Using GIS to Support ITS and Operations

ITS Alaska Quarterly Presentation
August 30, 2012

What we will cover today…

- **The evolution of GIS**
- **The evolution of ITS and Operations**
- **GIS and ITS – Working Together Today**
- **Future Opportunities for Integration**

Evolution of GIS

Past

- Cartographic representation of road network
- Map display of static assets, events, and conditions such as bridges, signs, crashes, traffic counts
- Integrating and mapping tool for portals, SLD, other tools

Present

- Analysis tool for safety, routing, travel demand
- Visualization for asset & financial management systems
- Map display of real-time data
- Location based services
- Emergency response

Near Future

- Integrated with Operations Activities
- Visualization and analysis of Connected Vehicle systems
- Expert systems that predict travel and make adjustments to networks based on historical trends

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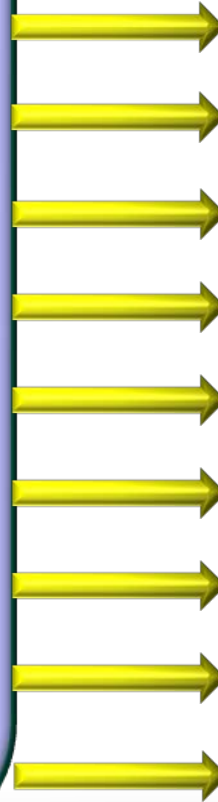*Excellence Delivered As Promised*

Evolution of GIS

- **DOTs have blazed the trail in transportation GIS due to the importance of the transportation layer to other agencies and the public.**

- **Transportation has unique challenges:**
  - Linear Referencing Systems (LRS)/Linear Referencing Methods (LRM)
  - Navigation rules and restriction information
  - Road network is in constant flux
  - Dynamic roadway conditions

Evolution of ITS and Operations

Moving From:		Moving Toward:
Construction & Maint.	→	Const., Maint., & Operations
Project-focused	→	Customer-oriented
District/State Lines	→	Regions & Corridors
M-F, 8 a.m. to 5 p.m.	→	24/7
Reactive	→	Proactive
Single Operator	→	Partnerships
Asphalt, Concrete, and Steel	→	Advanced Technologies (ITS)
Quantity of ITS Devices	→	Ops. Performance Metrics
Stand-Alone Systems	→	Integrated Systems

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Data, Data...Everywhere!
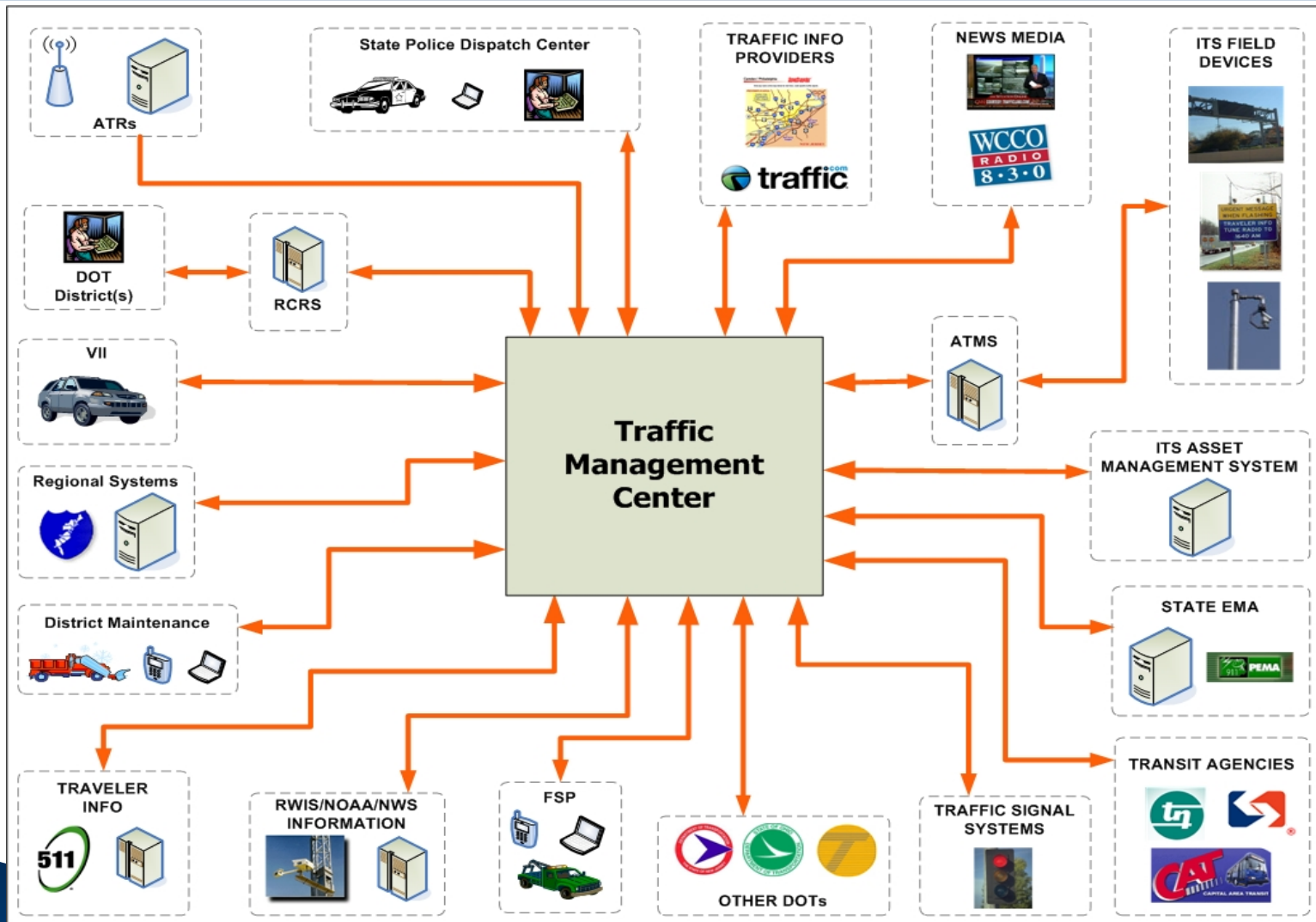
Operations Challenges We Face Today

