

A Multi-Purpose Geodatabase Serving GIS, Cartography, and Engineering at SHA



**Highway Information Services
Division**

SHA Enterprise GIS Application

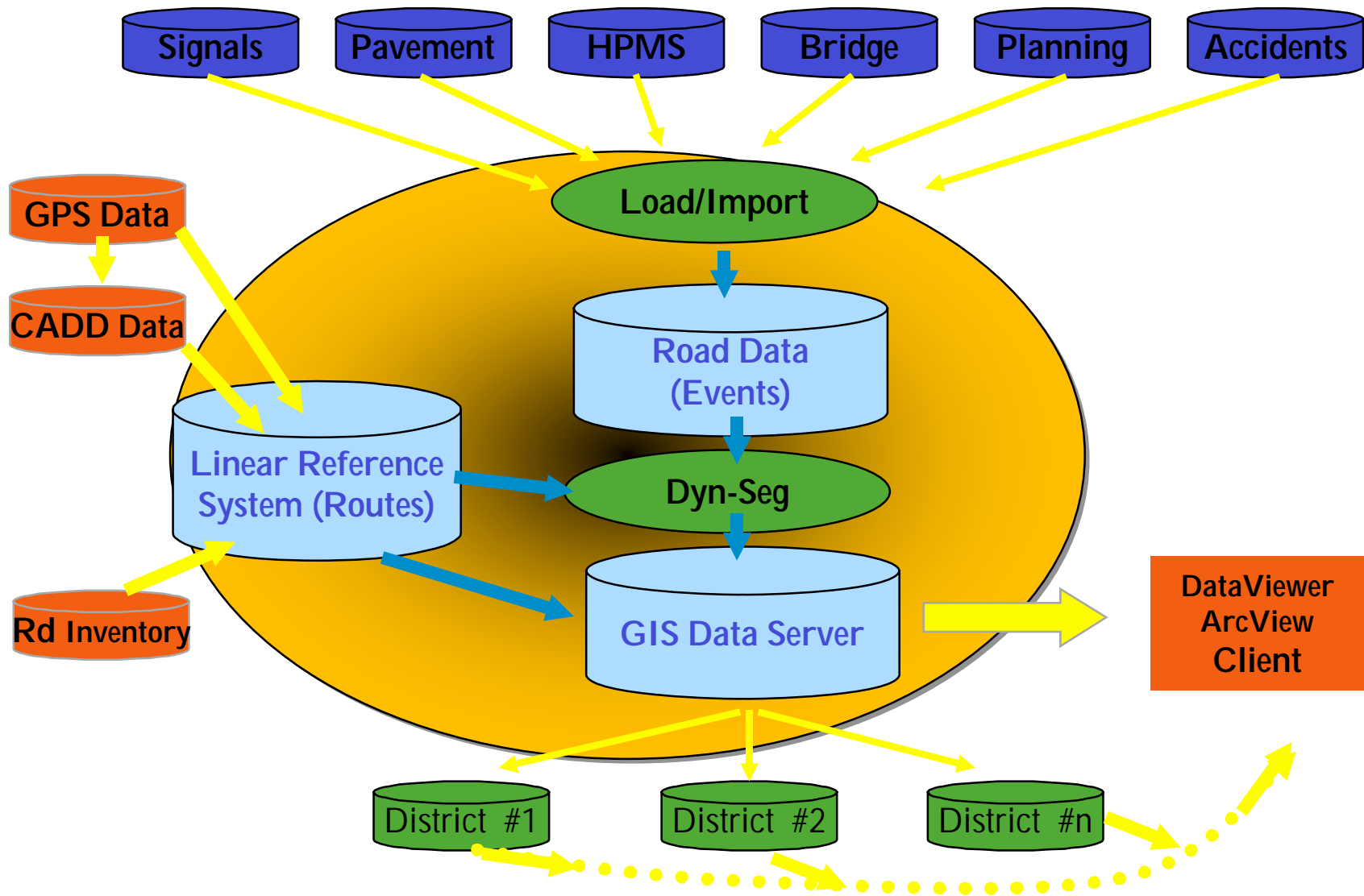
- **Background**
 - How we've gotten where we are today
- **TSD**
 - Centralized data repository in development
 - Serves HISD, and SHA with spatial data
- **Web Services Development**
 - IMS platform
 - Engineering focus
 - New foundation for enterprise GIS
 - Factors involved and decisions
- **Highway Development, Plats and Surveys**
 - How new mapping services with their data can help them do their job better
- **Future Phases and Demonstration**

