Change Management Board

Engineering Change Proposal #2.1

SunGuide℠ Software

SunGuide℠ CMB Agenda

Time	Item	Lead	Supporting Materials
3:00 – 3:05	Welcome and Introductions	Glotzbach	Sign-in Sheet
3:05 – 3:15	Recap and Purpose	Glotzbach	December 7, 2005 Meeting Minutes
3:15 – 3:30	CMB Membership and Chairperson	Glotzbach	Change Management Process
3:30 – 3:40	SunGuide℠ Software Full-time Support	Tillander	
3:40 – 3:55	Ramp Metering Firmware Update	Tillander / Martinez	Requirements Matrix
3:55 – 4:05	SunGuide℠ Software Device Compatibility	Tillander	Draft Guideline
4:05 – 4:30	Preset Scheduling Concept	Dellenbeck / Martinez	White Paper
4:30 – 5:00	SunGuide℠ Software Release 2.2 – Initial Event Manager and Performance Measures Subsystems	Tillander / Corbin	Draft Concept of Operations
5:00 – 5:20		Bonds	Draft Requirements Specification
5:20 – 5:30	Closing and Action Item Review	Glotzbach	

Welcome and Introductions

Gene Glotzbach, FDOT Central Office

Recap and Purpose

Gene Glotzbach, FDOT Central Office

What happened last

- Last CMB was held on December 7, 2005
- ECO #2 was approved and raised the project cost ceiling to $8,492,162 through June 2008
- Decisions on some items were postponed
  - Performance Measures (topic for today)
  - IM through C2C (approved November 2005)
  - Road Ranger subsystem (topic for today)
  - Proportional Font support for DMS messages (approved December 7, 2005)

Purpose of Today's Meeting

- ECO#2.1 begins to address Performance Measures and Road Ranger Support
- No voting today – primarily updates and presentation of concepts
- Voting on applicable requirements may be required at next CMB meeting/teleconference anticipated to be held in mid-August

Change Management Board Membership and Chairperson

Gene Glotzbach, FDOT Central Office

Why is there a CMB?

- Needed to control change of a product used by different users / stakeholders
- Needed to maintain the same level of quality in the product
- Needed to insure the documentation on the product remains up to date
- Needed to review and approve changes to a product used by all the members of the CMB
- Needed to make sure we don't violate the TxDOT license for the core software provided through SwRI

Membership and Chairperson

- Change Management Process document finalized on 4/12/05
- CMB Membership consists of a representative from each of the seven Districts, Florida's Turnpike Enterprise, and three members from the Central Office
- Members should be prepared to serve a minimum of 18 months
- ACTION – Confirm 11 existing CMB members
- Chairperson may change on a yearly basis to another CMB member
- ACTION – Nominations to be accepted by Chairman Glotzbach and voted on by CMB

Software Full-time Support

Trey Tillander, FDOT Central Office

Full-time Support

- Deployment support: activities to support (i.e. answer questions, configure software, adding new devices, adding new software modules, etc.) once software is deployed for operational use.
- Diagnosis of problem reports: activities to determine if a reported problem is a software failure (i.e., bug), operator error, computer/network/ commercial software error or an enhancement.
- Fixing bugs: activities to modify the software to fix an identified failure in the source code.
- Maintain a 24x7 SunGuide support line.
- Maintain SunGuide Footprints Issues Tracking database, including a Frequently Asked Questions (FAQ's) area
- Travel/On-site presence: Includes 1 trip a month for San Antonio based staff member.
- July 1, 2006 – June 30, 2007
- Additional Cost is $328K

Ramp metering subsystem status

Trey Tillander, FDOT Central Office
Jesus Martinez, FDOT District 6

Firmware licensing issue

- SunGuide release 2.0 was satisfactorily tested with Washington State DOT firmware in a 170 controller
- Subsequently, the Washington State DOT and the FDOT were unable to complete a licensing agreement for the use of the firmware.
- Options were to:
  - Purchase commercial firmware and rewrite SunGuide to use it (3 products were evaluated)
  - Reengineer the Washington State DOT firmware
- Most cost effective/lowest risk solution is for SwRI to reengineer the firmware (see next slide)

Software Solutions Considered

	NET	Siemens	TransCore	Firmware Rewrite
Synopsis	Offered firmware (and new hardware) along with a "central" system to control field devices. Master code and GUI would not be integrated into SunGuide.	Offered a controller replacement (upgrade to a 2070) along with firmware to provide functionality quire similar to the WSDOT firmware.	Offered a replacement for the WSDOT firmware with no field hardware modifications. Will provide source code for the firmware.	The firmware for the 170 controller would be developed from scratch by SwRI. No changes to the SunGuide subsystems would be required (i.e. the user interface would not be impacted by the rewrite)
Solution (Short Version)	• Replacement CPU module (based on PC-104 architecture) that is compatible with McCain 170E controller. The replacement CPU module consists of a carrier card that plugs into the 170E controller, a PC-104 CPU card, and a compact flash module. This CPU replacement module runs a Linux based operating system.	• Runs on a standard 2070L controller in a 334 cabinet • Implements NTCIP 1207 (Ramp Meter Control), NTCIP 1209 (Transportation Sensor Systems) and NTCIP 1201 (Global Objects) Note: Siemens also has an option to provide a "central" software solution.	• The firmware has been deployed at more than 200 locations in Wisconsin for over ten years (first deployed in 1994). • Firmware supports detector station and ramp metering functions. • Supports up to 24 detectors configured as any of ten different detector types. Note: TransCore also has an option to provide a "central" software solution.	• Firmware would be developed that would process the WSDOT protocol for communication between the controller and the "master" (in this case SunGuide) • FDOT would own the firmware source code.
Current deployed at	Chicago, Atlanta (Navigator)	Phoenix, Salt Lake, and Atlanta, and Dan Ryan expressway in Chicago (soon)	I-476 Philadelphia, Wisconsin	Seattle
Hardware	Install a PC104 card in the existing 170 chassis	Upgrade existing 170 to a 2070	Utilize existing hardware	Utilize existing hardware
Software Ownership	Software would be escrowed but not owned by FDOT.	Software could be purchased by under a non-disclosure agreement, but Siemens would also retain ownership. There would be limitations on distributing software based on the source code outside Florida.	Willing to provide source code for use within the state of Florida (not distributed outside Florida)	FDOT
Vendor Costs (22 sites)				
Software / Hardware	$370,484	$4,045 each Total: $88,990 (note 2070 included in above)	$50,000 (for all 22 sites)	$283,028 (includes 3 weeks support, HC11 compiler)
Installation (by vendor)	$700 each Total: $15,400	$1,500 each Total: $33,000	$1,500 each Total: $33,000	$0 Note: FDOT would need to install new EPROMS in each cabinet
SunGuide Modifications				
Driver (NTCIP 1207)	$60,000	$60,000	$60,000	$0
Subsystem	$0	$135,000	$135,000	$0
GUI / Editors	$0	$30,000	$30,000	$0
Total "ROM"	$445,884	$346,990	$308,000	$283,028

Ramp Meter Firmware Requirements

- TM021 The SunGuide system shall provide a ramp metering firmware for controlling traffic flow onto a roadway from an on-ramp.

Hardware requirements

- TM001H The Ramp Meter controller firmware shall control equipment consisting of standard transportation management hardware equivalent to the Model 170 controller.
- TM002H The Ramp Meter controller firmware shall be developed for the 68HC11 processor.
- TM003H The Ramp Meter controller firmware shall support Model 170 controller keypad, LED display, indicators, communications input and output functionality

Ramp Meter Firmware Requirements

Communications Requirements

- TM001C The Ramp Meter controller shall provide standardized communications similar to standard traffic controllers.
- TM002C The Ramp Meter controller shall accept configurable input from detectors on the roadway.

Ramp Meter Firmware Requirements

Operating requirements

- TM001O The Ramp Meter controller shall allow use of a common access keypad for manual access to firmware parameters and controller operation.
- TM002O The Ramp Meter controller shall accept pre-defined configurable firmware parameters.
- TM002O1 Firmware parameters shall be utilized for data collection and ramp metering algorithms.
- TM003O The Ramp Meter controller shall allow firmware parameters to be downloaded from a central system or manually input from the keypad.
- TM004O The Ramp Meter controller front panel shall provide controller metering and data collection status.
- TM005O The Ramp Meter controller shall provide a manually configurable Clock and calendar function.