- **Multiple systems for utilizing ITS field devices and other systems that support Operations**

- **Operations is still mainly based on manual processes such as emails and phone conversations**
  - Integration and automation of existing systems has not been widespread

- **Data sharing between agencies is difficult and not streamlined**
  - Increased data from existing systems
  - Increasing sources of data

Where Do We Go From Here?

- **GIS and ITS have both matured considerably over the past decade, but in different areas of DOTs**

- **Geospatial technologies are being used to integrate disparate data and to promote data sharing**

- **Good existing examples:**
  - Road condition and closure systems
  - Evacuation Planning and Emergency Detour Routes

Today, more than ever before, GIS can be used as a tool to support Operations.

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Opportunities to Leverage GIS for Operations

- **As data has become more readily available and easier to share across multiple platforms, the opportunities for GIS applications to be used to support Operations have also increased**

- **Applies to Planning, Design, and Day-to-Day Operations**

- **This concept is 'in line' with FHWA's *Planning for Operations* initiative**

  http://plan4operations.dot.gov/

Examples of specific applications…

- **Linear Referencing Systems (LRS)**
- **Data Repository/Warehouse Design, Development, and Implementation**
- **Straight Line Diagramming (SLD) Applications**
- **Safety Analysis Systems**
- **Highway Performance Monitoring System (HPMS) Consoles**

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Safety Analysis Management System (SAMS)