Who HISD Is & What We Do

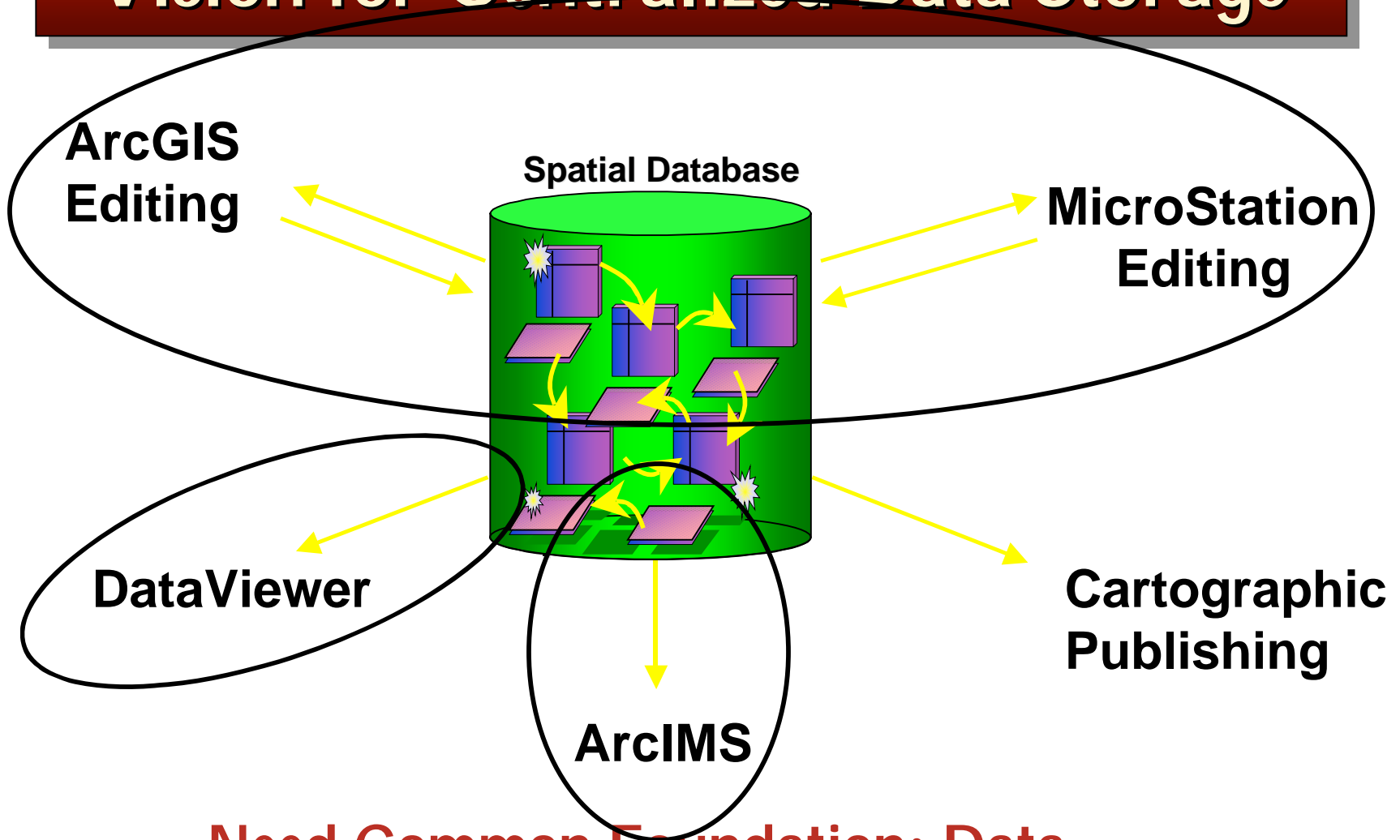
SHA Highway Information Services Division

