



December Meeting

12/11/2019

AGENDA

1. Announcements
2. Esri Update
3. Roads and Highways for AGOL and Portal
4. Open Discussion

**** Please mute phones!! ****

ANNOUNCEMENTS

- Implementation Status Survey
- AEGIST Peer Exchange
- GeoNet

Esri Updates

Nathan Easley

Roads & Highways for AGOL and Portal

Doug Cochran

Open Discussion

RHUG Community

Upcoming Meetings / Contacts

Wednesday, January 8, 2020

Contact Info:

Erin Lesh ealesh@ncdot.gov

Patrick Whiteford pwhiteford@azdot.gov



Product Team Update (RHUG meeting 12/11/19)

Nathan Easley

Capabilities currently under development

- **Testing 10.6.1/10.7.1 patches**
- **Intersections**
 - **Configuration**
 - **Modification**
- **Complex route shapes (loop, lollipop, alpha, branch, etc.)**
 - **Create Route**
 - **Extend Route**

Support Incidents/Defects

- **BUG-000124441** – Incorrect value gets auto-populated for some routes while using tools from Roads and Highway toolbar (developer working on fix for 10.8.1)
- **BUG-000127180** – The Check Events tool does not indicate that a gap exists when creating a micro gap between events (less than 7) at the 7th decimal place (currently investigating)

10.8 Defects

Defect	Action
BUG-000122847 – Certain decimals change after manual inputting certain numbers in attributes within Event Editor	Fixed in 10.8
BUG-000123422 – When Registering an Event from the ALRS Properties window, Event behaviors will reset to defaults	Fixed in 10.8
BUG-000122121 – When performing a cartographic realignment that is larger than the M tolerance but smaller than the default XY tolerance and the network is configured to update the measure for cartographic realignments, no calibrate edit log records are written, resulting in incorrect event behaviors being applied	Fixed in 10.8
BUG-000125618 – Delete Routes Geoprocessing tool fails unless the data owner user is connecting to enterprise geodatabase	Fixed in 10.8
BUG-000126639 – geometryToMeasure functionality for LRSServer map service shows route points locations even outside of the specified tolerance value	Fixed in 10.8
BUG-000126147 – Concurrencies operation on a linear referencing (LRS) enabled map service does not return expected results	Fixed in 10.8

Other Announcements

- **Examples of route edits made to complex route shapes (loop, lollipop, alpha, branch, etc.)**
- **Use of CAD and Civil 3D within your DOT and how it's used with Roads and Highways**



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Linear Referencing System (LRS) in ArcGIS Online and ArcGIS Enterprise



Doug Cochran, dcochran@esri.com
ArcGIS Online Product Management

LRS Requirements in ArcGIS Online and ArcGIS Enterprise

- Provide an LRS-Event “READOUT” tool

The screenshot displays the ArcGIS Online interface. On the left, a list of routes is shown:

- RouteName: NY158, RouteID: 10009501
- RouteName: NY242, RouteID: 10019501
- RouteName: NY325, RouteID: 10029501
- RouteName: NY431, RouteID: 10039501
- RouteName: IN87, RouteID: 10049501 (highlighted)
- RouteName: SR913C, RouteID: 10059501
- RouteName: SR971B, RouteID: 10079501

Below the list, the 'Find Measure' section is visible:

Min Measure: 0
Max Measure: 11.246

Find Measure:
From Measure:
To Measure: (optional)

