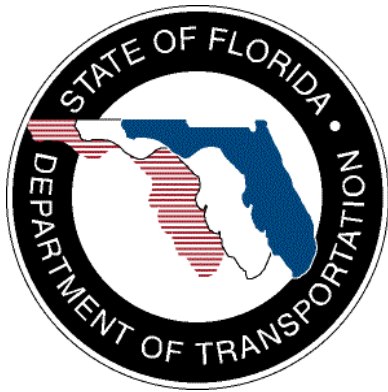


SunGuide[®]:

Incident Detection System Interface Control Document

SunGuide-IDS-ICD-4.2.0



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List of Acronyms

ATMS	Advanced Traffic Management System
DOT	Department of Transportation
FDOT	Florida Department of Transportation
ITS	Intelligent Transportation Systems
ITN	Invitation to Negotiate
IDS	Incident Detection System
SwRI	Southwest Research Institute
TMC	Traffic Management Center
VS	Video Switching
VW	Video Wall
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
4.2.0	April 16, 2009	New Schemas additions

1. Scope

1.1 Document Identification

This Interface Control Document (ICD) describes the interface between individual SunGuide® clients and the Incident Detection System (IDS) subsystem and between the IDS subsystem and the associated drivers. 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:

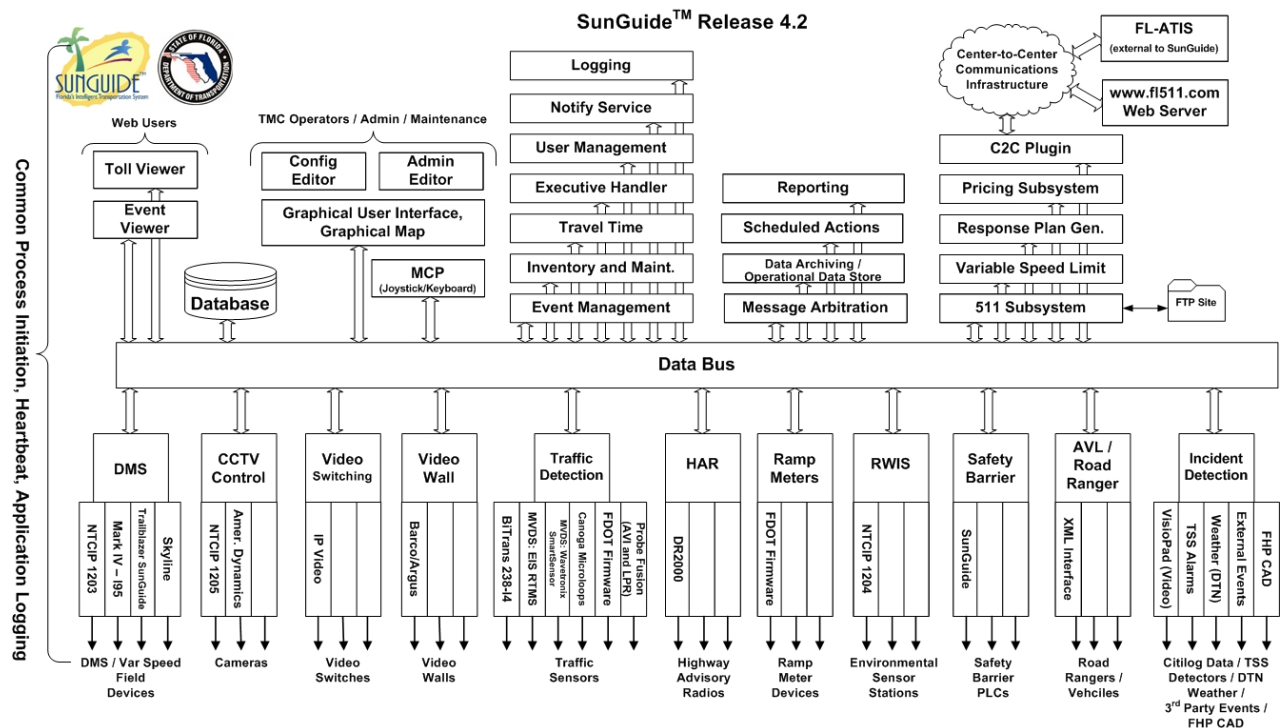


Figure 1.1 – High-Level Architectural Concept

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.

