

An aerial photograph showing a winding asphalt road that curves through a dense forest of green and autumn-colored trees. In the lower-left quadrant, a small white house with a dark roof is visible. To the right of the road, there is a large, open green field with some scattered trees and a utility pole. The background shows a hillside with a road and more trees under a clear sky.

Kentucky Asset Management and Safety Analysis

Recognizing the Need for Asset Management

- **KY recognized the need to develop an Asset Management program many years ago**
- **10 years of effort to build a base network to supply a way to provide all data with centralized spatial reference**
- **Beginning to see the benefits**

Prior to 1999 Data and GIS were Separated

1. **KY's database's for road inventory was owned by many different divisions.**
 - Not tied to a GIS but fairly accurate Roadway measures (LRS - County, Route Mile point)
2. **Road Centerlines stored as ArcInfo Coverage**
 - Mostly matched road network
 - Taken from topo maps (accuracy 1:24000)
 - State roads and Local roads maintained in different data sets

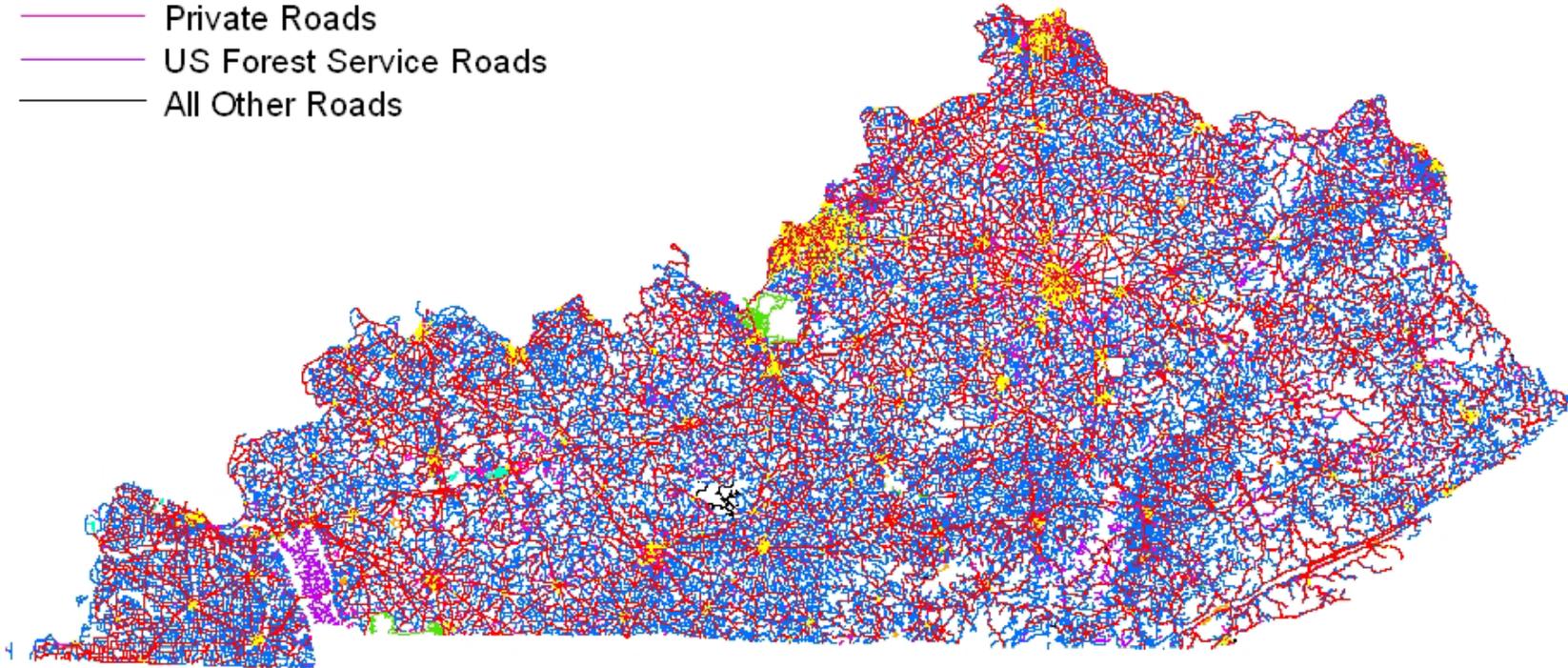
KY History

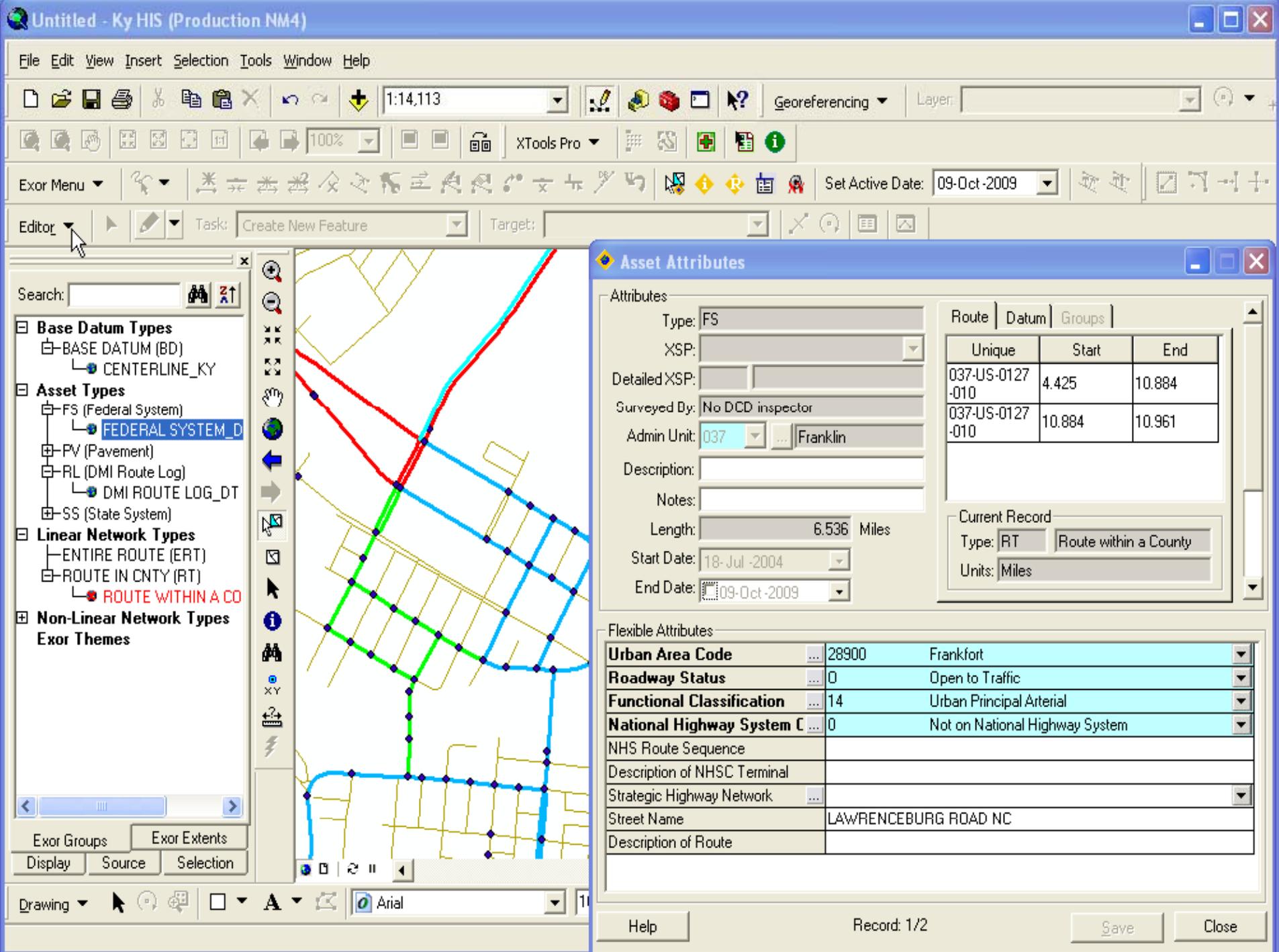
10 Year project to build network

- **GPS'd all public roads in KY from 1999 to 2003**
 - 2 to 4 meter accuracy
- **Loaded GIS Transportation Network and some Oracle Road Inventory tables late 2005 into Highways by EXOR (Highway Information System – HIS)**
 - GIS Enabled Oracle Database
 - GIS tools also update Oracle road inv tables.
- **Full production March 2006**
 - Currently the database consists of:
 - 83,183 mainline miles (including Private roads)
 - 86,566 total miles (including non-mainline section)
 - 27,567 state maintained mainline miles

Roadway Centerlines in Kentucky

- State Maintained Roads
- County Maintained Roads
- City Maintained Roads
- State Park and State Forest Roads
- Other State Agency Roads
- Military and Corp of Engineer Roads
- Private Roads
- US Forest Service Roads
- All Other Roads



