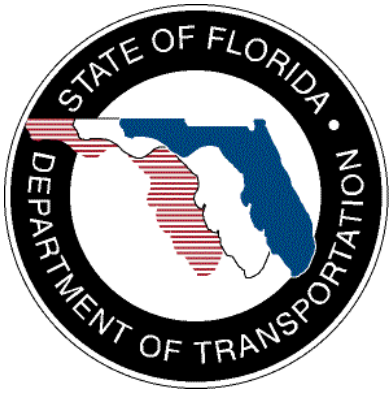
SunGuide™:

Response Plan Generator Interface Control Document

SunGuide-RPG-ICD-3.0.1



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List of Acronyms

ATMS	Advanced Traffic Management System
DOT	Department of Transportation
FDOT	Florida Department of Transportation
EM	Event Management
ITS	Intelligent Transportation Systems
ITN	Invitation to Negotiate
RPG	Response Plan Generator
SwRI	Southwest Research Institute
TMC	Traffic Management Center
XML	Extensible Markup Language

REVISION HISTORY

Revision	Date	Changes
3.0.0	October 16, 2007	Initial Release
3.0.1	November 14, 2007	Added “how to use this document” section

1. Scope

1.1 Document Identification

This Interface Control Document (ICD) describes the interface between individual SunGuide™ clients and the Response Plan Generator (RPG) subsystem and between the RPG subsystem and other SunGuide subsystems. The general base architecture of the XML communications including connection information, byte order and base transaction classes is delineated in the general ICD. This ICD defines Extensible Markup Language (XML) schemas upon which XML requests shall be based in communicating amongst the various processes. Refer to the SunGuide-General-ICD document for details regarding data transfer.

1.2 Project Overview

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

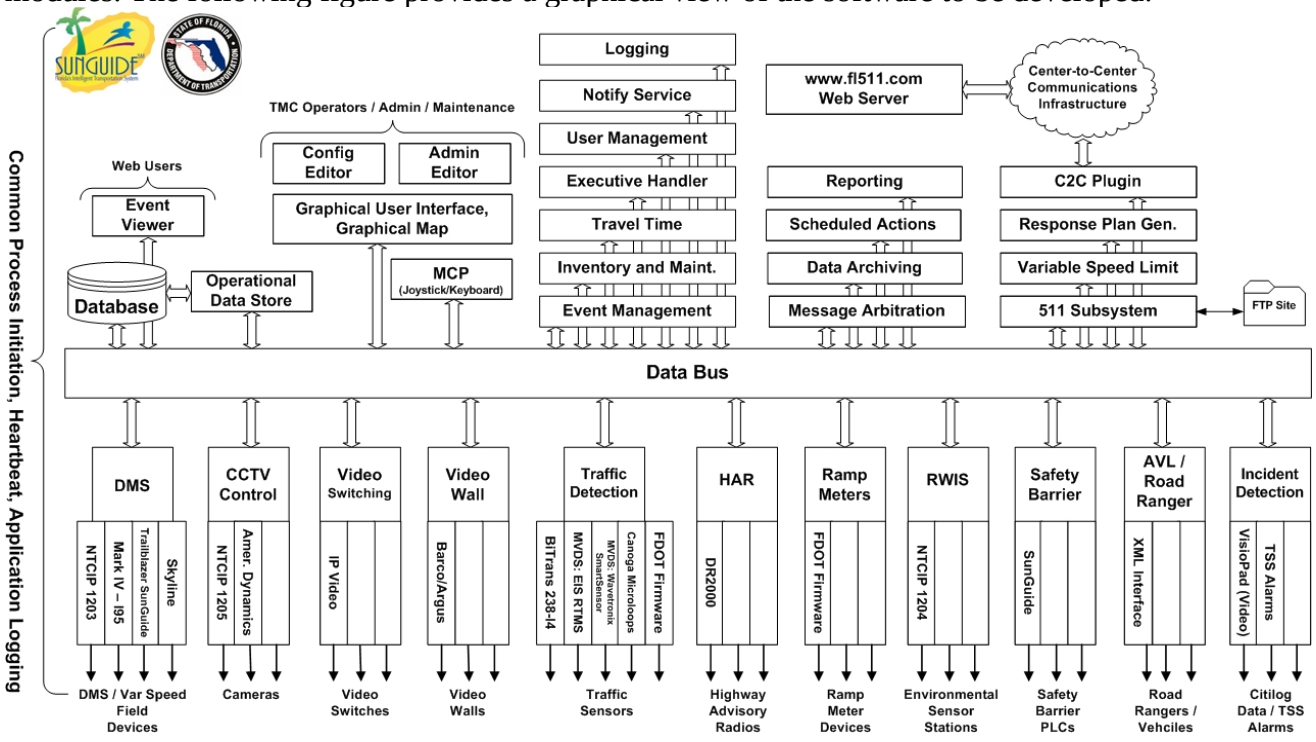

Figure 1-1 - High-Level Architectural Concept

1.3 How to Use This Document

The ICDs describe the specific interface between two SunGuide subsystems or between a SunGuide subsystem and a SunGuide driver. The relationship of appropriate documents is shown in the Figure 1-2.

