

PennDOT's E-GIS Upgrade

The Keystone of Planning and Operations

Frank Desendi
PennDOT, GID Manager

Nate Reck
GeoDecisions, Director

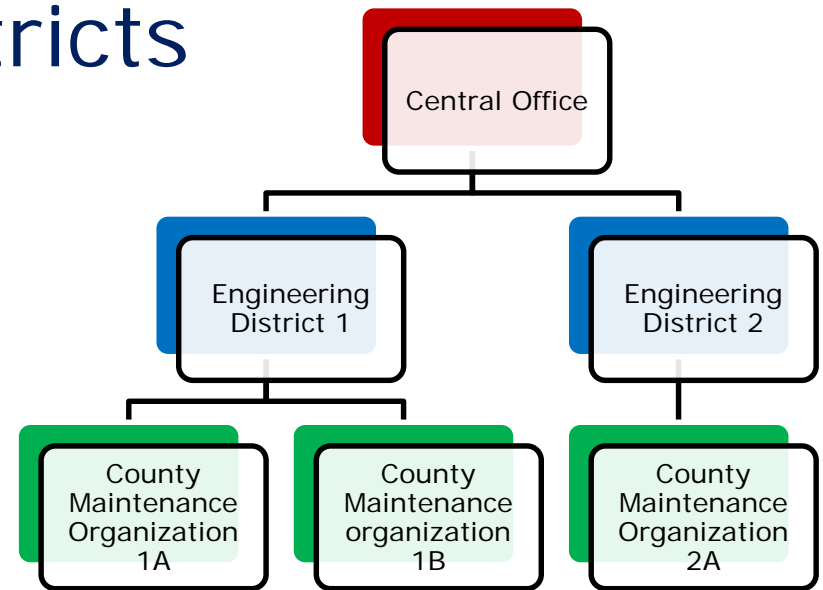


Agenda

- Background
- Facilitating Initiatives
- Outcomes
- Accomplishments
- Future Direction
- Questions

Background

- 67 Counties
- 11 Engineering Districts



Background

- PennDOT's Responsibility
 - 44,639 Miles of Roadway
 - § 3,500 Local Fed Aid Miles
 - 27,165 Bridges & Structures

Background

- PennDOT's GIS Database
 - ~50,530 Miles of Roadway
 - § Adding 70,000 Miles of Local
 - ~38,316 Bridges & Structures
- Supports
 - Annual Program ~ \$2B
 - Winter Services < \$300M

Background

- PennDOT's GIS Database
 - Roadway
 - Traffic
 - Bridge
 - Projects
 - Maintenance
 - Safety
 - ITS, Conditions
 - Boundaries
 - Environmental
 - Aviation
 - Rail

PennDOT's GIS

- Modernizing
 - Tech Refresh / Expansion
 - Interviews
 - Needs Assessments
 - Prototypes

Redesign Needs

- Desires:
 - “Google”-like mapping experience
 - Disparate database integration
 - EZ visualization
 - Sharing of data/maps
 - Custom Layers
 - Tools!

Redesign Constraints

- Constraints:
 - PennDOT Base Map
 - Data Exposure
 - Database Architecture
 - Marketing
 - Training
 - Incomplete Road Network

Meeting Needs & Overcoming Constraints

PennBOTS

- Embeddable Tool Set
 - VideoLog
 - Street View
 - Document Management
 - Query Builder
 - PETL



PennBOT Services

- Some Services
 - Ad Hoc query
 - LRM by Lat/Lon
 - Document Management
 - Legislative Districts
 - Many Tools and Searches



PETL

- Spreadsheet Dyn Seg Engine for the Web
- Dynamically Show Data in Apps and ArcMap



PennDOT ETL
Step 2: Project Creation / Column Mapping

Project Information: [Cancel New Project](#) [Cancel Existing Project](#)
Project: ETL_SIP
[Back to Overview/Back](#)

Validate Options:
[Start New File](#)
[Validate and Submit to Stage](#)

Database Field Mapping:
Host Name: 3
Geometry: Line
Unused Database Fields:
[List of unused fields]
Mapped Fields:
[Table with columns: COUNTY_NO, ETL_CODE, ST_NO, JUNE, etc.]