Provides powerful and flexible crash analysis tools to support the identification and elimination of hazardous locations and conditions.
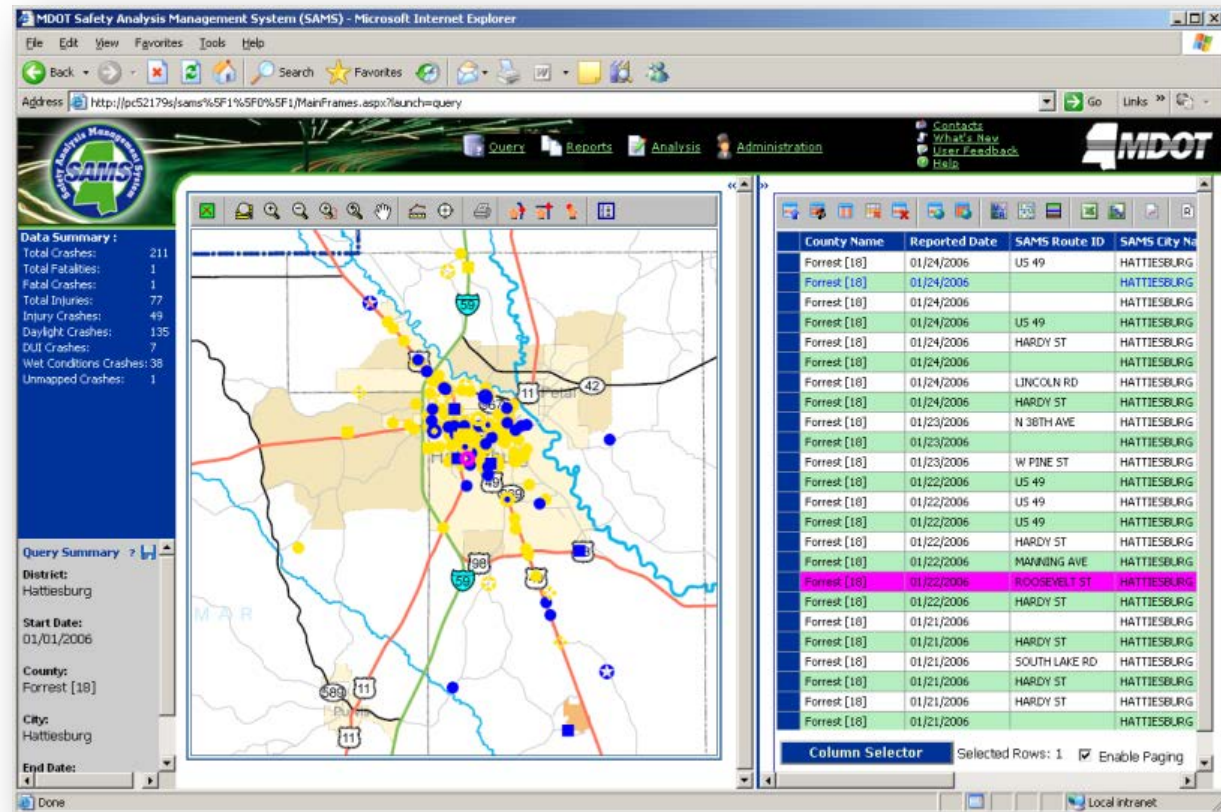
Criminal and Highway Analysis Mapping for Public Safety (CHAMPS)

CHAMPS is the future of crash and criminal analysis in Delaware as the two agencies work together to make the state safer.
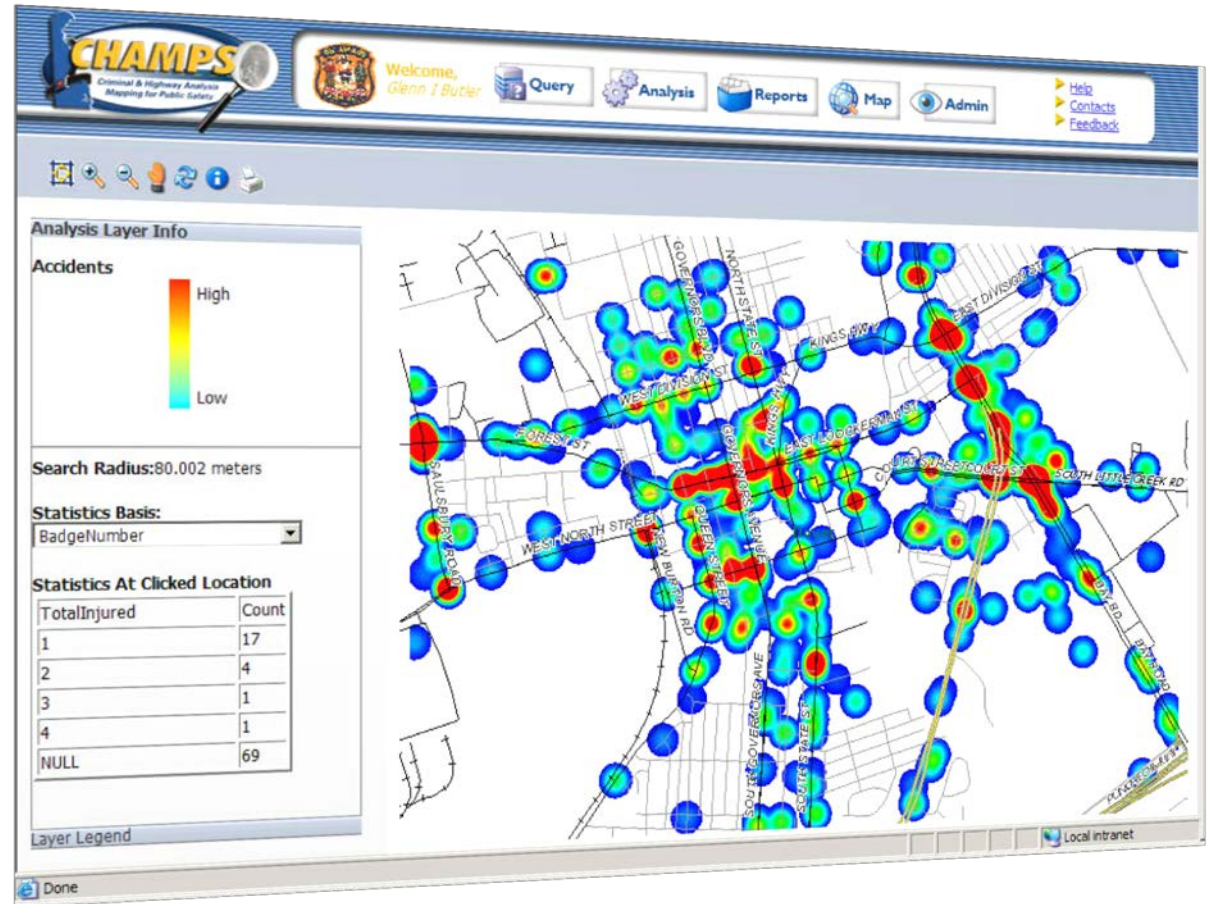
Geographic Resource Intranet Portal (GRIP)