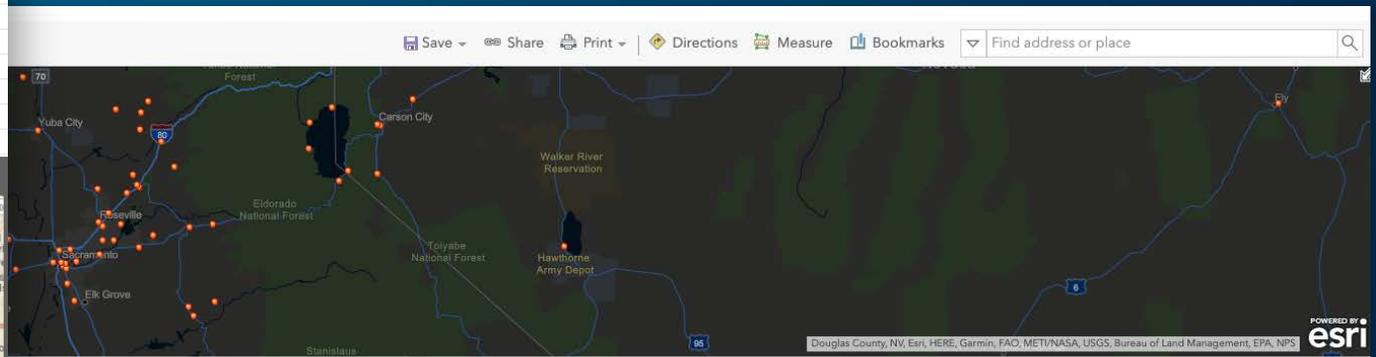
The 'Route' popup window displays the following details:

Field	Value
OBJECTID	1848
FromDate	2011-11-02
ToDate	<null>
RouteID	10049501
RouteName	IN87
MileLength	8.7
MilePointName	<null>
CountyOrder	<null>

LRS Requirements in ArcGIS Online and ArcGIS Enterprise

- Allow Online and Enterprise apps access to Event tables for query, analysis and visualization

	A	B	C	G	H	I	J	K
1	Routeld	From Measure	To Measure	Project	Proposed Completion Date			
2	IN278	9.25	10.1	Rumble Strips	9/3/2013			
3	IN278	15.32	15.64	Resurfacing	5/9/2014			
4	IN495	10.75	10.89	Guard Rails	10/7/2013			
5	IN678	12.13	12.63	Guard Rails	7/16/2013			
6	NY 27	13.12	13.79	Rumble Strips	3/5/2014			
7	NY 94	5.95	6.16	Resurfacing	6/1/2014			