- Public Road Data Collection
- Public Road Inventory Database
- Highway Mapping/Cartography
- GIS-based and attributed public highway system centerline, numerous map products and applications
- SHA currently working on statewide centerline project in conjunction with local governments

Role of DataViewer Application



Vision for Centralized Data Storage



Use Cases Addressed In Model

- **Editing and Maintenance of Base Map Layers**
- **Editing and Maintenance of the Map Templates**
- **Route System Maintenance**
- **Temporality**
- **Projection Management**
- **Data Import and Export**
- **Map Production**
- **Data Query and Access**

TSD - Key Concepts

- **A Central Data Repository**
- **Interoperability - CAD and GIS**
- **Support Cartographic Production**
- **Efficiency/Ease of Use**
- **Security and QA/QC**
- **Support Enterprise GIS Applications**

Web Client Enterprise System

- **Need for better distribution all the way to shops**
- **Less training needed**
- **Less client end support**
- **More information to all desktops**
- **Some integration capability**
- **Common denominator**

Web Client Enterprise System

- Part of new 3 pronged approach to the GIS needs of the enterprise
 - Web client- ArcIMS application
 - ArcReader
 - ArcMap, Arc/Info, ArcCatalog
- Two Approaches to IMS at SHA
 - Integrate others data into our site
 - Push map into frame in web app

Projects At SHA

- **Support for Engineering Environment**
 - **Every organization has a mission, support for ours depends on understanding of :**
 - **Engineering environment**
 - **Project focus**
 - **Full project lifecycle**
 - **Demanding data needs, short turnaround**

SHA Environment

- Everything has spatial component
- Lack of understanding of data needs
- Lots of CAD data
- Project focused; deadlines
- More and more technology used/needed to get job done
- More data coming from outside organization and flows back & forth
- So....more and more partners distributed
- The engineering data storage practices
- Support for interoperable environment

Goal of application

- **Data Warehouse Approach**
 - **Data gathered from different units**
- **Interoperable**
- **Get user to place on ground**
 - **Assume they want all information available about that place in Maryland**
- **Eye towards decision support in future versions**

Services Approach

- **Web services approach**
- **Integration of other tools besides viewing**
 - **Import/Export services**
 - **Short term solution**
 - **Avoid short lifespan/shelf-life data copied in numerous places**
 - **Data is then used to make new products**
 - **Will be implemented in ~month**

Decision Process

- What data do we need to integrate
- What do we want to accomplish
 - What phase
- Interface
- Funding
- Plan for growth
- Risk Assessment
- Accessibility
- Training

Decision Process

- **What Data Do We Have Ready To Work With?**
- **What Data Will Need To Be Developed?**
- **Who Are We Going To Serve?**
- **What Business Process(es) Are We Going To Support?**
- **Can The Infrastructure Support These Needs?**
- **What Are The Interoperability Requirements of Project?**
- **Technology Available For Project?**

Phases of Project

- **Phase I**
 - **One stop shop for all digital imagery available at SHA**
 - **Both orthogonal and forward looking roadway imagery**
 - **Data includes centerline, project imagery, VisiData roadway imagery, Grid Maps**
 - **Queries driven from roadway section selection or from cursor location click**
 - **Web service; shapefile export to .dgn with reprojection option**