GRIP improves the safety of Oklahoma's transportation network by providing tools to consistently monitor and analyze roadways, bridges, and crashes, as well as overall highway performance.


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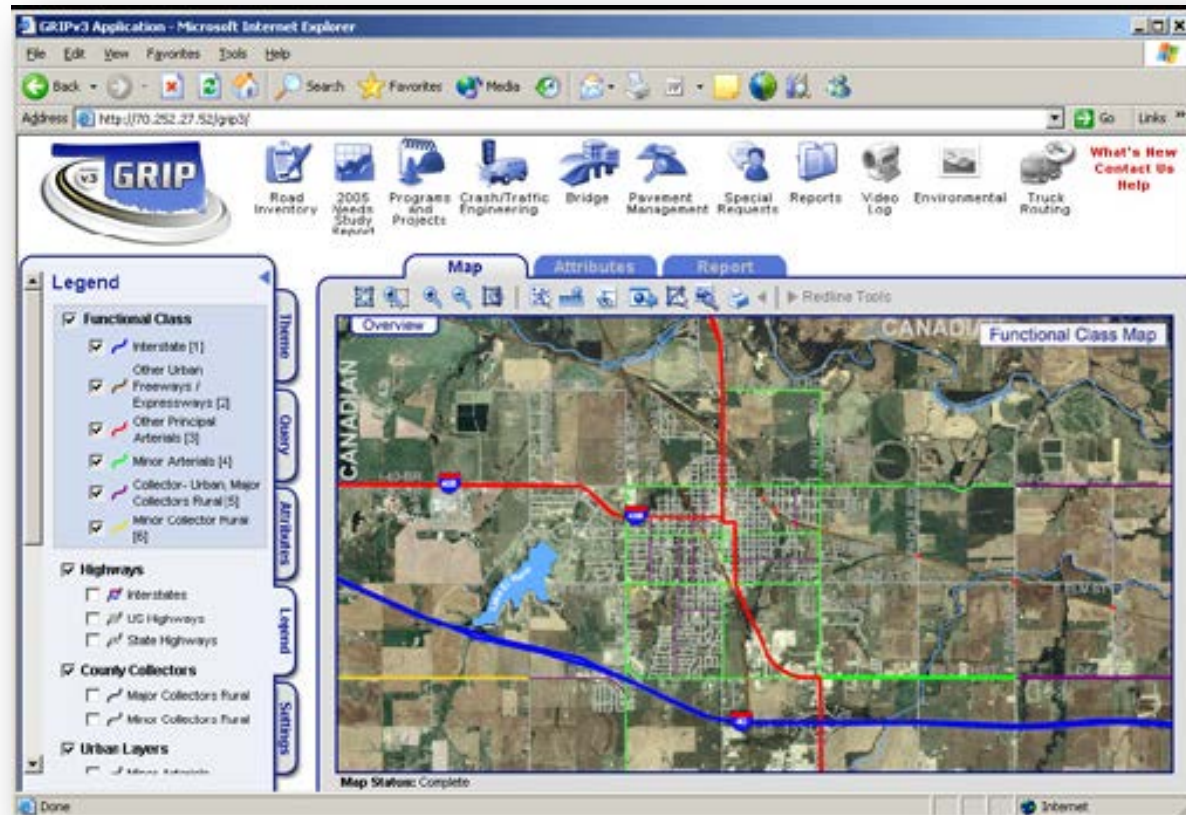
Straight Line Diagramming Application

