGuide system shall utilize real-time data from RWIS sensors to determine and report current weather and road surface conditions for any segment of roadway within the scope of system coverage.	S017	Approved	Demonstration
FEAT12.3	NTCIP protocol	The RWIS interface shall use the NTCIP protocol.	RW004	Approved	Inspection

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT12.4	Global object definitions	The RWIS interface function shall provide for the following global object definitions: · Database management; · Time management; · Report; · Simple transportation management protocol (STMP); and · Pulse position modulation protocol (PPMP).	RW001D	Approved	Demonstration
FEAT12.5	Object definitions	The RWIS interface function shall provide the following object definitions for environmental sensors: · Pressure; · Wind data; · Basic temperature data; · Enhanced temperature data; · Basic precipitation data; · Standard precipitation data; · Enhanced precipitation data; · Emerging precipitation data; · Solar radiation; · Visibility data; · Standard pavement sensor data; · Enhanced pavement sensor data; · Standard Sub-surface sensor data; · Enhanced Sub-surface sensor data; and · Air quality.	RW002D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT12.6	Data fields	The user interface shall provide the following data fields relative to each RWIS field unit: · Name; · Location; · Data age; · Air temperature; · Dew point temperature; · Relative humidity; · Precipitation type · Precipitation intensity; · Precipitation rate; · Precipitation accumulation; · Visibility; · Average wind speed; · Wind gust speed; · Wind direction; · Surface sensor name; · Surface temperature; · Freeze point; · Chemical factor; · Chemical percent; and · Ice percent.	RW002U	Approved	Demonstration
FEAT12.7	NTCIP protocol standard	The NTCIP standard for environmental sensor stations (ESS) shall be utilized for the RWIS interface communications.	RW001	Approved	Demonstration
FEAT12.8	RWIS Interface	The RWIS interface function shall provide protocol software to communicate with RWIS field units using NTCIP.	RW002	Approved	Demonstration
FEAT12.9	User interface display	The RWIS user interface shall be a software application within the SunGuide system that displays data including, but not limited to, atmospheric data, pavement data, and forecasts.	RW005	Approved	Demonstration
FEAT12.10	Statewide data display	It shall be possible for any workstation within the SunGuide system to access the RWIS user interface and the data from all RWIS system components statewide.	RW001U	Approved	Demonstration
FEAT13	Center to Center (C2C)				

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT13.1	Center-to-center communications	The SunGuide software shall provide software for center-to-center communications to support major incidents that affect multiple jurisdictions including evacuation.	A020	Approved	Demonstration
FEAT13.2	Coordination and delegation	The SunGuide software shall support the coordination and delegation of control of operations and management during natural or man-made disasters or evacuations. Information exchanged currently includes: Description Special staging area Number of people affected Source Contact Start and end times	A021	Approved	Demonstration
FEAT13.3	Center-to-Center functions	The SunGuide system shall support center-to-center communications through the normal command/control functions, the status update of field devices, web server switching to another RTMC, incident data review as an output from the Data Distributor, and the GUI display from the ARCView software or Map Objects.	S021	Approved	Demonstration
FEAT14	Data Archiving (DA)				
FEAT14.1	Data warehousing	The SunGuide software shall provide software for storing and regionally sharing traffic data so it can be archived in a data warehouse.	A019	Approved	Demonstration
FEAT14.2	Automated archiving	The system support archiving component shall provide automated archiving of data to a common file usable by external databases for reporting purposes.	SS001A	Approved	Demonstration
FEAT14.3	Archive data minimums	At a minimum, the system support archiving component shall archive the following information: · Incident history data; · Device status logs; · Detector data; and · System logs.	SS002A	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT14.4	Format standards	The format of the archived data shall comply with standards set by FDOT's TranStat Office that are required for performance monitoring and deployment evaluation, including data input to the HPMS. This applies only to SunGuide collected data.	SS003A	Approved	Demonstration
FEAT14.5	Export form	The system support archiving function shall support archiving as an export to comma delimited form.	SS004A	Approved	Demonstration

The ensuing sections detail the requirements for particular subsystems. A table for the FEAT requirements shows the original requirements for the subsystem. Additional requirements for each subsystem (SUB) have been added with traceability back to the FEAT requirements. Each subsystem is detailed.

2.3.1 Center to Center (C2C)

Table 2.5 - Center to Center FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT13	Center to Center (C2C)				
FEAT13.1	Center-to-center communications	The SunGuide software shall provide software for center-to-center communications to support major incidents that affect multiple jurisdictions including evacuation.	A020	Approved	Demonstration
FEAT13.2	Coordination and delegation	The SunGuide software shall support the coordination and delegation of control of operations and management during natural or man-made disasters or evacuations. Information exchanged currently includes: Description Special staging area Number of people affected Source Contact Start and end times	A021	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT13.3	Center-to-Center functions	The SunGuide system shall support center-to-center communications through the normal command/control functions, the status update of field devices, web server switching to another RTMC, incident data review as an output from the Data Distributor, and the GUI display from the ARCView software or Map Objects.	S021	Approved	Demonstration

Table 2.6 - Center to Center SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB11	C2C - Center to Center	Requirements for the C2C system.			
SUB11.1	System				
SUB11.1.1	Network ID	The SunGuide system shall require each connection (i.e., TMC or remote user) to supply a network identifier.	FEAT13.3	Approved	Inspection
SUB11.1.2	Retrieve data	The system shall allow a network to retrieve device status information from another network.	FEAT13.3	Approved	Demonstration
SUB11.1.3	Incidents	The system shall allow a network to send incident information to another network.	FEAT13.3	Approved	Demonstration
SUB11.1.4	Traffic data	The system shall allow a network to send traffic data including speed, volume, occupancy and travel times to another network.	FEAT13.3	Approved	Demonstration
SUB11.1.5	Roadway segments	Roadway segments shall be designated by two nodes and a link as defined in the ICD.	FEAT13.3	Approved	Demonstration
SUB11.1.6	Response plan	The system shall allow a network to retrieve a response plan consisting of a device or group of devices from another network.	FEAT13.3	Approved	Demonstration
SUB11.2	Status				
SUB11.2.1	DMS	The system shall maintain the most current DMS status information for DMSs in the connected networks.	FEAT13.3	Approved	Demonstration
SUB11.2.2	HAR	The system shall maintain the most current HAR status information for HARs in the connected networks.	FEAT13.3	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB11.2.3	CCTV	The system shall maintain the most current CCTV status information for CCTVs in the connected networks.	FEAT13.3	Approved	Demonstration
SUB11.2.4	LCS	The system shall maintain the most current LCS status information for LCSs in the connected networks.	FEAT13.3	Future	Demonstration
SUB11.2.5	RWIS	The system shall maintain the most current RWIS status information for RWISs in the connected networks.	FEAT13.3	Approved	Demonstration
SUB11.3	Control				
SUB11.3.1	DMS	The system shall allow a network to send a command request to a DMS in another network.	FEAT13.3	Approved	Demonstration
SUB11.3.2	HAR	The system shall allow a network to send a command request to a HAR in another network.	FEAT13.3	Approved	Demonstration
SUB11.3.3	CCTV	The system shall allow a network to send a command request to a CCTV in another network.	FEAT13.3	Approved	Demonstration
SUB11.3.4	LCS	The system shall allow a network to send a command request to an LCS in another network.	FEAT13.3	Future	Demonstration
SUB11.3.5	RWIS	The system shall allow a network to send a command request to a RWIS in another network.	FEAT13.3	Approved	Demonstration
SUB11.3.6	Response plan	The system shall allow a network to send a command request to execute a response plan on another network.	FEAT13.3	Approved	Demonstration