Why Start with Plats and Surveys

- As a service Division for all of Maryland State Highway and its districts. We do our own Data Collection through Field Surveys and Photogrammetry.**
- Maintain Basemapping for design and planning projects.**
- We are the starting point for highway projects.**

Plats and Surveys Base Mapping

- **Internal Field Data Collection**
- **Photogrammetry**
- **High Resolution Orthophotos**
- **County Base mapping**
- **County Orthophotos**

How We Obtained the Mapping

- **Photogrammetry contracts (project based)**
- **Coordination with all State Highway Divisions**
- **Commercial Photo Purchases**
- **Data Sharing relationships with other state agencies**
- **Data Sharing relationships with other state agencies**

On-Going Relationships

- **County relationships for new mapping from both ends**
- **Group funding efforts with other state agencies**
- **Group funding efforts with other state highway divisions**

The Application

The screenshot shows a web browser window displaying a GIS application. The browser's address bar shows the URL <http://gisweb/shadv/>. The application interface is divided into several sections:

- WIZARD:** Contains a "Step #1" section with the instruction "Select a County of interest:". Below this is a dropdown menu labeled "County: ..." and a "Query Tracker" icon.
- MAP:** Displays a map of the Baltimore region with various counties labeled, including Garrett, Allegany, Washington, Frederick, Carroll, Baltimore, Harford, Cecil, Kent, Queen Anne's, Talbot, Dorchester, Wicomico, Somerset, Worcester, St. Mary's, Charles, Calvert, Prince George's, Anne Arundel, and Howard. A red box highlights the Baltimore area. A scale bar at the bottom of the map indicates 0 to 28.22 miles.
- Navigation:** A row of buttons below the map includes "BACK", "RESTART", "NEXT", "ZOOM IN", "ZOOM OUT", "PAN", "IDENTIFY", and "RESTART".
- HELP:** A section titled "Help Section" with the text: "This section supports help information. Click any Identify icon in the application to review important usage information."
- RESULTS:** An empty section for displaying search results.

The Windows taskbar at the bottom shows the Start button, several application icons, and the system clock displaying 9:02 AM.

