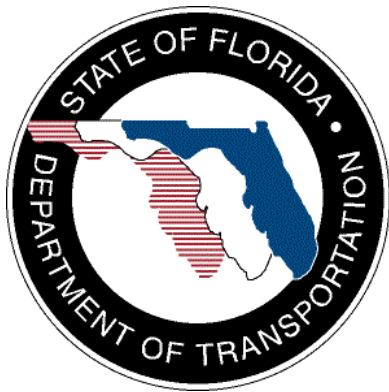


SunGuideSM:

District 4 – Deployment Report

SunGuide-D4-DR-1.0.0



Prepared for:

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List of Acronyms

CCTV	Closed Circuit Television
COTS	Commercial-Off-The-Shelf
DMS	Dynamic Message Sign
DR	Deployment Report
FDOT	Florida Department of Transportation
GUI	Graphical User Interface
IM.....	Incident Management
IP	Implementation Plan
ITS.....	Intelligent Transportation Systems
MCP	Manual Control Panel
MDX	Miami-Dade Expressway Authority
STR	Software Test Report
SwRI	Southwest Research Institute
TMC	Transportation Management Center
TSS.....	Transportation Sensor Subsystem
VDD.....	Version Description Document
VS	Video Switch
VW	Video Wall

REVISION HISTORY

Revision	Date	Changes
1.0.0	June 23, 2005	Initial Release.

1. Scope

1.1 Document Identification

This document serves as the Deployment Report (DR) for the SunGuideSM software Release 1.1 installed in District 4 June 13, 2005 to June 17, 2005.

1.2 Installation Objectives

A detailed Implementation Plan (IP) was provided to FDOT prior to deployment in District 4. This document identified the expected preconditions as well as what activities would be performed by the deployment team. The following SunGuideSM subsystems were to be installed for the initial deployment at District 4:

- Administrative Editor
- Executive Handler
- Status Logger
- Data Bus
- GUI / Map (GUI)
- Closed Circuit Television (CCTV)
- Dynamic Message Sign (DMS)
- Video Switching (VS)
- Video Wall (VW)
- Transportation Sensor Subsystem (TSS)
- Incident Management (IM)

The installation of the Commercial-Off-The-Shelf (COTS) software was to be the responsibility of the FDOT. The software required is detailed in the IP and the SunGuideSM Version Description Document (VDD).

1.3 Document Overview

The remainder of this document provides the following:

- Discussion of the day-to-day activities
- Issues identified during installation

2. Installation Activities

The following sections describe the activities and results of the installation activities that were performed.

2.1 Daily Activities

The following is a narrative discussion of the tests and their results.

2.1.1 Day One (Monday June 13, 2005)

SunGuideSM Release 1.1 software installation:

- District 4 intended SwRI to install the SunGuideSM Release 1.1 software into a Microsoft Windows 2003 Server Enterprise Edition Cluster environment. There were three pairs of servers, each pair formed a cluster. Two of the clusters were for SunGuideSM software, the third pair for Oracle.
- A SAN resident logical volume was created, formatted and mounted as the “S:” drive on the cluster SG-STATUS-LOGGER. A folder “SunGuide” was created in the root directory of S and made into a share point. Another directory was created for storing files from status logger.
- At the request of SwRI personnel, the second server in each cluster was powered off so that the initial installation would be not in a cluster but in a non-clustered Windows server environment.
- The config.xml file was moved into the “SunGuide” share with other configuration files (XML schema directory, devicesequence.xml file).
- The SunGuideSM software installation on SAMPLE and SUNRISE. The installations seemed successful, the installer was able to access the “SunGuide” share.
- The NETWORK SERVICE account (used by all the services) was not able to access the “SunGuide” share across the network. When the services were run as the Domain Administrator, they were able to access the share. Unable to resolve the problem with permissions, a temporary second “SunGuide” share was created on Sunrise and populated with duplicate data. This allowed the services to be run as NETWORK SHARE user.
- The system was started with access to the database on the SwRI laptop.

Installation of Oracle 10g with RAC:

- Oracle Cluster Ready Services was installed on the two servers in the group SG-DB-ORACLE. Oracle Enterprise was installed on the RAC. A SunGuideSM database (SGD4) was created and populated with basic data including roadways, cross streets and DMSs.
- The deployment team decided to not fight potential problems with the database and to continue running against the laptop.

Barco API Installation:

- SwRI personnel in a teleconference with Barco installed the Barco Apollo API on the District 4 wall controller.

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2.1.2 Day Two (Tuesday June 14, 2005)

CCTV:

- Continued testing with the CCTV driver to establish connectivity to the VBrick Encoder / port server; this testing was unsuccessful. District 4 is using the VBrick encoder as a port server. SwRI was not able to successfully connect to the camera controls in this manner. The only way that the cameras have been demonstrated in this manner is to slave the encoder to a decoder and pass serial data through the pair. Dellenback and Farmer were to test the configuration Wednesday AM in the SwRI labs.

Video switching:

- SwRI established the ability to control decoders in the server room to successfully decode VBrick streams coming into the server room. These are being displayed on a monitor within one of the server racks.

Video wall control:

- SwRI reinstalled a later version of the Barco Apollo API that was furnished by District 4 (after installing an earlier version supplied by SwRI on Monday). It was decided to install this later version since it was a released version instead of a Beta version supplied via download to SwRI.
- Tested successfully. The SunGuideSM software can retrieve layouts, change layouts, and switch inputs around including input streams from cameras and the D6 stream (among others. SwRI personnel configured the inputs into the District 4 TMC in the Barco Wall controller database to allow switching of those inputs.