2.3.2 Closed Circuit Television (CCTV)

Table 2.7 - CCTV FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8	Closed Circuit Television (CCTV)				
FEAT8.1	General				
FEAT8.1.1	Video surveillance	The SunGuide software shall provide software for video surveillance along the limited-access facilities and the interchange areas (along the mainline and crossroads).	A002	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.1.2	Interface with CCTV cameras	The SunGuide software shall interface with CCTV used for traffic surveillance.	S015	Approved	Demonstration
FEAT8.1.3	Analog video switch	The SunGuide system shall communicate with CCTV cameras through an analog video switch.	TV006D	Deleted	Demonstration
FEAT8.1.4	Lock CCTV	The CCTV function shall incorporate software logic to allow only one workstation at a time to control a particular CCTV unit.	TV003S	Approved	Demonstration
FEAT8.1.5	Camera menu	A selectable menu of cameras shall be provided to the user.	PA001U	Approved	Demonstration
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	TV003	Approved	Demonstration
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.	A008	Approved	Demonstration
FEAT8.2	Camera types				
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.	TV001D	Approved	Demonstration
FEAT8.2.2	Camera system types	The CCTV function shall be capable of controlling camers (e.g., pan/tilt/zoom). The following protocols will be used to issue command/control requests to the cameras. -NTCIP -SunGuide	TV002D	Approved	Demonstration
FEAT8.2.3	IP based controls	The CCTV driver shall also support cameras with IP based controls.	TV017D	Approved	Demonstration
FEAT8.2.4	Technologies supported	The CCTV function shall provide an interface that supports the following technologies for the transmission of video and data between field hardware, subsystems, TMCs and additional remote locations · Fiber optic transceivers; · Fiber optic video/data multiplexers; · MPEG encoders/decoders; and · Wireless.	TV002	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.2.5	Device driver types	At a minimum the CCTV function shall provide device drivers for the following camera types: -NTCIP compliant cameras -Sunguide protocol	TV001	Approved	Demonstration
FEAT8.2.6	NTCIP standard	Whenever possible, the NTCIP protocol standard shall be utilized for camera control and communication.	TV003D	Approved	Demonstration
FEAT8.2.7	Alternate SunGuide	An alternate to the NTCIP protocol shall be developed that is the SunGuide protocol.	TV004D	Deleted	
FEAT8.2.8	Functionality equal to NTCIP	Manufacturer-specific drivers shall, at a minimum, provide functionality equal to that provided via NTCIP mandatory objects provided the manufacturer's protocol supports the functionality.	TV005D	Approved	Demonstration
FEAT8.3	Functionality	Functionality will be provided if the protocol supports the particular function.			
FEAT8.3.1	Range objects	The CCTV range objects shall be implemented in the device drivers and at a minimum shall include: · A maximum number of presets parameters; · Pan left limit parameters; · Pan right limit parameters; · Pan home position parameters; · True north offset 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.	TV007D	Approved	Demonstration
FEAT8.3.2	Timeout objects	The device drivers shall contain the CCTV timeout objects and shall include the following parameters at a minimum · Pan timeout parameter; · Tilt timeout parameter; · Zoom timeout parameter; · Focus timeout parameter; and · Iris timeout parameter.	TV008D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.3.3	Preset objects	The device driver shall contain CCTV preset objects and shall include the following parameters at a minimum: · Go to preset position parameters; · Store preset position parameters; · Pan position parameters; · Tilt position parameters; · Lens zoom position parameter; · Lens focus position parameter; and · Lens iris Position Parameter.	TV009D	Approved	Demonstration
FEAT8.3.4	System feature control objects	The device drivers shall contain CCTV system feature control objects and shall contain the following parameters and characteristics: · System camera feature control parameter; · System camera feature status; · System camera equipment availability parameter; · System lens feature control parameter; · System lens feature status parameter; and · System lens equipment availability parameter.	TV010D	Approved	Demonstration
FEAT8.3.5	Alarm objects	The device driver shall contain the following CCTV alarm objects: · Alarm status parameters; · Alarm latch status parameters; · Alarm latch clear parameters; · Temperature alarm high-low threshold; · Temperature alarm current value parameters; · Pressure alarm high-low threshold parameters; · Pressure alarm current value; · Washer fluid alarm high-low threshold parameters; · Washer fluid alarm current value parameters; and · Alarm label index parameter.	TV011D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.3.6	Discrete input objects:	The device driver shall contain the following CCTV discrete input objects: · Discrete input status parameters; · Discrete input latch status parameters; · Discrete input latch clear parameters; and · Discrete input label index parameters.	TV012D	Approved	Demonstration
FEAT8.3.7	Discrete output objects:	The device driver shall contain the following CCTV discrete output objects: · Discrete output status parameters; · Discrete output control parameters; and · Discrete output label indexes.	TV013D	Approved	Demonstration
FEAT8.3.8	Zone parameters:	The device driver shall contain the following CCTV zone parameters: · Maximum number of zones parameter; and · Zone tables.	TV014D	Approved	Demonstration
FEAT8.3.9	Label objects	The device driver shall contain the following CCTV label objects: · Maximum number of labels parameters; · Label tables; · Label location parameters; and · Enable label text displays.	TV015D	Approved	Demonstration
FEAT8.3.10	On-Screen camera menu objects	The device driver shall contain CCTV On-Screen Camera Menu Objects to the extent supported by NTCIP: · Activate menu parameters; · Menu control parameters.	TV016D	Approved	Demonstration
FEAT8.4	Display				
FEAT8.4.1	MPEG2 displayed on monitors	The CCTV function shall support the switching of video signals to any video monitor or desktop workstation that is connected with a similar technology and has physical connectivitiy. Protocols to be supported by the software include: -None currently identified	TV001S	Approved	

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT8.4.2	View image multiple locations	The CCTV switching function shall support the switching of video signals to multiple workstations if the underlying video hardware provides the functionality.	TV002S	Approved	
FEAT8.4.3	Multiple video images from multiple sources on single monitor	The SunGuide system shall provide the capability for a single workstation monitor to display multiple video images from multiple sources to the extent possible provided by availability of digital video images on the network or the control capabilities of the video switch if the necessary switching, display, conversion and connectivity functionality is supported in the TMC video system.	TV004S	Approved	Demonstration
FEAT8.4.4	Route video frames to FDOT Central Office.	The SunGuide system shall be capable of routing the maximum number of video frames per second over the FDOT network to the FDOT Central Office that can be supported by the hardware video switch or the network.	TV005S	Approved	
FEAT8.4.5	Control video	A browser-based control mechanism shall allow an authorized user to control and view video from any video device so long as the user has a high-speed Internet connection defined as an upstream connection speed greater than 256 thousand (256,000) bits per second (user to device).	PA003	Approved	Demonstration