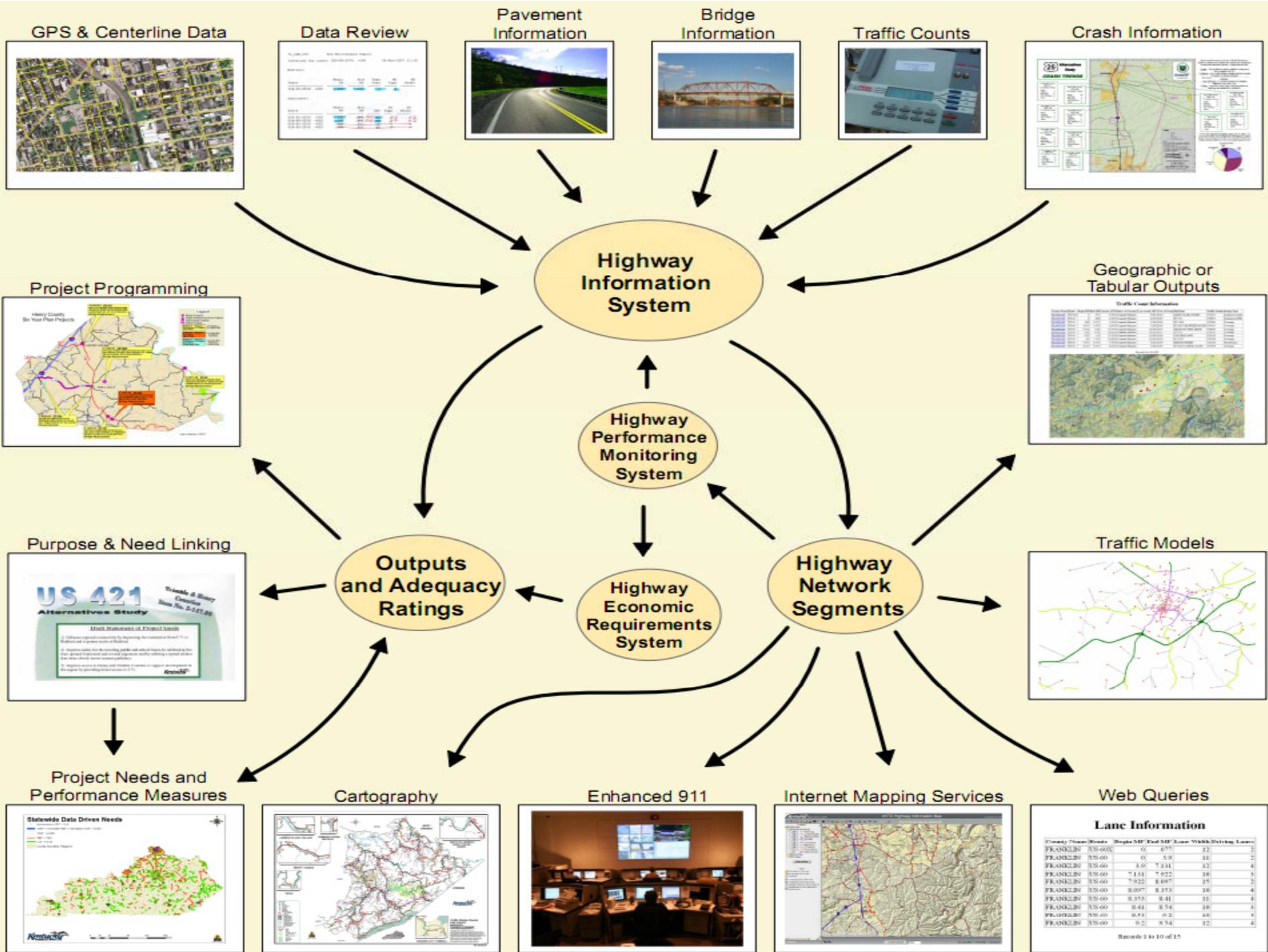


KYTC Asset Management Systems

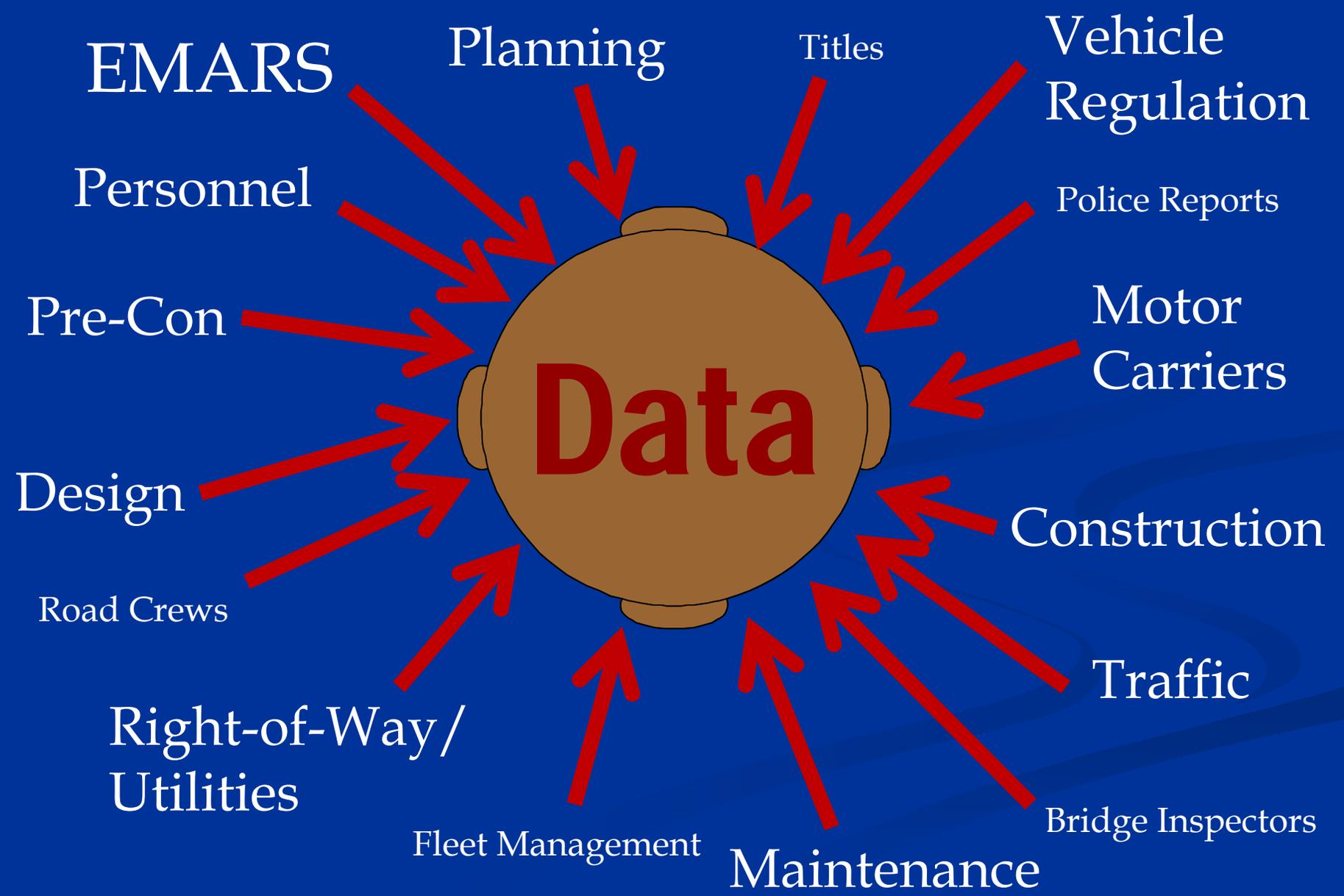
- **Highway Information System (HIS)**
 - Base Network for route locations
 - Roadway Characteristics
 - Roadway Systems
- **Operations and Maintenance System**
 - Work Orders
- **Pavement Management System**
 - Pavement Sections
 - IRI
 - Rutting
- **PONTIS**
 - Bridge System