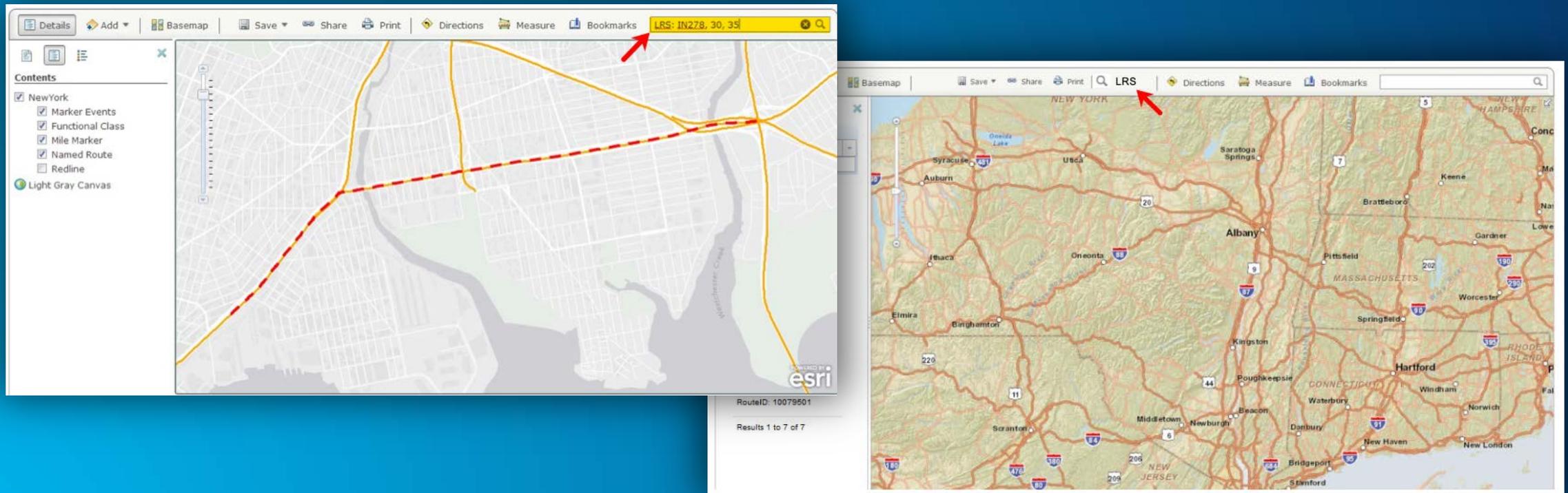


County	State	zip	Harvest Dates	x	y	ORGANIC	Bakedgoods	Cheese
Maricopa	Arizona	85308	1/8/2013, 4:00 PM	-112.19	33.66	N	Y	Y
Milwaukee	Wisconsin	53218	5/31/2013, 5:00 PM	-88.00	43.13	Y	N	N
Platte	Wyoming	82201	7/12/2013, 5:00 PM	-104.95	42.05	N	Y	N
Graham	Arizona	85546	10/31/2013, 5:00 PM	-109.72	32.83	N	Y	N
Santa Clara	California	95112	1/11/2014, 4:00 PM	-121.89	37.35	Y	Y	N
St. Louis City	Missouri	63118	5/22/2014, 5:00 PM	-90.23	38.59	N	Y	N
Orange	New York	10928	6/14/2014, 5:00 PM	-73.97	41.37	N	Y	Y
Hawaii	Hawaii	96740	11/25/2014, 4:00 PM	-156.00	19.65	Y	Y	N

1,010,722.00	Kona Sunset Farm	Kmart Parking Lot, Makalapa Shopping Center	Kailua Kona
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LRS Requirements in ArcGIS Online and ArcGIS Enterprise

- Enable LRS search queries in the Map Viewer Search box to locate point or line events in the LRS network



LRS Roadmap for Support in ArcGIS Online/Enterprise

- Currently being researched on the backend
- Will be looked at more closely in 2020, and other initiatives
- LRS support is a high priority for ArcGIS Online/Enterprise
- Beta opportunities to test LRS before public release

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Linear Referencing System (LRS) Requirements in ArcGIS Online and ArcGIS Enterprise

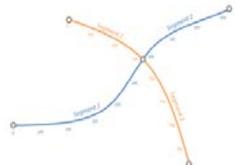
ITEM	DETAILS
Product Name & Version	ArcGIS Online v8.x, ArcGIS Enterprise
Document Title	Linear Referencing System (LRS) Requirements in ArcGIS Online and ArcGIS Enterprise
Authors	Doug Cochran, Tom Brenneman
Creation Date	01/15/2019
Last Updated	12/10/2019

Purpose of the document

This document provides the requirements in ArcGIS Online and ArcGIS Enterprise to support LRS.

Many organizations collect data about linear features as point locations along the line as an alternative to expressing the locations using X,Y or Lat/Long coordinates.

Linear referencing is the method of storing geographic locations by using relative positions along a measured linear feature. Distance measures are used to locate events such as car accidents, railroad repair work, river obstructions, along the line:



Questions for the RHUG

- Benefits of having LRS support in ArcGIS Online and Enterprise?
- Would this capability be used as a replacement or complimentary to Roads and Highways?
- Who are the consumers of LRS data in ArcGIS Online/Enterprise?

Thank you!

Contact:
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Roads & Highways REST API

Use at NYSDOT

December 12, 2019

Esri Roads and Highways/Linear Referencing REST API

Esri Linear Referencing REST API

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Esri Linear Referencing REST API - Overview

Introduction

The Esri Linear Referencing REST API provides a simple, open Web interface to linear referencing services hosted by ArcGIS Server. All resources and operations exposed by the REST API are accessible through a hierarchy of endpoints or Uniform Resource Locators (URLs) for each GIS service published with ArcGIS Server.