Table 2.8 - CCTV SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB6	CCTV - Closed Circuit Television	Requirements for the CCTV system.			
SUB6.1	Resource arbitration				
SUB6.1.1	Lock camera	The system shall allow a client to request locking of a camera for sole usage.	FEAT8.1.4	Approved	Demonstration
SUB6.1.2	Unlock camera	The system shall allow a client to request unlocking of a camera.	FEAT8.1.4	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB6.1.3	Breaking locks	A lock shall be broken by a user with a higher securiy level requesting the camera or by a timeout from last use of the camera.	FEAT8.1.4	Approved	Demonstration
SUB6.2	Control camera				
SUB6.2.1	Camera power	The system shall allow a camera to be powered on or off.	FEAT8.1.2	Approved	Demonstration
SUB6.2.2	Camera accessibility	The system shall allow a camera to be placed online (accessible) or offline (inaccessible).	FEAT8.1.2	Approved	Demonstration
SUB6.2.3	Blackout button	The system shall allow an operator to block a camera from being assigned to a predetermined list of outputs.	FEAT8.4.5	District request	Demonstration
SUB6.3	Camera presets				
SUB6.3.1	Set preset	The system shall allow a preset to be saved for a camera containing the pan, tilt, zoom, and focus positions.	FEAT5.1.4	Approved	Demonstration
SUB6.3.2	Select preset	The system shall allow saved preset position information to be sent to a particular camera.	FEAT5.1.4	Approved	Demonstration
SUB6.4	Video tours				
SUB6.4.1	Configure video tours	The system shall allow a video tour to be created, modified or deleted.	FEAT8.4.5	Approved	Demonstration
SUB6.4.2	Video tour parameters	The system shall allow a video tour to be created of a set of cameras in sequence with a dwell time.	FEAT8.4.5	Approved	Demonstration
SUB6.5	System				
SUB6.5.1	Logging	The system shall log events and actions including the user name, camera (if applicable), and the status of the event.	FEAT1.7.12	Approved	Demonstration

2.3.3 Data Archiving (DA)

Table 2.9 - Data Archiving (DA) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT14	Data Archiving (DA)				
FEAT14.1	Data warehousing	The SunGuide software shall provide software for storing and regionally sharing traffic data so it can be archived in a data warehouse.	A019	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT14.2	Automated archiving	The system support archiving component shall provide automated archiving of data to a common file usable by external databases for reporting purposes.	SS001A	Approved	Demonstration
FEAT14.3	Archive data minimums	At a minimum, the system support archiving component shall archive the following information: · Incident history data; · Device status logs; · Detector data; and · System logs.	SS002A	Approved	Demonstration
FEAT14.4	Format standards	The format of the archived data shall comply with standards set by FDOT's TranStat Office that are required for performance monitoring and deployment evaluation, including data input to the HPMS. This applies only to SunGuide collected data.	SS003A	Approved	Demonstration
FEAT14.5	Export form	The system support archiving function shall support archiving as an export to comma delimited form.	SS004A	Approved	Demonstration

No additional subsystem requirements have yet been identified for data archiving.

2.3.4 Data Distribution (DD)

Table 2.10 - Data Distribution (DD) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.2.1	Modular abstraction layer	The databus shall be a modular abstraction layer to allow subsystems to retrieve data.	DB001	Approved	Inspection
FEAT1.2.2	Input and output separated	The databus shall have an Interface Control Document (ICD) for client data exchange and an ICD for subsystem data exchange.	DB001A	Approved	Inspection
FEAT1.2.7	Databus architecture	Each subsystem shall ensure the central data repository (databus) contains the most recent data, including equipment status.	S003	Approved	Demonstration
FEAT6	Data Distribution (DD)				

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT6.1	Distribute data in real time.	The SunGuide system shall provide a function to distribute data in real time. Data shall include but not be limited to: · Travel time data; · Speed data; · Video images; and · Amber Alert data.	S010	Approved	Demonstration
FEAT6.2	Retrieving real time data from the database	The data distribution function shall be capable of retrieving data from the database and updating user workstations with the data as soon as it is received into the database.	DD001	Approved	Demonstration
FEAT6.3	Data selection	The user shall be capable of selecting the data to be displayed by the data distribution function.	DD002	Approved	Demonstration

Table 2.11 - Data Distribution (DD) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB4	DD - Data Distribution				
SUB4.1	Subsystem requests	The client shall be able to send subsystem requests to the data distribution function and receive subsystem responses.	FEAT1.7.12	Approved	Demonstration
SUB4.2	Route requests to subsystems	The data distribution function shall distribute requests from clients to the appropriate subsystems.	FEAT1.7.12	Approved	Demonstration
SUB4.3	Subscribe	The data distribution function shall enable the client to subscribe to status update notifications.	FEAT6.3	Approved	Inspection
SUB4.4	ICD	The data distribution function shall provide a published Interface Control Document for client connections.	FEAT6.1	Approved	Inspection
SUB4.5	Provider template	The data distribution function shall require subsystem ICDs to conform to a provider template.	FEAT1.7.12	Approved	Inspection
SUB4.6	Status request	The client shall be able to request status information from all provider subsystems currently in the system.	FEAT6.2	Approved	Demonstration

2.3.5 Dynamic Message Sign (DMS)

Table 2.12 - DMS FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT9	Dynamic Message Signs (DMS)				
FEAT9.1	DMS drivers	The SunGuide system shall provide an interface to dynamic message signs (DMSs) through a minimum of three drivers supporting: · NTCIP protocol (Florida MIB) and · Mark IV (I95 protocol).	S019	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT9.2	DMS control	The DMS device driver shall communicate to the DMS and perform the following: · Set or check date and time; · Poll the DMS on a periodic basis as specified in the database and retrieve DMS status. · Check the cyclic redundancy check of the DMS operating parameters and message library against the cyclic redundancy check parameters of the database; ·Download operating parameters and DMS command messages; ·Upload the current operating parameters and display on user's workstation; ·Download all message text and its attributes; ·Display all message text, database parameters and attributes on the user's workstation(s); ·Command the particular DMS message be stored in the message library; ·All uploaded information from the DMS shall be displayed at the user's workstation(s); ·The operator, with proper security, shall be able to display/change database messages and parameters. A log of all changes shall be maintained by time and operator identification; ·Provide a DMS test mode set of commands; ·Provide a method for restricting overwriting an essential (e.g., incident related) message on a DMS; ·Provide a log of all communication events to and from the DMS including the report of device errors; and ·Provide the capability to stop and restart the DMS device driver via operator control.	DM003D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT9.3	Sending database messages	The DMS software device driver shall be capable of sending all messages as defined in the DMS message database.	DM001	Approved	Demonstration
FEAT9.4	Save messages	The DMS software shall implement a database of standard messages.	DM002	Approved	Demonstration
FEAT9.5	Acceptable words/messages	The DMS database shall contain a list of acceptable messages and words/or messages that are unacceptable.	DM001D	Approved	Demonstration
FEAT9.6	System configuration	The DMS database shall contain DMS internal operating parameters and internal messages.	DM002D	Approved	Demonstration
FEAT9.7	Trail blazer signs	The SunGuide system shall provide an interface to the dynamic and blank-out trail blazer signs.	TB001	Approved	Demonstration