DMS control:

- District 4 provided a Digi device that had not been configured nor installed in their system for SwRI use. SwRI was unable to configure the Digi device and instead installed an SwRI owned device for testing.
- Configuration of all District 4 devices was completed in the SwRI laptop database.
- Initial testing with a modem connected sign failed. Later SwRI was to learn this was because of a bad modem in one of the server racks (it was unmarked and power was available to it).

TSS sensors:

- SwRI was able to establish connectivity to the Wavetronix sensor in the field with the SwRI test program.
- At days end SwRI was still not able to retrieve data from the Wavetronix sensor in the field using the RTMS driver.

2.1.3 Day Three (Wednesday June 15, 2005)

CCTV:

- SwRI successfully demonstrated use of a VBrick encoder as a port server in SwRI labs. SwRI found that the VBrick encoder would not accept a connection from the CCTV driver if a VBrick decoder was also trying to run in “pass through” mode. When the

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VBrick decoder in the District 4 server rack was no longer in “pass through” mode, the VBrick encoder accepted the connection and PTZ control was exercised for cameras 26 and 29 along I-95.

Video switching:

- SwRI renamed the video sources (VBrick encoders) to lead with a numeric field (this so that video switching can be accomplished using MCPs when they are available). This caused the video sources to become disassociated from cameras within the SunGuideSM database and loss of video switching capability. Once the association was reestablished within the database VS was reestablished.

DMS control:

- District 4 provided a access to the I-595 “loop” of cameras and one IP connected camera during the 10 AM to 2 PM time slot. SwRI successfully demonstrated the ability to display messages on the serial connected signs (IP to Digi / serial to fiber modem / fiber to field device / serial to sign). SwRI demonstrated the capability to display messages to a group of signs (all on I-595) within a matter of seconds.
- SwRI was unable to place a message on the IP connected sign. It was decided to bring a controller into the server room where the suspected cabling issues could be resolved. The controller was to be provided on Thursday.

TSS sensors:

- During analysis of the communications between the sensor and the RTMS driver SwRI discovered that the sensor (Moxa port server) was sending data to the RTMS driver in very small packets (4-6 bytes). These were causing the 250+ byte message to time out within the RTMS driver. When the time out limit was raised, communications were successfully established. The operator map successfully displayed TSS sensor data being retrieved from the field.

2.1.4 Day Four (Thursday June 16, 2005)

Oracle Fail Safe installation:

- District 4 decided to uninstall the Oracle RAC database (due to lack of licensing) and install Oracle Fail Safe as recommended by FDOT Tallahassee. The installer ran unsuccessfully until a conference call with Mike Novak. After the conference call and some Oracle Fail Safe installation cleanup, Oracle Fail Safe, Oracle Enterprise Server 10g, and the District 4 SunGuideSM database was successfully installed and running on the District 4 SG-DB-ORACLE windows cluster.

CCTV:

- Two more CCTVs were configured for NTCIP, the cameras were added to the database using the SunGuideSM administrative editor and ability to control the cameras was verified.

DMS control:

- DMS via IP connected Moxa port server: District 4 provided a controller and Moxa into the server room. The team tried a variety of cable combinations between the Moxa and

the controller; no combination seemed to help. SwRI successfully communicated to the controller using a serial cable and verified the controller is operational. SwRI found out the SwRI sign has Firmware 2.9 (or close to this) and District 4 has 2.4 (or close to this). SwRI and District 4 have spent a lot of time on this one controller (and can talk to 20+ signs trouble free.)

- SwRI was able to configure the District 4 supplied Digi controller after discussion with Network support staff at SwRI. That Digi was substituted for the SwRI supplied Digi.
- District 4 provided access to the “I-95 ring” for a period of time after 2:00 PM. The SunGuideSM DMS subsystem / driver talked to a vast majority of the signs (not all were in the database.)

TSS sensors:

- TSS data is being displayed on the Operator Map. A patch was developed and installed on the District 4 servers.

2.1.5 Day Five (Friday June 17, 2005)

Oracle Fail Safe Database installation:

- The District 4 SunGuideSM servers were reconfigured to access the Oracle Fail Safe Database. After some initial problems were corrected in the database, some of the subsystems worked, some continued to have problems. These were not immediately resolved and a transition was made back to the SwRI laptop database to facilitate additional sign testing between 10 AM and 2 PM.

DMS:

- The Moxa had been configured with a timeout value of 0 milliseconds for the transmit buffer – this causes the Moxa to send out a couple of bytes (using an entire Ethernet packet) rather than waiting until a full buffer of data was received – this caused problems in the DMS drive. Using this setting will cause network saturation when a District has a large number of devices.
- The SwRI & District 4 team changed the setting to 600 milliseconds and the sign and SunGuideSM software communicate. District 4 needs to move the device to the field for a complete test but all (including D4) expect no problem with this.

TSS:

- The TSS Moxa box has the same setting which SwRI believes is causing the behavior noted on Day 3; it is highly likely that if this setting was set to 500 milliseconds the code change would not have been necessary.

2.1.6 Week Two (Monday June 20 – Wednesday June 22, 2005)

During the subsequent week, on-site SwRI personnel worked with District 4 personnel to establish the high availability system that District 4 wanted. The SunGuideSM services are running on Windows 2003 Enterprise Server in two clusters. The database is running on Oracle cluster Fail Safe configuration.

2.2 Issues Identified

The following is a list of the issues identified during the deployment:

- Operating System: District 4 directed SwRI to install the SunGuideSM software on a Microsoft Windows Cluster. This operating system was not in the SunGuideSM requirements and no testing of the software has occurred on this platform. SwRI recommends that the SunGuideSM requirements be updated and testing performed with Windows Cluster.
- Database: FDOT did not purchase Oracle RAC licenses, but is licensed to run Oracle Fail Safe. SwRI recommends that the SunGuideSM requirements be updated and testing performed with Oracle Fail Save.