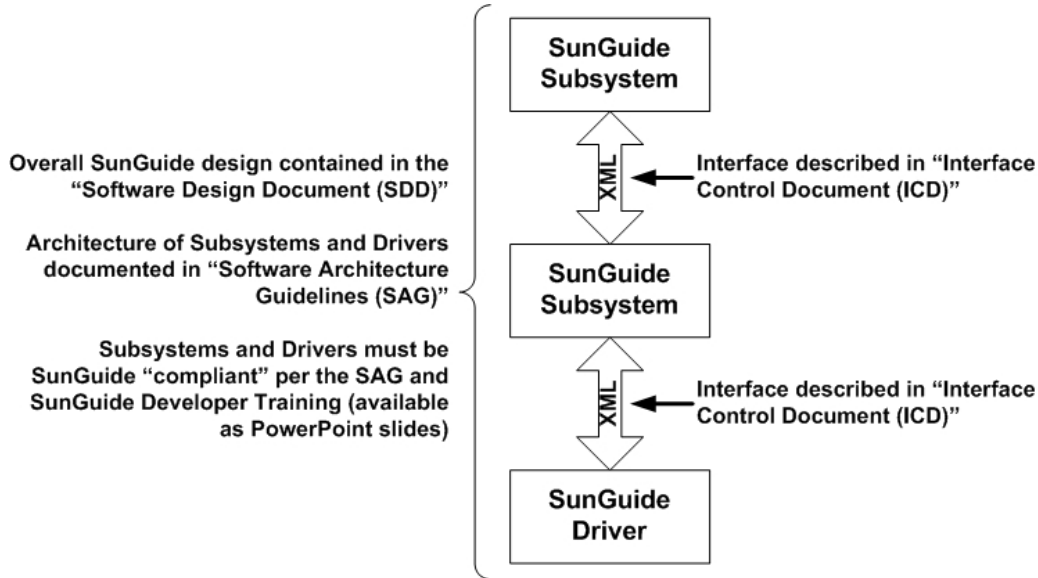


Figure 1-2 - SunGuide Developer Documentation

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://suguide.datasys.swri.edu>.

1.5 Contacts

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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, messages, and responses. Schemas are organized in the following tree structure:

- messages
 - addCitilogCameraMsg.xsd
 - deleteCitilogCameraMsg.xsd
 - disabledEventUpdateMsg.xsd
 - fhpAlertMsg.xsd
 - fhpResolveAlertMsg.xsd
 - modifyCitilogCameraMsg.xsd
 - incidentAlarmDetectedMsg.xsd
 - incidentAlarmResolvedMsg.xsd
 - replaceIncidentAlarmMsg.xsd
 - updateCitilogCameraStatusMsg.xsd
 - visopadDisabledAlarmDetectedMsg.xsd
- objects
 - citilogCamera.xsd
 - idsOptions.xsd
 - incidentAlarm.xsd
 - status.xsd
- requests
 - addCitilogCameraReq.xsd
 - deleteCitilogCameraReq.xsd
 - disableVisioPadCameraReq.xsd
 - enableVisioPadCameraReq.xsd
 - modifyCitilogCameraReq.xsd
 - resolveIncidentAlarmReq.xsd
 - resolveVisiopadDisabledAlarmReq.xsd
 - retrieveDataReq.xsd
 - setIdsOptionsReq.xsd
 - setVisioPadCameraEnabledReq.xsd
 - subscribeReq.xsd
- responses
 - addCitilogCameraResp.xsd
 - deleteCitilogCameraResp.xsd
 - disableVisioPadCameraResp.xsd
 - enableVisioPadCameraResp.xsd
 - modifyCitilogCameraResp.xsd
 - resolveIncidentAlarmResp.xsd
 - resolveVisiopadDisabledAlarmResp.xsd

- retrieveDataResp.xsd
- setIdOptionsResp.xsd
- setVisioPadCameraEnabledResp.xsd
- subscribeReq.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 IDS, the list of Citilog cameras and unresolved incident alarms in the system is retrieved from the database on startup. Once a client has initiated the connection to IDS, the following requests may be made:

- Citilog Cameras may be added, modified or deleted
- The operational status of a camera may be modified
- Camera data can be requested or subscribed to
- VisioPad detection for camera can be enabled/disabled
- Incident Alarms can be asynchronously received if subscribed to
- Incident Alarms can be resolved