Ramp Meter Firmware Requirements

Lane Control Requirements

- **TM001L** The Ramp Meter controller shall provide Surveillance functions.
- **TM001L1** The Ramp Meter controller shall provide data collection surveillance services in a local mode.
- **TM002L** The Ramp Meter controller shall meter traffic flow.
- **TM002L1** The Ramp Meter controller shall meter a configurable number of lanes not to exceed three lanes.
- **TM002L2** The Ramp Meter controller shall operate in a local or central command mode.
- **TM002L3** The Ramp Meter controller local mode shall operate based on local traffic conditions and firmware parameters.
- **TM002L4** The Ramp Meter controller central command mode shall operate based on algorithms defined by the central system.

Ramp Meter Firmware Requirements

Lane control requirements (continued)

- TM003L The Ramp Meter controller metering algorithms shall be defined for local mode.
- TM004L The Ramp Meter controller shall allow configurable metering rates while in a central mode.
- TM005L The Ramp Meter controller shall allow for manual starting, stopping and modifying the metering from central command.
- TM006L The Ramp Meter controller shall meter in local mode when active and disconnected from central command.

End Ramp Meter Firmware Functional requirements

Cost and Schedule

- Once approved, Firmware will be ready for testing at D6 within 90 days.
- Cost of $283K is included in the ECO 2.1.

ITS Device Compatibility Testing

Trey Tillander for Liang Hsia
FDOT Central Office

SunGuide℠ Software and ITS Device Compatibility

ITS Device Driver Development

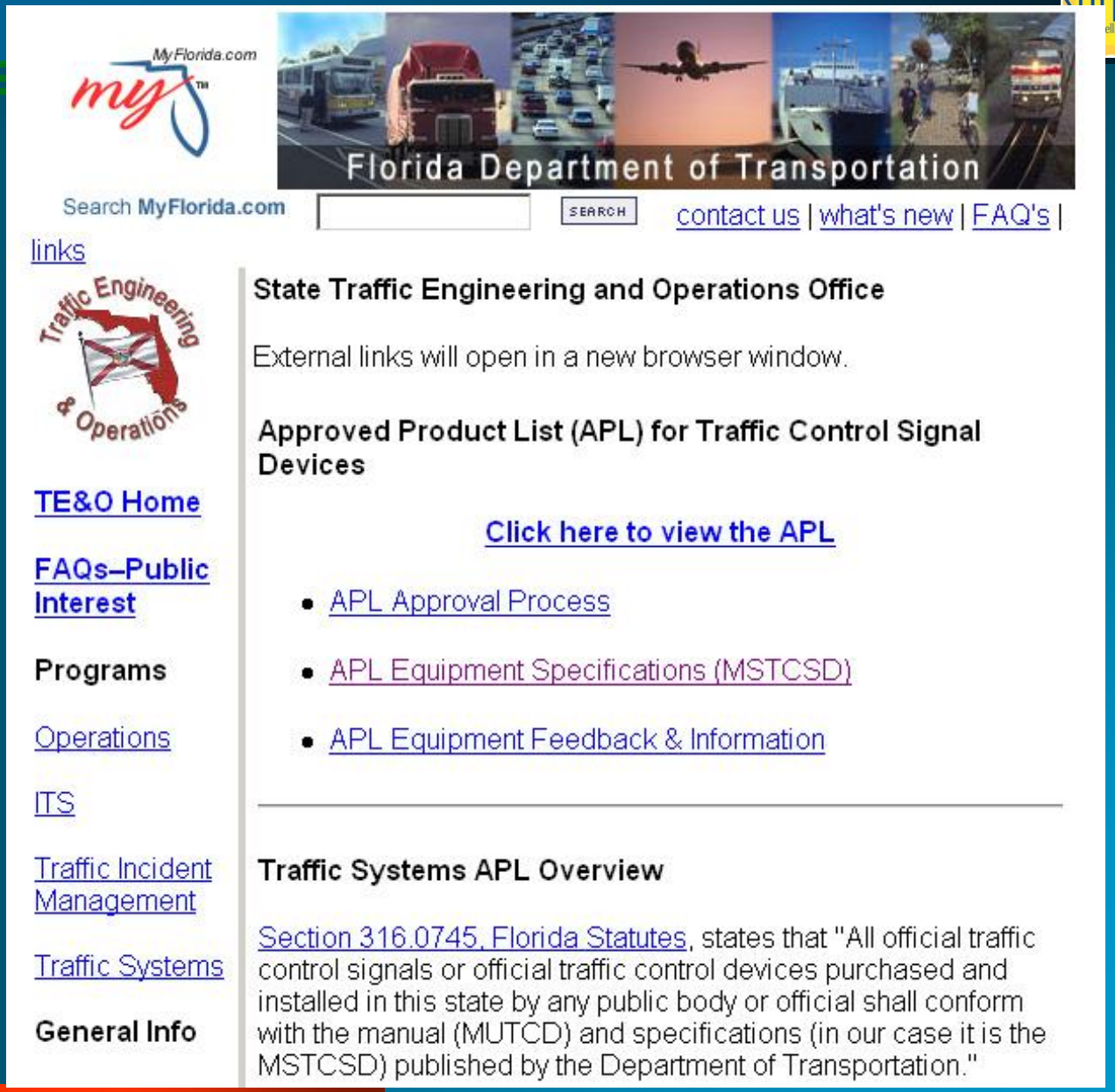
- Vendor follows the Interface Control Documents (ICDs) and the *SunGuide℠ Software Architecture Guidelines*, which are published at the SunGuide℠ Software project Web site, http://sunguide.datasys.swri.edu/.
- *SunGuide℠ Software Supported Protocols* shall be considered first. This information is published at the SunGuide℠ Software project Web site at http://sunguide.datasys.swri.edu/ReadingRoom/Etc/SunGuide%20Protocol%20Support.htm.
- If the *SunGuide℠ Software Supported Protocols* cannot meet the District's need, then a new device driver, enhancement or update will be developed with the approval of the FDOT's Change Management Board.

SunGuide℠ Software and ITS Device Compatibility

ITS Device Acceptance

- Vendor provides the FDOT Traffic Engineering Research Lab (TERL) with the device for quality assurance (QA) certification and independent verification and validation (IV&V) testing.
- Neither the vendor-created device driver that meets FDOT requirements nor its developer/owner who meets FDOT QA requirements is endorsed or warranted by FDOT.
- Provided that the device driver passes the TERL's IV&V testing, its protocol will be listed in the *SunGuide℠ Software Supported Protocols*.

Florida Statutes 316.0745



Qualification, Certification, and the FDOT's APL

Quality Assurance: Vendor and/or Manufacturer QA Program Evaluation

Certification: Device Evaluation and Test

APL: Device Meets QA and Certification Requirements

http://www.dot.state.fl.us/trafficoperations/Traf_Sys/terl/apl.htm

FDOT APL Approval Process

Step 1 Vendor requests device to be listed on the APL

Step 2 Vendor passes FDOT APL Quality Assurance Standards Evaluation

Step 3 Device passes FDOT APL Device Specifications Evaluation

Step 4 Device is listed on the FDOT APL

Preset Scheduling Concept

Dr. Steve Dellenbeck, SwRI
Jesus Martinez, FDOT District 6

Presets: What was Requested

- System-wide Presets
  - A feature to the system to allow one or more cameras to be easily moved to predefined presets.
  - This feature would be accessible as a “perform now” type of action or could be scheduled to occur at certain times of day.

- Preset Homing
  - A feature to the system to allow one or more cameras to be periodically (maybe once every 30 minutes) returned to a preset position.

