T-Program Products And Services

The Washington Transportation Framework Project

WA-Trans is a statewide database of location-based transportation data to use in GIS across the state. WA-Trans will contain the best data available from data providers; from all levels of government and tribal nations.

Washington Transportation Framework Overview:

- Washington Transportation Framework (WaTrans) will be a statewide transportation data set for use in GIS.
- WA-Trans combines the best available data on roads, railways, ferries, aviation, ports, and non-motorized transportation infrastructure.
- WaTrans data can be used in transportation planning, transportation safety, emergency management, law enforcement, and other business functions.
- It will facilitate the sharing of transportation data across agencies and jurisdictions and also support other statewide layers that are in production (water, property, aerial images).
- The underling assumption is that WaTrans will utilize the best (most accurate and up-to-date) data from data providers around the state.
- The data will include a complete depiction of the roadways in the state, street address on all roads, the WSDOT Linear Referencing System on State Roads (LRS), and LRS for selected county and local roads.
- It utilizes a series of computerized software and processes to facilitate data sharing and integrations.

Benefits of WA-Trans include:

- Supports decision making process for distribution of safety funding to local governments.
- Supports statewide collision location and analysis.
- Supports statewide emergency management and response efforts.
- Reduces the duplication of data collection and thus reduces costs across the state.
- Provides significantly improved data accuracy by having data owners provide frequent and periodic updates.
- Supports data standardization across agencies enabling integration of data from multiple sources into a standard format and environment.
- Uses address and LRS location as a mechanism for relating data.

Success Stories:

- Puget Sound Pilot Project combined data form King and Pierce counties, two of the most populous counties in the state.
- One Road Data Pilot involved the development and integration of data from Benton, Franklin, and Walla Walla counties in Washington, with data and LRS from several counties in Oregon.
- Eastern Washington Regional Dataset Pilot involved coordinating and assisting counties in rural Washington coordinate disparate data into one dataset.

Survey Monuments

The Survey Team provides a number of essential value-added services. They place, preserve and maintain survey monuments. Geodetic control monuments are the foundation of locating roadways, features and properties. Monuments are the basis for engineering design and construction and are crucial in locating Right of Way. Monument data is essential for accurate and error-free location across projects. Some of the benefits are:

- Clear and Visible location of Control Monuments prior to construction.
- Strict adherence to State and Federal standards.
- Replacement of lost or destroyed control monuments.
- Educating staff concerning the importance and legal requirements regarding monuments.
- The Monument Database Web application data is created and maintained by the Survey Team for use by WSDOT & Public.

Success Stories:

- Population of the Monument Data interface for the Data Engine.
- High Accuracy Reference Network (HARN) network monumenation.

T-Program Contacts

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Web Sites (copy links to your browser)

Monument Data Engine
- http://www.wsdot.wa.gov/monument/gis/viewer.htm

Winter Operations
- http://webprod5.wsdot.loc/maintenance/management/winter-operations/

Traffic Road Temperatures
- http://www.wsdot.wa.gov/traffic/RoadTemps/

Ferries Vessel Watch
- http://www.wsdot.wa.gov/ferries/commuter_updates/vesselwatch/index.cfm?vesselwatch_ind=4&&vw_route_abbrev=sea-bi

GIS Workbench
- http://wwwi.wsdot.wa.gov/GIS/supportteam/Applications/GISApplications.asp#GISWorkbench (Internal website only)

January 2009

Geographic Services

Washington State Department of Transportation

Geographic Services developes and produces spatially related products that serve the agency and Washington State citizens to preserve and enhance their safe environment, transportation system, and emergency preparedness.

T - Program Products & Services

- *Application Tools Development*
- *Web Based GIS Applications*
- *Winter Operations AVL System*
- *Impact Risk Screening Tool*
- *Survey Monument ID & Repair*
- *Washington State Highway Map*
- *Medium & Small Scale Mapping*
- *GIS Technical Support & Training*
- *Traffic Weather Camera Prototype*
- *Complete Map Coverage of Roads*

Value Added GIS Data for WSDOT

The Geographic Services Office supports the capital program by providing information and tools needed for project planning, budget development (programming), design, construction, maintenance, and much more.