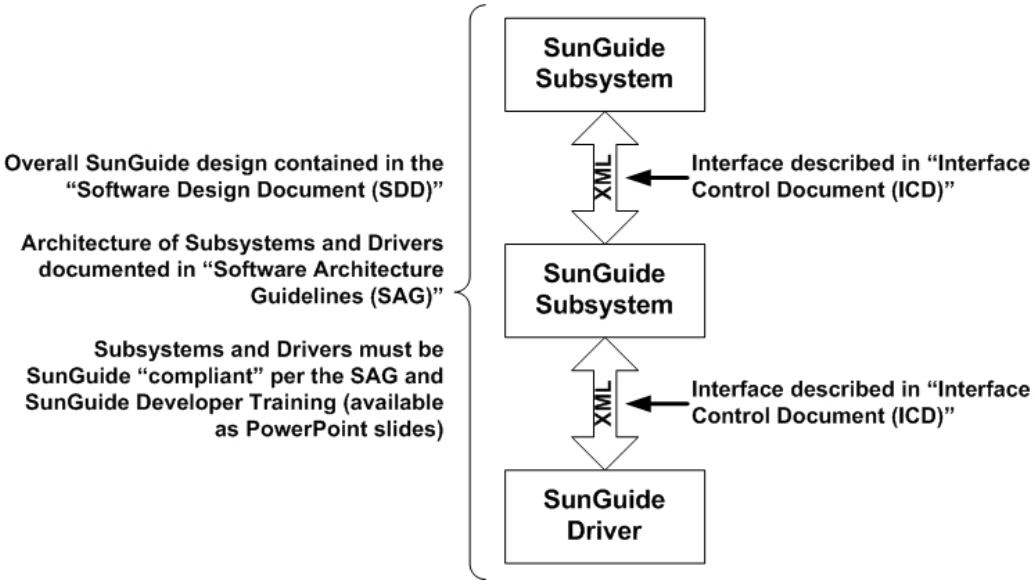

Figure 1-2 - SunGuide Developer Documentation

This document describes an *internal* SunGuide interface. The interface described is between two SunGuide compliant processes. The reader should review the following document to gain an understanding of how SunGuide compliant application is created (this will vary if the application is a driver or subsystem):

SunGuide Software Architecture Guidelines (SAG)

The SAG describes what needs to be included in a SunGuide application to assure that it will work cooperatively in the SunGuide environment. Once the SAG is reviewed, the following document should be reviewed:

SunGuide Software Design Document (SDD)

The SDD will provide an understanding of how individual components of SunGuide were designed. Finally the ICD, along with the associated schema should be reviewed to determine what data needs to be exchanged on the interface being defined in this document.

Additionally, a SunGuide "Developer Training" class is available that provides the students with an introduction into developing SunGuide processes. The SunGuide source code repository has a generic subsystem and a generic driver available that can be used as the basis for developing a new application.

1.4 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.

1.5 Contacts

The following are contact persons for the SunGuide software project:

- Elizabeth Birriel, ITS Central Office, elizabeth.birriel@dot.state.fl.us, 850-410-5606
- Trey Tillander, FDOT SunGuide Project Manager, trey.tillander@dot.state.fl.us, 850-
- 410-5617
- John Bonds, Senior ITS Specialist, jbonds@pbsj.com, 408-873-2514
- David Chang, ITS Specialist, David.Chang@dot.state.fl.us, 850-410-5622
- Steve Dellenback, SwRI Project Manager, sdellenback@swri.org, 210-522-3914
- Robert Heller, SwRI Software Project Manager, rheller@swri.org, 210-522-3824

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

- Liang Hsia, FDOT TERL, liang.hsia@dot.state.fl.us, 850-410-5615

2. Data

The following sections detail the XML transactions that can be exchanged between client and server applications.

2.1 Schema

The schemas for these transactions may be located in the Schemas directory. The objects directory contains common data schemas that are used by the various requests/responses. Schemas are organized in the following tree structure:

- objects
  - deviceLinkingInfo.xsd
  - DeviceTemplate.xsd
  - emailMessage.xsd
  - MessageTemplate.xsd
  - plans.xsd
- requests
  - addItemToPlanReq.xsd
  - addMessageTemplateReq.xsd
  - addPlanReq.xsd
  - deleteMessageTemplateReq.xsd
  - modifyMessageTemplateReq.xsd
  - modifyPlanReq.xsd
  - removeItemFromPlanReq.xsd
  - removePlanReq.xsd
  - retrieveDataReq.xsd
  - setDeviceTemplateReq.xsd
  - setPlanItemNameReq.xsd
  - subscribeReq.xsd
  - suggestResponseReq.xsd
- responses
  - addItemToPlanResp.xsd
  - addMessageTemplateResp.xsd
  - addPlanResp.xsd
  - deleteMessageTemplateResp.xsd
  - modifyMessageTemplateResp.xsd
  - modifyPlanResp.xsd
  - removeItemFromPlanResp.xsd
  - removePlanResp.xsd
  - retrieveDataResp.xsd
  - setDeviceTemplateResp.xsd
  - setPlanItemNameResp.xsd
  - subscribeResp.xsd
  - suggestResponseResp.xsd

Requests may be sent from a client to a subsystem or from a subsystem to a driver. Responses may be sent from a driver to a subsystem or a subsystem to a client. A message can be sent from any process to another process.