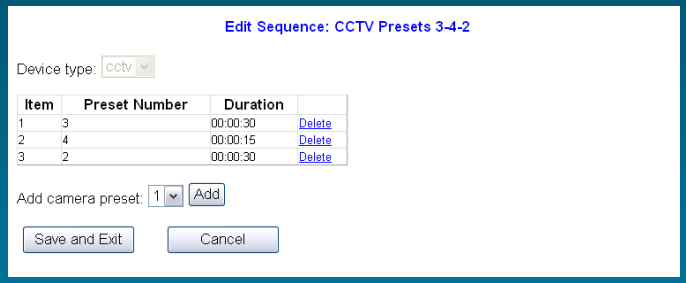
- Preset Tours
  - A feature to cycle cameras between various presets.
  - For instance, the operators may want a camera to switch between northbound and southbound views every minute.

Proposed Solution:
Preset Scheduler – the "Big" Picture

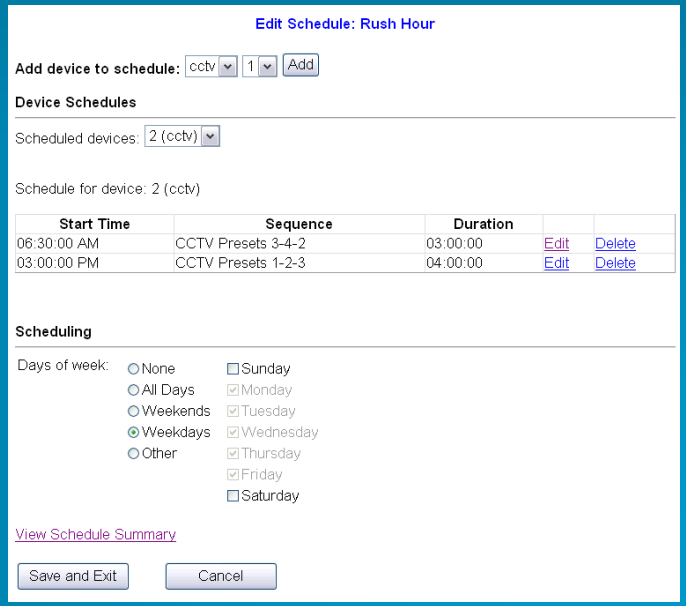
- Preset scheduler:
  - Establish a list of presets for a CCTV (i.e. a series of preset for a single CCTV)
    - For example, create a list "CCTV I95@Concord" containing:
      - Go to preset 1 for 30 seconds
      - Go to preset 5 for 15 seconds
      - Go to preset 3 for 30 seconds
      - Repeat above (this would be an option)
  - Establish a list of CCTV preset lists (i.e. a series of single CCTV lists)
    - For example, create a list "I95 CCTV Tour" containing:
      - Execute list "CCTV I95@Concord"
      - Execute list "CCTV I95@Main"
      - Execute list "CCTV I95@Broadway"
- Lists membership would be non-exclusive

Proposed Solution:
Preset Scheduler – GUI "Concepts"

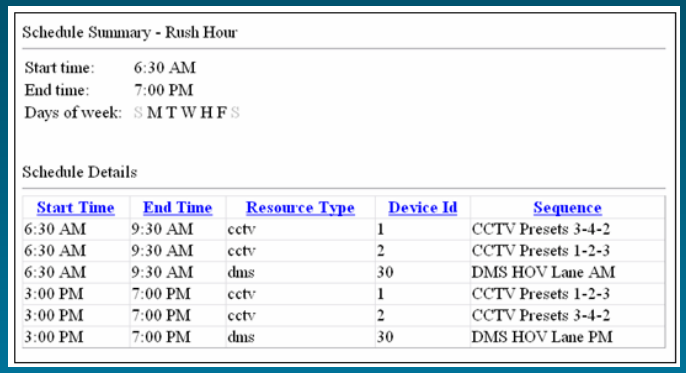
- To establish a list for a single CCTV:
  - For each preset:
    - Which "preset": assume CCTV has been configured
    - Duration: how long before "moving" to next



- Establish a "schedule" or presets:
  - Select device (each device may have multiple preset lists)
  - Establish schedule
    - Start / end times
    - Days of the week



Proposed Solution:
Preset Scheduler – GUI "Concepts" con't



Schedule Summary - Rush Hour

Start time: 6:30 AM
End time: 7:00 PM
Days of week: S M T W H F S

Schedule Details

Start Time	End Time	Resource Type	Device Id	Sequence
6:30 AM	9:30 AM	cctv	1	CCTV Presets 3-4-2
6:30 AM	9:30 AM	cctv	2	CCTV Presets 1-2-3
6:30 AM	9:30 AM	dms	30	DMS HOV Lane AM
3:00 PM	7:00 PM	cctv	1	CCTV Presets 1-2-3
3:00 PM	7:00 PM	cctv	2	CCTV Presets 3-4-2
3:00 PM	7:00 PM	dms	30	DMS HOV Lane PM

- Schedule summaries:
  - Show all scheduled sequences
  - Could show multiple device types
- Managing Schedules
  - An operator can select a schedule and choose to "start now". Start now will change the start time to now and activate the schedule.
  - An operator may choose to activate a schedule. Activation of a schedule will start the schedule without changing the start time.
  - An operator may choose to deactivate a schedule. No additional actions that are part of the schedule will be taken.
- Note: "Locked" CCTVs would be "passed over"

Solution Rationale

- System-wide Presets
  - The scheduler would allow a list presets to be created.
  - This sequence could be activated on one or more cameras as a “start now” type of action with no scheduled time, or it could be added to a schedule that could occur every day at a certain time.
- Preset Homing
  - A schedule of presets could be created with the repeat attribute selected and a dwell time of 30 minutes.
  - This would result in the camera(s) being moved to the appropriate preset position every 30 minutes.
- Preset Tours
  - Two or more camera presets could be added to the scheduler for each camera with a dwell time.
  - If the schedule were set to repeat, moving to presets would cycle through each of the applicable presets for each camera before repeating the list.
  - A schedule such as this could be setup with a one minute dwell time to allow cameras to move between two presets in a repeated fashion over a particular time period.
- Note: this capability can be extended to other device types (e.g. HAR, DMS, etc.)

Recommended Requirements

- The system shall allow a sequence to be created for presets containing at a minimum the following details:
  - One or more preset numbers and
  - A duration or dwell time for each preset.
- When activating a sequence, the user shall be able to specify on which device the sequence should be activated, whether the sequence should repeat, and for what duration the sequence should run.
- An active sequence shall cause each action to be performed in a sequential fashion and repeated if specified.
- When an active sequence's duration expires, the sequence shall cease performing actions for the sequence and mark the sequence as deactivated.

Recommended Requirements:
Continued

- The system shall allow a schedule to be created containing the following details:
  - Specified days of the week which the schedule should be active,
  - Start and end times during which the schedule should be active,
  - One or more sequences, and
  - An associated device for each sequence.

- Start now of a schedule shall cause the schedule's start and end times to be change and the schedule to become active.

- Activating a schedule shall cause actions to begin which are scheduled to be running at the current time. Any actions scheduled to end before the current time shall be skipped.

Recommended Requirements:
Continued

- Deactivating a schedule shall cause the system to stop performing any actions which were scheduled to occur at a time later than the deactivation.
- An active schedule which has a corresponding list of days on which to run shall perform the list of scheduled actions on each of those days beginning at the specified start time and ending at the specified end time.
- Schedules and sequences shall be created using the administrative editor.
- Schedules and sequences shall be started, activated and deactivated from the operator map.
- Camera locking shall add a new level, scheduled locking, that would have a lower priority than users locking a camera. (Optional)

Q&A on Presets

Questions ?