KYTC Asset Management Systems

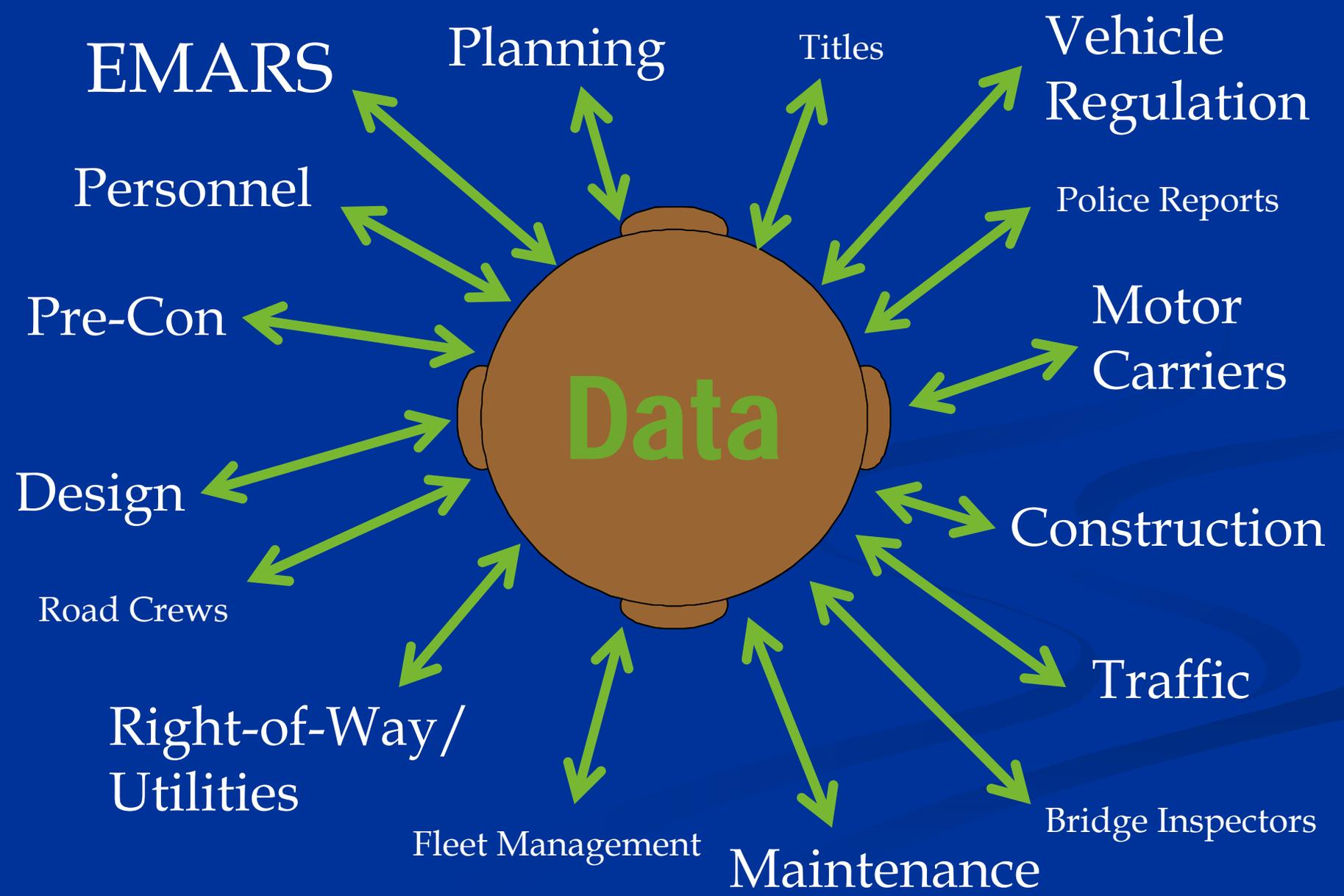
- **TRADAS**
 - Traffic Count System
- **EMARS**
 - Accounting System
- **Six Year Plan**
- **Highway Design Project Archive**
- **Transport**
 - Construction Tracking
- **Transportation Enterprise Database**
 - In development at present
 - Future hub of data and analysis