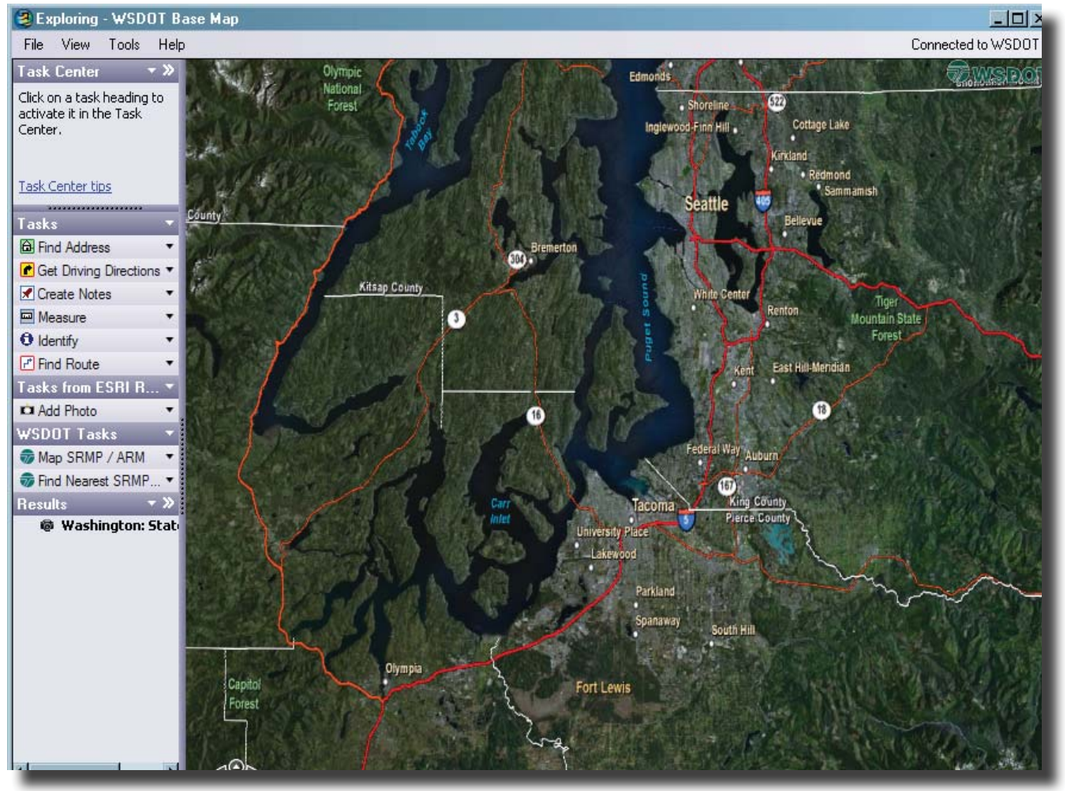
The value added data produced by the Cartography & GIS Branch (CGIS) is used in Geographic Information Systems (GIS) for a wide variety of purposes - emergency management, transportation project delivery, economic analysis, and even climate change monitoring and analysis.

GIS produces “smart maps” that show both the locations of things and database information associated with that spatial display. GIS is an effective modeling tool and can be used to help determine where things might be changing, how they are distributed spatially, and how features and events are related to each other in the landscape.

GIS makes it possible to visualize information, show relationships, and solve problems. The maps and databases can be easily updated, and producing results using GIS is more effective than ever before. GIS is an important tool for all decision makers throughout the department.

The products and services produced in CGIS contribute directly and indirectly to the agencies goals of Safety, Preservation, Mobility, and Stewardship. They also provide foundational data and technology to assist in efforts to re-stabilize our global environment.

T-Program Products & Services Highlights
Meeting Transportation Safety & Mobility Needs



