Improving the Information and Decision Support system

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SAMS Overview

- **Goals**
- **Data**
- **Security**
- **SAMS Web Application Overview**
  - Query
  - Analysis
  - Reports
  - Administration
- **Architecture**

NUMBER 1 Goal!!!

Help Reduce Fatal and Injury Producing Crashes!
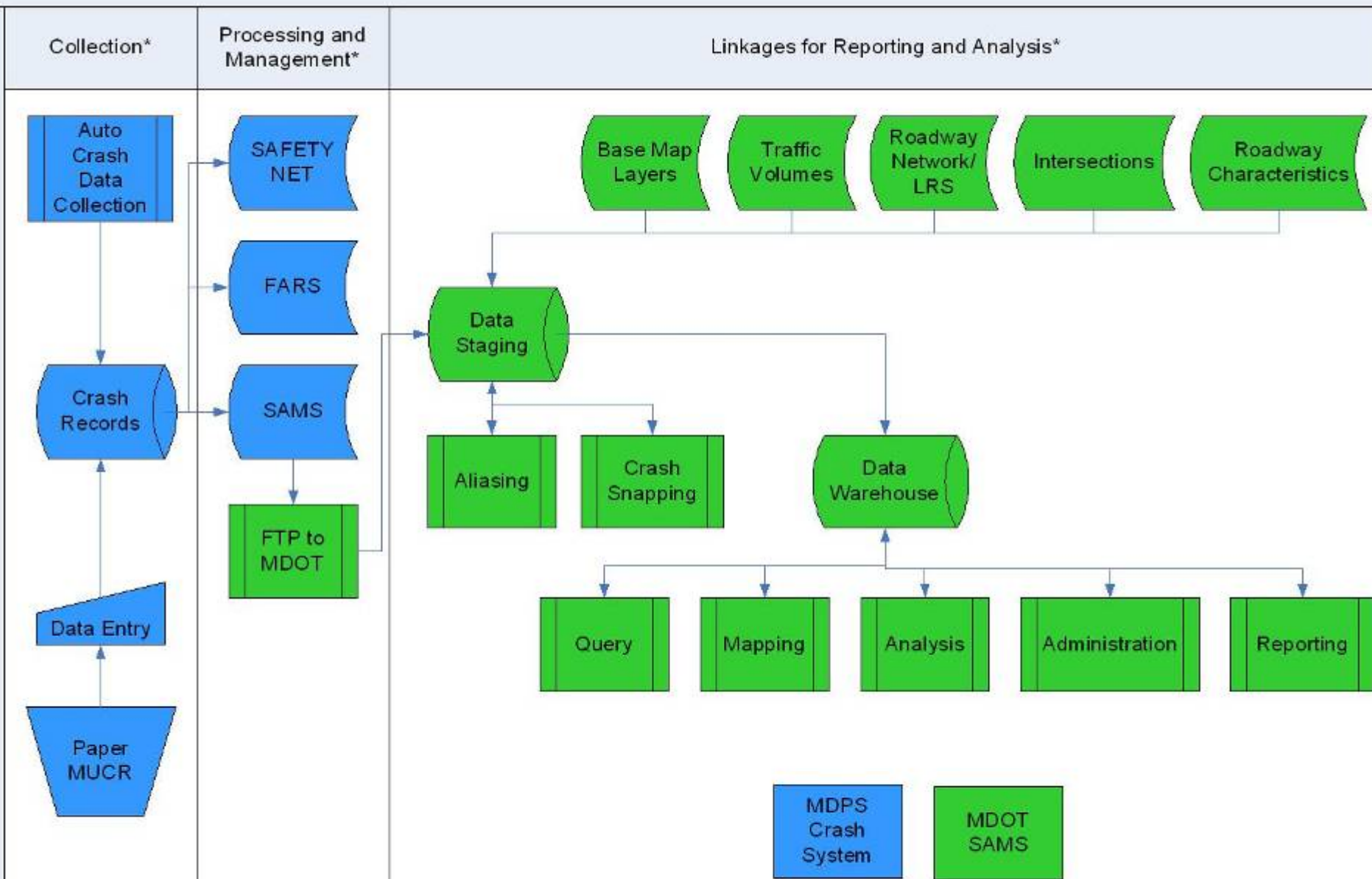
What are the Goals for SAMS?

- Help Reduce Fatal and Injury Producing Crashes

- Quickly Identify Locations with Opportunity

- Identify Countermeasures for Individual Locations and for the entire Road Systems

- Evaluate Highway Safety Improvement Program and Projects

Data Layers and Sources

- **MS Dept of Public Safety**
  - Crash Data
  - Narratives
  - Crash Diagrams
- **NCHRP Report 500 Series**
  - Crash Reduction Factors
- **NHTSA**
  - FARS
- **TeleAtlas**
  - Local Roads (Line work and RWC)

- **Planning Division - MDOT**
  - Road Network
  - Roadway Characteristics
  - Traffic Volumes
- **Traffic Eng Division – MDOT**
  - Sign Data
- **Research Division – MDOT**
  - Pavement Data
- **Bridge Division – MDOT**
  - Bridge Data

