WVDOT GIS Strategic Plan

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Director of Strategic Data Management & Technology Division
West Virginia Department of Transportation
Agenda

- Background
- WVDOT GIS Strategic Plan
- Key Recommendations
- Implementation Plan
- Where are we?
- Near Future Plan
- Questions & Answers
GIS at WVDOT

• GIS Function
  ▪ Strategic Data Management & Technology Division
  ▪ District Analytics Unit

• Esri Shop
  ▪ No ELA, No EAP, but Top Account Service
  ▪ ArcGIS Products
    ❖ ArcGIS Enterprise 10.8.1
    ❖ Server Extensions: Roads & Highways (R&H) 10.8.1, Data Reviewer, Workflow Manager, Image Server, etc.
    ❖ ArcGIS Desktop 10.8.1 & Extensions such as R&H
    ❖ ArcGIS Online
    ❖ ArcGIS Pro 2.9
Geospatial Program at WVDOT

• Two Sections & Six Units in the Strategic Data Management & Technology Division
  ▪ GIS Section
    ❖ GIS Coordinator
    ❖ GIS Services Unit
    ❖ LRS Services Unit
    ❖ Mapping Services Unit
  ▪ Geospatial Infrastructure Section
    ❖ Fleet Management Unit
    ❖ GIS Programming Unit
    ❖ Highway Data Services Unit
• Geospatial Products & Services
• Customers: WVDOT Users, the Public, Federal & State Government Agencies, the Private Sector, etc.
# Geospatial Program Partners/Stakeholders

## Federal Programs & Strategic Initiatives
- National Bridge Inventory (NBI)
- Model Inventory of Roadway Elements (MIRE)
- Highway Performance Monitoring System (HPMS)
- Transportation Asset Management Plan (TAMP)
- Highway Safety Improvement Program (HSIP)

## WVDOH Divisions
- Contract Administration
- Engineering
- Equipment
- Materials
- Operations
- Planning
- Programming
- Right of Way
- Traffic Engineering
- Districts

## WVDOT Programs
- West Virginia Aeronautics Commission
- West Virginia Parkways Authority
- Division of Public Transit
- Public Port Authority
- State Rail Authority

## Business Partners
- WV GIS Technical Center
- U.S. Fish and Wildlife
- U.S. Geological Survey
- Federal Emergency Management Administration (FEMA)
- Federal Highway Administration (FHWA)
- West Virginia State Historic Preservation Office (WVSHPO)
- West Virginia Department of Environmental Protection

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**2022 WVDOT/MPO/FHWA Planning Conference, April 27, 2022**
WVDOT ENTERPRISE GIS SERVERS

Staging Environment

DOTB6GISWEBRHT
- ArcGIS Server/Enterprise
- ArcGIS Web Adapter
- Data Reviewer Server
- Event Editor
- FTP Server
- New Analysis & Reporting Applications
  - Portal for ArcGIS
  - Road Analyzer (RA)
- Roads & Highways Server
- Workflow Manager Server
- Single 64-bit CPU @ 2.50 GHz; 32 GB RAM
  *0.96.0.80

DOTB6GISDBST01
- Editing/Transactional
  - ORP Repository
  - GTI_EDITING_STG
  - RILS_STG
  - WMdb_STG
- Publication
  - GeoRIL_STG
  - GTI_PUB_UTM_STG
  - GTI_PUB_WK_M_STG
  - RILS_PUB_STG
- Single 64-bit CPU @ 2.50 GHz; 32 GB RAM
  *0.96.0.84

Production Environment

DOTB6GISRHO01
- ArcGIS Server/Enterprise
- Roads & Highways Server
- Workflow Manager Server
- Two 64-bit CPU @ 3.30 GHz; 32 GB RAM
  *0.96.0.81

DOTB6GISAPPO01
- ArcGIS Server/Enterprise
- Data Reviewer Server
- Roads & Highways Server
- Workflow Manager Server
- Two 64-bit CPU @ 3.30 GHz; 32 GB RAM
  *0.96.0.83

DOTB6GISWEB01
- ArcGIS Web Adapter
- Event Editor
- FTP Server
- New Analysis & Reporting Applications
  - Portal for ArcGIS
  - Road Analyzer (RA)

DOTB6GISSTOR01
- Database Server storing daily, weekly, and monthly backups for Editing and Transactional database
- Contains UDAR Data
- Single 64-bit CPU @ 2.50 GHz; 32 GB RAM
  *0.96.0.79

DOTPW01
- Database Server AT District 1
- Monthly backups for Editing and Transactional database
- Contains UDAR Data
- Single CPU @ 2.4 GHz; 32 GB RAM
  *0.96.0.53

WVDOT Intranet

Web Apps/ArcGIS Online

Mobile Solutions

Cloud Infrastructure
Selected Latest Products

- 2021 WVDOH Fuel Site Map Book
- New Geometry & Measures
- 2022 WVDOT Projects
- 2022 Municipal Street Map Series
- 2022-2023 West Virginia Tourism Map
WVDOT GIS Strategic Plan

• The 1st plan was developed in 2011.
WVDOT GIS Strategic Plan

- The 1\textsuperscript{st} plan was developed in 2011.
- Substantial Changes Since 2011
  - New Federal Reporting Requirements
    - All Roads Network of Linear Referenced Data (ARNOLD)
    - Financial Information Management System (FIMS)
    - Highway Performance Monitoring System (HPMS)
    - Highway Safety Improvement Program (HSIP)
    - Model Inventory of Roadway Elements (MIRE)
    - National Bridge Inventory (NBI)
    - Transportation Asset Management Program (TAMP)
  - Enterprise Resource Planning (ERP) Implementation
  - Change in Geospatial Technology
WVDOT GIS Strategic Plan

• The 1st plan was developed in 2011.

