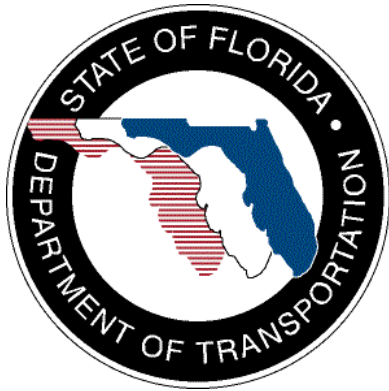


SunGuide™:

Implementation Plan for MDX

SunGuide-IP-MDX-1.0.0



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

C2C.....	Center-to-Center
CCTV	Closed Circuit Television
ConOps	Concept of Operations
CSE.....	Computer Sizing Estimates
DMS	Dynamic Message Sign
EH.....	Executive Handler
EM.....	Event Management
FDOT.....	Florida Department of Transportation
GUI.....	Graphical User Interface
HAR.....	Highway Advisory Radio
HIS.....	Highway Information Systems
IIS	Internet Information Server
IP	Implementation Plan
ITS	Intelligent Transportation Systems
IV&V	Independent Verification and Validation
MCP.....	Manual Control Panel
MDX.....	Miami-Dade Expressway
NTCIP	National Transportation Communications for ITS Protocol
RMS.....	Ramp Metering Subsystem
RPG	Response Plan Generator
RS	Reporting Subsystem
RTMC.....	Regional Traffic Management Center
RWIS	Roadway Weather Information System
SATP	Software Acceptance Test Plan
SDD	Software Design Document
SICP.....	Software Integration Case Procedures
SIP	Software Integration Plan
SRS	Software Requirements Specification
SUM	Software User's Manual
SwRI.....	Southwest Research Institute
TCP/IP.....	Transmission Control Protocol/Internet Protocol
TMC	Transportation Management Center
TSS	Transportation Sensor Subsystem
TvT	Travel Time
VDD	Version Description Document
VPN.....	Virtual Private Network

REVISION HISTORY

Revision	Date	Changes
1.0.0-Draft	March 5, 2008	Initial Release
1.0.1-Draft	March 7, 2008	Updated Cluster discussion
1.0.0	March 18, 2008	Updated with FDOT CO and MDX comments

1. Scope

1.1 Document Identification

This document serves as the Implementation Plan (IP) for the SunGuide™ software specific to Miami-Dade Expressway (MDX) Authority.

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 was based on ITS software available from the state of Texas. In addition to the reuse of software (along with customization of this software), a number of new software modules are being developed. The following figure provides a graphical view of the software.

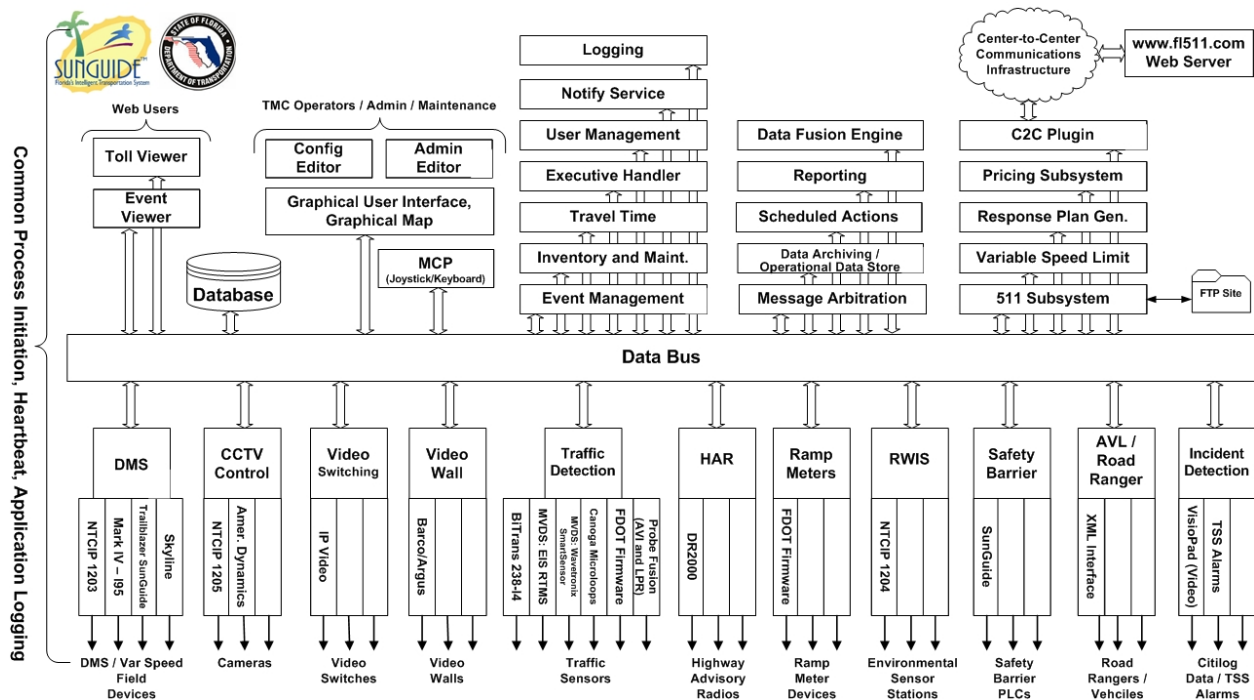


Figure 1.1 - High-Level Architectural Concept

The SunGuide development effort began in October 2003, two major releases have been developed and this document is addressing the third major release of the software. 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:

- 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
- 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

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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. Deployment Details

The following documents should be available to MDX staff as they prepare for a SunGuide deployment (the most recent versions are available on the project web site):

- Computer Sizing Estimates (CSE)
- Software Requirements Specification (SRS)
- Software Design Document (SDD)
- Version Description Document (VDD)
- Software User's Manual (SUM)
- Software Integration Plan (SIP)
- Software Acceptance Test Plan (SATP)
- Software Integration Case Procedures (SICP)
- Administrator Training Slides
- Operator Training Slides (through FDOT Central Office General Contractor)
- Installation Notes
- Migration Plan

2.1 Subsystems To Be Installed

The following Release 3.0.3 (Patch 4) SunGuide subsystems will be installed for the initial deployment at MDX:

- Administrative Editor (AE)
- Center-to-Center (C2C)
- Closed Circuit Television (CCTV)
- CCTV Digital Video Switching (VS)
- Data Bus (DB)
- Executive Handler (EH)
- Graphical User Interface/Map (GUI)
- Highway Advisory Radio (HAR)
- Event Management (EM)
- Reporting Subsystem (RS)
- Response Plan Generator (RPG)
- Status Logger (SL)
- Transportation Sensor Subsystem (TSS)

As additional hardware is installed at MDX, additional subsystems will be added to the base deployment.

2.2 MDX: Before Software Installation

The following sections describe the activities that MDX staff needs to perform prior to the SunGuide software deployment.

2.2.1 Servers

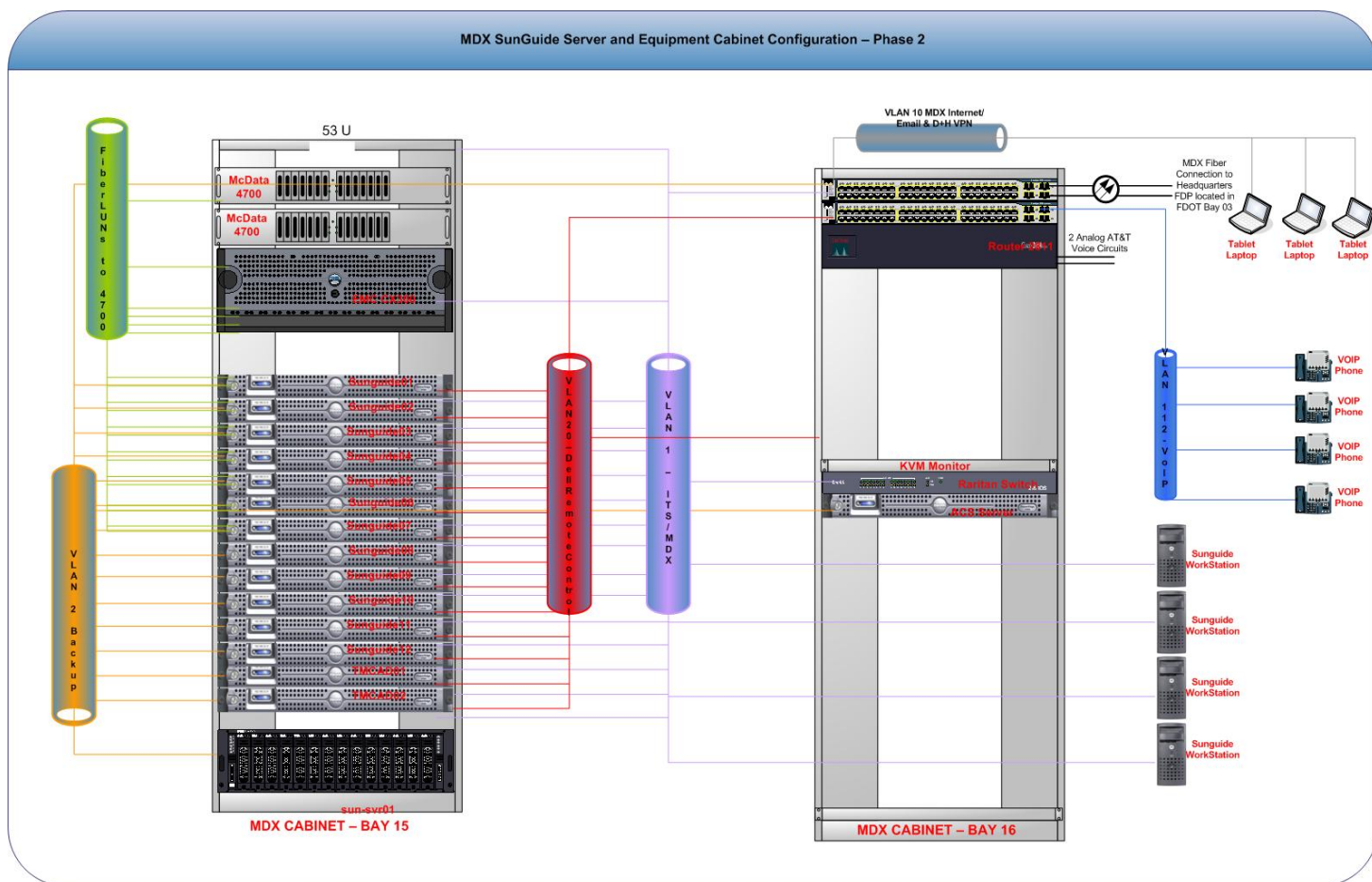
MDX has procured fourteen (14) servers to support the deployment of SunGuide in MDX TMC located at the FDOT District 6 SunGuide RTMC. The remainder of this section discusses the