TransMapper - A no cost, WSDOT global mapping tool

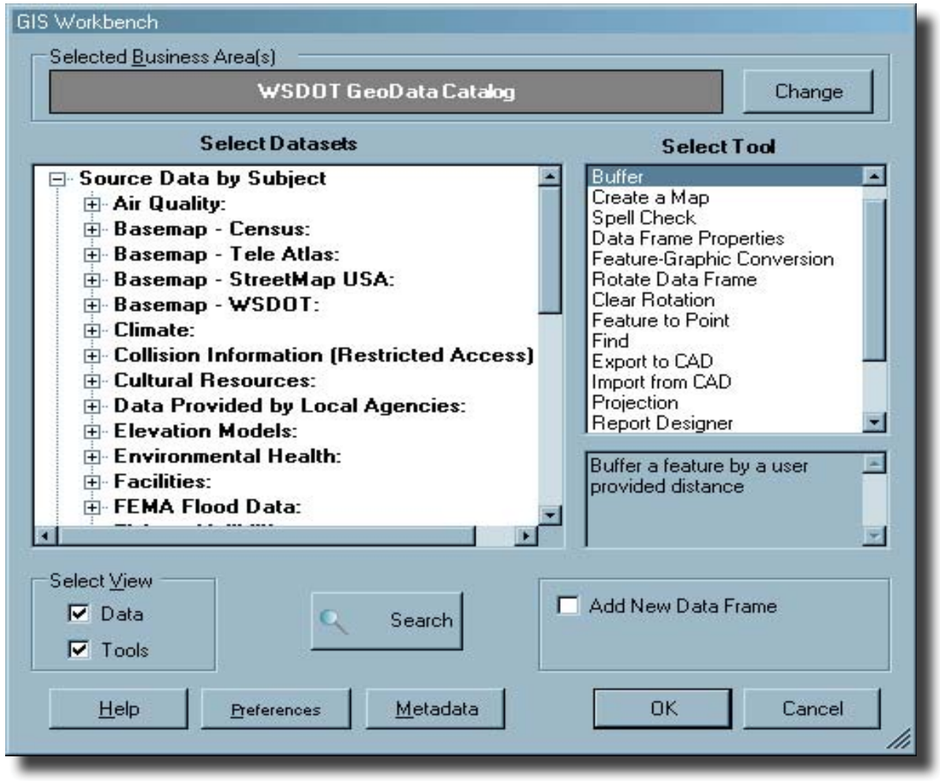
TransMapper, short for Transportation Mapper, is a free global mapping tool that is similar to Google Earth™ but is compatible with WSDOT map data and GIS software.

TransMapper is built on top of a freely available, downloadable application (ArcGIS Explorer) providing easy-to-use tools to view and share information geographically. ArcGIS Explorer provides many very useful WSDOT related tasks that other similar applications do not, unique tools include; Route Finding, Map & Locate State Route Mile Posts (SRMP), Measure, and Hyper link. This data is displayed over two nationwide cloud free orthophoto datasets - the National Agricultural Imagery Program (NAIP) and the ESRI (Environmental Systems Research Institute, Inc.).

CGIS has developed TransMapper in order to more effeciently support the rapidly growing interest in simple mapping applications. The initial version contains the most requested WSDOT specific customizations to work with our Linear Referencing System (LRS) and the Transportation Data Office (TDO), State Route (SR)View application. Additional customization and map layers are planned and will be added in a timely manner.

TransMapper meets policy goals by providing spatial data quickly and easily for emergency responder personnel, planning staff, and policy makers.

T-Program Products & Services Highlights
Meeting Transportation Project Delivery Needs



The GIS Workbench - Delivering data layers to WSDOT

The GIS Workbench serves all business areas of WSDOT. The GIS Workbench provides a flexible and easily used product for the entire agency. The GIS Workbench is an ArcGIS Desktop extension. The extension provides WSDOT custom tools and simplified data access methods for connecting to the departments enterprise GIS databases.

Benefits of the Workbench:

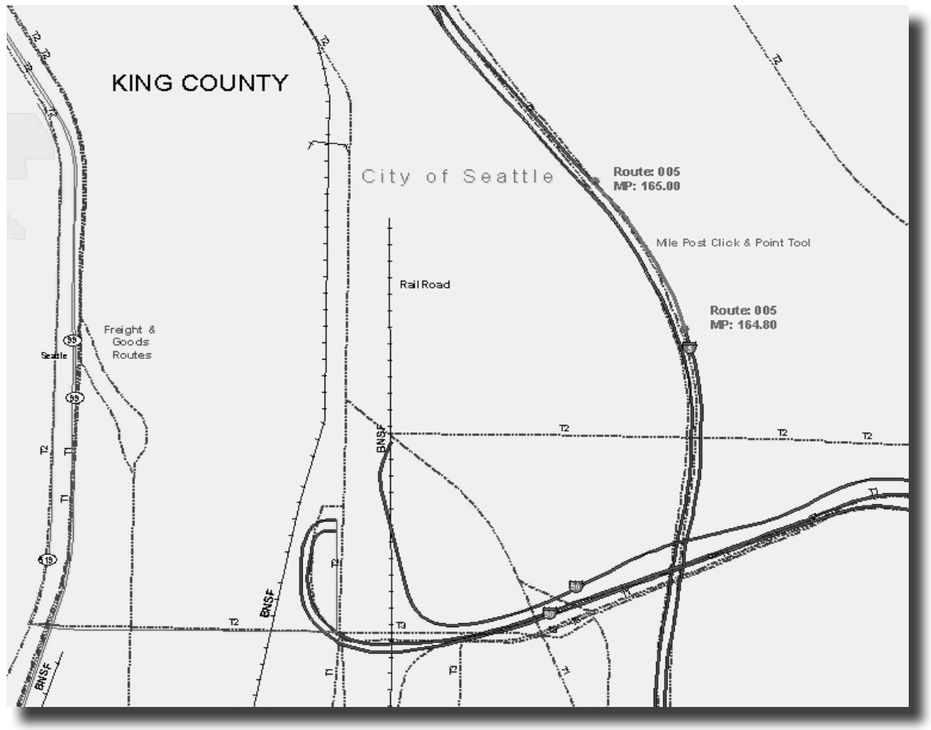
- One stop shop for all corporate spatial datasets - this minimizes duplication of data.
- Ensures that the best, most current data is easily accessible & properly documented (metadata).
- Provides easy access to custom spatial tools like “Map an SR Location” to clearly define project location.