Table 2.13 - DMS SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB7	DMS - Dynamic Message Signs	Requirements for the DMS system.			
SUB7.1	Control DMS				
SUB7.1.1	Send message	The system shall be able to send a message containing MULTI text, display duration, owner and priority of the message to one or more DMSs.	FEAT9.3	Approved	Demonstration
SUB7.1.2	Terminate message	The system shall be able to terminate the message on one or more DMSs.	FEAT9.3	Approved	Demonstration
SUB7.1.3	Set operational status	The system shall be able to set the operational status of one or more DMSs to "Active" or "Out of Service".	FEAT9.2	Approved	Demonstration
SUB7.1.4	Set brightness	The system shall be able to set the brightness mode of a DMS to "Auto", "Day" or "Night".	FEAT9.2	Approved	Demonstration
SUB7.1.5	Control mode	The system shall be able to set the control mode for one or more DMSs.	FEAT9.2	Approved	Demonstration
SUB7.1.6	Exercise shutters	The system shall be able to exercise the shutters of a DMS.	FEAT9.2	Approved	Demonstration
SUB7.1.7	Reset controller	The system shall be able to reset the controller of one or more DMSs.	FEAT9.2	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB7.1.8	Synchronize clock	The system shall be able to synchronize the clock on one or more DMSs with the current system time.	FEAT9.2	Approved	Demonstration
SUB7.2	Query DMS				
SUB7.2.1	Status poll	The system shall be able to query one or more DMSs for their current status. Current status includes operational status, power status, control mode, short lamp status, short pixel status, fan status, brightness mode, temperature (if supported) and the current display.	FEAT9.2	Approved	Demonstration
SUB7.2.2	Echo message	The system shall be able to query a DMS for the current message display including the MULTI text, the remaining display duration, owner, and priority of the message.	FEAT9.2	Approved	Demonstration
SUB7.2.3	Fan status	The system shall be able to query a DMS for the status of the fans.	FEAT9.2	Approved	Demonstration
SUB7.2.4	Lamp status	The system shall be able to query a DMS for the current lamp status including stuck on and stuck off lamps.	FEAT9.2	Approved	Demonstration
SUB7.2.5	Pixel status	The system shall be able to query a DMS for the current status of the pixels on the display.	FEAT9.2	Approved	Demonstration
SUB7.3	System				
SUB7.3.1	Configure messages	The system shall allow messages to be composed and saved in the database.	FEAT9.4	Approved	Demonstration
SUB7.3.2	Approved words	The system shall check messages contain only approved words before saving to the database or sending to a DMS.	FEAT9.5	Approved	Demonstration
SUB7.3.3	System defaults	The system shall maintain system defaults including a default message and poll cycle times.	FEAT9.6	Approved	Demonstration
SUB7.3.4	Automatic polls	The system shall poll DMSs for their current status information on a cyclic basis.	FEAT9.2	Approved	Demonstration
SUB7.3.5	Logging	The system shall log events and actions including the user name, DMS (if applicable), message (if applicable), and the status of the event.	FEAT1.7.12	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB7.3.6	Timed messages	The system shall allow specific messages to be identified with specific DMSs. A set of such messages can be activated to run on specific DMSs at specific days of the week and times.	FEAT9.3	Approved	Demonstration
SUB7.3.7	Arbitration queue	The system shall allow different priority messages to be queued for display on a DMS.	FEAT9.3	District request	Demonstration

2.3.6 Executive Handler (EH)

Table 2.14 - Executive Handler (EH) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT3	Executive Handler (EH)				
FEAT3.1	Executive handler function	The SunGuide system shall have an executive function that handles all monitoring and reporting of the status of external devices and internal processes.	S008	Approved	Demonstration
FEAT3.2	Minimum functionality	As a minimum the executive handler shall provide: · Process initiation/termination; · Process status and monitoring; · Error logging.	EX001	Approved	Demonstration
FEAT3.3	Start, stop, and restart processes	The executive handler shall be capable of automatic and manual initiation, termination and re-initiation of system processes.	EX002	Approved	Demonstration
FEAT3.4	Scheduled process control	The executive handler shall have the capability to add scheduled process control for subsystems and drivers	EX003	Approved	Demonstration
FEAT3.5	Group dependencies	The executive handler shall notify personnel if an application fails or is restarted.	EX004	Approved	Demonstration
FEAT3.6	Process start order	In the case of a failure, the executive handler shall start processes in the same order that they originally started.	EX001F	Approved	Demonstration
FEAT3.7	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.	EX002F	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT3.8	Initialize individual components	The executive handler shall have the ability to initialize individual components as well as subsystem groups.	EX005	Approved	Demonstration
FEAT3.9	Monitor, report and display status	The executive handler shall be capable of monitoring, reporting, and displaying the status of all subsystems, subsystem components, and network communications links and components.	EX006	Approved	Demonstration
FEAT3.10	Hierarchal 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.	EX001D	Approved	Demonstration
FEAT3.11	Monitor key data	Monitoring shall include pertinent system information such as the current system state, as well as historical information such as system performance, uptime, and error logs.	EX001M	Approved	Demonstration
FEAT3.12	Database storage of information	All information collected shall be capable of being stored in the database.	EX002M	Approved	Inspection

Table 2.15 - Executive Handler (EH) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB1	EH - Executive Handler	Requirements for the EH system.			
SUB1.1	General				
SUB1.1.1	Configurable parameters	The following shall be configurable parameters of the EH process: Host name TCP port number	FEAT3.2	Approved	Inspection
SUB1.1.2	Log level	The system shall allow the logging level to be modified.	FEAT3.11	Approved	Inspection
SUB1.2	EH process				
SUB1.2.1	Control processes	The system shall be able to stop and start processes running on machines reachable on the local network.	FEAT3.3	Approved	Demonstration
SUB1.2.2	Heartbeat	The system shall be capable of receiving a heartbeat from the system processes.	FEAT3.9	Approved	Demonstration
SUB1.3	EH viewer				

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB1.3.1	Visibility of processes	The system viewer shall be capable of viewing the status of processes for computers on the local network.	FEAT3.9	Approved	Demonstration
SUB1.3.2	Process health	The system viewer shall display the health of the various processes in a configurable manner.	FEAT3.9	Approved	Demonstration

2.3.7 Graphical User Interface (GUI)

Table 2.16 - Graphical User Interface (GUI) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.2	GUI				
FEAT4.2.1	Add/edit/delete equipment GUI	The inventory/maintenance software shall provide a GUI display screen for the operator to add/edit/delete inventory equipment information. The equipment information shall at a minimum include: · Type identification and description; · Model identification and description; · Manufacturer information; · Serial number; · Firmware version; · Location description; · Date installed; · Status (inventory/installed/repair); · Location geographic reference; and · Quantity by Type identification on hand.	IM001	Approved	Demonstration
FEAT4.2.2	Add/edit/delete vendor information GUI	The inventory/maintenance software shall provide a GUI for the operator to add/edit/delete vendor information. The vendor information shall at a minimum include the following: · Vendor name; · Vendor contact; · Address/ information including city, state, and zip code; · Telephone and facsimile numbers; and · Web address for purchase.	IM003	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.2.3	Print reports GUI	All printed reports of the inventory software shall be selected via a GUI menu.	IM002R	Approved	Demonstration
FEAT4.2.4	Equipment history GUI	History of the equipment transfer and its inventory status shall be maintained and reported via GUI to the workstation operator or printed.	IM004D	Approved	Demonstration
FEAT4.2.5	Displays	The congestion report display shall result from a comparison between all possible sources of data derived from real-time data, operator input or historical data as determined by the algorithm.	ID001W	Approved	Demonstration
FEAT4.2.6	Repair status display	The repair status of a specific piece of equipment shall be displayed to the operator.	IM007	Approved	Demonstration
FEAT7	Graphical User Interface - General (GUI)				
FEAT7.1	Entry of location and direction of travel data	Workstation GUI screens shall support the entry of the exact location and direction of travel data as efficiently as possible.	TM003	Approved	Demonstration
FEAT7.2	Map based				
FEAT7.2.1	GIS software interface	The SunGuide system shall provide a GIS interface that displays shape files.	S014	Approved	Demonstration
FEAT7.2.2	GIS data	The SunGuide GIS function shall translate shape files containing GIS-formatted data such as traffic speed, incidents, message sign data, and device status.	GS001	Approved	Demonstration
FEAT7.2.3	Viewable from PTMCs, VTMCs, RTMCs and FDOT central office	Data such as traffic speed, incidents, message sign data, device status, and other data shall be viewable from PTMCs, VTMCs, RTMCs and the FDOT Central Office.	GS002	Approved	Demonstration
FEAT7.2.4	SVG technology and ESRI shape file	The GIS map shall be a browser-based map using Scalable Vector Graphics (SVG) technology and Environmental Systems Research Institute (ESRI) shape files.	GS003	Approved	Inspection
FEAT7.2.5	Remote viewing	The GIS function shall support remote viewing of data through a TCP/IP connection at a minimum speed of 1.544 million bits per second.	GS004	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT7.2.6	Call box activation icon	The GIS map covering the FIHS segment where a call box with remote communications that is accessible by the SunGuide software is activated shall display an icon indicating the call box activation until acknowledged by the SunGuide operator of the workstation that is displaying the GIS map.	GS005	Future	