MS Crash Records System

Collection*	Processing and Management*	Linkages for Reporting and Analysis*

Collection*

Auto Crash Data Collection → Crash Records → Data Entry → Paper MUCR

Processing and Management*

SAFETY NET

FARS

SAMS

FTP to MDOT

Linkages for Reporting and Analysis*

Base Map Layers | Traffic Volumes | Roadway Network/ LRS | Intersections | Roadway Characteristics

Data Staging

Aliasing | Crash Snapping | Data Warehouse

Query | Mapping | Analysis | Administration | Reporting

Legend:
- MDPS Crash System
- MDOT SAMS

* Three areas that can define the success of a crash records system, adapted from *NCHRP Synthesis 350: Crash Records Systems*

MDPS Crash Data Extraction and Transfer

- **MDPS ReportBeam Crash Data**
  - MS Access format
  - Output nightly from ReportBeam system
  - Incremental data from last 24 hours
  - Uploaded to MDPS website
- **SAMS Data Staging Service**
  - Runs as windows service from webserver
  - Utilizes Oracle DBMS Job scheduled nightly
  - Download MDPS Access file
  - Email notification of nightly completion

SAMS Data Loading

- **Staging service core components**
  - Oracle package
  - Initial load into staging schema
  - Aliasing (city, streets)
  - Snapping
    - Locates data on state maintained system
    - 8 snapping methods utilized
    - Involves dynamic segmentation processes
  - SAMS attribute population
  - Promotion to SAMS warehouse
  - Logging and Notification via email

SAMS Security Module

- **Ties into MDOT Active Directory (AD)**
- **Relies on SAMS Group assignment in AD**
  - Admin, Power User, User, Data Maintainer
- **Geographic Restrictions set by State Safety Engineer**
- **Allows VPN access for local FHWA rep, etc.**
- **Controls application display to end user**
- **Site and User Tracking (future)**

SAMS Web Application Overview

- **Query**
- **Mapping**
- **Reports**
- **Data Grid**
- **Analysis**
- **Admin**

Attribute Queries

File   Edit   View   Favorites   Tools   Help

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Query   Reports   Analysis   Administration

MDOT

Select a Query : ?
Basic Query

Geographic Area ?
Date/Time ?
Crash ?
Vehicle ?
Person ?
Road ?

Query Summary ?

District:
Batesville

County:
Benton [5]

City:
Brody

Crash Location:
Roadway

Roadway System:
Interstate

Area of Interest

District:
Batesville
Hattiesburg
McComb

County:
Attala [4]
Benton [5]
Calhoun [7]

City:
Ashland
Bethel
Brody

Query By Interactive Map

Build SQL
Show XML

Street/Route

SAMS Route ID:

☐ Query for NULL SAMS Route ID

Traffic Flow Direction:
East
North
South

Intersecting Street/Route

SAMS Intersecting Route ID:

Intersection: Select option

☐ Query for NULL SAMS Intersecting Route ID

Crash Location

Crash Location:
Roadway
Off-Roadway
Median

Intersection Type:
Crossover
Driveway
Five-point or more

Roadway System:
City Street
County Road
Interstate

Output Options: ? ☐ Statistics Only   ☐ Map   ☑ Data   **Reset**   **Submit**

Local intranet

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Query   Reports   Analysis   Administration

MDOT

Vehicle Related

Select a Query : ?
Basic Query

● **Geographic Area** ?
● **Date/Time** ?
● **Crash** ?
● **Vehicle** ?
● **Person** ?
● **Road** ?

Vehicle Action:
Avoidance
Backing
Going Straight

Vehicle Configuration:
ATV
Commercial Bus
Emergency Vehicle

Pre-Crash Direction of Travel:
E (East)
N (North)
NE (Northeast)

Initial Contact:
☐ Under
☐ Overturn
☐ None
☐ Other

Speed Zone: min: ____ max: ____

Roadway/Control Related

Divided: Select option
Device Functioning?   Select option

Center Turn Lane: Select option

Road Character:
Begin/End Divided Road
Bridge
Crossover

Road Design:
1 Lane
2 Lane
3 Lane

Road Surface Type:
Asphalt
Concrete
Dirt

Traffic Control Device:
Channel-Painted
Channel-Physical
Flag Person

Bikeway Type:
None
Signed
Right Only

Query Summary ?

Commercial Vehicle Related

HAZMAT Released: Select option

Cargo Body Type:
Grain/Chips/Gravel
Flatbed
Pole/Log

Output Options: ? ☐ Statistics Only   ☐ Map   ☑ Data

Reset   **Submit**

Done   Local intranet

Spatial Query

File   Edit   View   Favorites   Tools   Help

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MDOT

Select a Query : ?

Basic Query

- Geographic Area ?
- Date/Time ?
- Crash ?
- Vehicle ?
- Person ?
- Road ?

Query Summary ?

Query by Geographic Area
Interactive Map Options

Query by User-Defined:

--Select Option --   **Submit**

Save & Return   **Cancel**

55

20   20

55

59

10   10

File   Edit   View   Favorites   Tools   Help

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MDOT

Query by Geographic Area
Interactive Map Options

Select a Query :
Basic Query

Query by User-Defined:

--Select Option --   Submit

| --Select Option -- |
| Rectangle |
| Polygon |
| Polygon with Route from List |
| Polygon with Route from Map |
| Point and Radius |
| Point and Keyed-in Radius |
| Begin and End Points from Map |

Cancel

- Geographic Area
- Date/Time
- Crash
- Vehicle
- Person
- Road

D' Iberville

BILOXI

FPORT

Query Summary   ?