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SwRI recommended installation of the SunGuide software on those servers given the following restrictions from MDX.

- One six server cluster will be dedicated to running SunGuide software
- One server pair will be dedicated to Oracle Standard Edition
- One server pair will be dedicated to be a Microsoft Domain Controller and will also run additional management applications such as Network Monitoring, Backup and Disaster Recovery (DR), and other applications to be defined by MDX.
- One server will be dedicated to a testing and staging environment running the SunGuide software, as well as an environment to support a mimic of D6 operations in case of a catastrophic failure in D6.
- One server will be dedicated as a maintenance access server to allow access to the rest of the system without having to circumvent Internet Explorer security permissions, install diagnostic tools, utilize resources, or otherwise disturb the production servers unnecessarily.

All servers will be running Windows 2003, Enterprise Edition (Enterprise is required to support Windows clustering). The following diagram depicts how the servers will be installed in the racks in the computer room:



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The contents of the following table are based on information furnished to SwRI by representatives of MDX and provide current and 3 year projected device counts in the Miami area.

SunGuide Device Types	Current Count	Future Count (3 yrs)
Maximum simultaneous users	3-5	10
DMS TCP/IP connected signs	0	10
DMS Dialup Connected Signs	0	0
CCTV Users Simultaneously Controlling Cameras	3-5	10
American Dynamics MCPs	0	0
CCTV Users Simultaneously Switching Video	3-5	10
Video Wall Barco/Argus Controllers	0	0
TSS EIS Detectors	67	67
TSS Wavetronix Detectors	0	70
TSS 3M Microloop Detectors	4	0
TSS Bitrans Detectors	0	0
Simultaneous Active Events	5	10
Ramps Metered	0	0
RWIS TCP/IP Stations	0	0
Highway Advisory Radio (one controller for multiple HARs)	1	1
Data Archive Deployment	0	1
Safety Barrier Safety Barrier Stations	0	0

The following table is extracted from the SunGuide *Computer Sizing Estimates* document and is used to quantify the number of SunGuide application servers required based on the subsystems to be installed.

SunGuide Subsystem	Number of Servers Required	MDX Deployment
Status Logger	0.1	0.1
Data Bus		
Base system up to 500 ITS devices	0.5	0.5
Over 500 devices	0.5	0
User Interface		
For every 10 users simultaneously logged in	0.5	0.5
DMS (includes MAS)		
Base subsystem	0.5	0
For every 100 TCP/IP connected signs	0.5	0

	Number of Servers Required	MDX Deployment
SunGuide Subsystem		
For every 50 dialup signs (assumes 5 modems)	0.5	0
CCTV Control (includes Manual Control Panel [MCP])		
Base subsystem	0.25	0.25
For every 10 users simultaneously controlling cameras	0.25	0.25
Video Switching		
Base subsystem	0.5	0.5
For every 10 users simultaneously switching video	0.1	0.1
Video Wall		
Base subsystem	0.25	0
For each Barco/Argus Controller	0.1	0
TSS		
Base subsystem	0.25	0.25
For every 300 detectors	0.5	0
Event Management		
Base subsystem for up to 20 concurrent incidents	0.25	0.25
For each 20 concurrent incidents over the base amount	0.25	0.25
Ramp Metering		
Base subsystem	0.5	0
For every 20 ramps	0.25	0
Roadway Weather Information System (RWIS)		
Base subsystem	0.25	0
For every 50 TCP/IP connected sensors	0.25	0
Highway Advisory Radio (HAR)		
Base subsystem	0.25	0.25
For every 50 HARs	0.1	0.1
Archive		
Base subsystem	0.5	0.5
Safety Barrier		
Base Subsystem	0.1	0
For every 50 Barriers	0.1	0
Travel Time (TvT)		
Base Subsystem	0.5	0
Web Servers (should be protected with a firewall)		
General Web server	1	0
Center-to-Center interface server	0.5	0
Emergency Evacuation	0.5	0
Maintenance Management Systems	0.5	0
Total SunGuide Application Servers Needed		3.8

The above analysis suggests that 3.8 servers would be needed to support the SunGuide installation as has been discussed with MDX. The sizing estimates in the *Computer Sizing*

Estimates were based on best engineering judgment. After several installations it is clear that the estimates were extremely conservative; Southwest Research Institute® (SwRI®) believes that given the number of devices and based on the number of subsystems being initially deployed in MDX that four servers be dedicated to running SunGuide software with two servers for redundancy and growth.