When using the REST API, you typically start from a well-known endpoint, which represents the server catalog. The table of contents for this Help system mimics the hierarchy of resources in the REST API. The default start URL for an ArcGIS Server installation is:

```
http://<host>/arcgis/rest
```

For example, to get to the root directory of ArcGIS Online services, the URL is:

```
http://services.arcgisonline.com/arcgis/rest/services
```

From this base URL, you can traverse to any of the listed service and resources and operations associated with the service.

The REST API is stateless, which means that REST does not keep track of transactions from one request to the next. Each request must contain all the information necessary for successful processing.

Getting Started

If you want to learn more about how the REST API works, you can start by following the examples in [Getting Started](#).

Resources and Operations

The REST API has some level of support for each of the ArcGIS Server service types. Each service is a resource and has a unique URL. Although a REST system always returns only representations of resources to the clients, for the sake of simplicity, the resources of the ArcGIS REST API are divided into two types: resources and operations.

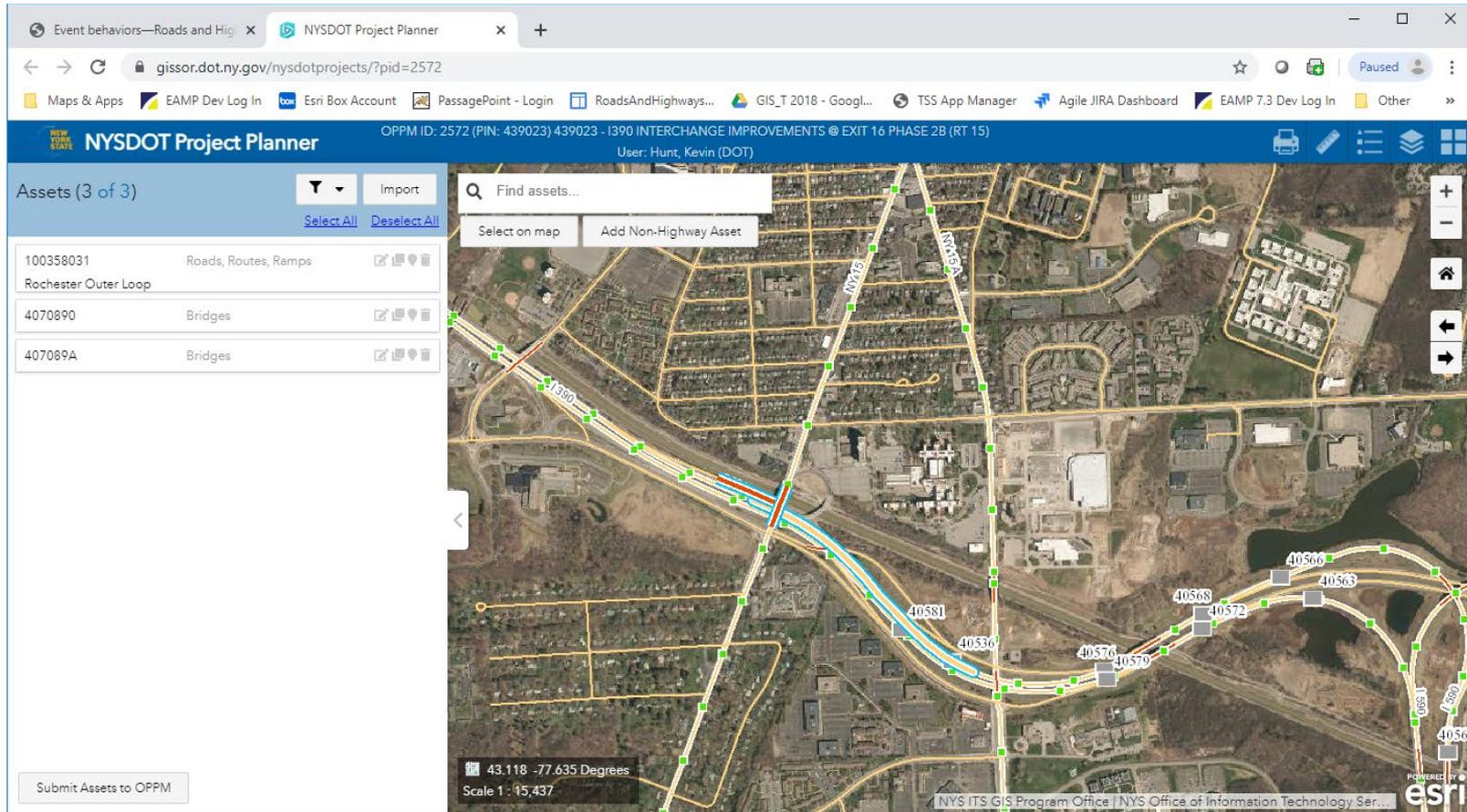
The supported service types that include operations are map, geocode, geoprocessing, geometry, and image. Another set of service types that are supported as resources but have no associated operations include network, geodata, and globe services. One requirement of the REST API is that ArcGIS Server services must be configured as Pooled. Non-pooled services are not listed in Services Directory.