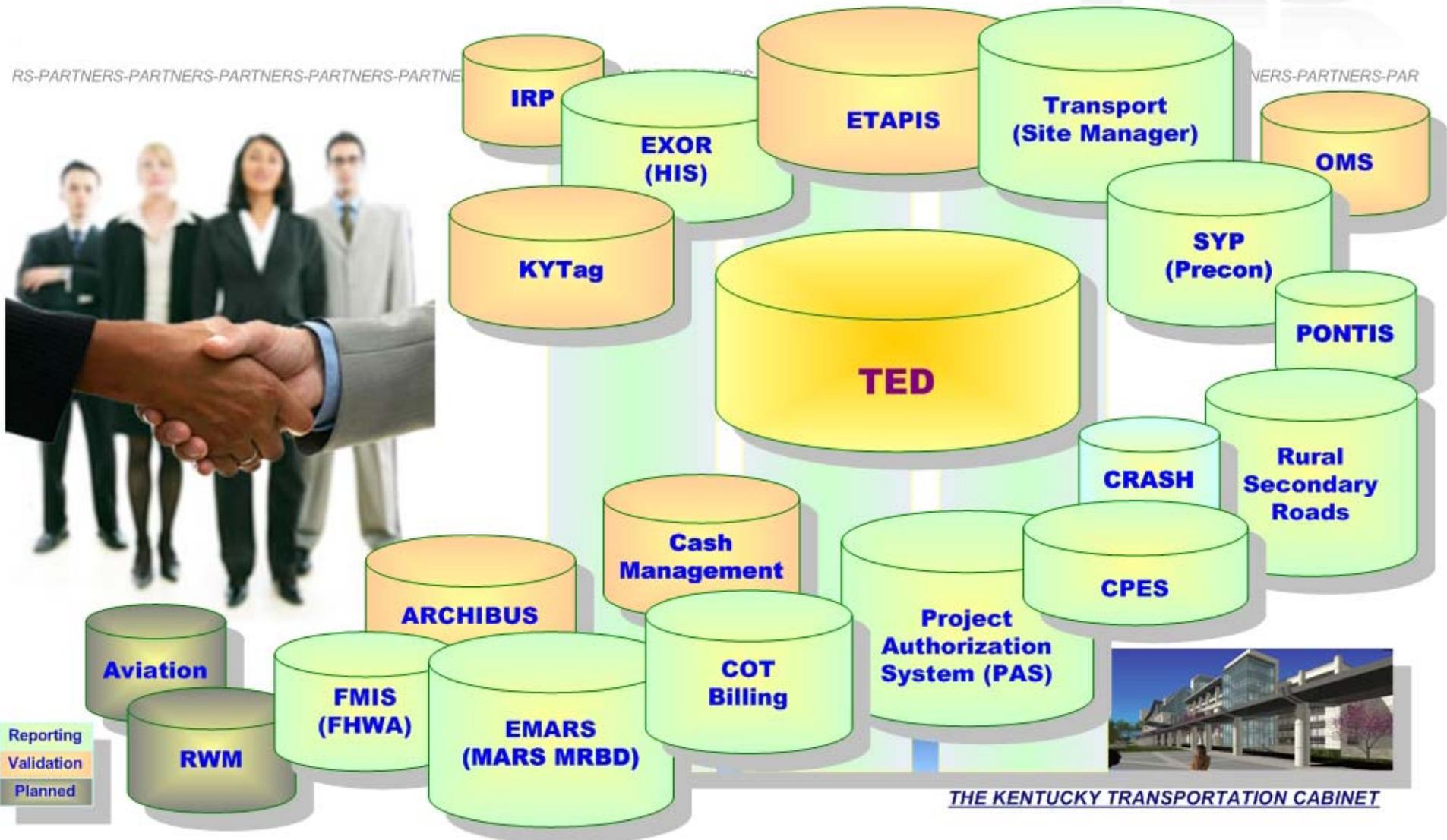
TURNING THE TABLE ON KYTC DATA



TURNING THE TABLE ON KYTC DATA



Powered by: Transportation Enterprise Database



New Data Management Tools

- **Sharepoint**
- **Data Dashboards**
- **.NET/GIS Applications**
- **Business Object Reports**
- **Historical Archives**

Current Collecting, Managing, and Sharing

1. **How closely do the Asset Management and Safety folks work together in terms of collecting, managing, and sharing data for safety analysis?**
 - Currently focus on safety provides opportunities for asset managers and safety analysts to work together and share information
 - Asset Management and Safety provide exports of their data to each other
 - Provide assistance when needed.

Safety Analysis data and who provides

- **HIS – inventory on entire state system and locally owned collectors and above.**
 - Lane, Median, Shoulder, Traffic Counts, Truck Network, Speed Limit, Horizontal Curve, Vertical Grade,
- **HIS – inventory on all roads in KY**
 - Functional Class, Pavement
- **Safety – Inventory on all roads in KY (collected by Law enforcement)**
 - Accident locations

Safety Analysis data and who provides

- **Operations and Maintenance Systems - Inventory on state owned network**
 - Maintenance Activities
- **Pavement Management System – Inventory on state owned network**
 - Pavement Section information
 - Resurfacing Projects
- **Transport**
 - Construction Project status

Future Development for collecting, sharing, and managing

- **Transportation Enterprise Database (TED) will be the central hub of data storage**
- **Independent Data systems will make their data available to TED to:**
 - Assure all data is easily accessible
 - Maintain and publish metadata
 - Develop custom reports
 - Develop tools to easily query all data
 - Develop cross system data integration and analytical tools
 - Consult on metadata changes pertaining to affects on other databases linked