The following software needs to be installed on the servers before the software installation team arrives on-site:

- Microsoft Windows 2003 Server Enterprise with all current updates from Microsoft should be installed on all servers.
- The domain controller should be properly configured.
- Servers clusters configured and operational

The software installation team assumes that MDX will have installed and have the licenses and installation media available for the following products:

- Microsoft Standard Server 2003 (Enterprise is acceptable, SunGuide only requires Standard version)
- Oracle 10g, version 10.1.0.2.0

The SunGuide software will be installed and configured on the servers in the following configuration:

- MDX SunGuide RTMC Domain Controller (SwRI will not configure the domain controller)
- Database Server
 - Oracle 10g, version 10.1.0.2.0
 - MDXSG database

All of the remaining servers will be configured as SunGuide application servers. The following SunGuide software will be installed on all the application servers.

- All Application Servers
 - SL Viewer
 - EH Viewer and Service
 - Oracle 10g Client, version 10.1.0.2.0
 - SL Service
 - Notify Manager
 - Map Generator
 - Administrative Editor
 - Event Management
 - Reporting Subsystem
 - Response Plan Generator
 - Operator Map
 - HAR
 - Data Bus
 - C2C Plugin (to communicate to other SunGuide deployments)
 - Data Archive

- CCTV
- Video Switching
- TSS

The application servers will then be configured to use Microsoft Clustering to implement the desired redundancy as well as load balancing. If any server goes down, Microsoft Clustering will redistribute the SunGuide application processes across the remaining servers in the cluster according to a predefined configuration. The staging environment will be setup in a similar fashion with fewer servers.

MDX plans to reserve one or two servers for “test servers”, these will be identified during the installation that these servers will be configured to run all of the appropriate SunGuide processes in a “test configuration”.

During the installation activities, a VPN (Virtual Private Network) connection will be configured that will allow SwRI staff to access the MDX computers from remote locations. This will facilitate any troubleshooting that will need to occur after the deployment team leaves the RTMC.

2.2.2 Workstations

The following software must be installed on each workstation that will access the SunGuide software:

- Microsoft Windows XP, Service Pack 2
- Microsoft Internet Explorer 7.0
- Adobe SVG Viewer 3.03 (can be downloaded at no charge from the Adobe website)

2.2.3 Device Protocol Compliance

For the devices being deployed, MDX needs to verify that the protocol used by the devices to be controlled by the SunGuide software is compliant to the following protocols:

Subsystem	Protocol Reference
CCTV Control	NTCIP 1205 v01.08 Amendment 1 v01.08 (August 2004)
HAR	Highway Information Systems DR2000
Video Switching	iMpath i1000/i4100
Traffic Detection	EIS RTMS, Issue 2 (April 2003)

In addition to verifying the protocols are compliant, the MDX staff needs to verify the TCP/IP connectivity to the field devices prior to the on-site installation activities being performed. This can most simply be accomplished by using “ping” to verify that the device is accessible from the server room using the network that the SunGuide servers will be utilizing.