Start Date:
01/01/2007

End Date:
01/01/2008

City:
Gaines

Local intranet

File   Edit   View   Favorites   Tools   Help

Contacts
What's New
Query   Reports   Analysis   Administration   User Feedback
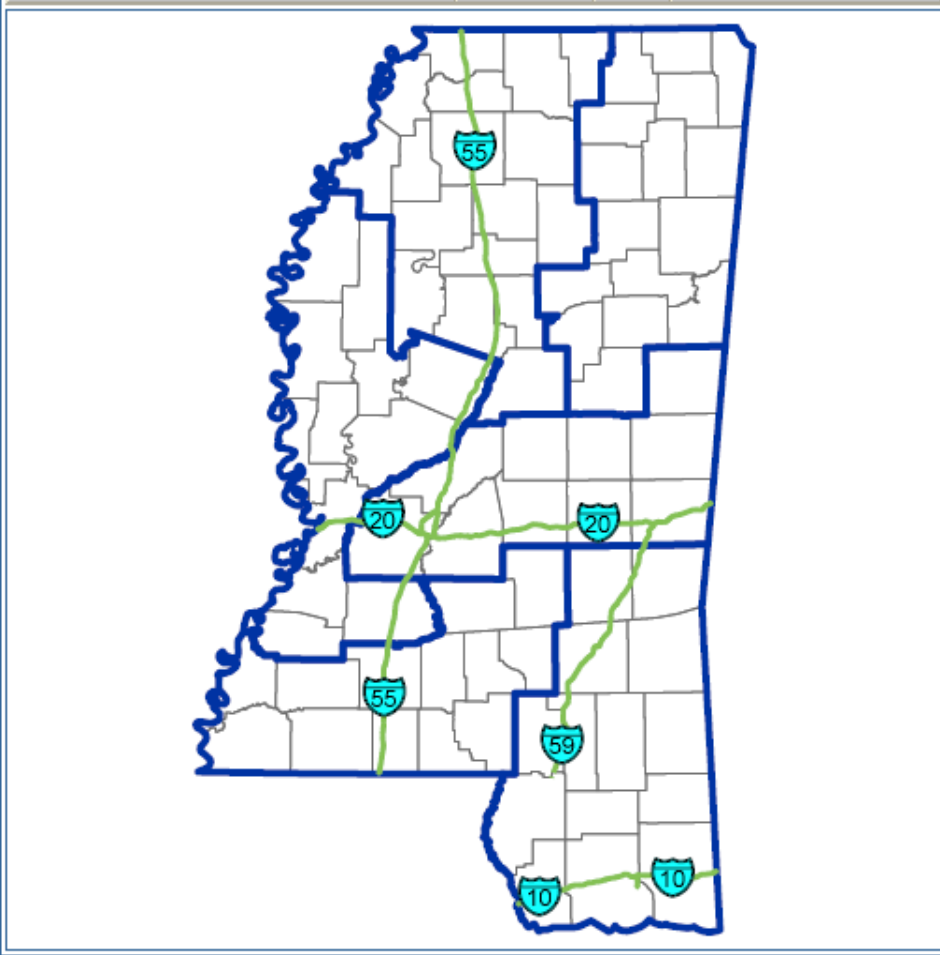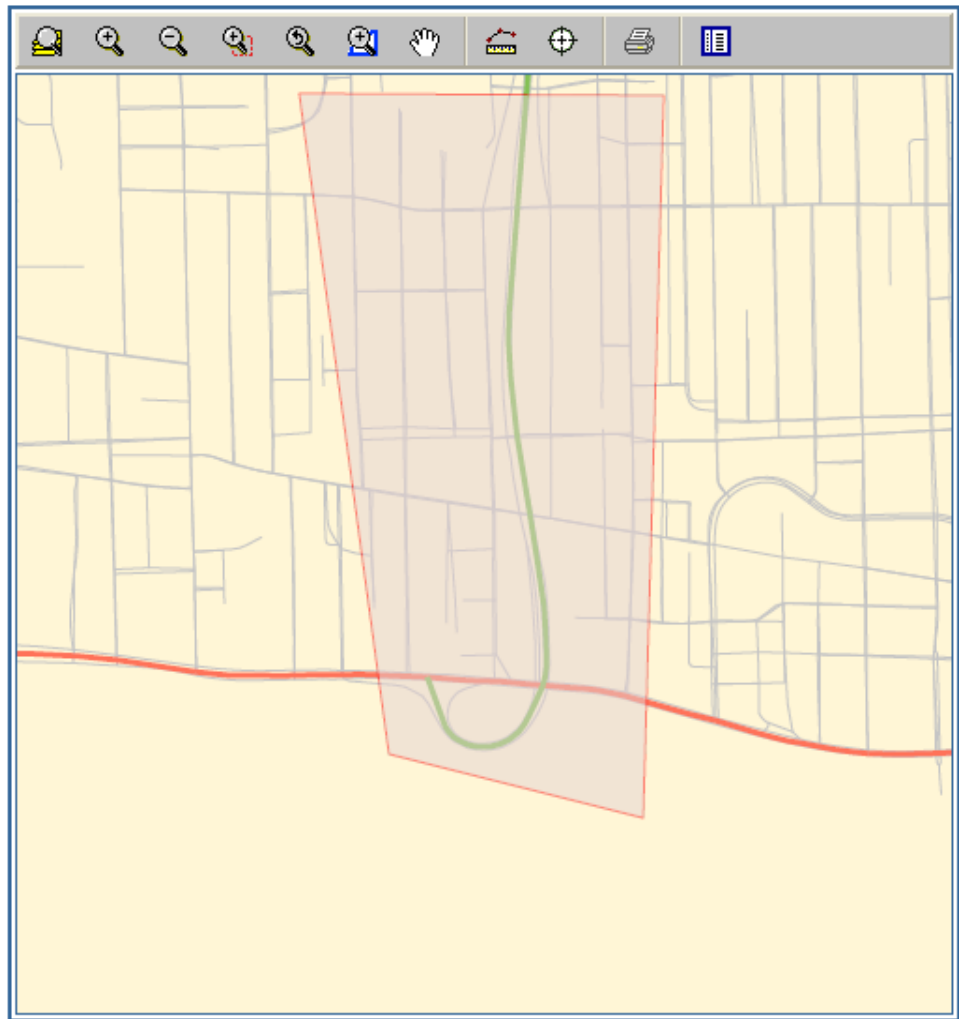Help