Table 2.17 - Graphical User Interface SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB5	GUI - Graphical User Interface (General)				
SUB5.1	General				
SUB5.1.1	Configuration editor	The system shall provide a configuration editor component to allow authorized users to modify system configuration, including user permissions, equipment setup and device communication.	FEAT1.2.11	Approved	Inspection
SUB5.1.2	Reports	The system shall provide authorized users a method of selecting and customizing data reports.	FEAT1.7.10	Approved	Inspection
SUB5.1.3	Security Levels	The following security levels will be allowed for the various subsystems: Administrator, Manager, Operator, Guest (local), and Guest (remote).	FEAT1.1.7	Approved	Inspection
SUB5.2	Map				
SUB5.2.1	Map-based primary GUI	A Scalable Vector Graphics (SVG) map shall serve as the primary user interface for operators' daily traffic management activities.	FEAT7.2.4	Approved	Inspection
SUB5.2.2	Map icons	The map shall display icons for roadway devices, incidents, and other resources (e.g., fire hydrants).	FEAT5.1.4	Approved	Inspection
SUB5.2.3	Device status	The map shall provide a method for displaying the current status of any roadway device displayed on the map.	FEAT1.7.12	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB5.2.4	Device control	The map shall provide a method for sending appropriate commands to any roadway device displayed on the map.	FEAT1.7.12	Approved	Demonstration

2.3.8 Highway Advisory Radio (HAR)

The ITN had no specific HAR requirements listed. The subsystem HAR requirements are derived from the incident management requirement to allow messages to be formatted for HAR equipment.

Table 2.18 - Highway Advisory Radio (HAR) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB13	HAR - Highway Advisory Radio				
SUB13.1	System				
SUB13.1.1	Configure messages	The system shall allow messages in text or audio format to be composed and saved in the database.	FEAT5.3.5	Approved	Demonstration
SUB13.1.2	Approved words	The system shall allow a message to be checked to ensure it contains only approved words.	FEAT5.3.5	Approved	Demonstration
SUB13.1.3	Timed messages	The system shall allow messages to be sent to a HAR at a specified time.	FEAT5.3.5	Approved	Demonstration
SUB13.1.4	Automatic polls	The system shall poll HARs for their current status information on a cyclic basis.	FEAT1.7.12	Approved	Demonstration
SUB13.1.5	Logging	The system shall log events and actions including the user name, HAR (if applicable), message (if applicable), and the status of the event.	FEAT1.7.12	Approved	Demonstration
SUB13.2	Control HAR				
SUB13.2.1	Send message	The system shall allow a message to be sent to a HAR or multiple HARs.	FEAT5.3.5	Approved	Demonstration
SUB13.2.2	Terminate message	The system shall allow the message currently being broadcast on a HAR to be terminated.	FEAT5.3.5	Approved	Demonstration
SUB13.2.3	Set operational status	The system shall be able to set the operational status of one or more HARs to "Active" or "Out of Service".	FEAT1.7.12	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB13.2.4	Activate/deacti vate beacon	The system shall allow the beacon to be activated or deactivated independently of broadcasting a message or as part of a message.	FEAT1.7.12	Approved	Demonstration
SUB13.3	Query HAR				
SUB13.3.1	Status poll	The system shall be able to query one or more HARs for their current status. Status includes the message currently broadcasting and whether the beacons are activated.	FEAT1.7.12	Approved	Demonstration
SUB13.3.2	Echo message	The system shall be able to query a HAR for the current message broadcasting including the message and whether the beacons are activated.	FEAT1.7.12	Approved	Demonstration

