

Utah ARNOLD Technical Workshops Summary Findings

June 6-9, 2016

The Utah Department of Transportation and the Automated Geographic Reference Center (AGRC) recently hosted a series of workshops designed to engage local governments for the development of a unified statewide GIS-based roadway network. This network is critical to the operations of many statewide initiatives that directly impact local communities. A few of these initiatives include 911 services, 811 services and funding for roadway improvements.

The team, consisting of representatives from UDOT, AGRC and Consulting partners conducted interactive half-day workshops designed to cover topics such as:

- Impacts of FHWA's ARNOLD and NG-911.
- Establishing better communication protocols between locals and the State.
- Data requirements to support local, state and federal needs.
- Impacts of MAP-21 on the maintenance of local roads data to support asset management, operations, and maintenance.
- Communication during the data maintenance lifecycle.
- Discussion of QA/QC needs and requirements for all stakeholders.
- Future Shared Editing Portal Discussion.

The level of participation from local government representatives helped make these meetings very successful and served as the beginning of a long-term process to improve the maintenance of Utah's roadway centerline data.

Detailed meeting notes are included in later sections of this document. Common elements of discussion during the workshops included:

- The definition of a Federal Highway Administration (FHWA) public road was discussed to ensure all attendees understood which streets should and should not be included in ARNOLD. Attendees discussed several ways new roads are added into their databases, including the city and county vetting process.
- Attendees discussed known experiences uploading roadway data to the Utah Automated Geographic Reference Center (AGRC) system. Attendees suggested that the AGRC model needs to accommodate ownership data attributes as cities and counties update new roads to be included in the database. It is clear that all cities and counties are not on the same GIS maturity capability level and therefore the processes for providing editing updates to AGRC vary. However, most cities and counties participating report that the AGRC data upload process was efficient and seamless.
- AGRC has a data model and desires to improve collaboration with local entities to ensure its standardized model fits user requirements. It was mentioned that most ARNOLD

requirements are already being reported, but most importantly this project is about improving the process for reporting data and making it available to the stakeholders.

- Attendees were interested in additional training in order to ensure the highest level of data quality assurance and quality control (i.e., training for the person submitting and editing data in a phased approach).
- Shared editing of centerline geometry is a concern for many attendees. Most believe that the data model/submission process should support multiple business processes to fit city/county needs. Overall concerns from the group arose regarding dual editing. Ideally, cities and counties would want to edit their own data in addition to editing the AGRC version of their data. As a result, they want to be able to edit the AGRC version, then possibly copy it to local databases. Some examples discussed during the meetings included ArcGIS Online feature service editing vs. a direct SDE editing environment.
- 811 discussion topics within the group focused on the preferred process for submitting data prior to acceptance by cities. The majority of the group believed that data should be submitted prior to actual acceptance, but there are obvious concerns for liability with the data (e.g., when will Google receive the data and what if the data does not display and/or attribute correctly?). For those roadways classified as “preliminary/under construction”, there are concerns about data liability. Other 811 comments and questions focused on data schemas and whether or not the group thought that a rigid schema was a good idea to implement. Benefits of this could include faster processing. Attendees discussed that in general, a good data steward and data keeper is required. However, it was noted that some counties view AGRC as the expert and depend on AGRC to understand and implement stewardship guidelines. Larger GIS-experienced counties are less dependent on AGRC for technical guidance but voiced concerns regarding consistent data symbolization and standardized roadway designations for state routes, US highways and interstates.
- Shared portal access and potential issues were discussed among the attendees. Issues such as data security, data user access and editing privileges were highlighted. It was mentioned that AGRC maintains its data without including personal identification information, even with parcel datasets assembled by AGRC. The goal is ultimately to reduce multiple datasets within local agencies.

ARNOLD Local Workshop Notes

City of Logan ARNOLD Workshop (June 6, 2016)

The ARNOLD project team met with local representatives in the City of Logan, UT to provide an overview discussion and technical workshop of the FHWA ARNOLD program, the UDOT program involvement and project status updates.

The meeting began with an open attendee discussion regarding road maintenance and updates to AGRC. It was mentioned that Box Elder County sends updates to AGRC every six (6) months. Furthermore, attendees discussed that schema changes requested by AGRC have caused some issues with them keeping up with data schema conversions/updates. It was mentioned that part of the reason that data schema conversions and updates are behind is due to staff turnover, and some counties cannot always keep up with the modifications to versions/schemas/updates and training required.

The group attendees also discussed that the State needs to help with conversion of data to Spillman (911). Some attendees mentioned that, in general, cities are a good resource for editing because of the permitting and planning for new construction and that they have access to the build information. While cities can be a good resource for editing purposes, several concerns were brought up including the fact that city/master plans of subdivisions sometimes are never built due to lack of planning. However, these new roads need to be officially adopted by the respective city and flagged in data attributes as “to be built.” The following example was mentioned to the meeting attendees: A city accepts a new subdivision after one (1) year. The developer is bonded for the initial year to maintain infrastructure, but this should be still included for 911 purposes, and therefore this would be an intermediate attribute before the final acceptance. It was also mentioned that certified miles are only recognized after official city acceptance. Cities have different processes for “accepting” new roads to be included into the master database.

