SunGuide^{SM}:

Beacon Management Subsystem Interface Control Document

SunGuide-BMS-ICD-6.2

Prepared for:

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

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List of Acronyms

ATMS	Advanced Traffic Management System
DOT	Department of Transportation
FDOT	Florida Department of Transportation
IM	Incident Management
ITS	Intelligent Transportation Systems
ITN	Invitation to Negotiate
BMS	Beacon Management Subsystem
SwRI	Southwest Research Institute
TMC	Traffic Management Center
VS	Video Switching
VW	Video Wall
XML	Extensible Markup Language

REVISION HISTORY

Revision	Date	Changes
6.2	March 17, 2016	Initial Release

1. Scope

1.1 Document Identification

This Interface Control Document (ICD) describes the interface between individual SunGuide clients and the Beacon Management Subsystem (BMS). 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-6.2 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 Related Documents

The following documents were used to develop this document:

- FDOT Scope of Services: *BDQ69, Standard Written Agreement for SunGuide Software Support, Maintenance, and Development, Exhibit A: Scope of Services.* July 1, 2010.

- Notice to Proceed: Letter to Southwest Research Institute® (SwRI®) for BDQ69, July 1, 2010.

- SunGuide Project website: http://sunguidesoftware.com.

1.4 Contacts

The following are contact persons for the SunGuide software project:

- Fred Heery, ITS Section, Traffic Engineering and Operations Office Central Office, fred.heery@dot.state.fl.us, 850-410-5606
- Derek Vollmer, ITS Section, Traffic Engineering and Operations Office Central Office, Derek.Vollmer@dot.state.fl.us, 850-410-5615
- Clay Packard, Atkins Project Manager, clay.packard@dot.state.fl.us, 850-410-5623
- David Chang, Atkins Project Advisor, david.chang@dot.state.fl.us, 850-410-5622
- Tucker Brown, SwRI Project Manager, tbrown@swri.com, 210-522-3035
- Roger Strain, SwRI Software Project Manager, rstrain@swri.org, 210-522-6295

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 Schemas1.0 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
  - addBeaconMsg.xsd
  - beaconStatusMsg.xsd
  - deleteBeaconMsg.xsd
  - modifyBeaconMsg.xsd
- objects
  - beacon.xsd
  - beaconMsg.xsd
  - beaconStatus.xsd
  - beaconStatusMsg.xsd
  - sign.xsd
- requests
  - addBeaconReq.xsd
  - deleteBeaconReq.xsd
  - getBeaconStateReq.xsd
  - modifyBeaconReq.xsd
  - retrieveDataReq.xsd
  - setBeaconStateReq.xsd
  - setOpStatusReq.xsd
  - subscribeReq.xsd
- responses
  - addBeaconResp.xsd
  - deleteBeaconResp.xsd
  - getBeaconStateResp.xsd
  - modifyBeaconResp.xsd
  - retrieveDataResp.xsd
  - setBeaconStateResp.xsd
  - setOpStatusResp.xsd
  - subscribeResp.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 BMS, the list of Beacons in the system is retrieved from the database on startup. Once a client has initiated the connection to BMS, the following requests may be made:

- Beacon devices may be added or deleted,
- Beacons may be turned on or off.

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
deviceStatus	Beacons status values for beacon state as well as op status.	setBeaconStateResp, setOpStatusResp
deviceData	New, modified or, deleted beacons.	addBeaconResp, deleteBeaconResp, modifyBeaconResp
userData	Changes to Beacon Subsystem users.	updateSystemDataMsg

2.1.2   Device subsystem communication

Initial communication from a subsystem to a device is described in the general ICD.

2.2 Examples

For example, if a client wishes to add a device to the system, the client sends an addBeaconReq 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 and sends an addBeaconResp to the subsystem. The subsystem then sends this response back to the appropriate client and to clients who have subscribed to device data.
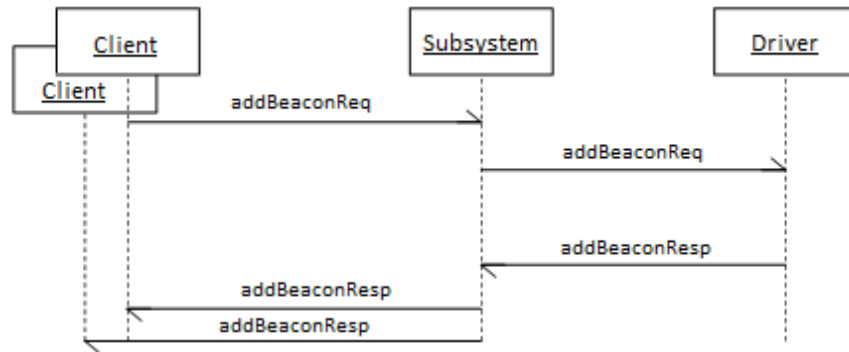
Figure 2.1 - Sample Transaction

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
Used to add a new beacon to the system.	addBeaconReq	X	X	addBeaconResp	X	X	addBeaconMsg			X
Used to update the state of the beacon.							beaconStatusMsg		X	X
Used to delete an existing beacon to the system.	deleteBeaconReq	X	X	deleteBeaconResp	X	X	deleteBeaconMsg			X
Used to determine if a given beacon is on or off.	getBeaconStateReq	X	X	getBeaconStateResp	X	X				
Used to update an existing beacon to the system.	modifyBeaconReq	X	X	modifyBeaconResp	X	X	modifyBeaconMsg			X
Used to retrieve the system's data.	retrieveDataReq	X		retrieveDataResp		X				
Used to toggle a given beacon on or off.	setBeaconStateReq	X	X	setBeaconStateResp	X	X				
Used for a client to change the operational status of a beacon.	setOpStatusReq	X	X	setOpStatusResp	X	X				
Used to subscribe to updates from the system.	subscribeReq	X		subscribeResp		X				

2.4 Driver Schemas

3. Notes

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