You can find out additional details about all resources and operations supported by the REST API. To get going, you can review [Linear Referencing Service](#), which is the root node for the API.

Map services containing network and event layers can be consumed the same way as other ArcGIS Server dynamic map services. In an ArcGIS Server web API application, these layers can be visualized either as a `ArcGISDynamicMapServiceLayer` or as a `Feature Layer`.

New York and our consultants are currently using or developing against the REST API capabilities for a number of projects.

Route, Road, Ramp Project Locations and OPPM



The screenshot displays the NYSDOT Project Planner interface. The browser address bar shows the URL gissor.dot.ny.gov/nysdotprojects/?pid=2572. The application header includes the NYSDOT logo, the title "NYSDOT Project Planner", and the project details: "OPPM ID: 2572 (PIN: 439023) 439023 - I390 INTERCHANGE IMPROVEMENTS @ EXIT 16 PHASE 2B (RT 15)". The user is identified as "User: Hunt, Kevin (DOT)".

On the left side, there is a panel titled "Assets (3 of 3)" with an "Import" button and "Select All" / "Deselect All" links. The asset list is as follows:

Asset ID	Asset Type	Actions
100358031	Roads, Routes, Ramps	[Edit] [Share] [Favorite] [Delete]
Rochester Outer Loop		
4070890	Bridges	[Edit] [Share] [Favorite] [Delete]
407089A	Bridges	[Edit] [Share] [Favorite] [Delete]

The main map area shows an aerial view of a road interchange. Several project locations are marked with green squares and labeled with asset IDs: 1350, 40581, 40536, 40576, 40570, 40568, 40572, 40566, 40563, and 40500. A search bar at the top of the map area contains the text "Find assets...". Below the search bar are buttons for "Select on map" and "Add Non-Highway Asset". The map includes navigation controls (zoom in/out, home, pan) and a status bar at the bottom showing coordinates "43.118 -77.635 Degrees" and a scale of "Scale 1 : 15,437".

At the bottom left of the asset list, there is a "Submit Assets to OPPM" button. At the bottom right of the map, there is a footer for "NYS ITS GIS Program Office | NYS Office of Information Technology Services" and the Esri logo.

Automation around deriving LRS locations where geospatial is the master

Route: 100382022
Location: 10.884

Route Field (Required): NY417

100382021 (NY417) 100382022 (NY417)

Find

Route Reference: Milepoint_IUSNY
Route Identifier: ROUTE_ID
Route:
Type: Point Line
Location: 10.884341

Right-click a row to show context menu.

Route	MMin	MMax	Location
100382022	-0.000000	34.748726	10.884341

One object found

Table

Small Culverts

Culvert ID Number	USNG ID	ROUTE ID	Measure	Route
124348	17T QG 3660	100382022	10.884341	NY417

(1 out of 44007 Selected)

Roadside assets including signs, guiderail, small culverts, lighting, etc.