Zoom Box or Route Search

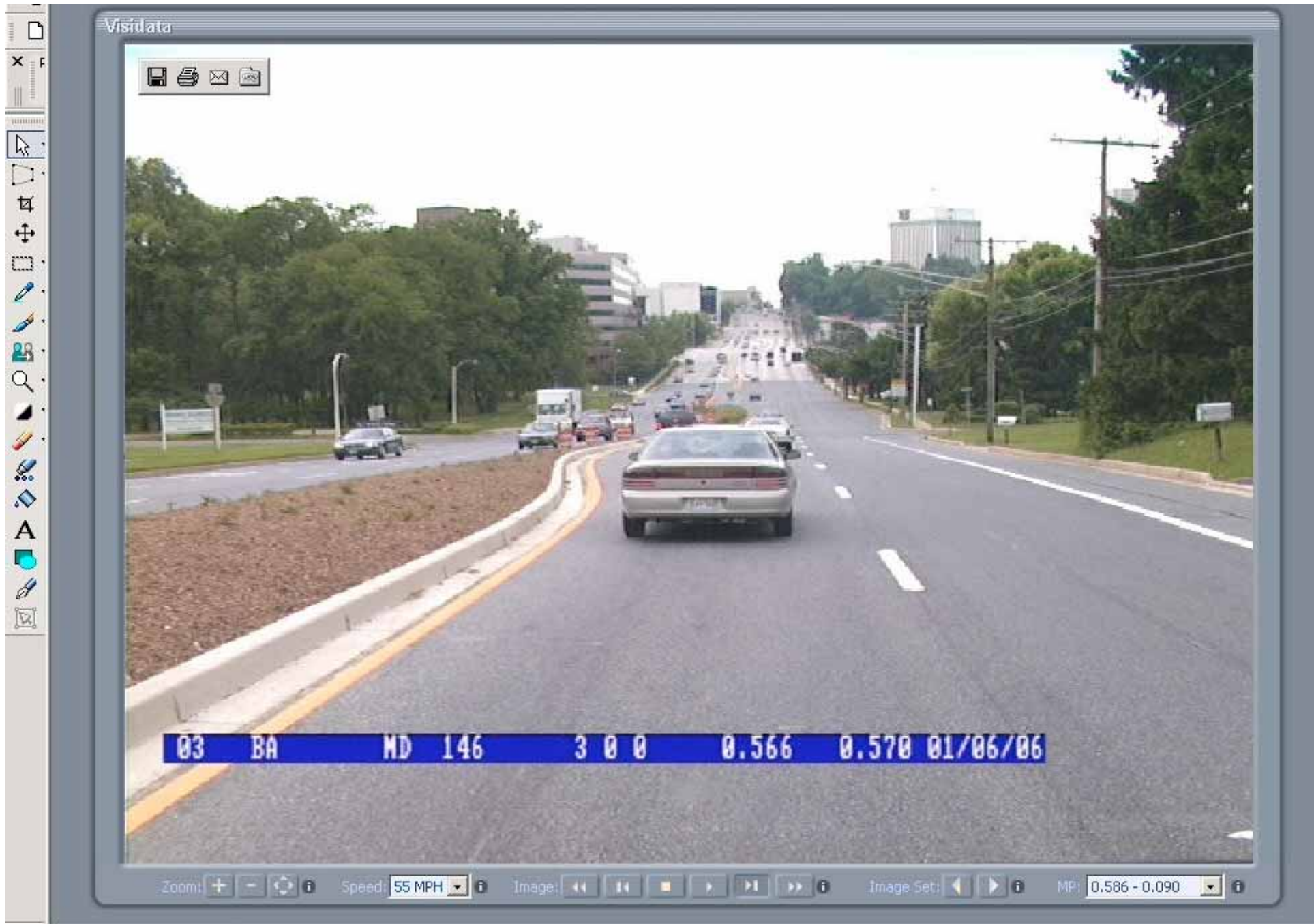
Visidata



Zoom: Speed: Image: Image Set: MP:

Pan Tool: Click and drag to pan images larger than the window.

Image: 1024 x 768 x 16



Pan Tool: Click and drag to pan images larger than the window.

Image: 1024 x 768 x



How we will build on this internally

- **GPS Data**
- **Archive of Data Collection**
- **Plats**
- **Tax maps**
- **Property Owner Information**
- **Pending Access Permits**
- **On Going Design Projects**

Phases of Project

- **Phase II**
 - **Pavement**
 - **Owners of VisiData roadway imagery**
 - **Pavement History**
 - **Pavement Attributes (qualitative)**
 - **Highway Hydrology**
 - **Infrastructure: pipes, culverts, inlets, outfalls**
 - **Water quality data**

Phases of Project

- **Phase II**
 - **Highway Hydrology**
 - **Other needs**
 - **Land Parcel Data**
 - **Available land records information**
 - **Local parcel vectors**
 - **Parcel ID, SDAT**
 - **Survey Points**
 - **NGS blue book points**
 - **Other SHA survey points**

Phases of Project

- **Phase III and beyond**
 - **Bridges**
 - **Other needs**
 - **Project Extent Data**
- **Long Range Planning**
 - **Highway Needs Inventory**
- **Safety Data**
 - **Incidents**
- **Tie to Highway Asset Data**

Phase II Interface Prototype

The screenshot displays a web browser window with the URL <http://gisweb/shadv/>. The interface is divided into several sections:

- WIZARD:** Step #7, "You have queried for: HOWARD County Roadways US 00001". It notes that the beginning intersection was set to 2.82 and the ending intersection was set to 2.88.
- MAP:** A topographic map showing a road network with two blue diamond markers indicating survey points. A yellow box in the bottom right corner of the map displays the value "12.3".
- HELP:** A section titled "Help Section" providing information on using the Identify icon.
- RESULTS:** A table showing survey points with columns for Point ID, Designation, Height Meters, Height Feet, and Details.