2.3.9 Incident Management (IM)

Table 2.19 - Incident Management (IM) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5	Incident Management (IM)				
FEAT5.1	General				
FEAT5.1.1	Minimum functionality	The incident management subsystem shall acquire data from the vehicle detection subsystem and include the following functionality at a minimum: · Incident verification; · Motorist information; · Response; · Site management; · Traffic management; and · Incident clearance.	TM002	Approved	Demonstration
FEAT5.1.2	Incident type	The incident management function shall support operator entry of the incident type such as HAZMAT spills.	TM003W	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.1.3	Video verification	The SunGuide software shall provide software for video verification of messages posted on DMS to the extent possible due to physical configuration in the field of the camera and sign.	A009	Approved	Demonstration
FEAT5.1.4	Minimize keystrokes	The SunGuide system's incident management function shall minimize the number of key strokes for the entry of traffic incidents while providing drop-down menus, check boxes, and data interfaces with subsystems such as the road weather information systems (RWIS), vehicle detection, motorist aid, vehicle detection, motorist aid (AVI), DMSs, and CCTVs.	TM001	Approved	Demonstration
FEAT5.2	Detect				
FEAT5.2.1	Incident detection	The SunGuide software shall provide software for incident detection along the limited-access facilities.	A001	Approved	Demonstration
FEAT5.2.2	Automatic detection of incident or congestion	The SunGuide system shall support the detection of incidents or congestion, via a software algorithm, that determines occupancy, volume, or speed and makes a determination based on user-defined thresholds.	ID001	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.2.3	View congestion report	The SunGuide system shall provide the ability to view a congestion report for all roadway segments in the system. The congestion report shall include a graphical display and the following information for each roadway segment in the system: · Roadway segment identifications; · Source of the incident or congestion information; · Reported speeds [in miles per hour (MPH)] · Historic speeds (in MPH); · FDOT's LOS; · Congestion cases (i.e. closed, heavy, moderate, none, or free flow); and · Other recommended parameters.	ID002	Approved	Demonstration
FEAT5.2.4	View incident or congestion raw data	The workstation operator shall have the ability to view an incident or congestion raw data report for all links in the system.	ID003	Approved	Demonstration
FEAT5.2.5	Manual incident entry	The workstation operator shall have the ability, via a menu and the selection of a link on a map, to enter manual incident or congestion information. The incident or congestion information the user may enter shall include: · Congestion case (i.e. closed, heavy, moderate, none, or free flow); · Incident types; · Roadway weather conditions; and · Incident duration (i.e., the amount of time incident the will last).	ID004	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.2.6	Graphical displays	The congestion report shall include graphical displays and the following information for each roadway segment in the system · Roadway segment identifications; · Roadway segment geometries; · Source names (determined by the algorithms); · Reported speed, volume, and occupancy; and · Congestion case.	ID002W	Approved	Demonstration
FEAT5.3	Manage				
FEAT5.3.1	Geographic personnel lists	The personnel list shall be on a geographic basis and, at a minimum, shall include. · Response personnel/and contacts; · Geographic agency responsibilities; · Talk list (i.e., responders contact list); · Radio frequencies; · Phone/ and facsmiles numbers; and · Pager numbers.	TM001R	Approved	Demonstration
FEAT5.3.2	Messaging	The incident management software will provide the ability to redirect incident information to standard message services (such as FAX, email, pagers).	TM002R	Approved	Demonstration
FEAT5.3.3	Cataloging of incident management teams/resources	The incident Management function shall support the cataloging of incident management teams and resources with a listing of equipment, material, and the available personnel who possess special skills.	TM003R	Approved	Demonstration
FEAT5.3.4	Recommend DMS/HAR locations and messages	The incident management response function shall recommend a set of DMS locations and messages for the workstation operator to select. In addition, HAR messages shall be activated.	TM005R	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.5	Recommend a set of HAR messages	The incident management response function shall recommend a set of HAR messages to be activated.	TM006R	Approved	Demonstration
FEAT5.3.6	Recommend alternate routes	The incident management response function shall recommend alternate routes in response to incidents that are blocking roadways.	TM007R	Approved	Demonstration
FEAT5.3.7	Select alternate maps	In response to incidents requiring alternate route(s), the workstation operator shall be able to select alternate maps via drop down menus.	TM008R	Approved	Demonstration
FEAT5.3.8	Communicate with detour message signs	When appropriate, the incident management response function shall communicate with detour message signs that are supported by the SunGuide software and TMC communications network capability indicating recommended alternate routes.	TM009R	Approved	Demonstration
FEAT5.3.9	Hierarchy of traffic management activities	The incident management response function shall support a hierarchy of traffic management activities and display these activities for review by RTMC managers.	TM010R	Approved	Demonstration
FEAT5.3.10	Personnel lists and contact numbers	The incident management function shall provide the workstation operator with personnel lists and contact numbers as well as a catalog of agency resources via drop-down menus.	TM005	Approved	Demonstration
FEAT5.3.11	Distribute information	The incident management function shall distribute video feeds, traffic flow, and incident information, and traffic event data until the incident is cleared and the traffic flow is back to normal.	TM004	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.12	Format for dissemination	The incident management function shall format information for distribution to the following dissemination media: · HAR; · Commercial radio broadcast; · Internet Web servers; · DMSs; · 511 Telephone systems; · Commercial and public televisions; · Facsmile machines and pagers; and · Additional dissemination mechanisms provided by the dissemination function.	TM001I	Approved	Demonstration
FEAT5.3.13	Quick click interface to GIS	The incident management function shall provide a quick click interface to the GIS maps for the display and location of resources, i.e. fire hydrants.	TM004R	Approved	Demonstration
FEAT5.3.14	Incident status GUI	The incident management function shall provide the workstation operators with GUI screens that record accurate information regarding the incident's current status, the overall progress towards clearance and the equipment required to complete the process.	TM006	Approved	Demonstration
FEAT5.3.15	Traffic control procedures	The incident management function shall support the RTMC with traffic control procedures that include, at a minimum, point traffic control at the scene, managing the roadway space, and deploying personnel to better manage the traffic by improving traffic flow past incident sites and on alternate routes.	TM007	Approved	Demonstration
FEAT5.3.16	Incident removal resources	The incident management function shall provide support to the incident clearance process by the cataloging of resources for the removal of the all types of incidents.	TM008	Approved	Demonstration
FEAT5.3.17	Catalog of FDOT resources	Included in the catalog shall be the resource, location, cost of service, and availability of related equipment and resources.	TM011R	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.18	Construction work zones	The SunGuide software shall provide for the identification of construction work zones and activities to support operations and management of these work zones and, where smart work zone management is provided, integration of the smart work zone management into freeway management systems (FMS) and incident management systems (IMS).	A006	Approved	Demonstration
FEAT5.3.19	Map display	The system shall have a map display of the current incident or congestion for each segment. The map shall change the color of the roadway segment based on the current condition. An algorithm will determine the congestion case.	ID005	Approved	Demonstration
FEAT5.3.20	Incident data archiving	The SunGuide software shall provide software for incident data archiving. The data archived currently includes; -Location -Start and end times -Response plan	A010	Approved	Demonstration
FEAT5.3.21	Management, dispatch, and coordination of RR Service Patrols.	The SunGuide software shall provide software for the management, dispatch, and coordination of Road Rangers Service Patrols.	A012	Future	
FEAT5.3.22	Coordination of freeway incident management team	The SunGuide software shall provide software for coordination with a freeway incident management team involving major stakeholders.	A015	Approved	Demonstration
FEAT5.3.23	Diversion routes	The SunGuide software shall provide software for the maintenance of a list of diversion routes for management of traffic during incidents and evacuations. The software shall tie in with construction updates to avoid detours into construction areas.	A022	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT5.3.24	Lane or road closures	The SunGuide software shall provide software for the management of lane or road closures during natural or manmade disasters or evacuations and integration with computer-aided dispatch (CAD) systems for incident detection with regional communications centers (RCCs) and emergency operations centers (EOCs) through co-location, Center to Center Communications or the provision of operator stations in the TMC.	A023	Approved	Demonstration

Table 2.20 - Incident Management (IM) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB3	IM - Incident Management				
SUB3.1	Associate events	The system shall allow an operator to associate a new incident with another, existing incident.	FEAT5.3.14	District request	Demonstration

2.3.10 Inventory Maintenance System (IMS)

Table 2.21 - Inventory Maintenance System (IMS) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4	Inventory Management System (IMS)				
FEAT4.1	System				
FEAT4.1.1	Interface to maintenance and inventory tracking software	The SunGuide system shall be provided with an interface to a software system that tracks the inventory of all ITS equipment and the status of equipment repair(s) and maintenance (i.e. life-cycle asset management software system).	S022	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.1.2	Index by equipment type	The inventory/maintenance software database shall index by equipment type for the purpose of reporting and updating the inventory.	IM002	Approved	Demonstration
FEAT4.1.3	Vendor name referenced by equipment type ID.	The vendor name shall be referenced by the equipment type identification.	IM001D	Approved	Demonstration
FEAT4.1.4	Reports provided by type ID	Reports shall be provided by type identification for all equipment according to equipment status.	IM001R	Approved	Demonstration
FEAT4.1.5	View and print vendor table	The workstation operator shall be capable of viewing and printing the complete vendor table or the vendors according to a specific type identification.	IM002D	Approved	Demonstration
FEAT4.1.6	Location data	The inventory/maintenance software shall maintain warehouse locations, repair shop locations, and installation locations, with a GUI screen to add/edit/delete such locations.	IM003D	Approved	Demonstration
FEAT4.1.7	Equipment status catagories	The equipment status shall be: · In inventory; · Installed; or · In repair/test.	IM005D	Approved	Demonstration
FEAT4.1.8	Record status of equipment	The inventory/maintenance software shall provide the operator the capability to record the status of equipment that has failed and is in the process of being repaired.	IM004	Approved	Demonstration
FEAT4.1.9	Equipment status tracking	The inventory/maintenance software shall support tracking the status of the equipment being tracked as follows: · Failed at site; · At repair depot; · In repair at depot; · In testing at depot; and · In inventory.	IM006D	Approved	Demonstration
FEAT4.1.10	Save repair information	The inventory/maintenance software shall contain repair information on the equipment to include the dates of failure and repair, the repair technician, the time to repair, parts utilized by part number and comments.	IM005	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT4.1.11	Repair history	The inventory/maintenance software shall maintain a history of the equipment repairs and may be reported via GUI to the operator or may be printed.	IM006	Approved	Demonstration

No additional subsystem requirements have yet been identified for inventory maintenance.