SunGuide Event Manager and Performance Measures Subsystems

Background

Trey Tillander, FDOT Central Office

Concept of Operations

Steve Corbin, FDOT District 4

Background

- Currently, the SunGuide℠ software system does not support the collection and reporting of District 4 or 6 Road Ranger response data or generate performance measure reports.
- However, the SMART℠ system developed by District 4 meets their data collection needs and reports performance measure data that is used to manage operations
- A link will be created between SunGuide and SMART to meet the immediate District 4 and 6 needs for Road Ranger management and performance measures reporting in an expedited timeframe
- District 4 provided a document that describes how they envision the combined SunGuide and SMART software to work

Background

- The immediate need is satisfied by making small changes to SunGuide to support a separate module to be developed by District 4's software developer
  - Referred to as SunGuide Release 2.2
  - Does not conform to the SunGuide Software architecture
  - Estimated completion is end of September
- Future version would integrate the functionality into SunGuide in accordance with the architecture rules.
  - Referred to as SunGuide Release 3.x
  - Incorporates any additional CMB needs and requirements
  - Estimated completion is 1st quarter of 2007

SunGuide ConOps
Incident Scenario – FHP Detected

Steve Corbin, District IV

EM/PM Concept of Operations

- The purpose of the following slides[1] is to illustrate a vision for the future of Florida's statewide SunGuide software.
- The basis of the slides has been created from the daily activities and requirements of the District 4 and District 6 RTMCs.
- Although multiple storylines were developed depicting operational and managerial scenarios, only one will be presented to you today.

[1] Screen captions depict the current legacy software; the appearance and layout of these screens will be changed in Release 2.2.

Operational Storyline

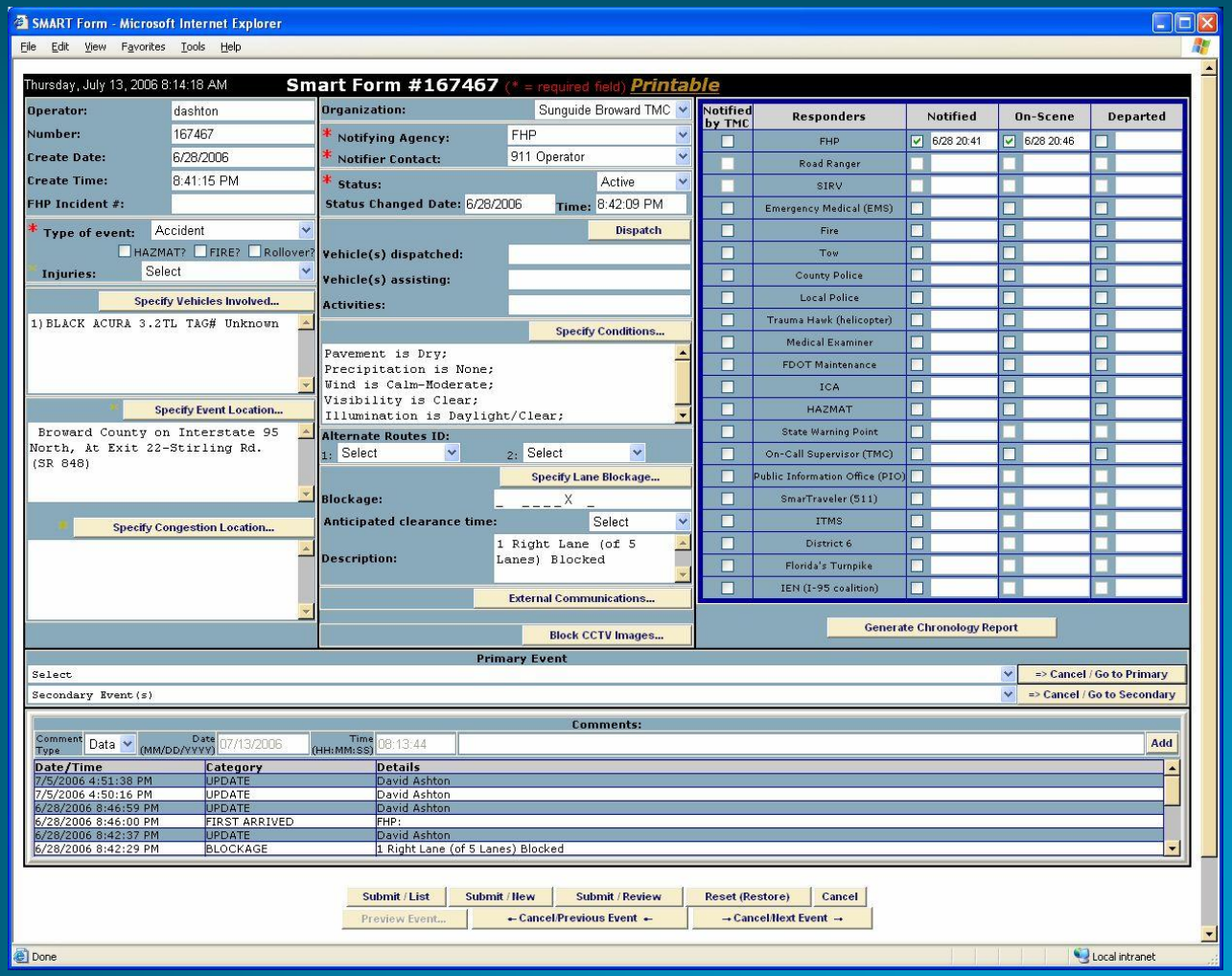
- At 6:45 AM on a Tuesday, the SunGuide Transportation Management Center (TMC) Operator receives a call from the Florida Highway Patrol (FHP) reporting a multi-vehicle crash with all lanes blocked on I-95 northbound before Cypress Creek Road.
- Utilizing the manual pan/tilt/zoom feature of the nearest CCTV camera, the SunGuide Operator is able to view the crash and confirm that all lanes are blocked northbound approximately ¼ mile south of Cypress Creek.

Notification and Verification

- Operator receives call from FHP
- CCTV Verification
- Operator enters data

Data Entry Screen

- Location
- Vehicles involved
- Agency timestamps
- Lane blockages
- Event Status
- Road Ranger dispatch
- Comments
- Event Notifier
- Injuries
- Hazmat, Fire, Rollovers
- Congestion
- Weather conditions