2.2.4 Network Infrastructure

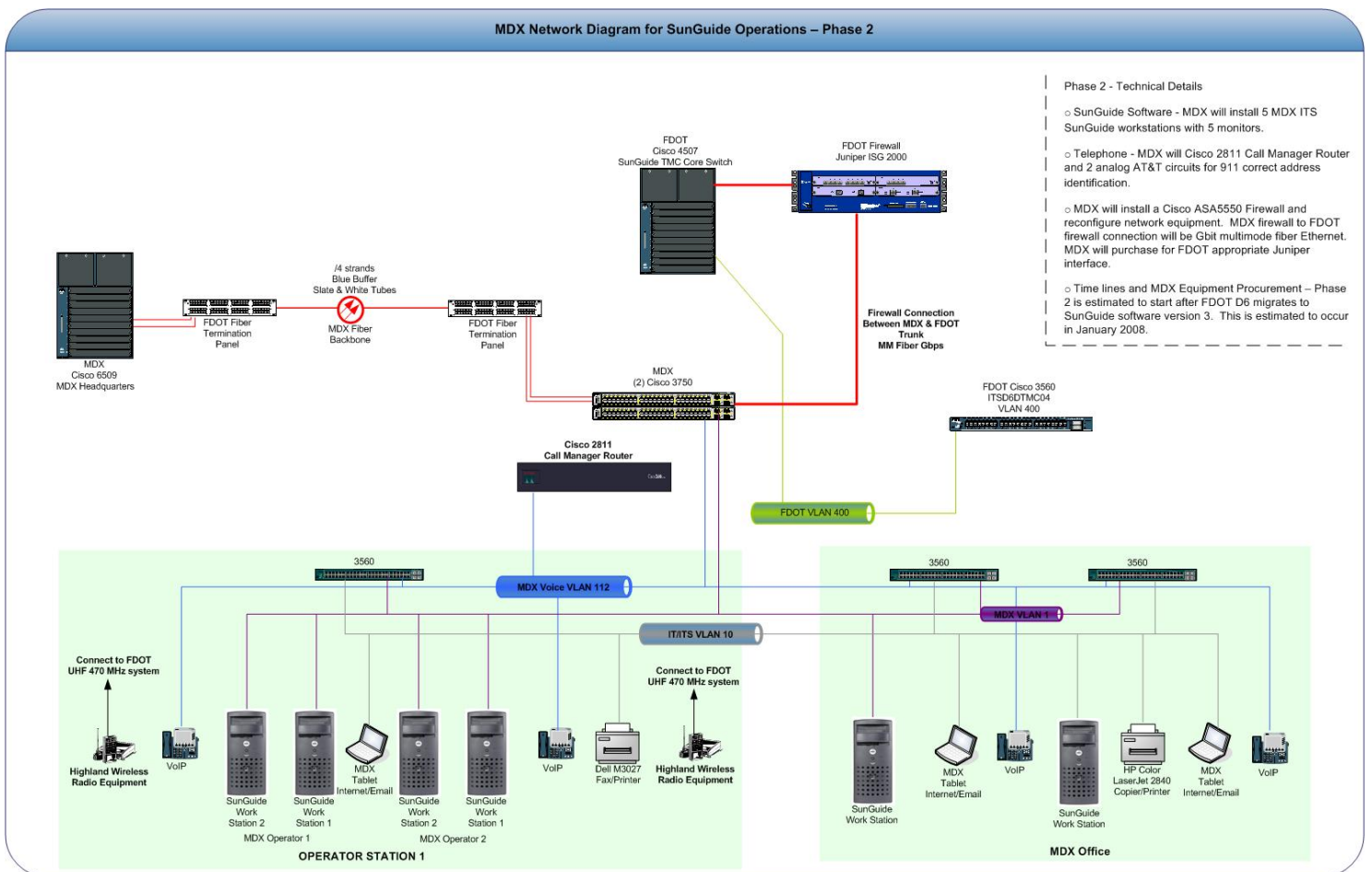
The following sections described the network infrastructure that must be in place prior to installation of the SunGuide software.

2.2.4.1 Hardware

Due to the client/server nature of the SunGuide software, TCP/IP is used to exchange data between application servers. Due to the web based implementation of the SunGuide user interface, each SunGuide workstation requires TCP/IP access to the SunGuide application servers. MDX needs to verify that TCP/IP connectivity exists between all SunGuide application servers and SunGuide workstations.

Early in the development of requirements for SunGuide, FDOT made the decision that the devices should be connected via TCP/IP to the SunGuide application servers. There are a number of techniques to connect traditional serial ITS devices so that they can be accessed via TCP/IP, these techniques include the use of a terminal server (a box that has a TCP/IP connection and has multiple serial ports) or a port server (a box that has a TCP/IP connection and a single serial port). The only exception to the use of TCP/IP access is that DMS devices can be accessed via a modem or directly through a serial port if the connection is made through a Windows “COM” port on the SunGuide application server running the DMS device driver.

It is MDX responsibility to provide all necessary network hardware and cables to provide the required connectivity. The following network diagram depicts the MDX network layout.



2.2.4.2 Software

As the SunGuide software is configured, it will need access to various network servers that may be installed as part of the SunGuide installation or may be available as part of the greater MDX network. The following network services need to be available and the details (e.g., host names, addresses) need to be available during the SunGuide software configuration:

- SMTP Mail Server (optional): The SunGuide notify manager needs to be able to send emails on major system events so SMTP mail server access is required.
- DNS Server (optional): The SunGuide applications utilize TCP/IP to exchange data and the applications can use either IP addresses or host names in their configuration files. Note that the use of DNS is preferred because using explicit IP addresses is less flexible than using hostnames.
- Time Server (optional): It is recommended that all SunGuide computers be synchronized to a common time source as it is desirable during diagnostics to have the same time on all SunGuide systems.

2.2.5 Device Worksheets

The following sections describe the information that must be collected about each device that is to be utilized by the SunGuide software. MDX is in a unique situation where all of the devices to be configured in the installation are currently configured and operational in the District 6 SunGuide installation. During the installation process, the SwRI team will open the Administrative Editor from District 6 on one monitor and the Administrative Editor from MDX on another monitor and copy the data from one system to the other.

Note: it will be extremely important that devices are “disabled” (or preferably removed) from the District 6 database so that two different SunGuide deployments are not trying to communicate to the same piece of equipment. Now that District 6 is running 3.0, the TSS detectors are not actively being used in District 6 (they were last used in their 2.2 configuration) so the MDX installation can use them as soon as they are configured. The MDX cameras are configured in District 6, once MDX decides to cut the cameras over to the MDX installation the District 6 administrator will alter the configuration of the camera definitions (using the Administrative Editor) to change them to a “false” address so they will not be inadvertently used (but retained in the database in case they need to be quickly restored). The video switching (use o video from MDX cameras) will need no modification in District 6.