Linkable Datasets

2. **Are the primary data sets (crash, road inventory, and traffic) readily linkable (i.e. do they use the same referencing system – route/log mile, lat/long, GPS coordinates)?**
 - All Data is linkable through the LRS County Route and Mile point.
 - Crash locations are collected by officers using a map interface on a laptop that captures GPS and LRS

Supplemental Data

3. **Do you collect/maintain any “supplemental” data sets that could be helpful to safety?**
 - Curve
 - Grade
 - Pavement condition
 - Intersections / Signals
 - Guardrails and Signs being collected
 - Adequacy Ratings

Innovative Data Collection

4. **Have you implored any innovative data collection techniques? If so, did it require different entities within the State to work together? What was the collaboration process?**
 - Photo van imaging system
 - Images every 26', both directions
 - Entire State System on 6 year cycle
 - Hoping for 2 year cycle if 2 additional vans added
 - PONTIS Link to HIS
 - Accident Location Program

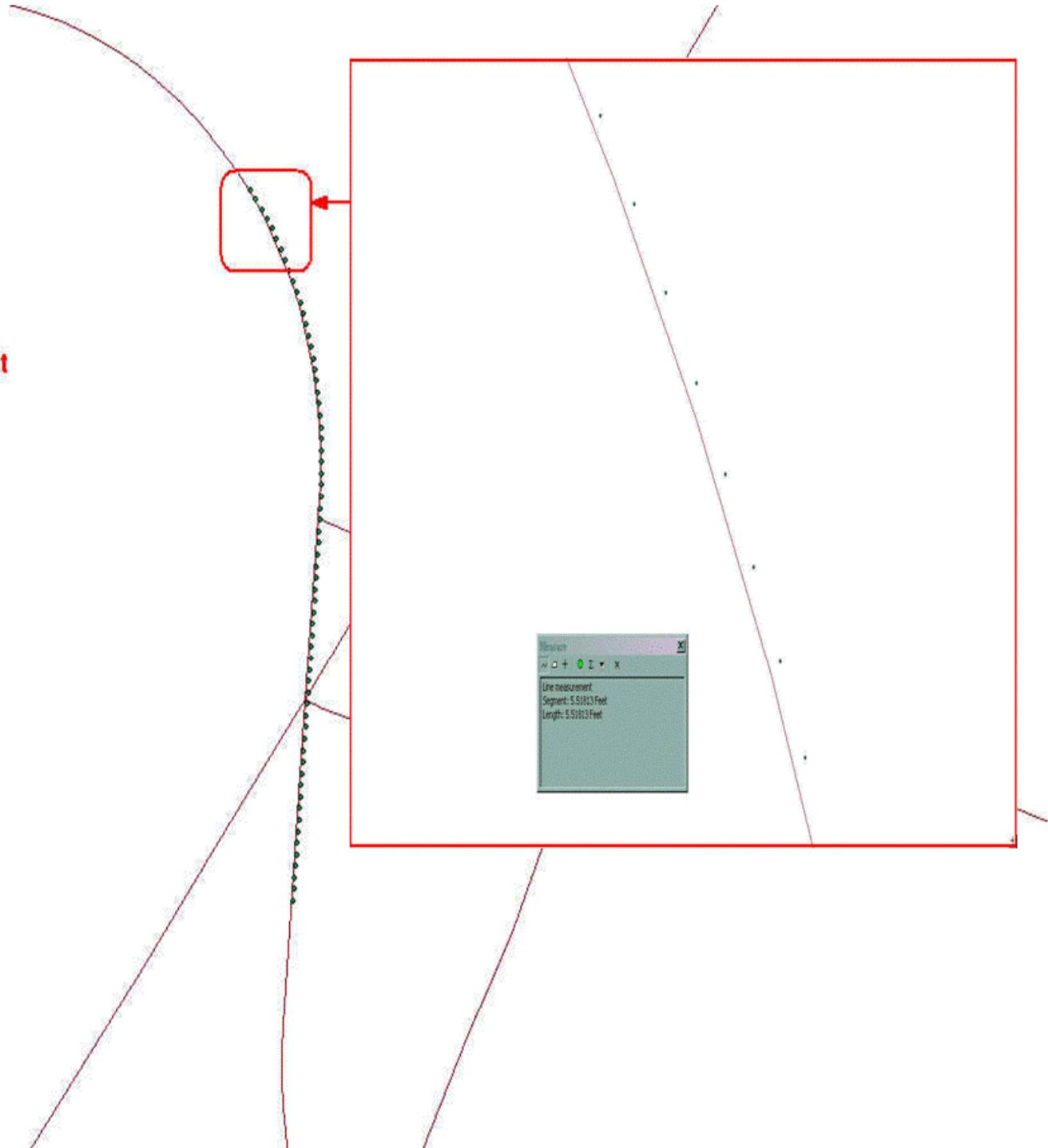
Photo Imaging System

- **Division of Maintenance, Planning, and Information Technology have worked extensively to make Photo Imaging System and the HIS work together**
 - Vendors Agile Assets and EXOR have cooperated to make it work

Photo Imaging System

- Currently being linked to HIS base network to provide “corrected” mile point (custom tools)
- Signs and guardrails will be extracted from images
- Roadway Characteristic Inventory to be verified and adjusted if needed
- Rutting and Cracking
- IRI
- Curve
- Grade

The photolog van takes a GPS point every 26.4 feet. This is a snapshot of 64 of these points at a scale of 1:4000. The inset is taken from the curve at 1:300 and shows that each point is approximately 4.5 ft to 5.5 ft, at most, from the Centerline.