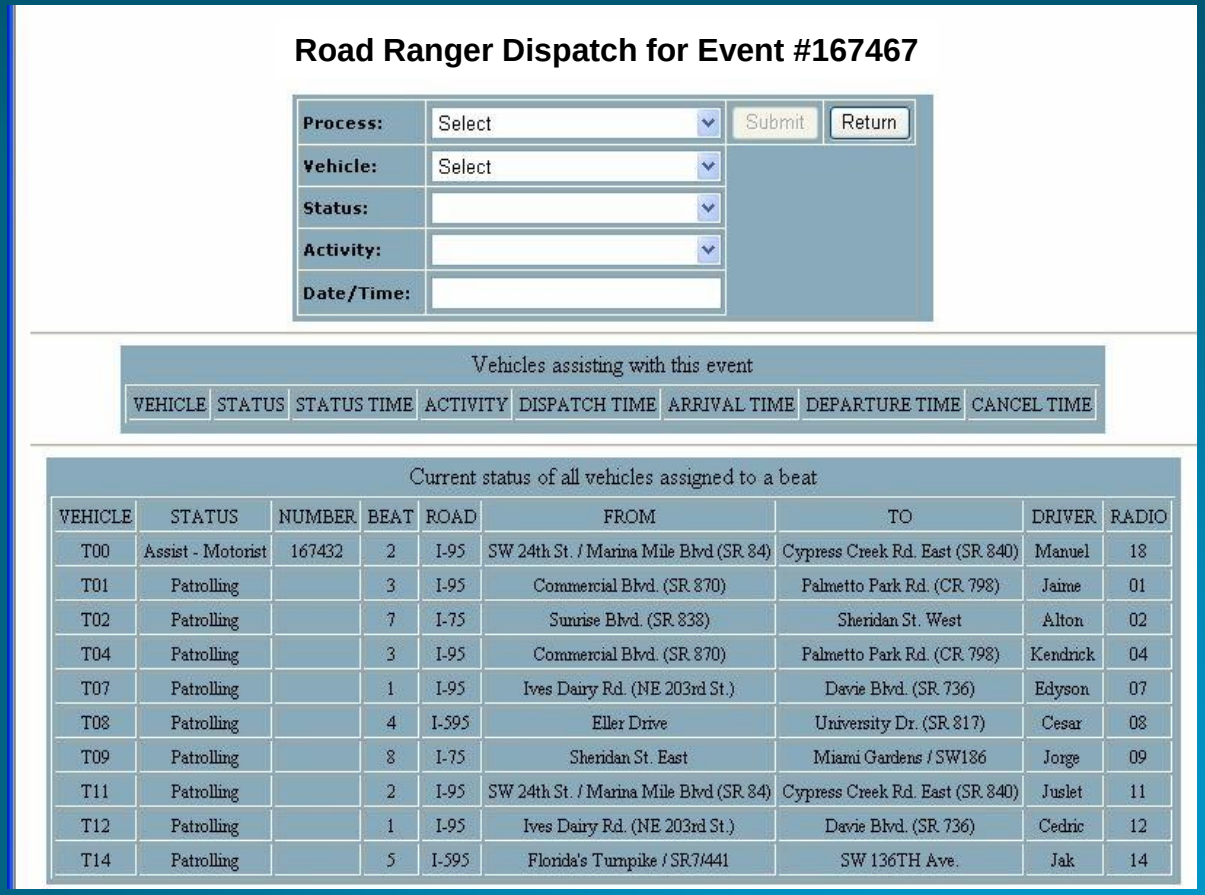


Road Ranger Dispatch

- The TMC Operator dispatches Road Rangers and SIRV to the scene

Road Ranger Dispatch Screen

- Notification
- Arrival
- Activities
- Departure
- Vehicle selection
- Current Road Ranger Availability



Road Ranger Dispatch for Event #167467

Process:	Select	Submit	Return
Vehicle:	Select		
Status:			
Activity:			
Date/Time:			

Vehicles assisting with this event

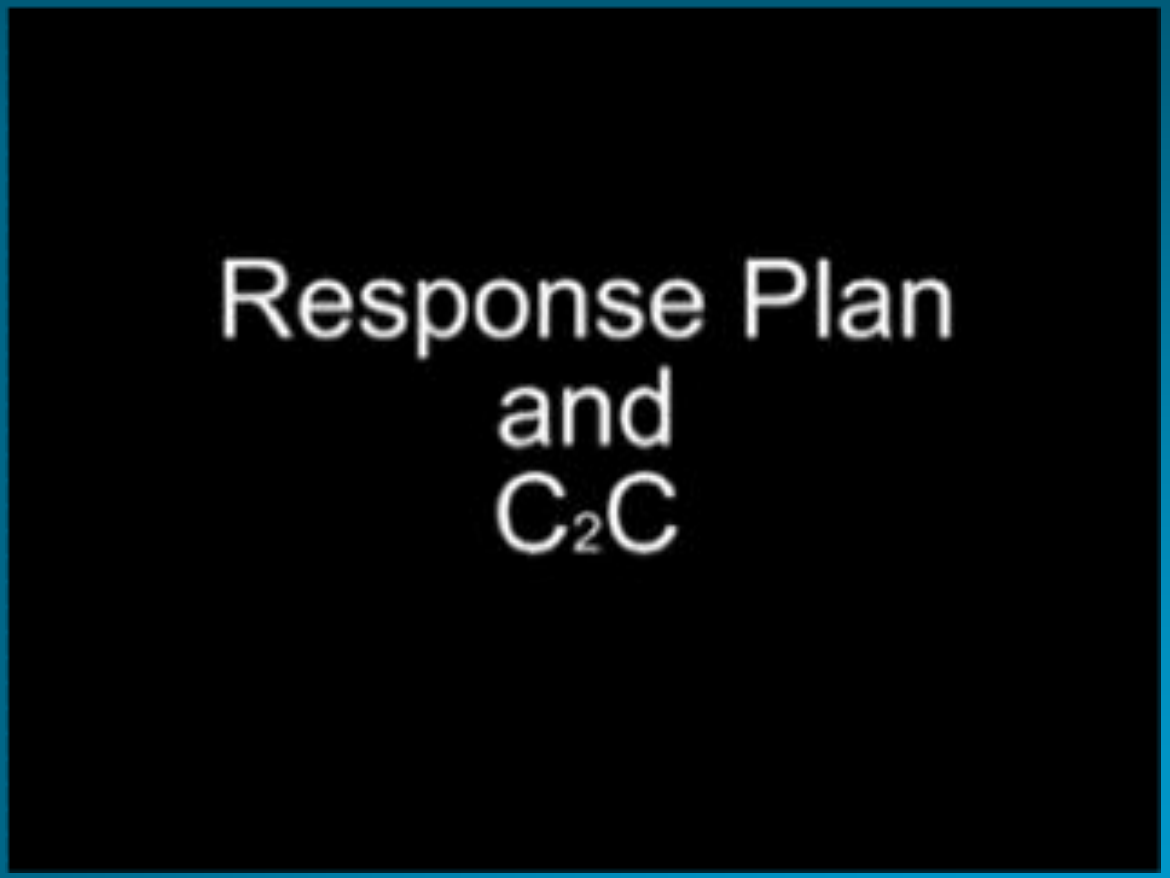
VEHICLE	STATUS	STATUS TIME	ACTIVITY	DISPATCH TIME	ARRIVAL TIME	DEPARTURE TIME	CANCEL TIME

Current status of all vehicles assigned to a beat

VEHICLE	STATUS	NUMBER	BEAT	ROAD	FROM	TO	DRIVER	RADIO
T00	Assist - Motorist	167432	2	I-95	SW 24th St. / Marina Mile Blvd (SR 84)	Cypress Creek Rd. East (SR 840)	Manuel	18
T01	Patrolling		3	I-95	Commercial Blvd. (SR 870)	Palmetto Park Rd. (CR 798)	Jaime	01
T02	Patrolling		7	I-75	Sunrise Blvd. (SR 838)	Sheridan St. West	Alton	02
T04	Patrolling		3	I-95	Commercial Blvd. (SR 870)	Palmetto Park Rd. (CR 798)	Kendrick	04
T07	Patrolling		1	I-95	Ives Dairy Rd. (NE 203rd St.)	Davie Blvd. (SR 736)	Edyson	07
T08	Patrolling		4	I-595	Eller Drive	University Dr. (SR 817)	Cesar	08
T09	Patrolling		8	I-75	Sheridan St. East	Miami Gardens / SW186	Jorge	09
T11	Patrolling		2	I-95	SW 24th St. / Marina Mile Blvd (SR 84)	Cypress Creek Rd. East (SR 840)	Juslet	11
T12	Patrolling		1	I-95	Ives Dairy Rd. (NE 203rd St.)	Davie Blvd. (SR 736)	Cedric	12
T14	Patrolling		5	I-595	Florida's Turnpike / SR7/441	SW 136TH Ave.	Jak	14