WSDOT Policy Needs Met By CGIS Critical Data Layers:

Environmental & Climate Change	**Transportation Projects**	**Economic Vitality**
Flood Zones	Collision Data	Census Data
Liquefaction Zones	Bridge Preservation	City Annexations
Road Kill Data	Unstable Slopes	*UCA / MPO / RTPO

*(**U**rban **G**rowth **A**rea, **M**etropolitan **P**lanning **O**rganization, **R**egional **T**ransportation **P**lanning **O**rganization)

T-Program Products & Services Highlights
Meeting Transportation Stewardship Policy



Making decisions with clear, current, precise, and stewarded data helps WSDOT deliver!

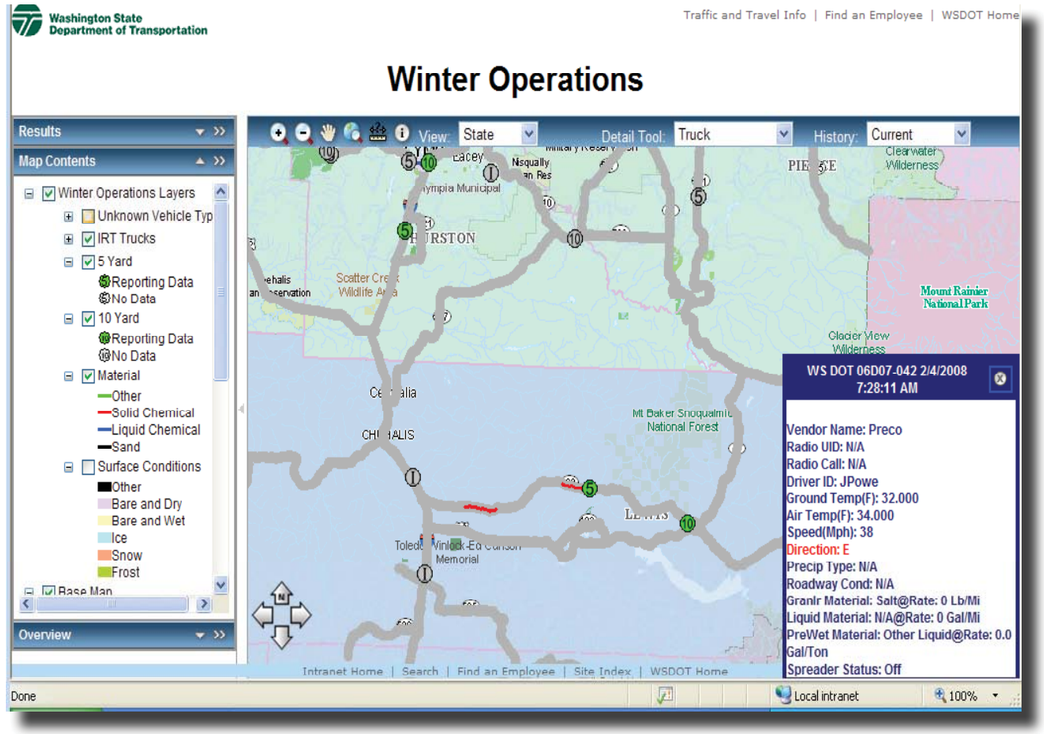
The Cartography and GIS Branch creates, maintains, and stewards critical map layers for emergency response, public safety, environmental concerns, roadway preservation, and transportation mobility. These data layers also help WSDOT Project Engineers plan, design, and deliver transportation projects with ease and in a timely manner.