2.3.11 Road Weather Information System (RWIS)

Table 2.22 - Road Weather Information System (RWIS) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT12	Road Weather Information System (RWIS)				
FEAT12.1	Detection of road weather conditions	The SunGuide software shall provide software for detection of road weather conditions that may impact operations.	A005	Approved	Demonstration
FEAT12.2	Report weather and surface conditions	The SunGuide system shall utilize real-time data from RWIS sensors to determine and report current weather and road surface conditions for any segment of roadway within the scope of system coverage.	S017	Approved	Demonstration
FEAT12.3	NTCIP protocol	The RWIS interface shall use the NTCIP protocol.	RW004	Approved	Inspection
FEAT12.4	Global object definitions	The RWIS interface function shall provide for the following global object definitions: · Database management; · Time management; · Report; · Simple transportation management protocol (STMP); and · Pulse position modulation protocol (PPMP).	RW001D	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT12.5	Object definitions	The RWIS interface function shall provide the following object definitions for environmental sensors: · Pressure; · Wind data; · Basic temperature data; · Enhanced temperature data; · Basic precipitation data; · Standard precipitation data; · Enhanced precipitation data; · Emerging precipitation data; · Solar radiation; · Visibility data; · Standard pavement sensor data; · Enhanced pavement sensor data; · Standard Sub-surface sensor data; · Enhanced Sub-surface sensor data; and · Air quality.	RW002D	Approved	Demonstration
FEAT12.6	Data fields	The user interface shall provide the following data fields relative to each RWIS field unit: · Name; · Location; · Data age; · Air temperature; · Dew point temperature; · Relative humidity; · Precipitation type · Precipitation intensity; · Precipitation rate; · Precipitation accumulation; · Visibility; · Average wind speed; · Wind gust speed; · Wind direction; · Surface sensor name; · Surface temperature; · Freeze point; · Chemical factor; · Chemical percent; and · Ice percent.	RW002U	Approved	Demonstration
FEAT12.7	NTCIP protocol standard	The NTCIP standard for environmental sensor stations (ESS) shall be utilized for the RWIS interface communications.	RW001	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT12.8	RWIS Interface	The RWIS interface function shall provide protocol software to communicate with RWIS field units using NTCIP.	RW002	Approved	Demonstration
FEAT12.9	User interface display	The RWIS user interface shall be a software application within the SunGuide system that displays data including, but not limited to, atmospheric data, pavement data, and forecasts.	RW005	Approved	Demonstration
FEAT12.10	Statewide data display	It shall be possible for any workstation within the SunGuide system to access the RWIS user interface and the data from all RWIS system components statewide.	RW001U	Approved	Demonstration

No additional subsystem requirements have yet been identified for the road weather information system.

2.3.12 Status Logging (SL)

The ITN had no specific subsystem logging requirements listed. The status logging requirements are derived from the general driver requirement which listed logging.

Table 2.23 - Status Logging SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB14	SL - Status Logging				
SUB14.1	General				
SUB14.1.1	Configurable parameters	The following shall be configurable parameters of the logging process: Host name TCP port number File directory location Log rollover interval File reuse.	FEAT1.7.12	Approved	Inspection
SUB14.1.2	Message level	The status logger shall support the following four message types: SLINFO: Informational message SLWARN: Warning message SLERROR: Error message SLDEBUG: Debugging message	FEAT1.7.12	Approved	Inspection

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB14.1.3	Log fields	The status logger shall support the following message fields from clients: Process Name Host Name User ID Event Code Event ID Event Description Message.	FEAT1.7.12	Approved	Demonstration
SUB14.2	Logging process				
SUB14.2.1	Connect	The logging process shall allow a client to connect and disconnect from a TCP/IP TCP socket.	FEAT1.7.12	Approved	Demonstration
SUB14.2.2	Multiple clients	The logging process shall support multiple simultaneous client connections.	FEAT1.7.12	Approved	Demonstration
SUB14.3	Log viewer				
SUB14.3.1	View files	The log viewer shall be capable of viewing in a scrollable window any of the log files generated by the logging process.	FEAT1.7.12	Approved	Demonstration
SUB14.3.2	Filter messages	The log viewer shall allow the user to filter the view of messages displayed based on the following parameters: Time logged Message type Process name Host name User ID Event code Event ID Event description Message.	FEAT1.7.12	Approved	Demonstration
SUB14.3.3	ASCII export	The log viewer shall be capable of exporting a log file to an American National Standard Code for Information Interchange (ASCII), tab-delimited file.	FEAT3.12	Approved	Demonstration
SUB14.3.4	Refresh	The log viewer shall support manual and periodic log file display refresh.	FEAT1.7.12	Approved	Demonstration

2.3.13 Transportation Sensor System (TSS)

Table 2.24 - Transportation Sensor System (TSS) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT10	Transportation Sensor System (TSS)				
FEAT10.1	Data collection	The SunGuide software shall provide software for traffic data collection and support incident detection.	A007	Approved	Demonstration
FEAT10.2	Predict traffic conditions	The SunGuide system shall utilize real-time and archived data from a variety of sources to determine and report current and predicted traffic conditions for any segment of roadway within the scope of system coverage.	S016	Approved	Demonstration
FEAT10.3	Data sources	The SunGuide system shall be capable of collecting traffic data from a variety of in-ground and above-ground traffic NTCIP compliant detection technologies including, but not limited to, inductive loop systems, radar systems, and video detection systems.	TD001	Approved	Demonstration
FEAT10.4	Data time intervals	The SunGuide system shall be able to receive and process traffic data in time intervals including but not limited to: . Ten (10) seconds; . Twenty (20) seconds; . Thirty (30) seconds; . One (1) minute; . Five (5) minutes; . Ten (10) minutes; . Fifteen (15) minutes; . Thirty (30) minutes; and . Sixty (60) minutes.	TD002	Approved	Demonstration
FEAT10.5	Bitrans WashDOT standard	To the maximum extent possible, the Bitrans WashDOT standard for transportation sensor systems shall be utilized for traffic detector communications.	TD003	Approved	Demonstration
FEAT10.6	Serial connections	The SunGuide system shall provide protocol software to communicate with the Bitrans 238I-95 traffic detection unit using serial and/or Ethernet connections over a variety of transmission media (i.e. fiber optic, copper, and wireless) that are capable of baud rates equal to or greater than 1200 bits per second.	TD004	Approved	Demonstration

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT10.7	Non NTCIP drivers	For traffic detectors within the system that do not support NTCIP, control of these devices shall be supported through device drivers that can be selectively loaded and unloaded by the system's traffic detector application on an as-needed basis.	TD005	Approved	Demonstration
FEAT10.8	Data element categories	The device driver for vehicle detectors shall contain the following categories of data elements: · System setup data elements; · Control data elements; and · Inductive loop detector data elements.	TD006	Approved	Demonstration
FEAT10.9	System setup data elements	The transportation sensor system setup data elements shall at a minimum contain the following: · Sensor system reset parameters; · Sensor system status parameters; · Sensor system occupancy type parameters; · Maximum number of sensor zones parameters; · Sensor zone tables; · Clock available parameters.	TD001D	Approved	Demonstration
FEAT10.10	Control Data elements	The transportation sensor system control data element shall at a minimum contain the following: · Maximum number of outputs parameters; · Output configuration tables; · Maximum number of output groups parameters; · Output group tables; · Data collection tables; · Data buffer tables.	TD002D	Approved	Demonstration
FEAT10.11	Loop detector data elements	The transportation sensor system inductive loop detector data element shall at a minimum contain the following data elements · Loop system setup tables; · Loop output conditioning tables; and · Loop system status tables.	TD003D	Approved	Demonstration