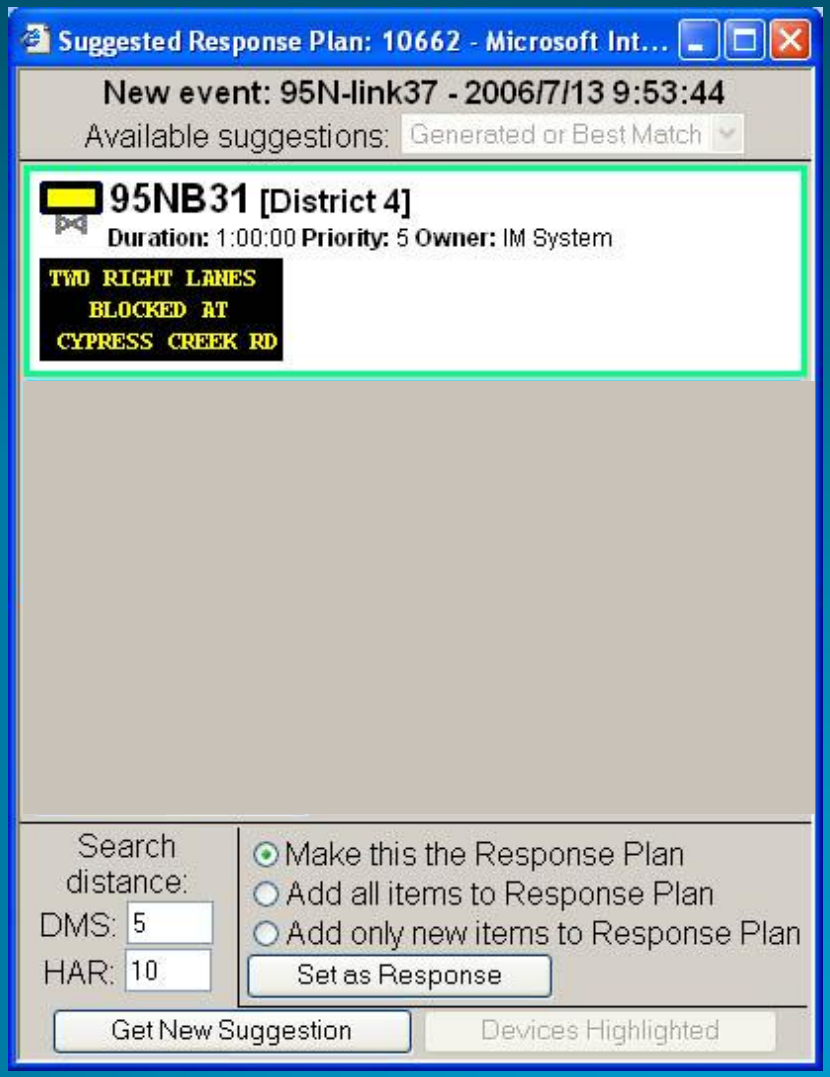
Response Plan and C_2C

- Using SunGuide, the Operator generates a response plan.
- Using C_2C, DMS messages are also posted in District 6.



Response Plan Generation

- DMS messaging
- Text messaging (future release 3.x)



Information Dissemination

- The graphic display map on the website alerts motorists, allowing them to make informed travel decisions.
- Email text alerts inform internal / external customers and the media of the incident.

Information Dissemination

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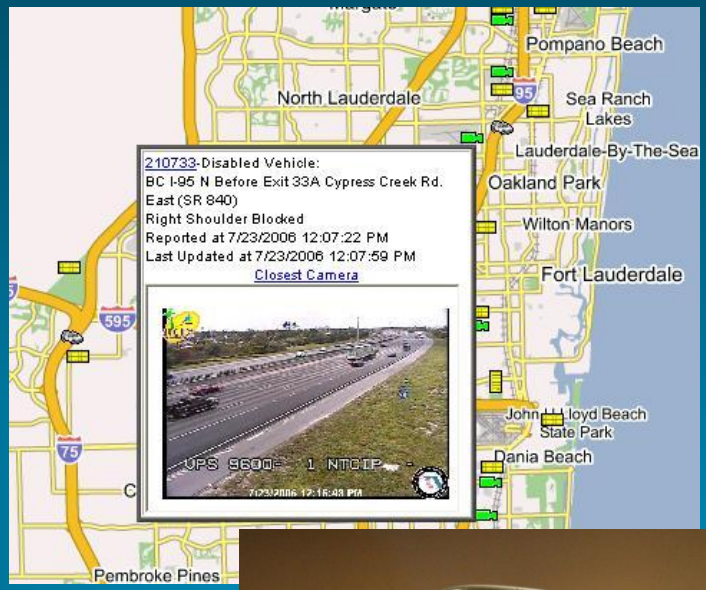
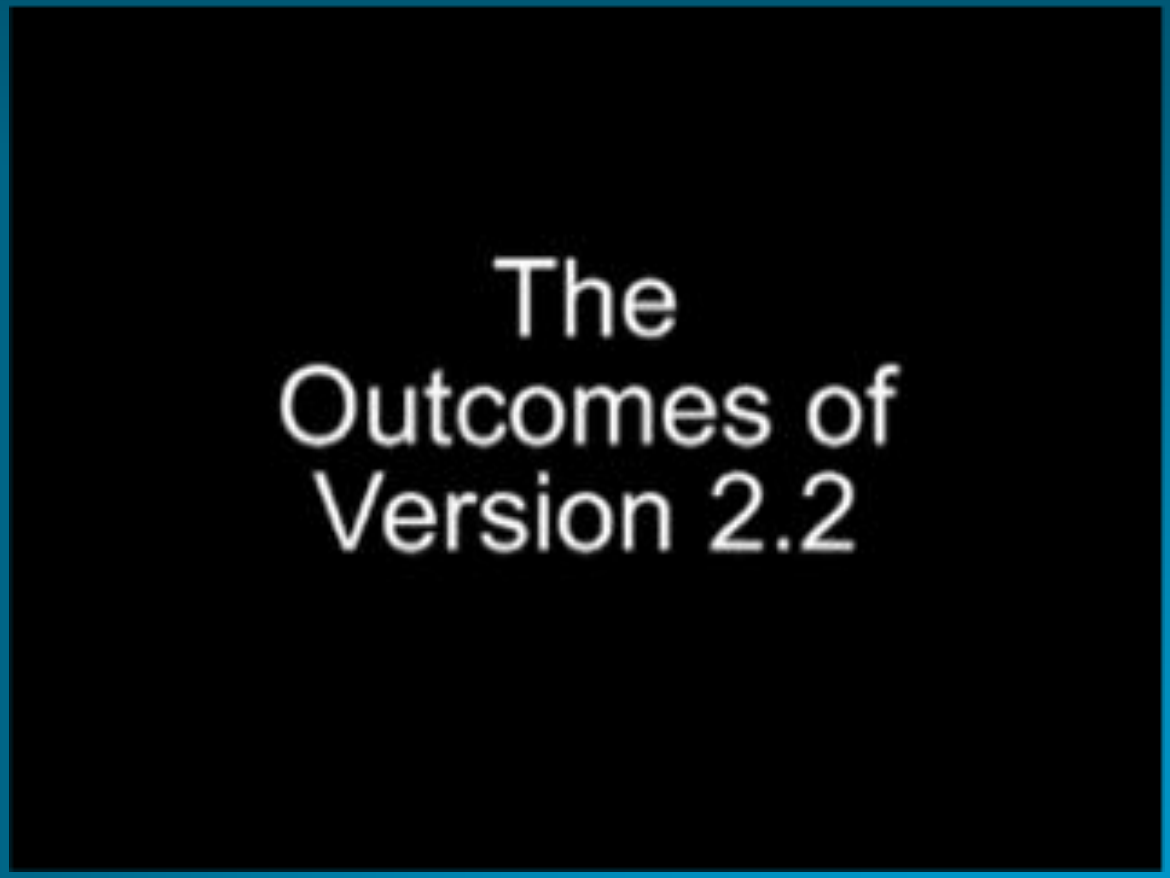


Response and Clearance

- Road Rangers arrive on-scene and begin clearing the incident
- As lanes are re-opened, response plans are updated

Version 2.2 Outcomes

- SunGuide suggests travel times on the signs
- Traffic returns to normal
- Secondary accidents are reduced
- Congestion and delay are reduced



SunGuide Release Comparison

Functionality (Operations Perspective)	Release 2.1	SMART	Release 2.2	Release 3.x
Incident Detection and Alert Mechanism	✓		✓	✓
Incident Response Plan Generation	✓		✓	✓
Device Control (DMS, CCTV, detectors, ramp metering, ...)	✓		✓	✓
Device Error Reporting, Debugging, and Diagnostic Tools	▪		▪	✓
Camera Switching and Video Wall	✓		✓	✓
Camera Video Blackout feature	▪		▪	✓
Integrated SunGuide GUI and Architecture	✓		▪	✓
Center-to-Center Features	✓		✓	✓
Event/Incident Management	▪	✓	✓	✓
Road Ranger Data Collection and Dispatching		✓	✓	✓
Performance Measures Reporting		✓	✓	✓
Chronology, Management Reporting		✓	✓	✓
Camera Image Blocking for District websites		✓	✓	✓
Read-only web-based event viewer, with event details		✓	✓	✓
Event Data Auditing and Editing for QA/QC		✓	▪	✓
Text alerts to public subscribers		✓	▪	✓
Video-based incident detection, via CitiLog VisioPad COTS		✓	▪	✓
Queue (Congestion) Management		▪	▪	✓
Road Ranger wireless device support		▪	▪	✓
Maintenance trouble ticket system w/ wireless interface				✓
Device trouble history screen				✓
Road Ranger AVL				✓
Device Maintenance Reports (history, MTBF, MTBR)				✓
Automatic Notifications from FHP CAD System				✓

✓ – Functional ▪ – Partially Functional (Blank) – No Functionality

Performance Measures - Outputs

Statewide

Output Measures

- **Road Ranger Stops***
- **ITS Miles Managed**
- **511 Calls**

All Reported Annually

District 4

Output Measures

- **System Coverage**
  - **ITS Miles Managed**
  - **% Centerline Miles Managed**
  - **# of ITS Devices**
- **Traffic Flow**
- **Incident Management**
  - # of Incidents
  - Incident Detection Method
  - Incident Level
  - # of RR/SIRV Responses*, Events, & Activities
  - **# of Incoming/Outgoing TMC Calls**

White = Tracked today **Red = Not tracked today** **Yellow = Tracked & Automated**

Performance Measures - Outputs

Statewide

District 4

Output Measures Cont.