GIS stewarded data layers allow users to graphically see the data, and easily view everything about the data in nationally recocognized metadata formats.

The State Route, Freight, and Goods, WSDOT Regions, Railroads, and City Limits layers shown above, are just a few of many layers that are created for use by the WSDOT, and other City and County agencies, as well as the Military and emergency response units and environmental monitoring efforts accross Washington.

Project planners and designers are able to display project limits and other critical project details with these stewarded data layers and easily share the knowledge with WSDOT project staff, consultants, and partners.

T-Program Products & Services Highlights
Meeting Transportation Mobility Needs



Winter Operations web mapping application keeps WSDOT Moving!

Winter Operations (Winter Ops) is a web browser based GIS software application to manage WSDOT snow and ice activities. The activities of about 80 trucks are represented on the map by custom marker symbols (indicating truck type). Trucks that are currently reporting data are shown in green, the gray symbols are trucks that have been parked.

You can click on a truck with your mouse and get detailed information about what the truck is doing:

- Truck Type (IRT, 5 Yard, 10 Yard etc.)
- Rate of Material (deposited by truck)
- Truck Heading
- Truck Speed
- Road Temperature
- Air Temperature
- Blade Position

Historic data is also displayed on the map so you can see where WSDOT has already applied a treatment to the road. Different road treatments are represented by different colored lines.

This helps with crew shift changes, the new shift can see what-when-where-how much the previous shift did. The application includes other map layers that can be turned on or off such as:

- Jurisdictional Boundaries
- Orthophotos
- Maintenance Facilities

When you click on a maintenance facility you are shown information about the material at the facility.

Winter Ops is user friendly and a fast method of delivering critical mobility data to WSDOT.

T-Program Products And Services

The Map And Data Production Team

Map & Data Production Team
The Cartography and Geographic Information Systems (CGIS) section is responsible for mapping over 7,000 miles of the Washington State's public highways. As part of the Geographic Services Office we provide state-of-the-art geospatial products and services to the Washington State Department of Transportation and its customers.

The Production Team produces a number of high profile products and services that add value to other business areas and are used extensively by the public and other state and local government agencies.

- Provides accurate and timely data and maps as requested from staff throughout the Department.
- Only source in the state for up-to-date City Boundary Annexation and Growth Management Area Boundary Maps and GIS layers.
- Provides and updates special-purpose maps such as the Official State Highway Map, Tourist Map, Milepost Map, Rail Maps, Functional Class, and others
- Provides base map layers of jurisdictional boundaries, topography, water, and text for the Departments Enterprise GIS.
- Developed and maintains the Linear Referencing System (LRS) for the Agency enterprise GIS at several scales.
- Provides maps associated with Safety - for collision analysis, emergency response planning, or e-911 systems.
- Provides base maps and GIS layers associated with environmental monitoring, and climate analysis.
- Contributes to Highway Preservation by providing maps and GIS layers to track Maintenance activities and performance.
- Contributes to Mobility by designing and producing maps and GIS layers concerning freight movement and travel demand.
- Many of these maps and GIS layers are used in planning and project scoping activities, eliminating field work in some cases.
- Provides a full schedule of introductory and advanced GIS courses; provides accurate and timely documentation and web seminars for staff.
- Develops base maps and GIS layers that can used in economic analysis (traffic flow maps, congestion maps), for climate change analysis (topographic, bathymetric, and congestion maps), and project development.
- Produces maps and GIS layers that are used by numerous business areas throughout the agency who also contribute to the overall goals of Safety, Preservation, Environment, Mobility.

Success Stories:
- Increased the range of mapping representation capabilities.
- Able to provide regular updates to important Planning GIS layers such as Annexations, and Growth Management Areas.
- Makes it easier to provide and receive data and layers from other federal, state, and local agencies and jurisdictions.
- Has made it possible for the department to keep abreast of latest technology for spatial analysis and geospatial visualization.
- Has provided regular and timely updates to the State Tourist Map.
- Has trained hundreds of agency staff to use this important decision-making and data representation toolset (GIS).

CGIS Production
Key Products & Services

- Medium and small scale mapping: for planning, budget development, preliminary design, communication, traveler information, and environmental mapping.

- GIS LRS: The GIS Linear Referencing System is a special state highway map that allows data with State Route Milepost to be used in GIS with other GIS data.

- Special Purpose Maps: Official State Highway Map, Interstate Guide, Bike Map, Milepost Map, Control Section Map, Functional Class Map, Freight and Goods Map, Annexations, and Urban Growth Areas.