Using server based Roads and Highways capabilities

- REST API vs GP tools vs published geoprocessing services.
- Are REST API capabilities providing the expected results?
- Are you using the Roads and Highways/Linear Referencing API for similar workflows or integrated applications?
- Recommend using GeoNet to continue the discussion among the community on best practices and effective use, documentation, issues with API functionality,

Yueming Wu @ WVDOT-Highways13:00

Doug of ESRI, can you move to the next slide so we can record your contact info.?

Blaine Hackett MnDOT13:04

Doug, MnDOT is looking at implementing 10.7.1. Can you speak to how Roadway Characteristic Editor takes advantage of AGOL and/or Portal?

You13:05

DCochran@esri.com

Tom Brenneman13:06

Blaine, The Event Editor uses the security model of ArcGIS Online or the ArcGIS Enterprise Portal.

Nicole Hanson13:06

Doug- ITD has implemented the use of an external portal to allow for those outside the agency to edit LRS events. Would having LRS support in ArcGISOnline replace that?

Tom Brenneman13:07

Sorry having trouble with mic

Yueming Wu @ WVDOT-Highways13:08

Thanks, Erin

David Knudsen13:08

Doug--to the extent the AGOL capabilities parallel those of event editor, it would be helpful to developers! AGOL API is documented, but I've really had to hack the event editor to extend its capabilities. Haven't found any documentation of how to do that.

Doug Cochran13:09

LRS API in ArcGIS Online/Enterprise. Noted! thanks.

Nicole Hanson13:23

Kevin- ITD is using the R&H APIs

Michael Clement13:31

most people who aren't in the LRS editing environment want to see reference posts

Bibi13:31

Hello, is there a diagram of the recommend workflow between R&H model to LRS to help beginners implement the best practices process?

Claire Inbody13:33

Yes Nebraska DOT is the same ref post is used for everything outside of the LRS process.

Kyle G13:46

it would be a shame for counties to attempt to develop LRS solutions that would be different than the state LRS systems

Ryan13:48

Tom - I think the best way to think of the "multi LRM" issue is to think about it in terms of language (at least from my viewpoint). I really think the need is not about 1,2, etc. LRM's but instead is about the ability to "speak the language" of the user/need at any given time. The issue that everyone is trying to get past is much like the Tower of Babel story. There are many different users who need to communicate across multiple languages. While the LRS is the "universal language" from the software standpoint the translation between the universal language (whether it be cartographic length, mileposts, etc.) to another language (LRM) is not simplistic in nature. The need is for different users to be able to access the data as they would like to access it for the need at hand is key. For instance, the LRS team might want to talk in cartographic length language; while a bridge maintenance team would love to talk in physical attribute + offset language (Bridge Deck + 200').

Ryan13:48

An LRM translation tool would be ideal

Pedro Zanoquera13:49

Cannot view anything in the PC screen or hear anything,. I can only read the chat.
You13:49

Pedro - nothing is being shared right now. Just open discussion and chat box comments

UDOT13:50

we can't hear Nathan
Pedro Zanoquera13:50

Ok, thanks

Bibi13:51

Miami-Dade County is looking integrate CADD
Bibi13:51

with R&H
Sam Coldiron - Oklahoma DOT13:53

We use the DGN files from either As Built or 90% and spatially reference it so we can update new alignments or add new attributes

Tom Brenneman13:53

Ryan - My thought is to use location as the universal language. If we convert a reference post offset to a spatial location we can then use tools like Workforce or Navigator to send people to that location without having the field user to even know what the reference post or LRS position is. And conversly if someone fills out a form and captures the location in the field, then in the back office we can add

LRS and reference post offsets to that data. And then again in that second case the field user would not need to know their reference post position.

Nicole Hanson13:55

ITD does the same as Oklahoma

Blaine Hackett MnDOT13:56

We use it for background if we don't have aerials

Sam Coldiron - Oklahoma DOT13:57

We use microstation

Michael Clement13:57

DGN's here in Iowa

Claire Inbody13:57

dgn in nebraska

Eric Jackson13:58

DGN's here at WSDOT

Blaine Hackett MnDOT14:00

Where will the recording be available?