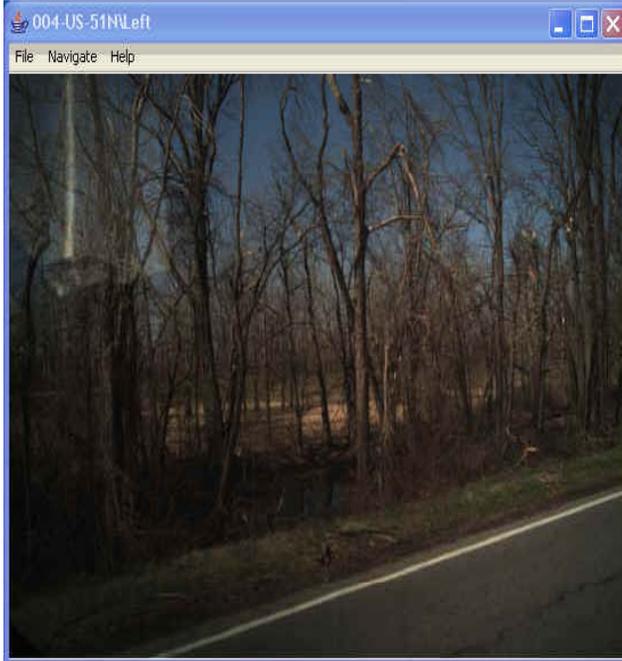


Table Viewer

File

Active Table Through Lane

County	<input type="text"/>	Route ID	<input type="text"/>	Direction	<input type="text"/>
Lane	<input type="text"/>	Beg Milepoint	<input type="text"/>	Beg Latitude	<input type="text"/>
Beg Longitude	<input type="text"/>	Beg Frame	<input type="text"/>	Beg Width	<input type="text"/>
End Milepoint	<input type="text"/>	End Latitude	<input type="text"/>	End Longitude	<input type="text"/>
End Frame	<input type="text"/>	End Width	<input type="text"/>	Length	<input type="text"/>
Offset	<input type="text"/>	Drv Lanes Card	<input type="text"/>	Drv Lanes Non-Card	<input type="text"/>
Drv Lanes Total	<input type="text"/>	Surface	Primitive	Comment	<input type="text"/>

County	Route ID	Direction	Lane	Beg Milep...	Beg Latit...	Beg Longi...	Beg Frame	Beg Width	End Milep...	End Latit...	End Longi...	End Fram
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Track Location
 Enable Filtering

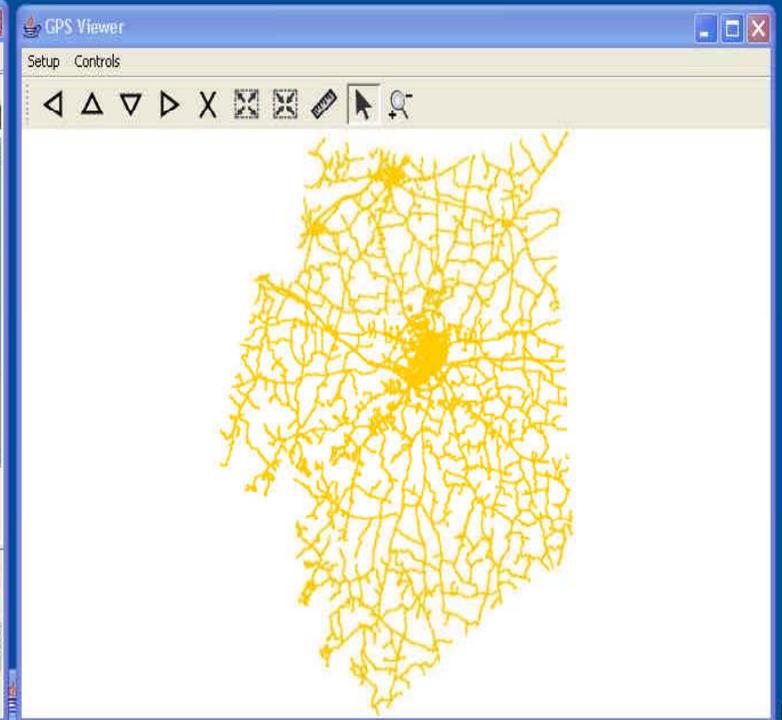


Photo Imaging System

■ Future Data Collection from images

- Barrier Wall
- Striping
- Cable Barrier
- Rumble (centerline and shoulder)
- Sound Barriers
- Many More

Pontis Bridge Locations

- **Bridge Maintenance, Planning, and Information Technology** have worked extensively to make Pontis and the HIS work together.

Pontis Bridge Locations

- GPS coords of bridges are collected by bridge inspectors
- GPS coords snapped to HIS route network for County, Route, and Mile point
- Bridge location stored in HIS with unique bridge number
- Bridge attributes stored in Pontis with unique bridge number
- Pontis query pulls HIS route location behind the scenes and vice versa.