MDOT

SAMS
Safety Analysis Management System

Select a Query: ?
Basic Query

- Geographic Area ?
- Date/Time ?
- Crash ?
- Vehicle ?
- Person ?
- Road ?

Query Summary   ?

Query by Geographic Area
Query by Polygon and Selected Route from List

Use the following steps to create a polygon on the map:

1. Click **Capture Map Input** to begin.

2. Click on the map to indicate the beginning point of the polygonal area of interest.

3. Continue clicking points on the map to draw the polygonal area of interest.

4. Double-click the last point of the polygonal area of interest (the minimum number of points is 3). The polygon will automatically be closed and completed.

5. Is the shaded polygon the correct area of interest? If so, click "Populate List." If not, click "Redigitize."

6. Select the Route of interest from the list:
   Populate List
   I-110

7. Is the selected Route correct? If so, click "Save & Return." If not, reselect the Route from the list.

8. Click "Cancel" to return to the Interactive Map Options menu.
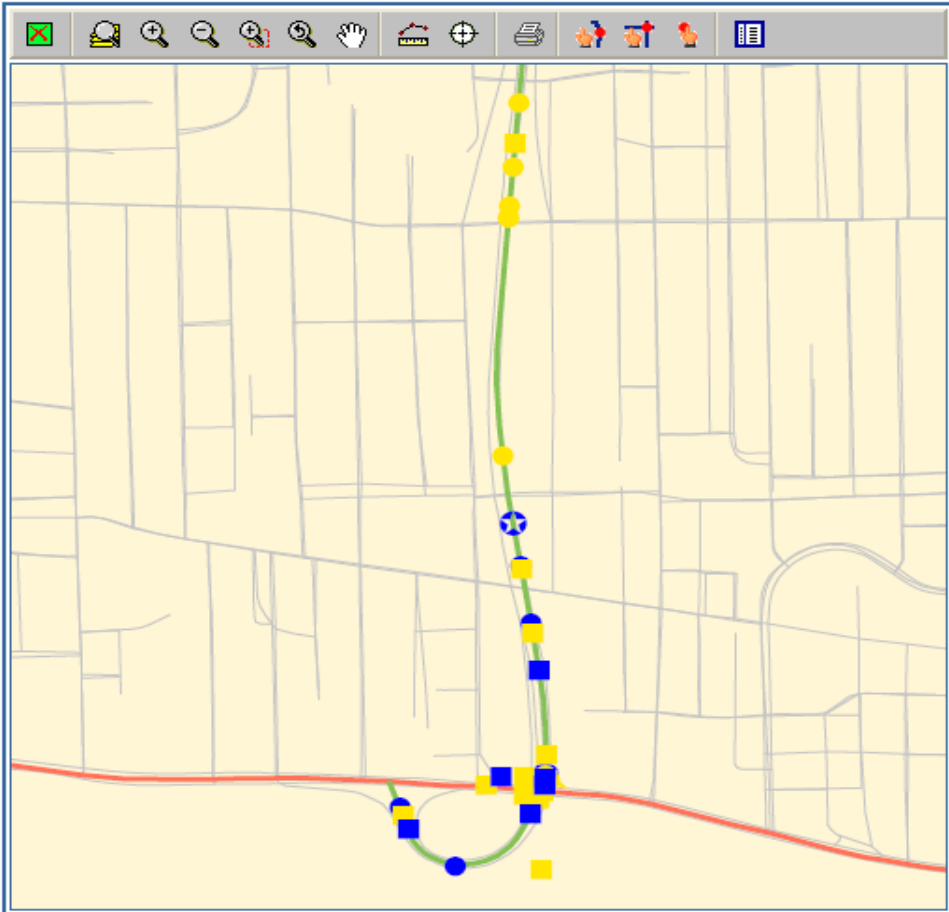
Save & Return   **Redigitize**

Cancel

Done   Local intranet

SAMS Mapping Output

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Query   Reports   Analysis   Administration

Data Summary :

Total Crashes:	45
Total Fatalities:	0
Fatal Crashes:	0
Total Injuries:	19
Injury Crashes:	13
Daylight Crashes:	28
DUI Crashes:	9
Wet Conditions Crashes:	23
Unmapped Crashes:	0

Query Summary ?