- GIS Technical Support & Training: For GIS software and data. Teaching the basic principles of GIS mapping and how to use GIS to view, query, and create geospatial data, by a vendor-authorized instructor.

- GIS Technical Learning Group
  The focus of the group is to work together to gain a better understanding of ArcGIS. Anyone who is currently using ArcGIS or is interested in learning more about GIS is welcome to attend. There is a topic for the first half of each meeting, and open discussion throughout. Attendees should bring questions, success stories and helpful ideas about working with ArcGIS.

- GIS Help Desk
  The GIS help desk provides technical GIS assistance to all Department staff. Staff can call the IT Help Desk to log a request or they can use the Remedy web help interface to log their own help request.

  The help desk is staffed Monday through Friday 7:30 to 5:00. ph: (360) 705-7050

T- Program Products And Services

GIS Application Development Team

The GIS Application Development Team develops computer applications that make it easier for agency staff to access, analyze, and present spatial data.

- Popular applications developed by our Team include The GIS Workbench, TransMapper, and Winter Operations.
- The GIS Workbench is a customized front-end to the level-playing-field GIS software that the Department uses. The Workbench reduces the amount of time a staff member needs to become productive using vendor GIS software.
- The Workbench allows easy access to hundreds of GIS layers to be used for analysis or display.
- The GIS Workbench is used extensively throughout the department in many business areas for tasks that include Project Scoping, Environmental Analysis, General Map Design and Analysis, Economic Impact Analysis, Collision Analysis, Inventory of Roadside Features.
- Many of these business areas use the Workbench to further contribute to the Agency's goals, programs, services, or products.
- TransMapper application is a Global GIS Tool (similar to Google Earth™), that allows fundamental GIS activity in the Web environment.
- TransMapper is a spatial web portal that allows free access to a multitude of Web Services (maps, images, analysis functions, or modeling) that are outside of the agency, or to those services that we have developed.
- The team provides expertise for the development of an enterprise GIS architecture, standards that promote efficient data integration and sharing, and troubleshooting technical issues for all users.
- The team developed spatial transformation tools which have standardized location reporting and identification, thus improving accuracy and minimizing errors.
- Winter Operations - monitors the movement of maintenance trucks during inclement weather.

Success Stories:
- The Workbench has significantly improved the efficiency and accuracy of the Project Scoping phase of the Design Process.
- Custom applications have increased the number of staff who regularly use GIS for analysis and decision making.
- TransMapper has significantly increased the number of GIS users at minimal costs.
- Using these tools, the amount of data collection (in the office or the field) has been reduced; thus saving labor, energy expenses, and GHG emmissions.
- Developed and maintained applications that are extensively used in emergency response location and mapping (WSP, WSDOT ER Team).
- Developed a web-based Winter Operations (Winter Ops) application that allows agency maintenance trucks and equipment to be displayed on a map and reports the amount and location of materials that are applied to the road.
- Developed Unstable Slope, Vessel Watch, and Monument web apps.

Application Development
Key Products And Services

- GIS Development with other Business Areas
  - Web-based Mapping Applications
  - Roadside Feature Inventory Project
  - Environmental Impact Risk Tool
  - Real Estate Web Site
  - Unstable Slopes Inventory
  - Survey Monuments Data Base
  - Location Translators
  - Weather Reporting
  - Traffic Camera Prototype
  - Vessel Watch
  - Winter Operations Automated Vehicle Location (AVL) System

- The GIS Workbench is a custom GIS portal for the Agency's Enterprise GIS System. With it, users can become productive and efficient GIS users more quickly. The Workbench provides:
  - Easy access to Enterprise GIS layers
  - Basic analytical and modeling tools
  - Simplifies the access and presentation of data
  - Standardizes data for data integration

- TransMapper, short for Transportation Mapper, is a free light weight global mapping tool that is similar to Google Earth™ but is compatible with WSDOT map data and GIS software.
  - Access to internal and external web services
  - Complete orthophoto coverage of the state
  - Complete road coverage of the state
  - Custom mapping simplified for the users
  - Does not use expensive software licences
  - Allows for more GIS users at minimal cost

- Consulting Services
  The team also provides consulting services to WSDOT business areas. We can help with software system architectural design and infrastructure planning. We also assist with coordination of contracted development work, ensuring that deliverables are compatible with existing WSDOT systems. We assist with consultant selection and with the evaluation of GIS software products and services.