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
citilogCameraData	Add, delete, or modify Citilog cameras	addCitilogCameraResp modifyCitilogCameraResp deleteCitilogCameraResp
incidentAlarmsUpdate	Receive notification that an alarm has been triggered or resolved	incidentAlarmDetectedMsg incidentAlarmResolvedMsg
disabledEventUpdate	Receive notification that a event has disabled VisioPaD for its' nearest camera.	disabledEventUpdateMsg
idsOptionUpdate	Receive notifications that for all ids option parameters	setIdOptionsResp
visiopadReminderData	Receive alerts when VisioPaD detection has been manually or systemwide disabled.	visioPadDisabledAlarmDetectedMsg resolveVisiopadDisabledAlarmResp

Subscription	Description	Updates Received
userData	Receive notification that user permissions have been modified.	updateSystemDataMsg

2.1.2 VisioPaD communication

Initial communication from a subsystem to a driver is described in the general ICD. For IDS, an addCitilogCameraReq is sent to the driver for each camera which belongs to that driver. See section 2.3 and 2.4 for tables that show which schemas are sent to and from the driver.

2.2 Examples

For example, if a client wishes to add a device to the system, the client sends an addCitilogCameraReq to the subsystem. Once the subsystem has verified this is a new device, the request is then forwarded to the appropriate driver. The driver adds the device using the VisioPaD Communication link to the Citilog Server and sends an addCitilogCameraResp to the subsystem. The subsystem then sends this response back to the appropriate client and to clients who have subscribed to device data.

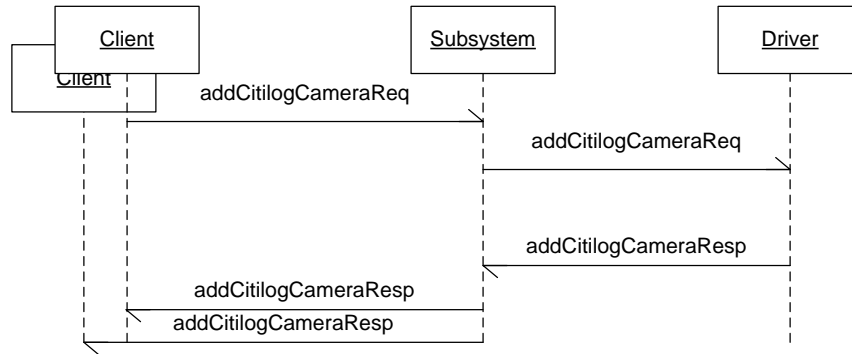


Figure 2.1 – Add Camera Request

As a second example, see below how a client subscribes to IDS incidents and how when they occur they get communicated back to the IDS client.