Point ID	Designation	Height Meters	Height Feet	Details
JV1327	N 109 MD SRC	133.053	436.52	Details
JV4039	Senior Reset	157.24	515.9	Details
JV4040	Senior RM 3	159.26	522.5	Details
JV4041	Senior RM A Reset	157.85	517.9	Details

Navigation buttons include BACK, RESTART, NEXT, ZOOM IN, ZOOM OUT, PAN, IDENTIFY, and RESTART. The status bar at the bottom shows "Downloading from site: http://gisweb/shadvdev/" and "Local intranet".

Survey Points and Benchmarks

Phase II Interface Prototype

http://gisweb/shadv/ - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print

Address http://gisweb/shadv/ Go

WIZARD

Step #7 ⓘ
You have queried for:
HOWARD County
Roadways
US 00001

The beginning intersection was set to 2.82.
The ending intersection was set to 2.88.
These values will be used to query imagery.

BACK RESTART NEXT ⓘ

MAP

ZOOM IN ZOOM OUT PAN IDENTIFY RESTART ⓘ

HELP

Help Section

This section supports help information. Click any Identify icon in the application to review important usage information.

RESULTS

Survey Highway Hydro Parcels Imagery Pavement

Points Located

PointID	Designation	Height Meters	Height Feet	Details
JV1327	N 109 MD SRC	133.053	436.52	Details
JV4039	Senior Reset	157.24	515.9	Details
JV4040	Senior RM 3	159.26	522.5	Details
JV4041	Senior RM A Reset	157.85	517.9	Details

Feedback Feedback Review Error Review

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Survey Points and Benchmarks

Phase II Interface Prototype

The screenshot displays a web application interface for survey points and benchmarks. The interface is divided into several sections:

- Full Metadata - Survey Point Details:** A panel showing detailed information for a specific survey point.
- Map:** A map showing the location of the survey point, with a blue diamond marker. The map includes labels for 'RESEARCH II PARK', 'HOWARD HIGH SCHOOL', and '12.3'.
- Navigation and Control:** Buttons for 'BACK', 'RESTART', 'NEXT', 'ZOOM IN', 'ZOOM OUT', 'PAN', 'IDENTIFY', and 'RESTART'.
- HELP:** A section providing help information, stating: 'This section supports help information. Click any Identify icon in the application to review important usage information.'
- RESULTS:** A table showing a list of survey points with columns for Point ID, Designation, Height Meters, Height Feet, and Details.

Survey	Highway Hydro	Parcels	Imagery	Pavement
Points Located				
Point ID	Designation	Height Meters	Height Feet	Details
JV1327	N 109 MD SRC	133.053	436.52	Details
JV4039	Senior Res et	157.24	515.9	Details
JV4040	Senior RM 3	159.26	522.5	Details
JV4041	Senior RM A Res et	157.85	517.9	Details

Feedback | Feedback Review | Error Review

Downloading from site: <http://gisweb/shadvdev/> Local intranet

Survey Points and Benchmarks

Phase II Interface Prototype

The screenshot displays a web-based GIS interface. The top window, titled "Full Metadata - Microsoft Internet Explorer", shows a survey network diagram on a grid background. The diagram consists of a series of points connected by red lines, forming a network. Some points are highlighted with yellow boxes. The bottom window shows a map view of the same area, with a blue diamond marker indicating a specific location. The map includes labels for "RESEARCH PARK", "HOWARD HIGH SCHOOL", and "100". A scale bar indicates a distance of 12.3 units. Below the map, there is a control panel with buttons for "BACK", "RESTART", "NEXT", "ZOOM IN", "ZOOM OUT", "PAN", "IDENTIFY", and "RESTART".