When entering latitude/longitude values a full 8 digits of precision must be entered as coordinates are stored in micro degrees which requires 8 digits. SunGuide has a 30 character limit for device short names and descriptions are limited to 256 characters.

2.2.5.1 CCTV Worksheet

The following data needs to be collected for each CCTV to be configured:

Camera Name	Unique name of camera
Center Id	Unique name of center where camera resides
Protocol	Specifies the protocol (values: SNMP, SNMP(PMPP)) for camera

Poll Process	Name of driver for camera
Manufacturer	Manufacturer of camera
Location Description	Description of where camera resides
Roadway	Roadway of where camera resides
Direction	Direction of roadway where camera is installed
Latitude	Latitude of where camera resides
Longitude	Longitude of where camera resides
Op Status	Operational status (values: Active, Error, Failed, OutOfService) of camera
Address Type1	Address type (values: pmppAddress, commAddress) for camera, if pmppAddress then camera uses SNMP (PMPP); if commAddress then camera uses SNMP
Address Type2	Specific address type (values: portServerAddress) of Address Type 1
Address	Device address of camera
Port Server IP	IP address for the port server where camera resides
Port Server Port Number	Port number for the port server where camera resides
Community Name	Community name for camera (SNMP)
Attach to Video Device	If selected, additional IP video parameters must be supplied.

The following data need to be provided for IP video:

Video Device IP Address	IP address for encoder
Blackout	Determines if camera restricted
Video Device Type	Type (IP video device) of video device for encoder
IP Streaming Driver ID	Unique IP video switch driver name
Card Number	Card number for VBrick encoder
Manufacturer	Manufacturer (values: Coretec, iMpath, Teleste, VBrick) of encoder
Model	Model of encoder
Streaming Type	Streaming type (values: elementary, transport, program) for encoder
Secondary Interface	Secondary interface for VBrick encoder which enables users to maximize number of inputs for encoder
Snapshot Requested	Determines if snapshots are generated for encoder

2.2.5.2 TSS Worksheet

The following data need to be provided for each Highway (Route) to be in the deployment:

Roadway Description	Textual description of the roadway (route)
Short Name	Short text name that will be seen by the operators
Directions	The directions that the roadway runs (can be multiple directions)
Cross Streets (multiple entries)	Textual descriptions of cross streets (that intersect the roadway); typically a roadway will have multiple cross streets
Lat Lon	Latitude and longitude of the intersection between the roadway and the cross street

The following data needs to be collected for each TSS detector to be configured:

Detector Name	Unique name of detector
Center Id	Unique name of center where detector resides
Driver Name	Name of driver for the detector (e.g., BiTrans, RTMS)
Poll Cycle	Time in seconds between device polls
Type	Type of detector (e.g., Loop or Radar)
Protocol	Specifies the protocol (values: EIS, Wavetronix, BiTrans)
Op Status	Operational status (values: Available or Offline)
Location Description	Description of where detector resides
Roadway	Roadway of where detector resides
Direction	Direction of roadway where detector is installed
Latitude	Latitude of where detector resides
Longitude	Longitude of where detector resides
Address	Device address of detector
Port Server IP	IP address for the port server where detector resides
Port Server Port Number	Port number for the port server where detector resides

The following data needs to be collected for each lane that is to be configured:

TSS Link	The name of the links that will be defined in the system; links will have an association to detectors.
TSS Lanes	For each link, the name of each lane associated with the link; for each lane the zone number and description needs to be identified (e.g., which detection zone is associated with a lane).

The following data needs to be collected for each link that will have an alarm threshold to be configured:

TSS Link	The name of the links that will be defined in the system.
Threshold Value(s)	What the speed and occupancy values should be for each threshold (this includes a start and end time) value to be defined.

2.2.5.3 HAR Worksheet

The following data need to be provided for each Highway (Route) to be in the deployment:

Host name	Hostname of the HAR server where the HIS DR2000 software is installed.
File share for audio files	File share name on the DR2000 where the HAR audio files will be placed.

2.3 SwRI: Software Installation

The following sections describe the activities that SwRI staff will perform to install the SunGuide software. Since the MDX equipment is currently being controlled by District 6 hardware there are no restrictions as to when the software can be installed and configured. Device testing will be coordinated with District 6 operational staff since it will require taking the equipment “off-line” (in District 6) to be tested with the MDX installation (see Section 2.6 for how testing will occur).

MDX staff should be available to monitor and observe the software installation process.

2.3.1 Server Preparation

The following software needs to be installed on the servers before the software installation team arrives on-site:

- Two servers be configured as the Oracle server:
 - Oracle 10g server, version 10.1.0.2.0
- Six servers will be configured as application servers:
 - Oracle 10g Client, version 10.1.0.2.0
 - IIS (Microsoft installation disk)
 - ASP.NET (this installed as part of Microsoft IIS)

2.3.2 Workstation Preparation

The following software needs to be installed on the workstations before the software installation team arrives on-site:

- Adobe SVG Viewer (must be acquired from Adobe.com)
- Roadgeek font (this is provided on the SunGuide install CD)

2.3.3 *Software Installation*

In order to install the SunGuide application software, the following steps will be performed by the software installation team:

- In a common directory with a share point accessible to the SunGuide application servers the following files will be installed:
 - Install master configuration file which is named config.xml and edit the contents to match the MDX network configuration
 - Install XML schemas used by the SunGuide applications
- Execute the database creation scripts to prepare the database for installation of the SunGuide applications
- Using the installation instructions in the SunGuide *Version Description Document* (VDD) and installation notes install the SunGuide applications. The four Release 3.0.3 patches need to be installed (in order) after the installation CD is executed.