Spatial Query:
[polygonlist]
Route Name: I-110
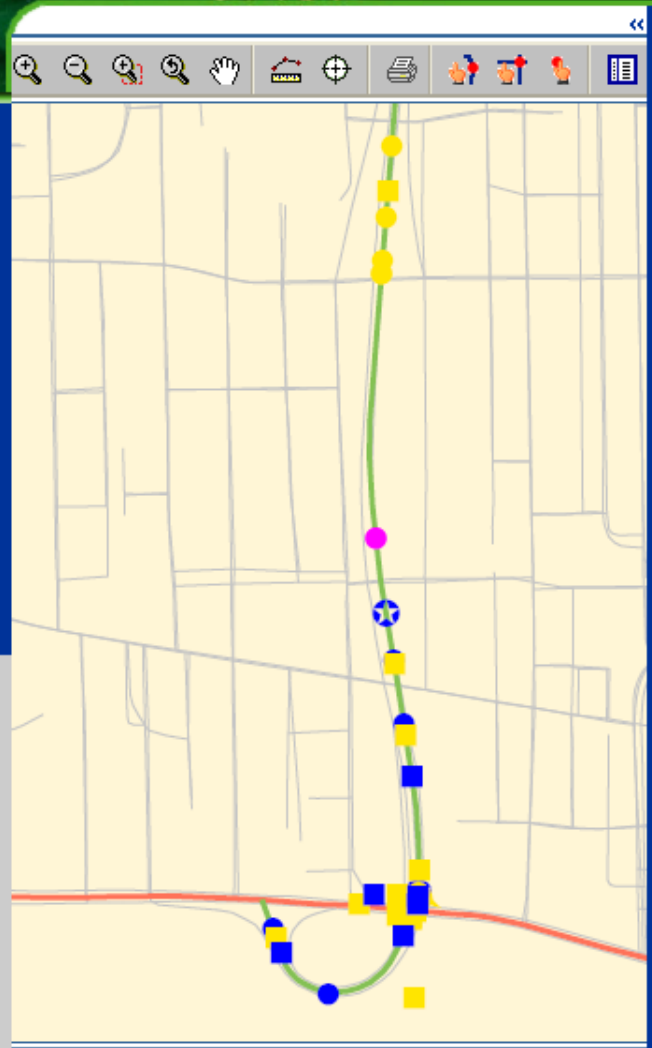
SAMS Route ID	SAMS Intersecti	Intersection Dist	Intersection Dist	Intersection Dire
I-110	US 90	0		
I-110	DIVISION ST	250	F	N
I-110	DIVISION ST	0.25	M	N
I-110	DIVISION ST	250	F	N
I-110	DIVISION ST	500	F	N
I-110	DIVISION ST	800	F	N
I-110	BAY VIEW AVE	0.1	M	N
I-110	US 90	0.5	M	N
I-110	US 90	0.12	M	N
I-110	US 90			
I-110	US 90			
I-110	US 90	150	F	W
I-110	US 90	20	F	N
I-110		0		
I-110		0		
I-110	US 90			
I-110	US 90	150	F	S
I-110	US 90	150	F	S
I-110	US 90	300	F	S
I-110	US 90			