COUNTY_NO	ETL_CODE	ST_NO	JUNE	SEG_NO	SEG_LEN	OFFSET_LEN	SEG_LEN	OFFSET_LEN	SEG_LEN	FEET	ACTIVITY	WANT	PERIOD	SEGMENT
1	14	100	0	1	14	0				141000	100	0	1	1000000
2	14	200	0	1	20	0	70	200	420	711000	200	0	2	2000000
3	14	300	0	1	30	0	100	300	630	722000	300	0	3	3000000
4	14	400	0	1	40	0	130	400	960	733000	400	0	4	4000000
5	14	500	0	1	50	0	160	500	1290	744000	500	0	5	5000000
6	14	600	0	1	60	0	190	600	1620	755000	600	0	6	6000000

PennDOT ETL
Step 3: Review Validation / Promote to Live

Project ID: 2338
Project Description: ETL_SIP
Files Processed: 1
Staged Totals: Points: 0 Lines: 425
File Processed

- Validated: 424
- Warnings: 5
- Errors: 1
- Empty Rows: 0
- Rows Processed: 424
- Promotable Rows: 424

[Hide Error Details](#)

Row	Reason
2	Validation Error SEG_END - Invalid Seg End (0000) for this CountyRoute
225	Warning OFFSET_END - Offset End (2711) is greater than Seg Length Feet (2690). Reducing to 2690.

[Go Back to File Mapping](#) [Looks Good. Promote Validated Data](#)
[Start New Project](#) [Start A New File](#)

GIS-IQ

- Custom Map Builder
- Exportable/Printable Map and Data Grid
- Custom Layer Management
- Google-Like Search
- Canned/Template Maps
- Save and Share Maps
- Import Spreadsheets

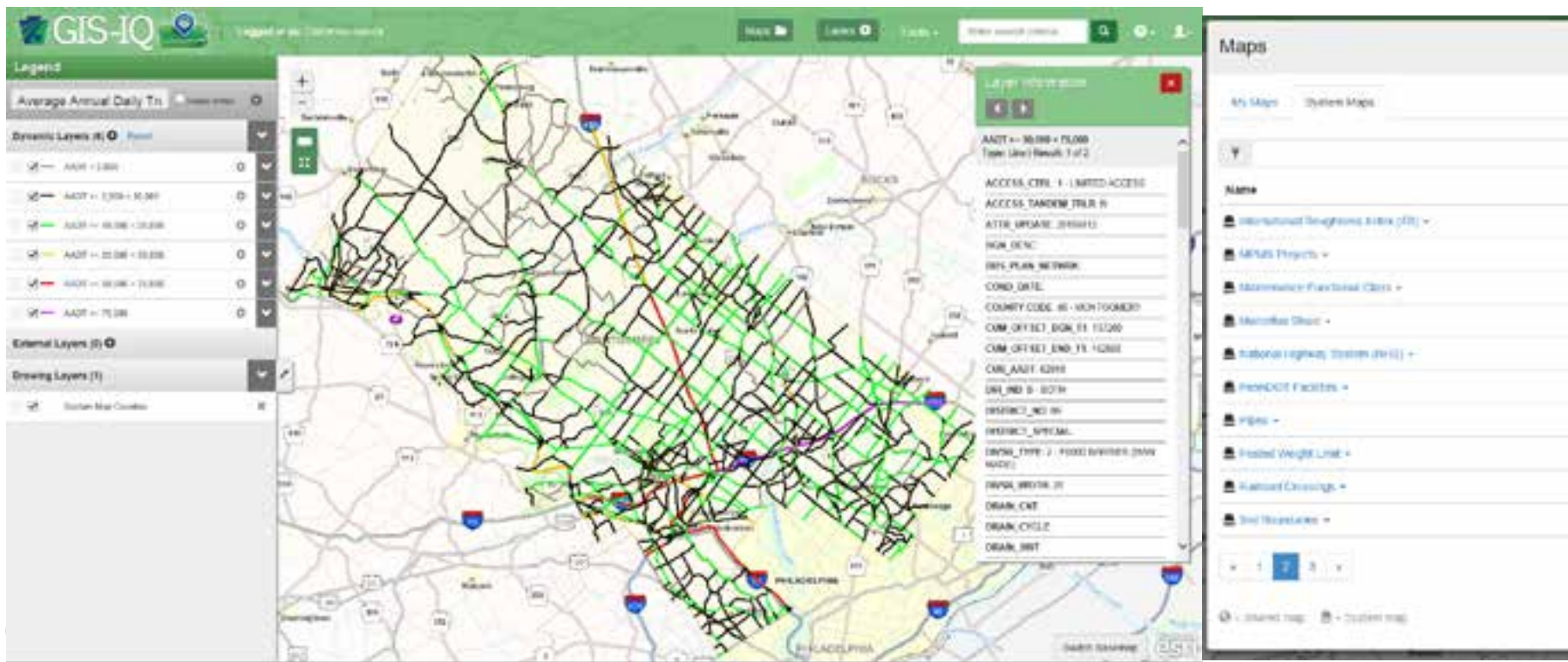
The screenshot displays the GIS-IQ web application interface. The main map shows a street network with various layers overlaid. A 'Layer Information' panel on the right lists details for a selected layer, including job ID, location, and other attributes. A 'Filter Layer - Dynamic Message Signs' panel on the right shows a search interface with filters and a 'Final Query' section. A 'Street View' inset in the bottom left shows a 3D perspective of a street.