Two SunGuide system administration applications do not execute in a browser environment. These applications should be installed on workstations that may be used to diagnose the health and status of the system; details of the application are contained in the SUM. SwRI will install the following applications on workstations as directed by MDX:

- Executive Handler viewer: provides an overview of currently operating SunGuide applications
- Status Logger viewer: provides the ability to review the SunGuide application log files

2.3.4 *Software Configuration*

After the SunGuide software is installed, various configuration activities need to occur; the software installation team will perform the following configurations:

- Install and configure Status Logger on a single SunGuide application server (the SunGuide applications will log to this one instance of Status Logger)
- Install and configure Executive Handler server on all SunGuide application servers
- Modify the IIS to restrict access to the SunGuide Admin utility to users specified by MDX

The SunGuide GUI is designed to load GUI components for the SunGuide applications. The loading (and overall performance) of the GUI can be improved if the GUI components associated with subsystems not installed is removed. The software installation team will remove the GUI components for the subsystems that were not installed.

2.3.5 *C2C Configuration*

During the SunGuide software configuration, the Center-to-Center (C2C) interfaces need to be configured so that the District 6 and MDX deployment can exchange information and command requests (assuming operators have the appropriate permissions). The following SunGuide C2C components need to be installed/configured in District 6 (these may already be installed):

- C2C Extractor
- C2C Provider
- C2C Collector
- C2C Command Receiver

The following SunGuide C2C components need to be installed on the MDX servers:

- C2C Plug-in Publisher
- C2C Plug-in Subscriber
- C2C Extractor
- C2C Provider
- C2C Command Receiver

The C2C interface should then be test to assure connectivity between the two deployments.

2.4 SwRI / MDX: Post Software Installation (Configuration)

The following sections describe the activities that MDX staff need to perform after the SunGuide software deployment. SwRI staff will be available to assist and work with MDX staff to accomplish these activities.

2.4.1 Populate Tables

Note: MDX has been operating its equipment from a District 6 SunGuide installation. It is not possible to simply “copy” over the District 6 tables to the MDX database and delete the District 6 equipment, this is because all information is “keyed” by a “SunGuide Center ID” that is unique to each deployment. This SunGuide Center ID is used to identify data in the C2C environment. Since the equipment being configured has been field tested with SunGuide, during the installation process, the SwRI team will open the Administrative Editor from District 6 on one monitor and the Administrative Editor from MDX on another monitor and copy the data from one system to the other to facilitate populating the database tables.

The following tables need to be populated using the SunGuide Administration tool:

- User Management:
 - Users
 - Groups
 - Workstations
- CCTV:
 - Device Tables
 - Video Destinations
 - Video Sources
- TSS:
 - Alarm Thresholds
 - Device Tables
 - Detector Maps
 - Poll Cycles
- HAR: Radios
- Event Management:
 - Activity Types
 - Agencies
 - Agencies Contacts
 - Comment Types
 - Event Status Types
 - Event Types

- Injury Types
- Organizations
- Location Configuration
- Mailing Lists
- Mailing Lists Contacts
- Procedural Errors
- Response Plans
- Vehicle Tracking
- Weather Conditions
- Reporting Subsystem:
 - Reports
 - Reporting Groups
- Data Archive: Properties
- Miscellaneous: Centers

The SunGuide *Software User's Manual* (SUM) and Administrator Training slides should be consulted on use of these editors.

The following actions should be taken to prepare the database for production:

- District 6 recommends that MDX clear out test data from their database prior to going into production. District 6 has a script available (provided by SwRI) that can be used to perform this action.
- The event numbering should be reset to avoid overlaps with events saved in the District 6 database in order to make year-end reporting easier (for example, District 6 started with 150,000 when they deployed Release 3.0 so that they would know that all incidents below 150,000 were from Release 2.2 and all above were from Release 3.0). This involves a very simple script that District 6 has available (provided by SwRI).

2.4.2 Create Map Links

Each implementation of SunGuide must have a Map Link layer created; this layer is used by the operator map to display instrumented sections of roadway as well as highway shields. This layer is displayed in conjunction with the DynaMap shape file data to provide a complete looking map on the operator workstation. The SUM has a section titled “Map Administration with Link Editor” that explains the use of this software. Additionally, the Map Link Editor should be used to create the shields that should be displayed.

To create this file for the MDX installation a copy of the District 6 file will be used, any links from District 6 will be deleted and the MDX links will be “re-associated” with the newly entered MDX TSS devices.

2.4.3 DMS Linking File

A device linking file does not need to be created since MDX does not have any DMS devices. HAR devices are identified by the Response Plan Generator using a “radius algorithm”.