- System Performance
  - ITS Device Uptime
  - TMC Systems Uptime
- Traveler Information
  - Website: Unique Users; Visits; Pages**
  - # of DMS Used
  - DMS Message Posting Time

Frequency varies:
Weekly, Monthly, and Annually

White = Tracked today **Red = Not tracked today** **Yellow = Tracked & Automated**

Performance Measures - Outcomes

Statewide

Outcome Measures

- **Travel Time Reliability**
- **Incident Duration**
  - **Total Incident Duration*****
  - **Detection Time**
  - **Verification Time**
  - **Response Time**
  - **Incident Clearance Time*****
- **Customer Satisfaction**

All Reported Annually

District 4

Outcome Measures

- **Congestion**
- **Travel Time Reliability**
- Incident Duration
  - Incident Clearance – FHWA***
  - Detection Time
  - Verification Time
  - Response Time
  - RR Dispatch Time
  - RR Response Time
  - Roadway Clearance Time – FHWA***
- **Customer Satisfaction**

Frequency Varies

White = Tracked today **Red = Not tracked today** **Yellow = Tracked & Automated**

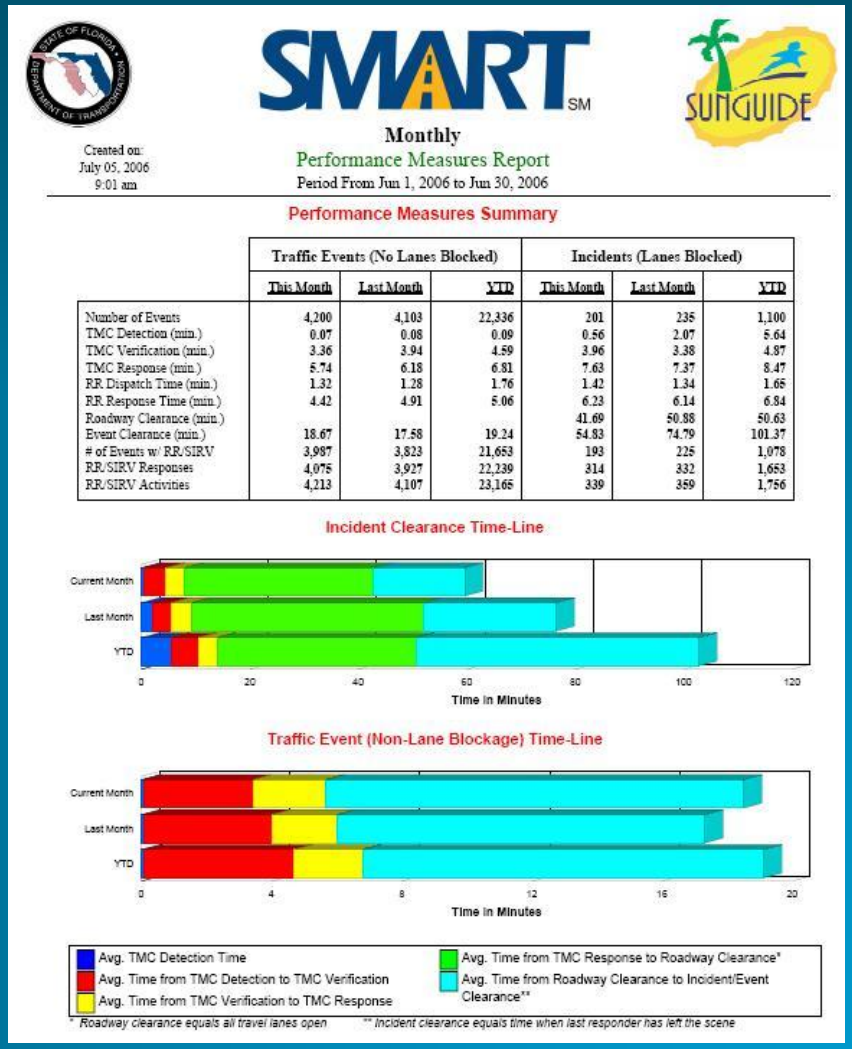
Performance Measures - Summary

Statewide Today	Statewide Combined with Legacy Software
Output Measures	***Output Measures***
– **Road Ranger Stops**	– Road Ranger Stops*
– **ITS Miles Managed**	– **ITS Miles Managed**
– **511 Calls**	– **511 Calls**
Outcome Measures	***Outcome Measures***
– **Travel Time Reliability**	– **Travel Time Reliability**
– **Incident Duration**	– Incident Duration*
• **Total Incident Duration**	• Incident Clearance (FHWA)
• **Detection Time**	• Detection Time
• **Verification Time**	• Verification Time
• **Response Time**	• Response Time
• **Incident Clearance Time**	• Roadway Clearance Time (FHWA)
– **Customer Satisfaction**	– **Customer Satisfaction**
All Reported Annually	*Automated Report at Desired Frequency

White = Tracked today **Red = Not tracked today** **Yellow = Tracked & Automated**

Performance Measures Reports

- Multiple-page performance measures reports generated with only a few button clicks
- Reports generated in PDF format



SMART SM

Monthly

Performance Measures Report

Period From Jun 1, 2006 to Jun 30, 2006

Created on: July 05, 2006 9:01 am

Performance Measures Summary

	Traffic Events (No Lanes Blocked)			Incidents (Lanes Blocked)		
	This Month	Last Month	YTD	This Month	Last Month	YTD
Number of Events	4,200	4,103	22,336	201	235	1,100
TMC Detection (min.)	0.07	0.08	0.09	0.56	2.07	5.64
TMC Verification (min.)	3.36	3.94	4.59	3.96	3.38	4.87
TMC Response (min.)	5.74	6.18	6.81	7.63	7.37	8.47
RR Dispatch Time (min.)	1.32	1.28	1.76	1.42	1.34	1.66
RR Response Time (min.)	4.42	4.91	5.06	6.23	6.14	6.84
Roadway Clearance (min.)				41.69	50.88	50.63
Event Clearance (min.)	18.67	17.58	19.24	54.83	74.79	101.37
# of Events w/ RR/SIRV	3,987	3,823	21,653	193	225	1,078
RR/SIRV Responses	4,075	3,927	22,239	314	332	1,653
RR/SIRV Activities	4,213	4,107	23,165	339	359	1,756

Incident Clearance Time-Line

Traffic Event (Non-Lane Blockage) Time-Line

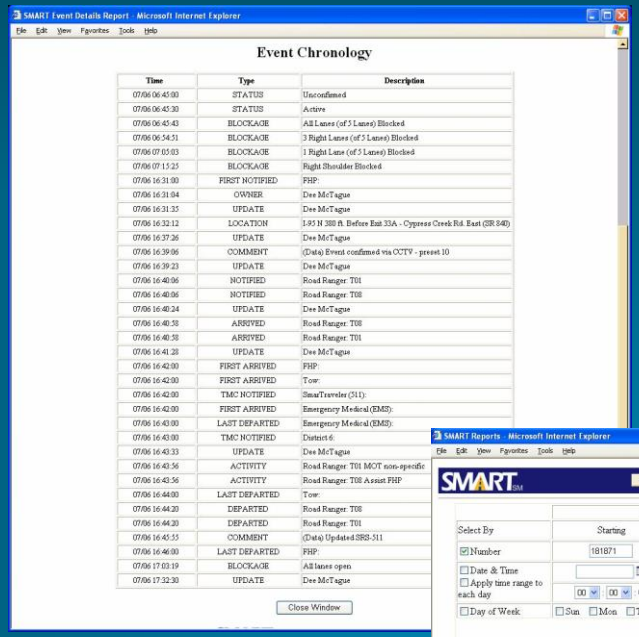
Avg. TMC Detection Time
Avg. Time from TMC Detection to TMC Verification
Avg. Time from TMC Verification to TMC Response
Avg. Time from TMC Response to Roadway Clearance*
Avg. Time from Roadway Clearance to Incident/Event Clearance**