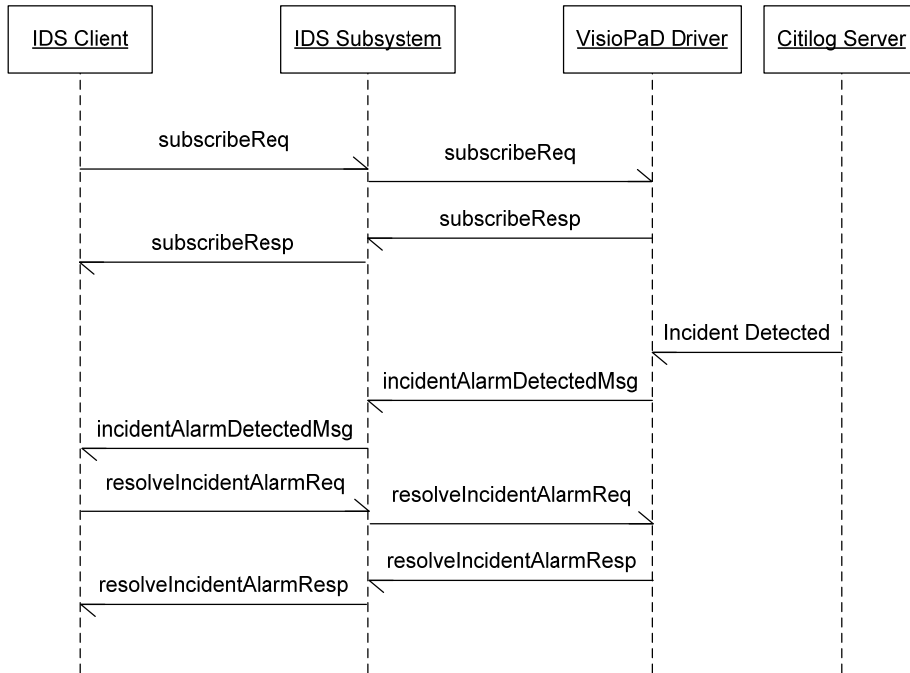


Figure 2.2 – Incident Subscribe Request and Occurrence

The tables below show which requests can be sent from client to subsystem. Requests and responses that are sent to and received from other subsystems for device control will depend upon the other subsystems. The responses sent from subsystem to client are also specified. Messages are sent instead of requests 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
Adds one or more Citilog cameras to IDS and VisioPaD driver	addCitilogCameraReq	X	X	addCitilogCameraResp	X	X	addCitilogCameraMsg	X		
Deletes one or more Citilog cameras from IDS and VisioPaD driver	deleteCitilogCameraReq	X	X	deleteCitilogCameraResp	X	X	deleteCitilogCameraMsg	X		
Sends modified Citilog camera info to IDS and VisioPaD driver	modifyCitilogCameraReq	X	X	modifyCitilogCameraResp	X	X	modifyCitilogCameraMsg	X		
Sends disable/enable info to VisioPad for detection on a camera	setVisioPadCameraEnabledReq	X		setVisioPadCameraEnabledResp		X				
Sends IDS option info currently used to enable/disabled VisioPad detection systemwide	setIdsOptionsReq	X		setIdsOptionsResp		X				
Disables VisioPad detection for a single camera	disableVisioPadCameraReq		X	disableVisioPadCameraResp	X		updateCitilogCameraStatusMsg			X
Enable VisioPad detection for a single camera	enableVisioPadCameraReq		X	enableVisioPadCameraResp	X		updateCitilogCameraStatusMsg			X
Gives update information regarding the creation of an incident alarm							incidentAlarmDetectedMsg		X	X
Resolves an incident alarm as confirmed or canceled	resolveIncidentAlarmReq	X	X	resolveIncidentAlarmResp	X	X	incidentAlarmResolveMsg		X	X

IDS Interface Control Document

Usage Description	Requests	FC	TD	Responses	FD	TC	Messages	TD	FD	TC
Sent to the client to update an existing unresolved alert							replaceIncidentAlarmMsg			X
A request sent by client to retrieve data from the system	retrieveDataReq	X	X	retrieveDataResp	X	X				
A request sent by client to subscribe to data updates from the system	subscribeReq	X	X	subscribeResp	X	X				
A message sent to notify operator that camera have had their VisioPad detection disabled							visiopadDisabledAlarmDetectedMsg			X
A request sent by client to resolve a alert about cameras disabled by VisioPad detection	resolveVisiopadDisabledAlarmReq	X		resolveVisiopadDisabledAlarmResp		X				

2.4 IDS Driver Schemas

TD (To driver), FD (From driver)

Usage Description	Requests	TD	Responses	FD	Messages	TD	FD
Adds one or more Citilog cameras to IDS and VisioPaD driver	addCitilogCameraReq	X	addCitilogCameraResp	X	addCitilogCameraMsg	X	
Deletes one or more Citilog cameras from IDS and VisioPaD driver	deleteCitilogCameraReq	X	deleteCitilogCameraResp	X	deleteCitilogCameraMsg	X	
Sends modified Citilog camera info to IDS and VisioPaD driver	modifyCitilogCameraReq	X	modifyCitilogCameraResp	X	modifyCitilogCameraMsg	X	
Gives update information regarding the creation of an incident alarm					incidentAlarmDetectedMsg		X
Confirms an incident alarm.	resolveIncidentAlarmReq		resolveIncidentAlarmResp		incidentAlarmResolvedMsg		X
A request sent by client to retrieve data from the system	retrieveDataReq		retrieveDataResp				
A request sent by client to subscribe to data updates from the system	subscribeReq		subscribeResp				
Disables VisioPad detection for a single camera	disableVisioPadCameraReq	X	disableVisioPadCameraResp	X			
Enable VisioPad detection for a single camera	enableVisioPadCameraReq	X	enableVisioPadCameraResp	X			

3. Notes

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