Column Selector   Selected Rows: 1   ☑ Enable Paging   Page 2 of 2

Done   Local intranet

Mapping Functions

SAMS Data Grid

MDOT Safety Analysis Management System (SAMS) - Microsoft Internet Explorer

File   Edit   View   Favorites   Tools   Help

Query   Reports   Analysis   Administration

Contacts
What's New
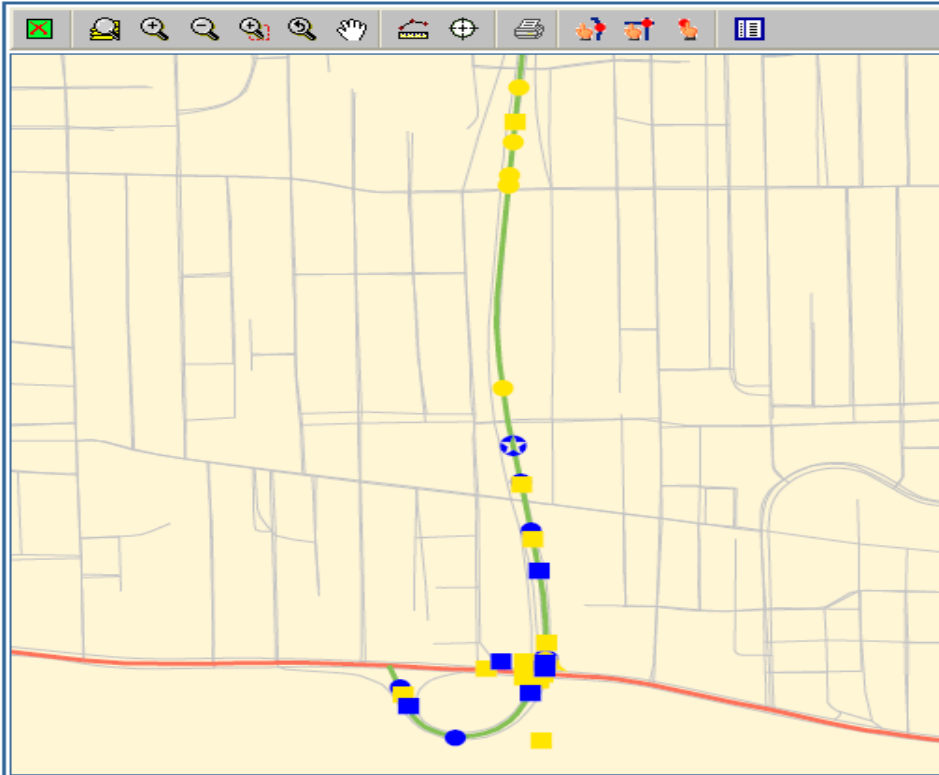User Feedback
Help

MDOT

Data Summary :

Total Crashes:	99
Total Fatalities:	0
Fatal Crashes:	0
Total Injuries:	61
Injury Crashes:	40
Daylight Crashes:	68
DUI Crashes:	8
Wet Conditions Crashes:	23
Unmapped Crashes:	0

Reported Date	Reported Time	SAMS Crash Type	Vehicle Count	Road Condition	DUI Involved	Light Condition	Crash Location	Invest
06/22/2007	11:56	Angle	2	Dry	0	Daylight	Roadway	2401
11/27/2007	12:38	Sideswipe	2	Dry	0	Daylight	Roadway	2401
07/10/2007	14:59	Angle	2	Dry	0	Daylight	Roadway	2401
07/03/2007	17:28	Angle	2	Wet	0	Daylight	Roadway	2401
09/21/2007	21:20	Angle	2	Wet	0	Dark-Lit	Roadway	2401
07/15/2007	16:08	Angle	2	Wet	0	Daylight	Roadway	2401
11/08/2007	16:20	Angle	2	Dry	0	Daylight	Roadway	2401
12/28/2007	10:46	Left turn cross traff	2	Wet	0	Daylight	Roadway	2401
04/04/2007	14:54	Left turn cross traff	2	Dry	0	Daylight	Roadway	2401
01/16/2007	07:42	Angle	2	Dry	0	Daylight	Roadway	2401
02/24/2007	13:40	Angle	2	Dry	0	Daylight	Roadway	2401
01/12/2007	11:06	Rear end slow or st	2	Dry	0	Daylight	Roadway	2401
08/05/2007	06:53	Rear end slow or st	2	Dry	1	Daylight	Roadway	2401
07/25/2007	12:53	Rear end slow or st	2	Dry	0	Daylight	Roadway	2401
08/28/2007	10:14	Angle	2	Wet	0	Daylight	Roadway	2401
07/11/2007	11:39	Parked vehicle	2	Dry	0	Daylight	Parking Lot	2401
06/02/2007	18:04	Hit and Run	3	Dry	0	Daylight	Roadway	2401
10/08/2007	12:21	Hit and Run	2	Dry	0	Daylight	Roadway	2401
09/12/2007	15:42	Hit and Run	2	Dry	0	Daylight	Roadway	2401
09/13/2007	14:34	Fixed Object	1	Dry	0	Daylight	Roadway	2401
09/04/2007	13:41	Rear end slow or st	2	Dry	0	Daylight	Roadway	2401
11/28/2007	07:31	Rear end turn	2	Dry	0	Daylight	Roadway	2401
11/18/2007	14:14	Other Object	1	Dry	0	Daylight	Parking Lot	2401

Query Summary ?

Start Date:
01/01/2007

End Date:
01/01/2008

Spatial Query:
[rectangle]

Column Selector   Selected Rows: 0   ☑ Enable Paging   Page 1   of 4   Go   First   Previous   Next

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Column Selector for Data Grid

Data Grid Functions

MDOT Safety Analysis Management System (SAMS) - Microsoft Internet Explorer

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Data Summary :
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01/12/2007	11:06	Rear end slow or st	2	Dry	0	Daylight	Roadway	2401
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07/25/2007	12:53	Rear end slow or st	2	Dry	0	Daylight	Roadway	2401
08/28/2007	10:14	Angle	2	Wet	0	Daylight	Roadway	2401
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11/28/2007	07:31	Rear end turn	2	Dry	0	Daylight	Roadway	2401
11/18/2007	14:14	Other Object	1	Dry	0	Daylight	Parking Lot	2401

Query Summary ?

Start Date:
01/01/2007

End Date:
01/01/2008

Spatial Query:
[rectangle]

Column Selector   Selected Rows: 0   ☑ Enable Paging   Page 1 of 4   Go   First   Previous   Next

Done   Local intranet

SAMS Data Grid Functions

- Promote Selection
- Invert Selection
- Multi-Column Sort
- Remove Rows
- Clear Selection
- Highlight Selection on Map
- Map All