HELP

Help Section

This section supports help information. Click any Identify icon in the application to review important usage information.

RESULTS

Survey	Highway Hydro	Parcels	Imagery	Pavement
Points Located				
PointID	Designation	Height Meters	Height Feet	Details
JV1327	N 109 MD SRC	133.053	436.52	Details
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Feedback | Feedback Review | Error Review

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Survey Points and Benchmarks

Phase II Interface Prototype

WIZARD

Step #7 ⓘ
You have queried for:
HOWARD County
Roadways
US 00001

The beginning intersection was set to 2.82.
The ending intersection was set to 2.88.
These values will be used to query imagery.

MAP

BACK RESTART NEXT ⓘ ZOOM IN ZOOM OUT PAN IDENTIFY RESTART ⓘ

HELP

Help Section

This section supports help information. Click any Identify icon in the application to review important usage information.

RESULTS

Survey	Highway Hydro	Parcels	Imagery	Pavement
Pipes Located				
Pipe ID	Upstream Structure	Downstream Structure	Length	
1302582	1301092.003	1301092.002	118.2	
1302600	1301092.004	1301092.003	168.4	
1302583	1301092.006	1301092.006	44.1	
1302443	1301092.007	1301092.007	328.1	
Structures Located				
Structures Located				

Feedback Feedback Review Error Review

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Highway Hydrology Data

Phase II Interface Prototype

WIZARD

Step #7

You have queried for:

HOWARD County
Roadways
MD 00108

The beginning mile point was set to 10.2,
The ending mile point was set to 12.3,
These values will be used to query imagery.

MAP

0 0.19mi

12.3

BACK RESTART NEXT ZOOM IN ZOOM OUT PAN IDENTIFY RESTART

HELP

Help Section

This section supports help information. Click any Identify icon in the application to review important usage information.

RESULTS

Survey Highway Hydro Parcels Imagery Pavement

Parcels Located

Tax Account	Address	Street Name	Street Type	City	Zip Code	MD Property View
1406445527	5283	Golden Sky	Ct	Columbia	21045	Details
1406446957	9076	Bellwart	Way	Columbia	21045	Details
1406450156	0		Rd	Columbia	21045	Details
1406447104	9073	Bellwart	Way	Columbia	21045	Details
1406446647	5305	Five Fingers	Way	Columbia	21045	Details

Feedback Feedback Review Error Review

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Land Parcel Information

Phase II Interface Prototype

The screenshot shows a web application interface for land parcel information. The main window is titled "Details - Microsoft Internet Explorer" and displays "MD Property View Details". The details window is open, showing the following information:

Field	Value
Account Number	1406445527
Dig X Coord	415000.1
Dig Y Coord	173019.5
CT 200	24027606605
BG 2000	240276066051
Geocode	81
001	H
Address	5283 Golden Sky Ct
Street Number	5283
Street Dir	
Street Name	Golden Sky
Street Type	Ct
Street FX	
Street Unit	

The interface also features a map on the right side, showing a street grid with a highlighted parcel. Below the map is a control bar with buttons: BACK, RESTART, NEXT, ZOOM IN, ZOOM OUT, PAN, IDENTIFY, and RESTART. At the bottom, there is a "HELP" section and a "RESULTS" table.

HELP

Help Section

This section supports help information. Click any Identify icon in the application to review important usage information.

RESULTS

Survey	Highway Hydro	Parcels	Imagery	Pavement		
Parcels Located						
Tax Account	Address	Street Name	Street Type	City	Zip Code	MD Property View
1406445527	5283	Golden Sky	Ct	Columbia	21045	Details
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1406446647	5305	Five Fingers	Way	Columbia	21045	Details

Feedback Feedback Review Error Review

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Land Parcel Information

Demonstration