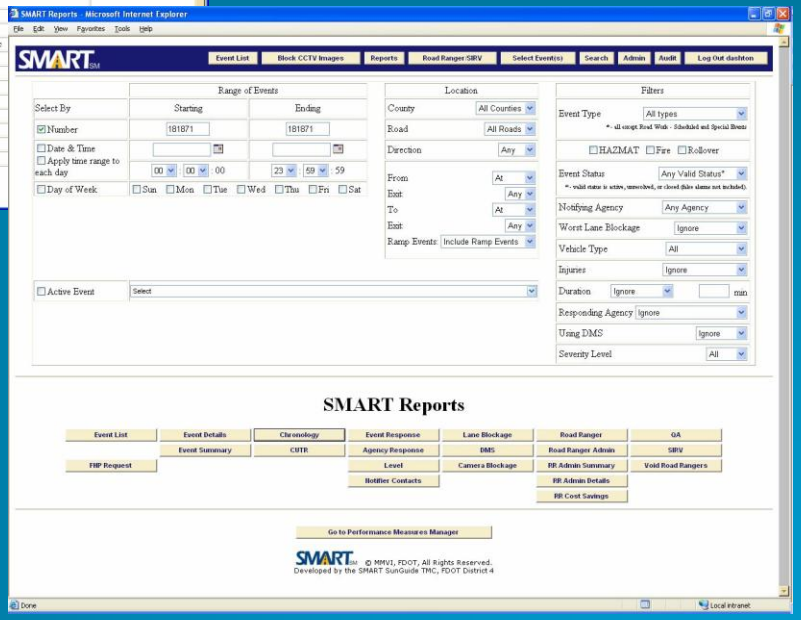
* Roadway clearance equals all travel lanes open

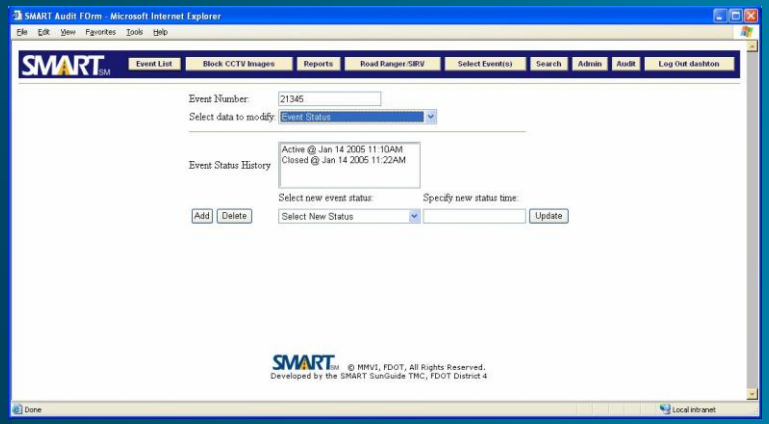
** Incident clearance equals time when last responder has left the scene

Other Management Features

- Chronology reports
- Data auditing and QA/QC
- Data analysis reports







SunGuide Event Manager and Performance Measures Subsystems

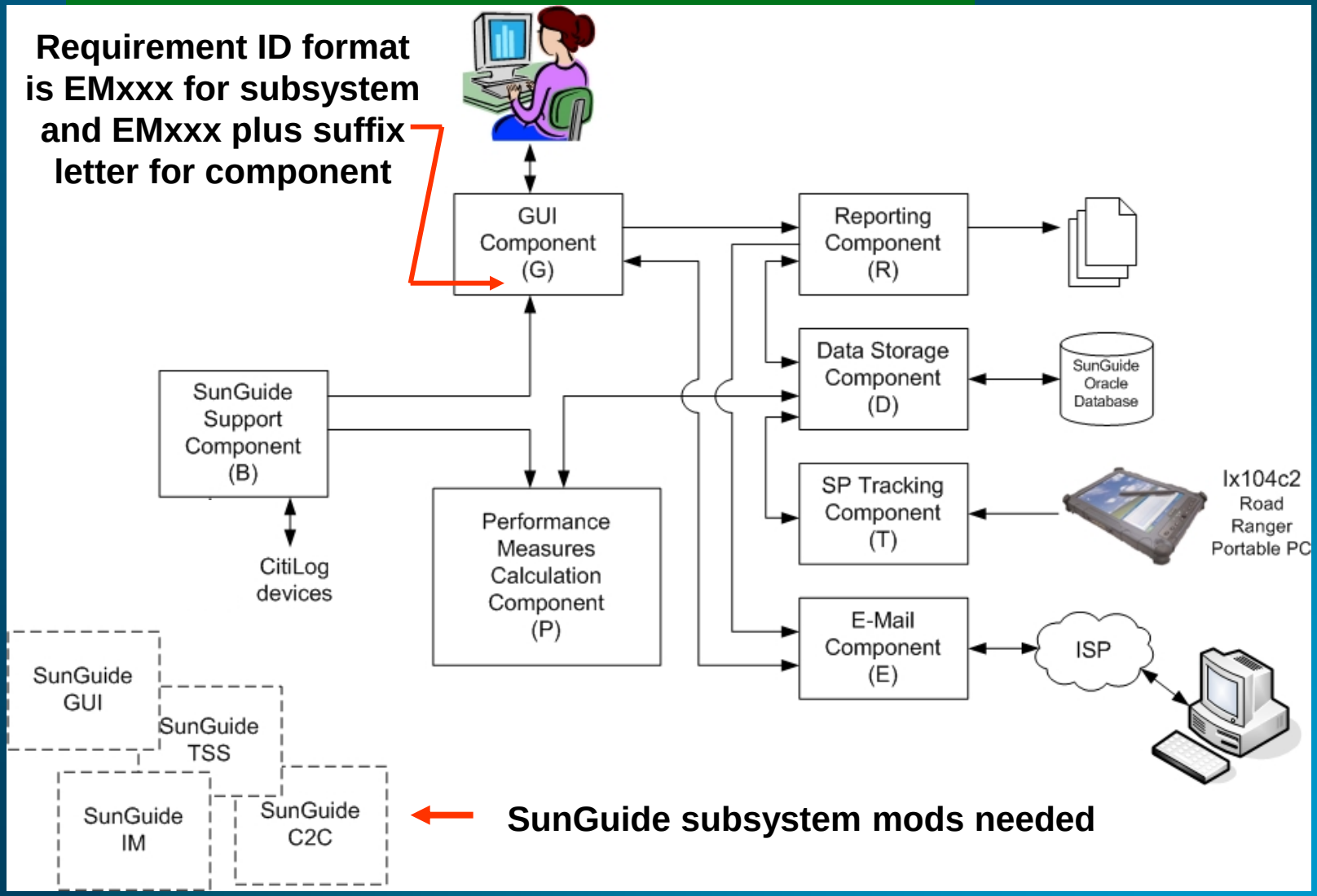
Requirements Specification

John Bonds, PBS&J

EM/PM Functions

- Road Ranger service patrol management and data collection function
- Performance Measures calculation and reporting function
- Will eventually be two separate SunGuide subsystems
- Immediate need is for one subsystem to be developed by the IBI Group for District 4 with support from SwRI. This will be included in SunGuide Release 2.2
- A draft subsystem specification was published for review and comment.
  - *Draft EM/PM Requirements Specification*

Major Functions of the EM/PM



SunGuide / EM-PM Database Interaction