- MUCR Crash diagram
- Collision diagram
- Export to Excel
- Export to CSV
- Report
- Save Result Set
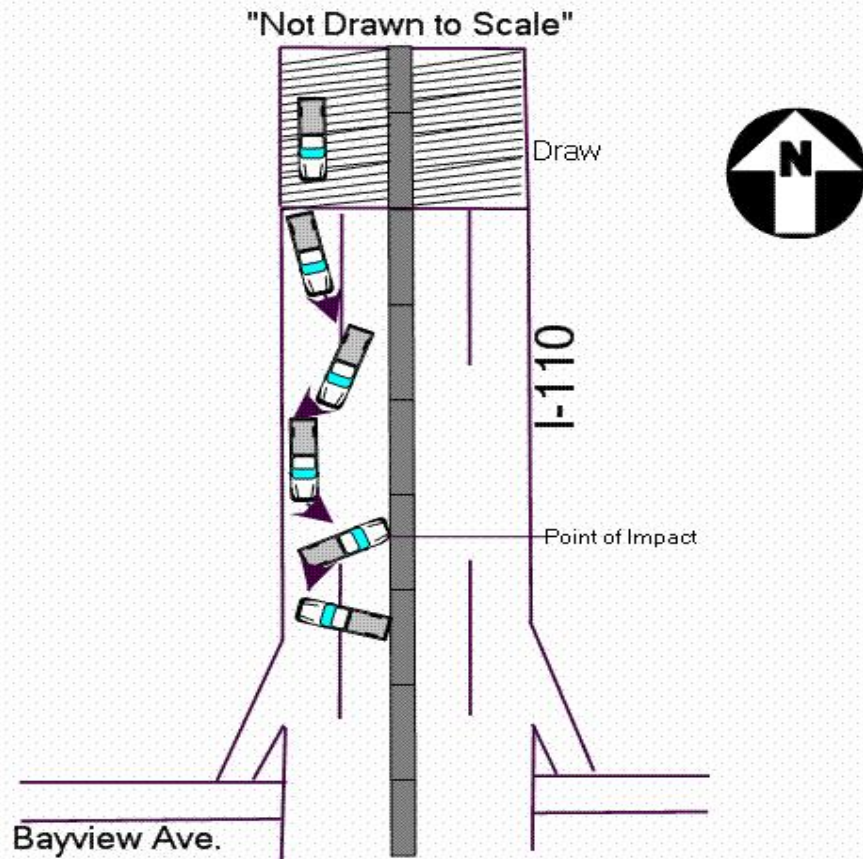- View Statistics

MUCR Diagram and Narrative

SAMS Analysis Functions

- Sliding Scale Analysis
- Cost-Benefit Analyses
- Rank High Crash Locations
- Severity Index
- Crash Rates and Critical Crash Rates
- Semi Automated Countermeasures

- Crash Rates for Homogenous Intersections and Highway Sections
- Identify Over-Representation of Crash Types at Intersections & Highway Sections
- Pre and Post Improvement Crash Rate Analyses

Note that many of the analysis functions listed here are currently under development, not in production yet.
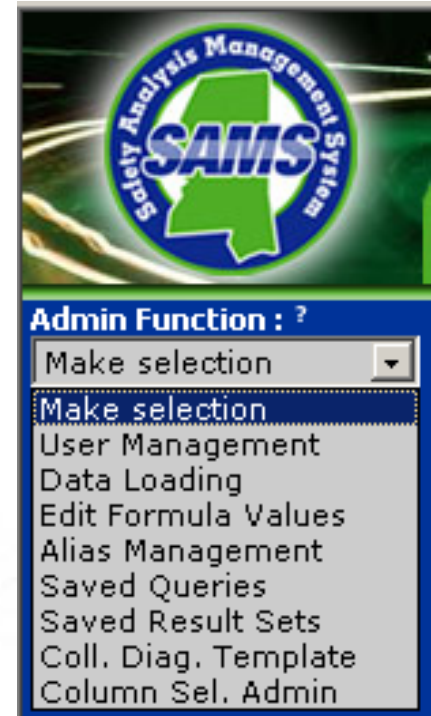
What are the SAMS Reporting functions?