Job ID	Location	Loc District	Longitude	Message Text
JOBID_1	11111111111111111111	DISTRICT_1	-87.63111111111111	MESSAGE_TEXT_1
JOBID_2	22222222222222222222	DISTRICT_2	-87.63111111111111	MESSAGE_TEXT_2
JOBID_3	33333333333333333333	DISTRICT_3	-87.63111111111111	MESSAGE_TEXT_3
JOBID_4	44444444444444444444	DISTRICT_4	-87.63111111111111	MESSAGE_TEXT_4
JOBID_5	55555555555555555555	DISTRICT_5	-87.63111111111111	MESSAGE_TEXT_5

County	CUMBERLAND (11)
Route	0701 (PA + 381)
Direction	WEST
Segment	0011
Offset	112.5

Template Maps

- Standard Operating Procedures in Visual GIS Form
- Best Practice of Visualization and Query
- Whole State On Same Page
- **Examples:** Traffic Volumes, Functional Class, NHS, Condition, etc.

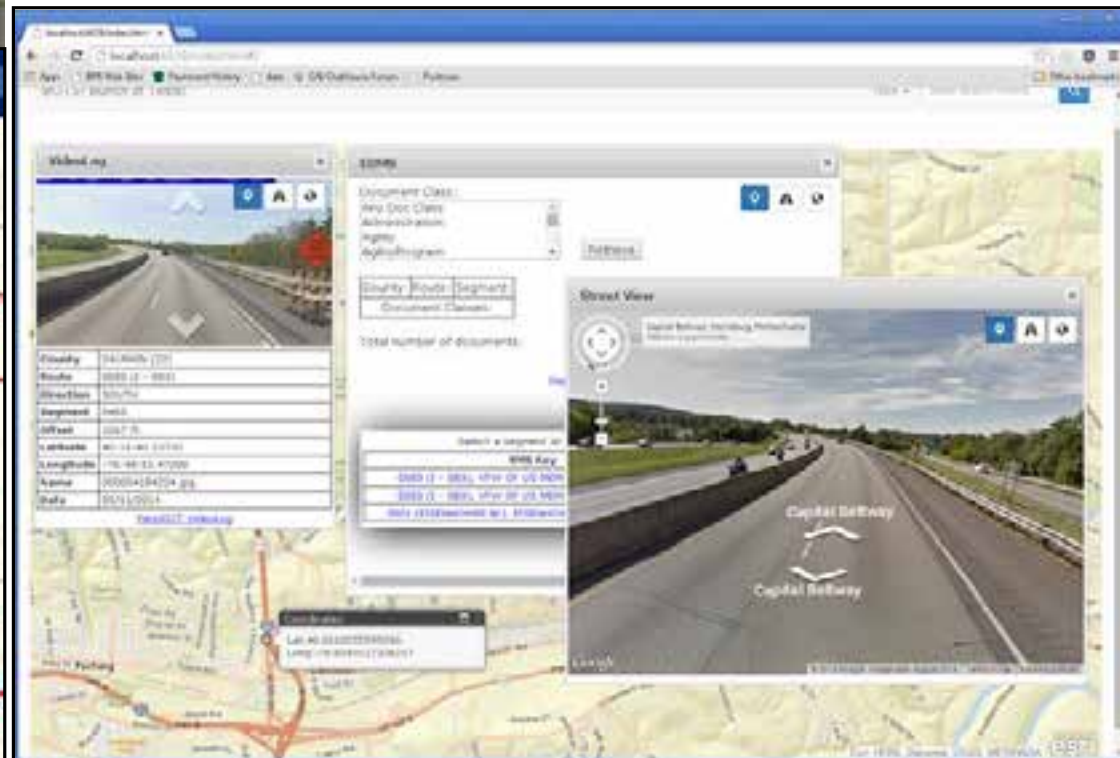
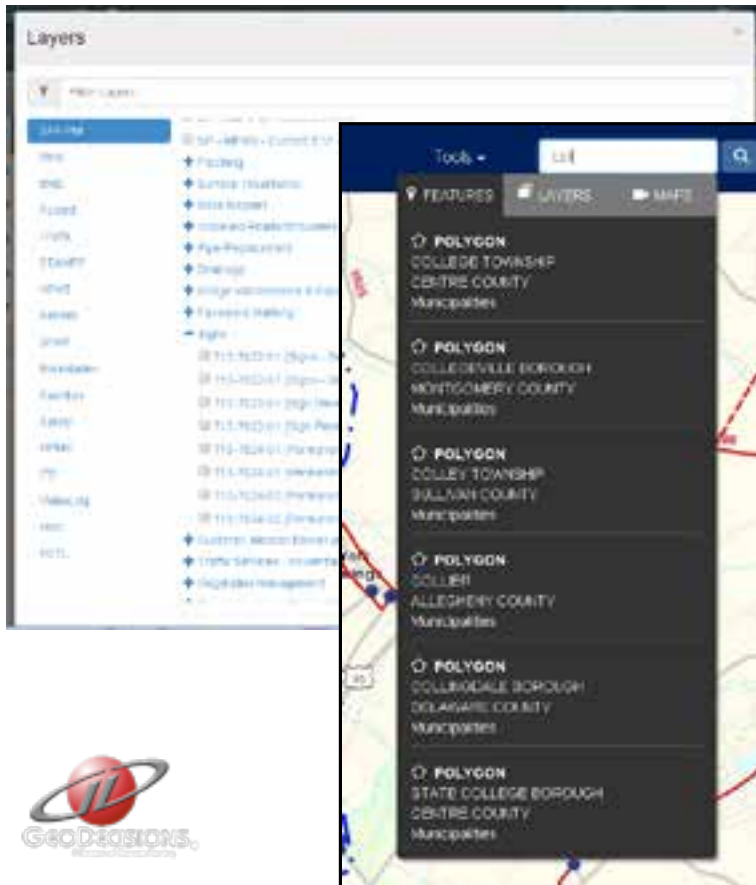


GIS-IQ

Demonstration

PennDOT's GIS – Future

- Common Codebases / Services
 - Wholesale and Retail Widgets (PennBOTS)



Technical Environment

- ASP.NET - Visual Studio 2012
- AngularJS
- Bootstrap
- Python

Technical Environment

- Oracle Spatial 11g
- ArcGIS for Server 10.2.2
- Business Objects – Crystal Reports

PennDOT's GIS – Future

- Expanded GIS-IQ Functionality
- Data Warehouse Redesign
- GIS Integration with Legacy Systems
- Services for Consumption
- External Data Loading (PETL)
- Partnerships with IT

Benefits

- Expanded GIS On-line Functionality
- Greater Data Exposure
- Collaborative Environment
- Reusable Utilities – BOTs

Benefits

- Shared Upgrades & Enhancements
- Faster Development
- GIS Tools / Non-GIS Applications
- Adaptive Workflow

Questions

- Thank You!!
- Questions...
- Contacts:

Frank Desendi, PennDOT

fdesendi@pa.gov

Nate Reck, GeoDecisions

nreck@geodecisions.com