Allows users to navigate seamlessly across and among business applications, including the SLD, with the RNS framework as the integrating mechanism, can provide users with significant benefits.
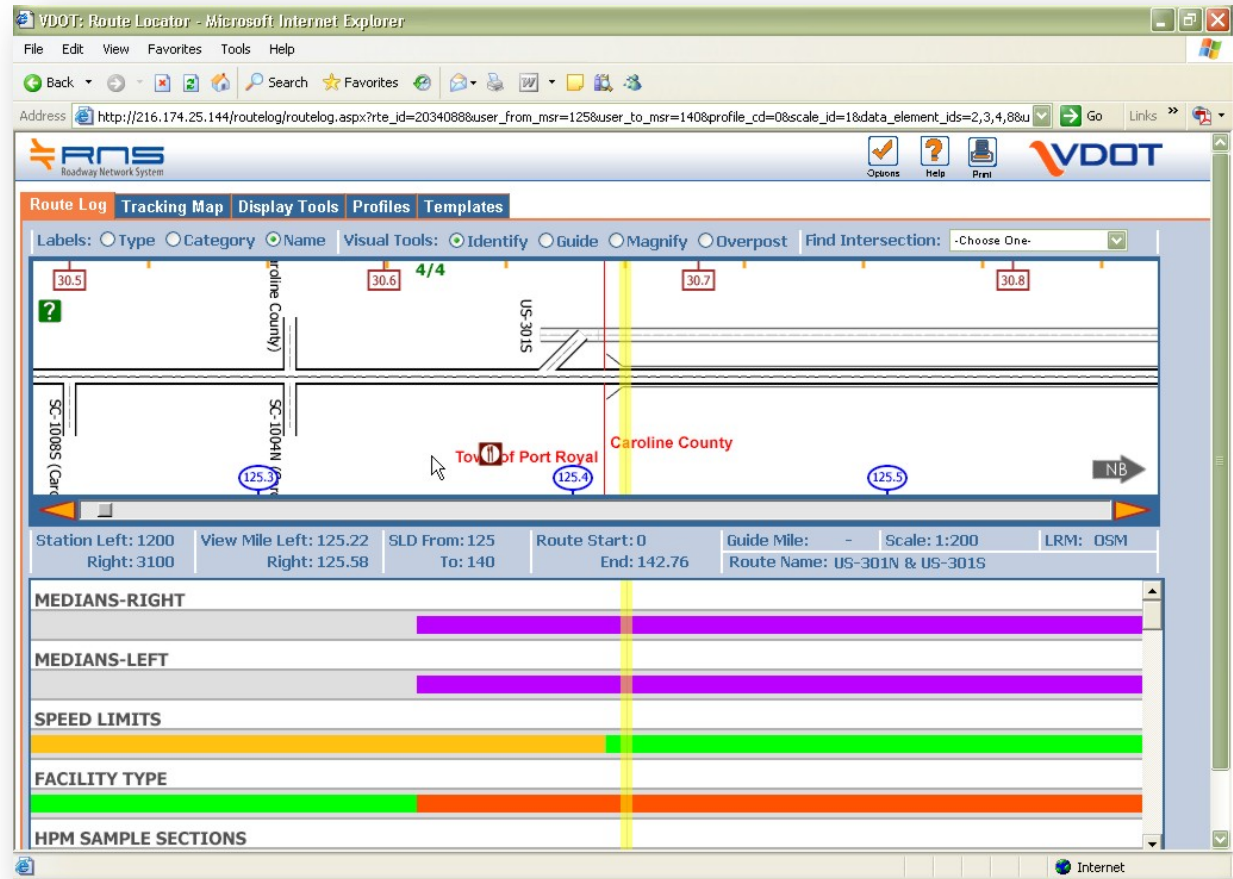
IRRIS – Transportation Logistics

IRRIS uses real-time data, including weather reports, traffic speed, traffic incidents, and roadway construction, to support transportation logistics.

