Integrating MAP-21 Asset Management Data Using Esri’s Roads and Highways
Presenters

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AzDOT Enterprise Needs
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- MAP-21 Performance Management
- All Roads Network
- HPMS Reporting
- Data Driven Decision Making
- Silo System Elimination
- Data Edit Propagation
Disparate Data and Analysis Systems
Integrated Systems
Standardized Enterprise Reference

- 32 Character ATIS Code
- Agency Naming Standard
- Linear Referencing System (LRS)
- Geographic Length in Miles
- Beginning and Ending Referents & Offsets
Migrated Business Records (Events)

- Established Business Data
  - Pavement
  - Traffic
  - Assets
  - Characteristics
- Assigned Event Behaviors
- Tracked Edits, Temporality and History
End User Editing Tools

- Roadway Characteristics Editor
  - Pavement
  - Traffic
  - Assets
  - Characteristics
- Custom Geocoding (Dyn Seg) Apps
- Desktop Route Editing
Ready for Systems Integration and Reporting

- MAP-21 Performance ✔
- All Roads Network ✔
- HPMS Reporting ✔
- Data Driven Decision Making ✔
- Silo System Elimination ✔
- Data Edit Propagation ✔
Performance management requires dynamic integration of enterprise business systems.

Features are dynamically generated from business systems.

Real time and temporal view of business data in the GIS.
COTS Business System Integration

**AgileAssets & Vueworks specific integration work**

### Flowchart Description

1. **LRS Edits made using Roads & Highways**
2. **Perform QC on LRS Edits**
3. **The changes are published**
4. **AgileAssets system updates system based on posted changes**
5. **Conversion complete**
6. **Did conversion pass without LRS or Event errors?**
   - Yes: Conversion complete
   - No: Rollback

### Additional Business Value

Additional business value for Roads & Highways...
Automated sync’ing of business systems with LRS

- Business systems
  - Web services communicate the last synchronization date
  - Web services communicate route and measure changes to business records

- Geodatabase
  - Rules define how events are updated
  - All edit activities are time stamped and stored

- LRS Editor
- LRS Change
Business Case for a Modernized LRS

NCHRP Value Analysis Study

onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-07(302)_FR.pdf

MULTI-LEVEL LINEAR REFERENCING SYSTEM (MLLRS) COST/BENEFIT VALUE ANALYSIS STUDY

Requested by:
American Association of State Highway and Transportation Officials (AASHTO)
Standing Committee on Highways

Prepared by:
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When expressed as a C/B ratio, the baseline effort yields a C/B ratio of 1.8:1 while the optional functional elements yield an aggregate 21.4:1 ratio of benefits to cost. These figures were generated from empirical values generated by several of the participating states as workshop participants. These aggregate C/B ratios are bound to be different when each particular state is analyzed separately for their own costs versus benefits using their individual operating conditions.
Robust set of web services for a variety of LRS functions

*Improve data integrity & usability*
COTS Business Applications

Additional business value for Roads & Highways...
HPMS capabilities in Roads and Highways

Output file formats, HPMS data model, RCE to edit sample sections and inventory

Supporting the all roads (ARNOLD) requirement

An LRSable, geocodable, routable, sustainable, collaborative environment

LRSable

Geocodable

Route
Route definitions

Centerline sequence
Key table for M-N relationship between Centerline and Route

LRS Foundation

Calibration points
Point feature class that stores route measures

Centerline
Line feature class that stores route geometry
What does the solution look like?

Create, sustain, collaborate and share to build and maintain ARNOLD

Big Bang Event

Conflate local, state and routing data into a common geometry

Build initial centerline file

Establish control points between jurisdictions

Sustainable Environment

Periodic Load

Web Input

Local Benefits

Conflation

State Data Maintenance

Sharing Content and Services

Providing a State-wide, collaborative system that has benefits for all…
How has technology environment changed?

New and enhanced Commercial Off-The-Shelf (COTS) products to support ARNOLD

- COTS LRS product release
- Sophisticated COTS conflation enhancements to build initial database & incorporate local changes
- COTS Web-based Redlining to Support local collaboration
- COTS Web-based Roadway Inventory data management

Providing a robust data, functionality and collaboration environment
Performance management visualization

Use of ArcGIS Online, Excel and PowerPoint
Discussion