2.1.1 Subsystem communication

Initial communication to a subsystem is described in the general ICD. For RPG, the initial dataset is retrieved from the database on startup: this includes plans, templates, and users. Once a client has initiated the connection to RPG, additional message and device templates may be added; existing templates may be modified, and deleted; pre-defined response plans can be created, modified and deleted; auto-generated response plans can be suggested.

If any data have been added, modified, or deleted, the response messages which indicate these changes will be sent to subscribed clients as well.

The following table shows the various subscriptions a client may request. The last column shows the XML updates that will be received if a client has subscribed to this data.

Subscription	Description	Updates Received
planData	Receive updates to plans data	addItemToResponsePlanResp, addPlanResp, modifyPlanResp, removeItemFromPlanResp, removePlanResp, setPlanItemNameResp
templateData	Receive updates to template data	addMessageTemplateResp, deleteMessageTemplateResp, modifyMessageTemplateResp, setDeviceTemplateResp
userData	Receive updates to user configuration	updateSystemDataMsg

2.1.2 Driver communication

Initial communication from a subsystem to a driver is described in the general ICD. For RPG, the DMS, HAR and C2C subsystems are analogous to drivers. RPG receives information about the status and current message of both the local and remote DMS's and HAR's in the system. This information is used to generate response plans for events.

2.2 Examples

For example, if a client wishes to add a message template to the system, the client sends an addMessageTemplateReq to the subsystem. The subsystem adds the template and sends an addMessageTemplateResp to the client and to any clients who have subscribed to template data.

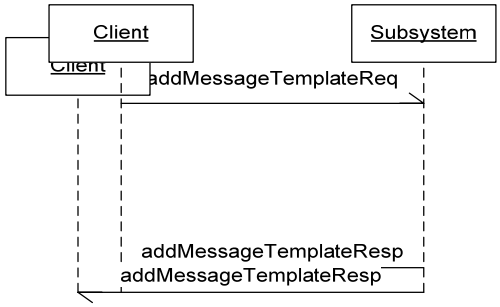

Figure 2-1 Sample Transaction

The tables below show which requests can be sent from client to subsystem and subsystem to driver. The responses sent from driver to subsystem, and subsystem to client, are also specified. Messages are sent when a response is not required.

2.3 Subsystem Schemas

FC (From client),TC (To client), TD (To driver), FD (From driver)

Usage Description	Requests	FC	TD	Responses	FD	TC	Messages	TD	FD	TC
Used for a client to add a plan item to an existing plan.	addItemToPlanReq	X		addItemToPlanResp		X				
Used for a client to add a message template to the system.	addMessageTemplateReq	X		addMessageTemplateResp		X				
Used for a client to create a new pre-defined plan.	addPlanReq	X		addPlanResp		X				
Used for a client to remove a message template from the system.	deleteMessageTemplateReq	X		deleteMessageTemplateResp		X				
Used for a client to edit an existing message template in the system.	modifyMessageTemplateReq	X		modifyMessageTemplateResp		X				
Used for a client to modify a pre-defined plan.	modifyPlanReq	X		modifyPlanResp		X				
Used for a client to remove an item from a pre-defined plan.	removeItemFromPlanReq	X		removeItemFromPlanResp		X				

Usage Description	Requests	FC	TD	Responses	FD	TC	Messages	TD	FD	TC
Used for a client to delete a pre-defined plan.	removePlanReq	X		removePlanResp		X				
Used for a client to redtrieve the initial IM dataset.	retrieveDataReq	X		retrieveDataResp		X				
Used for a client to set the message templates for a device in the system or used to set the default templates for a device type.	setDeviceTemplateReq	X		setDeviceTemplateResp		X				
Used for a client to set the item name for a pre-defined plan item.	setPlanItemNameReq	X		setPlanItemNameResp		X				
Used for a client to subscribe to updates from the subsystem.	subscribeReq	X		subscribeResp		X				
Used for a client to request a new response plan suggestion.	suggestResponseReq	X		suggestResponseResp		X				

2.4 Driver Schemas

The RPG subsystem does not communicate with drivers in the typical sense. The RPG subsystem utilizes the Subsystem Interfaces of the DMS and HAR subsystems to retrieve device information and make command requests. Refer to the DMS and HAR ICD's (SunGuide-DMS-ICD-1.0.2 and SunGuide-HAR-ICD-1.0.2) for further information on this interface.

3. Notes

Information about XML and schemas can be found at the World Wide Web Consortium (W3) website at http://www.w3.org.