Table 2.25 - Transportation Sensor System (TSS) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB8	TSS - Transportation Sensor System	Requirements for the TSS system.			
SUB8.1	Raw data	The system traffic flow information output shall include raw data.	FEAT10.8	Approved	Demonstration
SUB8.2	Smoothed data	The system output shall include smoothed traffic flow information.	FEAT10.8	Approved	Demonstration
SUB8.3	Smoothing algorithm	The system shall support a smoothing algorithm that takes a simple average of raw traffic flow data over a given sampling period.	FEAT10.8	Approved	Inspection
SUB8.4	Automatic polls	The system shall poll TSSs for their current status information on a cyclic basis.	FEAT1.7.12	Approved	Demonstration
SUB8.5	Logging	The system shall log events and actions including the user name, TSS (if applicable), message (if applicable), and the status of the event.	FEAT1.7.12	Approved	Demonstration

2.3.14 User Privileges (USER)

Table 2.26 - User Privileges (USER) FEAT Requirements

Req. No.	Req. Name	Requirement Text	SunGuide ID	Status	Test Method
FEAT1.1.5	User and user group assignments	The workstation security function shall provide the capability to assign specific users and groups to categories that have specific access to levels of the software functionality.	WS001	Approved	Demonstration
FEAT1.1.6	Encrypted passwords	The workstation security function shall use encrypted passwords to identify which users or groups can access what levels of software functionality.	WS002	Approved	Inspection
FEAT1.1.7	User/group functionality	Each user added to a group shall inherit the functionality of the group.	WS003	Approved	Demonstration

Table 2.27 - User Privileges (USER) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB15	USER - User Management				

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB15.1	Default group levels	The system shall have five default groups to which users may be assigned: Administrator, Manager, Operator, Local Guest, and Remote Guest.	FEAT1.1.5	Approved	Demonstration
SUB15.2	Modify individual user privileges	The system shall allow individual user privileges to be modified without affecting the default group levels.	FEAT1.1.7	Approved	Demonstration
SUB15.3	Modify default group levels	The system shall allow the default group permissions to be modified.	FEAT1.1.7	Approved	Demonstration

2.3.15 Ramp Metering (RMS)

The ITN had no specific ramp metering requirements listed. The ramp metering requirements are derived from a general requirement which listed a ramp metering system.

Table 2.28 - Ramp Metering (RMS) SUB Requirements

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB16.1.1	Download parameters	The system shall allow operational parameters to be downloaded to one or more ramp meter controllers. These parameters currently include: Metering rate table Mode control Communication information Time of day table	FEAT11.6.5	Proposed	Demonstration
SUB16.1.2	Online status	The system shall allow ramp meter controllers operational status to be manually changed to inactive/active.	FEAT11.6.5	Proposed	Demonstration
SUB16.1.3	Associate detectors	The system shall allow traffic detectors to be associated with a ramp meter controller.	FEAT11.6.5	Proposed	Demonstration
SUB16.1.4	Modify vehicle release mode	The system shall allow the vehicle release mode of a ramp meter to be modified. Release modes currently include: Single car 2-car tandem 2-car platoon 2-car staggered HOV bypass"	FEAT11.6.5	Proposed	Demonstration

Req. No.	Req. Name	Requirement Text	Traced From	Status	Test Method
SUB16.1.5	Responsive mode	The system shall allow responsive mode parameters to be modified for a ramp meter controller. Responsive mode parameters currently include: Speed Volume Occupancy Queue detection	FEAT11.6.5	Proposed	Demonstration
SUB16.1.6	Manual override	The system shall allow a user with appropriate permissions to override the automatic control of a ramp meter.	FEAT11.6.5	Proposed	Demonstration
SUB16.2.1	System operating parameters	The system shall allow the central operating parameters to be modified. These parameters currently include: Algorithm Time of day	FEAT11.6.5	Proposed	Demonstration
SUB16.2.2	Controller groups	The system shall allow groups of ramp meter controllers to be defined. Groups of groups may also be defined.	FEAT11.6.5	Proposed	Demonstration
SUB16.2.3	Central overrides	The system shall allow a time of day (TOD) ramp metering control to be defined for each ramp meter.	FEAT11.6.5	Proposed	Demonstration
SUB16.2.4	Monitoring status	The system shall monitor ramp meter status and change to failed or marginal as needed.	FEAT11.6.5	Proposed	Demonstration
SUB16.2.5	Metering on/off	The system shall turn metering on or off based on the WSDOT/UW algorithm using traffic conditions.	FEAT11.6.5	Proposed	Demonstration
SUB16.2.6	Logging	The system shall log the following events: Communication errors with ramp meter controllers Manual overrides of ramp meter control	FEAT11.6.5	Proposed	Demonstration
SUB16.3.1	Automatic polls	The system shall poll ramp meter controllers for their current status on a configurable periodic basis.	FEAT11.6.5	Proposed	Demonstration
SUB16.3.2	Manual poll	The system shall allow ramp meters to be manually polled for their current status.	FEAT11.6.5	Proposed	Demonstration
SUB16.3.3	Synchronize clock	The system shall allow the clocks on a ramp meter controller to be synchronized with the current system date and time.	FEAT11.6.5	Proposed	Demonstration

3. Qualification Provisions

The qualification provisions for each requirement are detailed in Section 2.3. The requirements tables show a Test Method with choices as outlined in Table 2.2.

4. Requirements Traceability

Traceability to specific tests will be added once the acceptance test plan has been completed.

5. External Interfaces

External clients connect to the SunGuide software using protocols that are defined in ICDs, in turn the Data Bus connects to subsystems using protocols defined in ICDs, and the subsystems connect to device drivers using protocols defined in ICDs. This design allows for additional subsystems to be added if they conform to ICDs and additional device drivers may also be added using the various subsystem ICDs. Data flow from the databus through a generic subsystem to the associated device is shown in Figure 2.

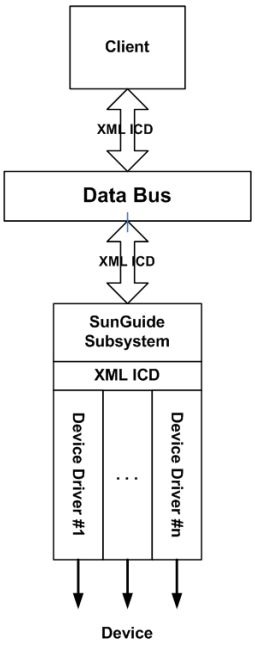

Figure 2 - Data flow

The drivers currently under contract for this system include the following.

- DMS:
  - NTCIP
  - Mark IV (v 2.5)
- CCTV (Cameras):
  - NTCIP
- Video Switch:
  - None
- Traffic Detectors:
  - BiTrans 238I-95
- Ramp Metering:
  - WsDOT (firmware)
- RWIS:
  - NTCIP