• Substantial Changes Since 2011
  - New Federal Reporting Requirements
    - All Roads Network of Linear Referenced Data (ARNOLD)
    - Financial Information Management System (FIMS)
    - Highway Performance Monitoring System (HPMS)
    - Highway Safety Improvement Program (HSIP)
    - Model Inventory of Roadway Elements (MIRE)
    - National Bridge Inventory (NBI)
    - Transportation Asset Management Program (TAMP)
  - Enterprise Resource Planning (ERP) Implementation
  - Change in Geospatial Technology

• The current plan was developed in 2019.
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<tr>
<th>Plan Development Methodology</th>
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<td>Legacy Plan Review</td>
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<td>• GTI Staff Survey</td>
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<td>Department Stakeholder Engagement</td>
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<td>Business Unit GIS Profiles</td>
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<td>• Stakeholder Survey Findings Summary Report</td>
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<td>• Five Year Plan</td>
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VISION STATEMENT

The West Virginia Department of Transportation Geospatial Program (GP) is committed to managing an enterprise Geospatial Information System that will improve the productivity of the West Virginia Department of Transportation, meet growing customer needs, and play a leading role in West Virginia’s geospatial community.

MISSION STATEMENT

To improve customer service to the citizens of West Virginia by supplying the latest geospatial transportation information.
Geospatial Program’s Goals

• To provide geospatial transportation information to the public in a timely manner
• To support WVDOT Divisions and Districts by providing geospatial technologies, training and technical assistance
• To support performance-based decision-making across WVDOT using geospatial information and promoting an enterprise approach to data management
• To support the integration of WVDOT data systems using geospatial technologies
• To improve data sharing and communication across WVDOT
• To promote better data governance for all WVDOT data assets
Geospatial Program’s Objectives

- To optimize organization structure and define roles and responsibilities
- To improve WVDOT transportation data model
- To create and improve transportation GIS base layers
- To spatially enable the road inventory log
- To migrate traditional WVDOT maps to GIS data warehouse
- To develop metadata
- To publish transportation geospatial information in a variety of ways
- To support the WVDOT transportation GIS user group and provide GIS training to WVDOT employees
- To collaborate with peers in transportation and the geospatial community
Key Recommendations

- **Goals**
  - Address Current Gaps
  - Meet Known Industry Changes

- **Three Categories**
  - Technical (4)
  - Process (7)
  - Organizational (6)

**Technical** recommendations are focused on enabling the Geospatial Program to continue supporting the business needs of the Department and improving the access to critical spatial and non-spatial data through the use of GIS-based applications.

- Improve Data Maintenance Automation through the use of ESRI and/or third-party tools
- Expand the use of ArcGIS Online and Portal
- Deprecate Internet Explorer
- Publish data standards and improve technical and user documentation

**Process** recommendations focus on data maintenance and publication support, improving communication between data owners and users, the development of better training opportunities for WVDOT staff and the proliferation of geospatial technologies throughout the Department.

- Establish Communications Service to
- Expand Event Editor Usage
- Expand Training Opportunities
- Expand Workflow Manager Usage
- Develop Workflow Documentation
- Streamline Data Sharing

**Organizational** recommendations focus on building GIS expertise throughout the Department, the development of a committee to establish a framework for data governance, and the fostering of communication between the Geospatial Program and other GIS staff within the Department.

- Establish Data Governance Committee
- Expand GIS Expertise
- GIS Compensation Review
- Geospatial Coordination Council
- Conduct Data Governance Review
- Geospatial Program Rebranding

Establishing a framework for managing technology - WVDOT should establish an organizational framework designed to foster better communication between data owners and consumers. This framework would also include representatives from the Geospatial Program and would be responsible for the guidance, selection, and implementation of new technologies. Technical leaders would engage Executive Management to provide assurance that new technologies support the Department’s strategic initiatives and improve data management practices.

2022 WVDOT/MPO/FHWA Planning Conference, April 27, 2022
# Implementation Plan (Five Years)

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<th>Recommendations</th>
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Ok, Mr. Presentation Guy, I can read the slides myself.
Is a plan really going to work?
### Technical
- Improve Data Maintenance Automation <--- Work in Progress (WIP)
- Expand the Use of ArcGIS Online & Portal <--- WIP
- Deprecate Internet Explorer <--- Completed

### Process
- Establish Communication Service to Connect Data Owners & Users <--- WIP
- Expand Event Editor Usage <--- WIP
- Expand Training Opportunities <--- WIP
- Expand Workflow Manager Usage <--- WIP
- Develop Workflow Documentation <--- WIP
- Streamline Data Sharing <--- WIP
- Expand Training Opportunities <--- WIP

### Organizational
- Establish Data Governance Committee <--- WIP
- Expand GIS Expertise <--- WIP
- Conduct GIS Compensation Review <--- WIP
- Establish Geospatial Coordination Council <--- WIP
- Conduct Data Governance Review <--- WIP
- Rebrand Geospatial Program <--- WIP
Near Future Plan

• Time to Update Significantly or Rewrite
• Why?
  ▪ Change in Post Pandemic Work Life
  ▪ Change in Org Chart
    ❖ Planning Division → ... → Strategic Data Management & Technology Division
    ❖ GTI Section → Geospatial Program
  ▪ Mission Critical Projects
    ❖ Core Maintenance Plan (CMP)
    ❖ Enterprise Resource Planning (ERP)
  ▪ Change in Technology
    ❖ Microsoft Office → Google Workspace
    ❖ On Premise → Cloud

"We've considered every potential risk, except the risks of avoiding all risks."
Thank You!

Yueming Wu, Ph.D., PMP, GISP
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