Urban Conversion Project (UCP)
UCI Annual Meeting
May 22, 2014

Todd Halacy, P.E.
VDOT – Local Assistance Division
Agenda

• Roadway Network System Program (RNS)
  • Background
  • Project Defined
  • Overview

• Urban Conversion Project (UCP)
  • Project Defined
  • Overview
  • Benefits of Project
  • Next Steps
  • Level 2 Defects/ Discrepancies
  • Locality Objectives
Roadway Network System (RNS)
• **Highway Traffic Records Inventory System (HTRIS)**

- Live in 1991, HTRIS was the official repository for state-maintained roadway information and was based on a hierarchical ADABAS database consisting of several modules (Crash, Speed Zone, Bridge, RDI, etc.)

- The mainframe had limited data entry points, difficult integration points, and challenging reporting outputs.
It started simple… “just upgrade it”

- Born in 2003, the ‘HTRIS Technology Upgrade’ meant to...
  - Port the mainframe to a relational database
  - Upgrade the ‘green screen’ to a web-based interface
  - ... then geo-enable all the data and map it
  - ... then new servers and technology updates

- The final piece of the ‘original project’ went live April 4, 2012

- The ‘original project’ turned out to be much more than “just an upgrade”
• The RNS Project became the RNS Program in 2010. The Program consists of multiple projects.

• RNS provides the means of tracking and managing Virginia’s road inventory and associated assets and attributes in a tabular, linear, and geospatial context. RNS is replacing a legacy mainframe (HTRIS) application while also enhancing and geo-enabling core business data.
The RNS Program currently supports internal VDOT business groups and external users with the following components in production...

- **Linear Referencing System**: a reference system that identifies the location of business data along VDOT’s roadway
- **Speed Zone**: Manages speed zone data along the LRS
- **Crash**: Manages, Consumes, locates, and feeds crash data via TREDs
- **Railroad Crossing**: Manages location and attributes of crossings
- **Structure and Bridge**: Manages location and attributes of bridges
- **Pavement**: Synchronizes pavement condition data with PMS
- **Other**: RNS Program data feeds DMV's Automated Routing System, Virginia 511, and VA Traffic.
**VGIN Centerline Transition Project**

- Establish the tools and business rules to utilize common road centerlines for all roads in the Commonwealth

**VGIN CL Key Items...**

- Common CL data model – *a single data model for CL shared between agencies*
- Replication of data w/ VGIN - *GIS coordination w/ state agencies & local govt’s*
- Centerline Editing Toolbar (CET) – *Custom built toolbar in ArcMap for CL editing*
- Import and Conflate Tool (ICT) – *Automated CL and data conversion toolset*

6/10/2014
Urban Conversion Project (UCP) –
Develop and execute the process to convert ‘urban data’ (UMIS), VDOT Center Lines & data, and VGIN Center Lines & data

UCP Key Items...
Converts urban road data, VGIN CL & data, VDOT CL & data with CET & ICT tools
Massive data CL data conversion effort – touches every mile of road in Virginia
Normalizes street names based on NENA standards
For the first time ever, VDOT will be able to map all roads in Virginia
In Development Projects

Roadway Inventory Management System (RIMS) –
Construct web-based tools & new business processes to update & maintain road inventory data

RIMS Key Items...
Phase 1 – Massive data conversion effort. Core road data as events on LRS.
Phase 2 – Temporal query capability (Oracle Total Recall, GDB archiving). Enabling field staff to edit event data...where the data enters the system.
Phase 3 – Provides interface for editing of Urban Maintenance Inventory System event data, ‘snow map’ event data, etc.
In Development Projects

Highway Performance Monitoring System (HPMS) –
Provide automated tools & processes to submit annually required report to FHWA

HPMS Key Items...
Based on RIMS data, ‘snapshots’ of rolled up data are taken
Snapshots are validated based on HPMS field manual rules
Enables edits to correct validation errors on snapshot data or back in RIMS
Simplifies upload of data to FHWA submission website
Urban Conversion Project (UCP)
The Urban Conversion Project utilizes tools and methods to merge VDOT centerline data, VGIN centerline data, and Urban Maintenance Inventory System (UMIS) tabular data and create a standard, feature-rich, geo-enabled centerline dataset.
The UCP project will..

- Standardize street names based on accepted industry standards
- Conflate VDOT centerline and VGIN centerline data
- Geo-enable UMIS business data for visualization
- Generate an enterprise and uniform centerline dataset for Virginia
- Create input data for street name-based linear referencing system
- Log appropriate discrepancies for data anomaly reporting
The Urban Conversion Project required updates to the centerline data while the existing LRS was *In Flight* and therefore each replacement of a centerline could *Do No Harm*.