2.5 Equipment Cutover

it will be extremely important that devices are “disabled” (or preferably removed) from the District 6 database so that two different SunGuide deployments are not trying to communicate to

the same piece of equipment. Now that District 6 is running 3.0, the TSS detectors are not actively being used in District 6 (they were last used in their 2.2 configuration) so the MDX installation can use them as soon as they are configured. The MDX cameras are configured in District 6, once MDX decides to cut the cameras over to the MDX installation the District 6 administrator will alter the configuration of the camera definitions (using the Administrative Editor) to change them to a “false” address so they will not be inadvertently used (but retained in the database in case they need to be quickly restored). The video switching (use o video from MDX cameras) will need no modification in District 6.

If devices are left configured on both systems AND both systems try to access the equipment communications conflicts will arise and SunGuide failures will be reported by one or both of the systems.

2.6 SwRI / MDX: Testing

Equipment “cut over” testing will only be performed between the non-peak hours of 10:00am and 3:00pm unless specifically agreed to by District 6 and MDX operational staff. The TSS devices may be tested at any time since they are not in operation in District 6. The testing will occur on both the operational servers and the test servers to assure that two working SunGuide environments are deployed prior to the deployment team leaving.

Once the configuration is complete and equipment is made available, a series of ad hoc tests will be performed to verify software operation. If MDX wishes, the formal test cases from the *SunGuide Software Integration Case Procedures (SICP)* can be executed but this activity has not been performed in recent SunGuide deployments.

Areas that will be tested / exercised include:

- Video:
 - Control of cameras
 - Video switching
- TSS Devices
 - Devices being polled
 - TSS data showing up on map
- HAR Devices
 - Devices being polled
 - Generate HAR messages
 - HAR devices showing up on map
- Event Management:
 - Event Creation
 - Event Management
 - Response Plan Generation (accessing HAR devices)
- Reporting Subsystem:
 - Generate reports
- Various:
 - Test C2C plugin using XML tester to receive data

- Verify Data Archive is configured to store TSS data (note that this subsystem will not be used in the short term but will be configured for future use)

2.7 Training

Training will be conducted in the District 6 (temporary MDX location) RTMC in Miami as the installation is performed; the training will be a hands-on that occurs during the installation and configuration activities. The following training will be provided to MDX personnel during the installation and configuration:

- Administrator Training - the intent of the System Administration/Deployment training is to prepare personnel to install/configure the SunGuide software and administer the SunGuide system on a daily basis. The following topics will be addressed during the hands-on training:
 - Installation procedures
 - Backup procedures
 - Recovery procedures
 - Modifying hardware configurations
 - Tailoring of the system environment
 - Starting/stopping/restarting the system
 - Troubleshooting:
 - Executive Handler
 - Status Logger
 - Workstation installation

2.8 Deployment Schedule

The following schedule is proposed for the deployment. The installation team will need access to hardware devices throughout the implementation process. Note that if activities complete early then if MDX and SwRI agree the timing for the following events may be modified to shorten the overall deployment schedule.

ID	Task Name	Duration	Start	Finish	Mar 7	Sun Mar 9	Tue Mar 11	Thu Mar 13	Sat Mar 15	Mon Mar 17	Wed Mar 19	Fri Mar 21	Sun Mar 23	Tue Mar 25	Thu Mar 27	Sat Mar 29	Mon Mar 31	Wed Apr 2	Fri Apr 4
					12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
1	Preinstallation Activities (MDX Activities)	10 days	Mon 3/10/08	Fri 3/21/08															
2	Install Operating Systems	10 days	Mon 3/10/08	Fri 3/21/08															
3	Install / Configure Clusters	10 days	Mon 3/10/08	Fri 3/21/08															
4	Install / Configure Oracle	10 days	Mon 3/10/08	Fri 3/21/08															
5	Install / Configure Workstations	10 days	Mon 3/10/08	Fri 3/21/08															
6	Server Configuration / Verification	1 day	Mon 3/24/08	Mon 3/24/08															
7	Verify server software	1 day	Mon 3/24/08	Mon 3/24/08															
8	Verify configuration	1 day	Mon 3/24/08	Mon 3/24/08															
9	Verify operations	1 day	Mon 3/24/08	Mon 3/24/08															
10	Site Installation and Checkout	4 days?	Mon 3/24/08	Thu 3/27/08															
11	Install SunGuide software	1 day?	Mon 3/24/08	Mon 3/24/08															
12	Configure SunGuide	1 day?	Mon 3/24/08	Mon 3/24/08															
13	Configure Devices	2 days	Tue 3/25/08	Wed 3/26/08															
14	Test Field Connectivity	2 days	Wed 3/26/08	Thu 3/27/08															
15	Software Testing	3 days	Tue 3/25/08	Thu 3/27/08															
16	Training	0.38 days	Thu 3/27/08	Thu 3/27/08															
17	Administrator Class (TBD - likely OJT)	3 hrs	Thu 3/27/08	Thu 3/27/08															
18	Post Installation Support	4 days	Mon 3/31/08	Thu 4/3/08															
19	SwRI on-site	4 days	Mon 3/31/08	Thu 4/3/08															

3. Notes

None.