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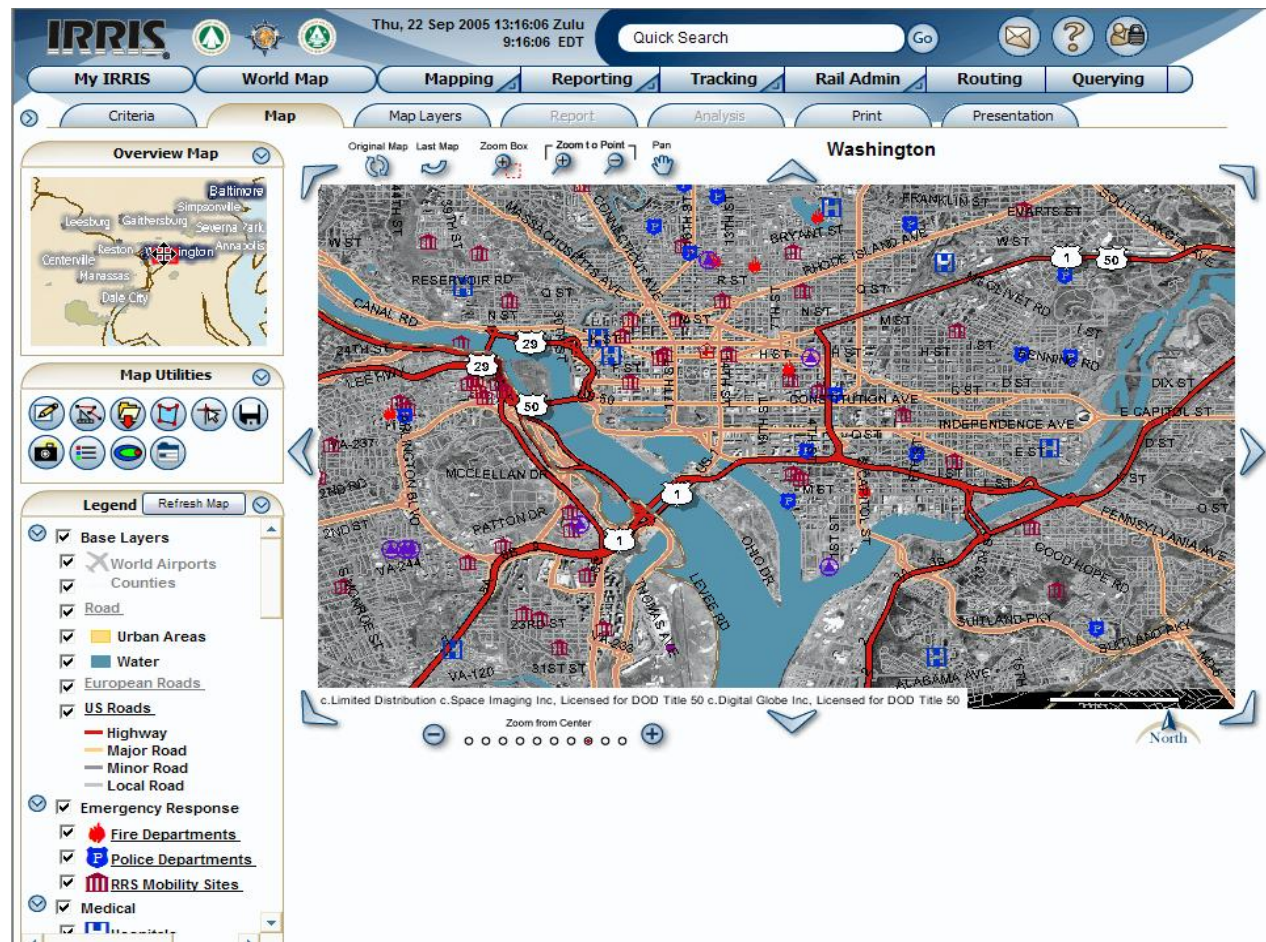
Geospatial Data Warehouse

Enterprise data warehouse that is geospatially enabled to allow agency-wide access to transportation business data including roadway inventory, crashes, traffic, pavement marking, and construction and maintenance projects.