Accident Location Program

- **HIS Base GIS Network used by Law Enforcement**
- **Accidents Locations picked from map to get route, mile point, X,Y coordinate, address range**
- **Automatically populates accident form**
- **Route and mile point can be populated by officer**
- **Very little cleanup required.**

Accident Location Program

MapObjectsLT Labeling Sample

Zoom Only Zoom Out Zoom/Select Select Only Pan Identify Refresh Measure Find Most

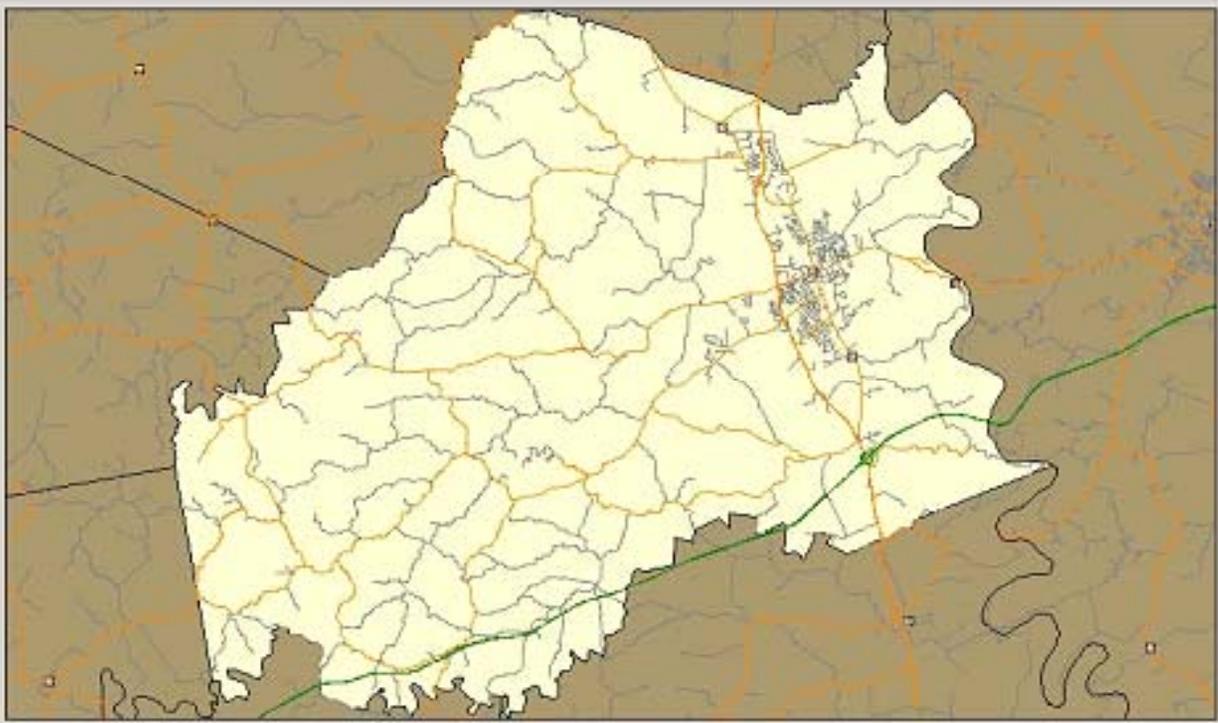
Rdwy: Milept: Save

Intersect: Latitude: Longitude: Undo

Between 1: Between 2: Restore Saved

City: Cancel

Check if Not On Displayed Roads: Allow User Entry



Scale: 1 inch = 18006 Feet, Distance 2 Points: Feet, Miles

The image shows a software interface for an accident location program. The main window is titled 'MapObjectsLT Labeling Sample'. It features a toolbar with icons for various map operations: Zoom Only, Zoom Out, Zoom/Select, Select Only, Pan, Identify, Refresh, Measure, and Find Most. Below the toolbar is a form with several input fields: 'Rdwy:' (a dropdown menu), 'Milept:' (a text box), 'Intersect:' (a dropdown menu), 'Latitude:' (a text box), 'Longitude:' (a text box), 'Between 1:' (a dropdown menu), 'Between 2:' (a dropdown menu), and 'City:' (a text box). There are also buttons for 'Save', 'Undo', 'Restore Saved', 'Cancel', and 'Allow User Entry'. A checkbox labeled 'Check if Not On Displayed Roads' is also present. Below the form is a map showing a road network with a yellow highlighted area. At the bottom of the window, there is a scale bar indicating 'Scale: 1 inch = 18006 Feet' and 'Distance 2 Points: Feet, Miles'.

Obstacles

5. **What are the largest obstacles to improving data (roadway, traffic, crash) in your State?**
 - Limited Resources
 - Staff
 - Funding
 - Time
 - Understanding of the need for sharing data
 - Tearing down the territorial walls

Data Gaps

6. **What additional data are needed to enhance your safety programs? / What are the largest “gaps” in data that prevent your States from having a more efficient/effective safety program?**
 - The primary issue is the lack of an “easy to use” interface for the average employee/engineer to drive down through the enormous amount data.
 - The Transportation Enterprise Database is being developed to resolve this problem

Working Together

7. **How can the Asset Management and Highway Safety Communities work together to fill the roadway inventory data gaps?**
 - Asset Management staff need to focus on data use and making it accessible as opposed to just collecting the data.
 - Highway Safety staff need to appreciate the amount of effort that goes into collecting data and use this data to drive many of their decisions.

A landscape photograph showing a sunset over a range of mountains. The sun is a bright red-orange circle positioned in the center of the frame, just above the mountain range. The sky is filled with soft, wispy clouds in shades of orange, yellow, and light blue. The foreground is dominated by dark, silhouetted trees and foliage. The overall mood is serene and contemplative.

Questions?

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