The Urban Conversion Project has dependencies across the RNS Program and to manage this large endeavor and *Do No Harm* required coordination across the entire program. Several phases/projects were established:

- RNS – UCP Pilot 1
- RNS – UCP Pilot 2
- RNS – UCP
- RNS – Operations and Maintenance – Centerlines
- RNS – LRS Build
- RNS – RIMS – UMIS
UCP Project Benefits

- Benefits of the UCP Project include:
  - Geo-referencing all UMIS roadway segments in RNS
  - Converges all data sources to one enterprise centerline repository
  - Discrepancy Reporting
  - Performance Measures
  - Boundary Adjustments
  - Public Roads Inventory: Compliance with several legislative initiatives, to include:
    - Federal Moving Ahead for Progress in the 21st Century (MAP-21)
    - Highway Performance Monitoring System (HPMS) and Safety reporting.
    - Highway Safety Improvement Program (HSIP)
  - Accident Sites
  - Federal Classification
  - Maintenance Responsibility

6/10/2014
## VDOT to VGIN Conflation

<table>
<thead>
<tr>
<th>Area</th>
<th>% of Centerline Edges Conflated Successfully</th>
<th>Total # of Edges</th>
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<tr>
<td>1</td>
<td>99.2%</td>
<td>43,854</td>
</tr>
<tr>
<td>2</td>
<td>99.3%</td>
<td>41,683</td>
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<tr>
<td>3</td>
<td>99.6%</td>
<td>52,722</td>
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<td>4</td>
<td>99.0%</td>
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<tr>
<td>5</td>
<td>98.8%</td>
<td>69,616</td>
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<td>6</td>
<td>99.9%</td>
<td>37,849</td>
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<td>7</td>
<td>99.7%</td>
<td>48,632</td>
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<td>8</td>
<td>99.7%</td>
<td>63,832</td>
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<td>9</td>
<td>99.9%</td>
<td>47,099</td>
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<td>10</td>
<td>99.9%</td>
<td>32,094</td>
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<tr>
<td>11</td>
<td>99.9%</td>
<td>62,343</td>
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<td>12</td>
<td>99.9%</td>
<td>52,610</td>
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<td>13</td>
<td>99.9%</td>
<td>40,115</td>
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# UCP – Outcome Metrics

## UMIS Conflation

<table>
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<tr>
<th>UMIS Group</th>
<th>% of UMIS Events Conflated Successfully</th>
<th>Total # of Events</th>
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<tr>
<td>0</td>
<td>83%</td>
<td>1,804</td>
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<tr>
<td>1</td>
<td>84%</td>
<td>5,707</td>
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<td>2</td>
<td>89%</td>
<td>7,365</td>
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<tr>
<td>3</td>
<td>88%</td>
<td>5,572</td>
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<tr>
<td>4</td>
<td>89%</td>
<td>6,423</td>
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<td>5</td>
<td>72%</td>
<td>7,360</td>
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<td>6</td>
<td>92%</td>
<td>5,031</td>
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<td>7</td>
<td>84%</td>
<td>4,505</td>
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<tr>
<td>8</td>
<td>86%</td>
<td>4,466</td>
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<tr>
<td>9</td>
<td>86%</td>
<td>6,206</td>
</tr>
<tr>
<td>10</td>
<td>84%</td>
<td>7,919</td>
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UCP was funded by Local Assistance Division through a State Planning and Research (SPR) funding grant.

<table>
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<tr>
<th>Funding Source</th>
<th>Total Budget</th>
<th>Total Actuals*</th>
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<tr>
<td>SPR</td>
<td>$2,771,300</td>
<td>$2,771,299.00</td>
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<td>ITD (last approved FY14)</td>
<td>$ 434,661</td>
<td>$ 12,092.60</td>
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<tr>
<td>Total</td>
<td>$3,205,961</td>
<td>$2,783,391.60</td>
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* Actuals are from PpM, VDOT ITDs Project Management System. Cardinal actuals will be forthcoming and adjusted, if necessary, to the ITD and SPR breakout defined above.
• Processing and Reconciliation of Level 2 Fallouts
  • Local Assistance Division is working with Centerline team and localities to resolve discrepancies
  • Current count of Defects is over 2,200

• Five Common Types of Level 2 Fallouts
  • Gap
  • Overlap
  • Segment Description
  • Segment Length
  • Street Name
• **Jan 2014**- localities received notification of UCP
• **2014**- VDOT LAD will be correcting errors and omissions within UMIS data
• **2014**- VDOT LAD will mail each locality a packet with detailed findings and pending changes to data
• **2014**- Localities will have 30 days to respond to LAD
• **2015**- Changes will be updated to UMIS and will begin to affect urban quarterly payment amounts
Types of Level 2 Fallouts - Gap

- A physical break exists in the event description that renders it impossible to be one event
• Two events that conflict by describing the exact same stretch of road. One must be deleted.
• There is an error in describing the TO/FROM of an event, the width, classification, or number of lanes.
• A segment as described is the incorrect length.
• The name of the event road is wrong, misspelled, or lacks the proper prefix/suffix (E/W, Dr/St, etc)
Within 30 days of packet receipt:
- Review errors and corrections
- Clarify serious description errors
- Dispute any incorrect actions
- Submit any new additions/deletions

UMIS Eligibility Criteria:
http://www.virginiadot.org/business/resources/local_assistance/Road_and_Street_Criteria_Summary.pdf
Questions?