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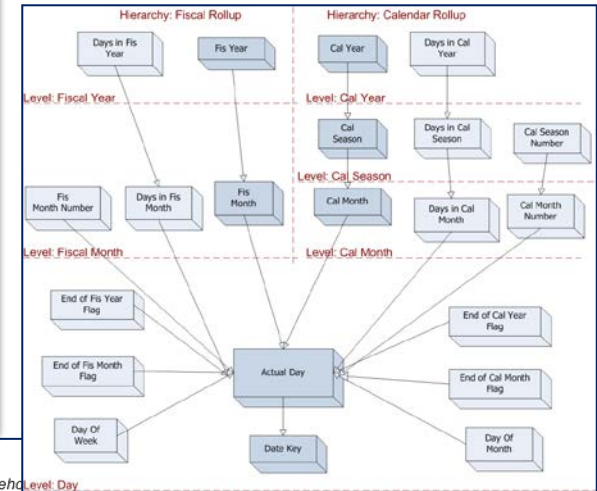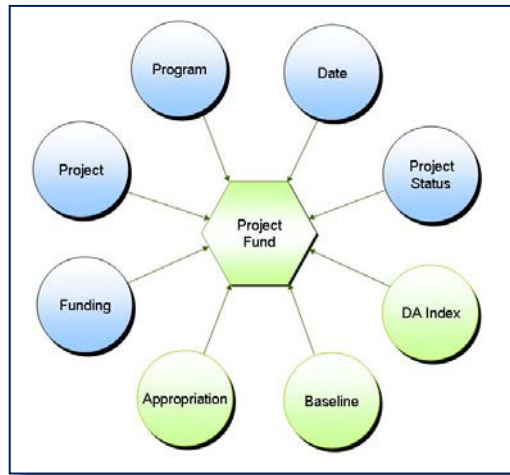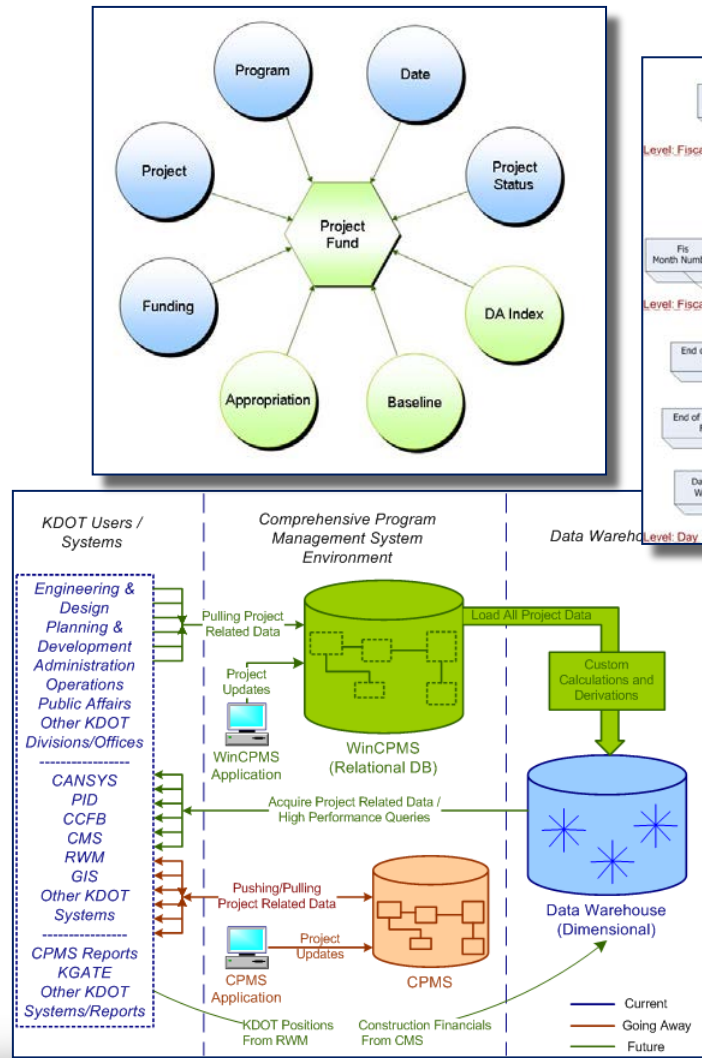
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