- Standard Reports
- Annual Crash Reports
- Customized Reports
- Maps and Printing
- Export from Data Grid
- Interactive Data Grid Reports
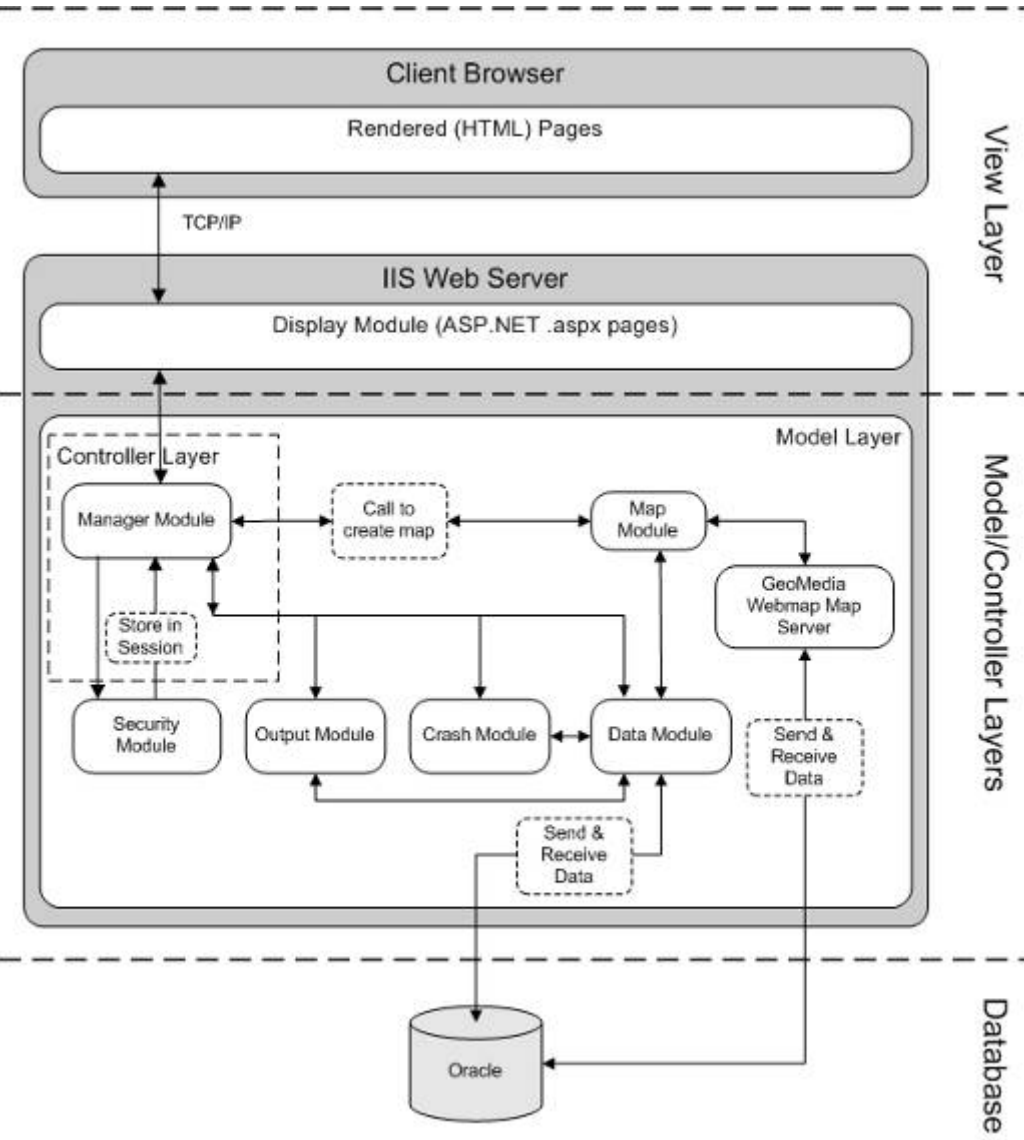- User Reporting Classes (admin)
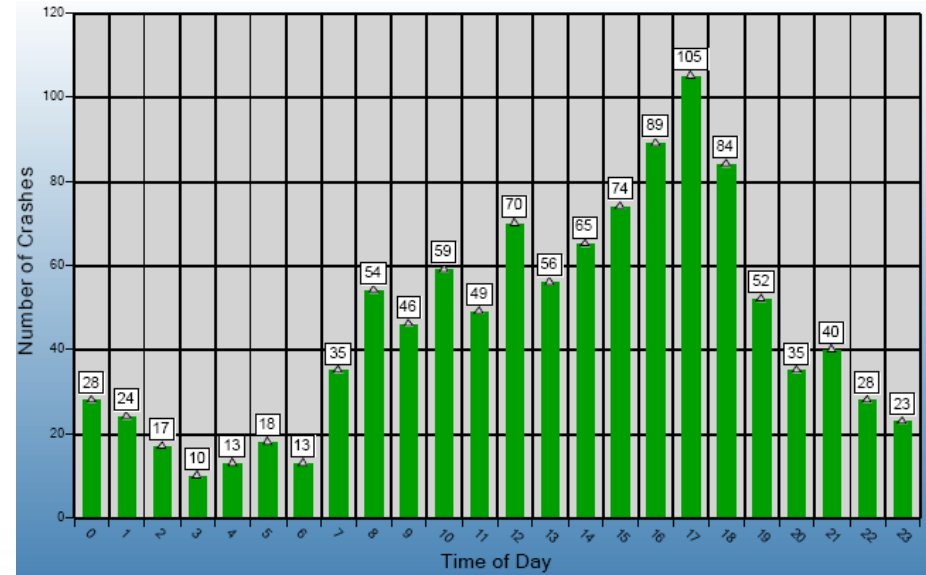
SAMS Administrator Functions

- User Management (security modules controls)
- Crash Data Loading
- Formula Edits (ie. crash cluster defaults)
- Alias Management
- Manage saved queries and result sets
- Define Collision Diagram templates
- Column Selector Defaults for Data Grid (s)

Admin Function : ?

Make selection

Make selection
User Management
Data Loading
Edit Formula Values
Alias Management
Saved Queries
Saved Result Sets
Coll. Diag. Template
Column Sel. Admin

SAMS Architecture

- Modular, web-based architecture
- Active Directory
- .NET
- Oracle Spatial
- GMWM
- LDMx
- ActiveReports for .NET
- Infragistics Data Grid
- Adobe SVG Plug-in
- Visual Statement collision diagramming

Project Status

- **Phase I (complete)**
  - Project goals and objectives
  - System requirements
  - Preliminary data model
- **Phase II**
  - High level design (complete)
  - Alpha release (complete)
  - Beta release detailed design (complete)
  - Beta release development (complete)
  - Beta release deployment (complete)
  - 1.0 release (development is underway)
- **Phase III**
  - Maintenance, technical support, and enhancements (begins at acceptance of 1.0 release).

Questions?

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