Attendees also discussed other AGRC upload process examples. Daggett County, for example, has emailed updates to AGRC via shapefile about once a year and that timetable allows for adequate time to handle any schema issues or inconsistencies. Another attendee discussed that in Cache County, cities provide monthly recorded updates to counties, send PDF files of plats and then the City georeferences and builds the GIS databases from as-built drawings. Additionally, for 811 requests, it was discussed that two (2) days expected turnaround time for 811 is not an easy schedule to meet. Other examples discussed included the City of Providence and the City of River Heights which have their counties submit the roadway updates to AGRC. In some cases, the cities/counties will work together to help edit each other’s data and some counties only get updates to the Records Office. In another example, consultants manage some city and county data. Davis County, however, does not provide any data to its consultant but rather works directly with the city.

At the latter part of the stakeholder meeting, attendees discussed additional ARNOLD topics specifically related to functional classification designation and roadway ownership. An attendee mentioned that Cache County does track roadway functional classification information, but they use a local code based on county ordinances, which could open a need to map these local codes to federal highway codes. Additionally, a discussion ensued that asked the question “How are federal codes relevant to local code requirements?” After group discussion, it was decided by the group that data schema may need to be modified to include local ordinance codes and federal functional classes separately.

Regarding data ownership, attendees discussed that ownership attributes should be used to track the newly built roads not yet accepted. Attendees further suggested that the AGRC model needs to accommodate ownership data attributes, as cities and counties can update this level of detail in the database. Some suggestions for attribution include possibly using a unique code to designate “Private” roads

Lastly, the group discussed some aspects of editing centerline geometry. Group discussion continued regarding shared editing of centerline data and some of the concerns involved. Some highlights included:

- Concerns from the group regarding dual editing. Ideally, cities and counties would want to edit their own data in addition to editing the statewide dataset. In practice they want to be able to edit at the state level then possibly copy to local databases.
- Can users upload only specific dates based on changes only, and only since last submittal?
- Can users just extract recent approved updates and not download all data?
- Data model/submission needs to support multiple business processes to fit city/county needs.

Salt Lake City ARNOLD Workshop (June 7, 2016)

On June 7, 2016, the project team met with Utah DOT (UDOT) and local stakeholders to provide an overview discussion and technical workshop of the FHWA ARNOLD program, UDOT program involvement and project status updates. The consultant team provided a detailed ARNOLD background PowerPoint presentation to the attendees.

Attendees began the 911 discussion with MSAG (Master Street Address Guide) and some limitations encountered when placing data into the program. For example, MSAG 911 is based on roadway address for Landline Customer addresses only, updates to MSAG happen with Excel spreadsheets, and sometimes roads are divided down the middle for city/county responsibility.

Regarding 811, attendees mentioned that there were over 380,000 request calls in 2015. However, it was discussed that some cities cited frustration about sharing data. Cities dislike getting emails

from 811 questioning the quality of their data. They want to share data better as a result and eliminate the calls from people questioning their data. Some attendees added that the B&C roads submission is not an easy process. Specifically, knowing the format and process for how and who to send information to is vague. Some attendees mentioned that spreadsheets are sometimes used as well as signed submittals. Additionally, Salt Lake City does linear referencing for their local roads, and two (2) other cities reacted positively to potentially including their data in the State's LRS database.

The second session's workshop discussion began with a focus on attribute requirements. Some attendees mentioned that there are minor questions regarding dual carriageways and cul-de-sacs, but no major issues were discussed regarding complying with a set standard. Regarding certified mileage, attendees discussed that roads split between two (2) city jurisdictions on opposite sides would include a split by length when submitting to FHWA.

Further discussion included the process for data submission. Specifically, questions were raised to the group regarding how data is submitted and if there were any concerns with their current process. The following groups voiced opinions and findings:

Salt Lake City

- Salt Lake City described that their process goes through the Salt Lake Valley Emergency Communications Center (SLVECC)
- Salt Lake City wants a copy of slides emailed to all attendees
- Salt Lake City has some known issues and wants to discuss offline at a later time

SLVECC

- Uses SDE technology. AGRC works with them and extracts data seamlessly
- 911 shares data with Salt Lake County and the current process works well

City of Ogden

- The City of Ogden uses an ArcGIS online application to update its data to Weber County. Weber County then updates all of the City of Ogden data and then finally submits to AGRC. This process has been going since February, 2016 and is reportedly doing well.

City of Murray

- The City of Murray uses pro-shared editing, similar to the SLVECC methodology. The City of Murray realizes the importance of data currency. They are currently testing ArcGIS Online and helping the City's planning group use this as tool for editing. The City of Murray would like to chat more about ArcGIS Online integration application opportunities in other discussions.

Davis County

- Some cities within the county maintain their own data
- Each entity has different needs and no GIS program capabilities. Some work is contracted out for other needs.

- Pro-shared environment is fostered.
- Primarily update the address points and use address points to provide review against the street centerlines.

City of Santaquin

- The City is currently missing a path of communication in order to update. Attendee mentioned that for the County of Granite/Grant school district that data quality is important to them and they use the data for routing buses. More specifically, the software manages the routing network, including turnarounds, divided roads, etc. At this time, they are seeing only minor issues with the routing data.

Final thoughts from the attendees on the topic of data submission were that some counties have cities that do not use GIS and therefore, update their own data. Additionally, some cities rely on consultants to perform their data updates. Also, regarding roadway connectivity between cities and counties, it was mentioned that AGRC is currently dealing with and trying to solve roadway connectivity issues with business model processes.

The last topic in the second session workshop included discussion on 811 comments and questions from the attendees. The first group discussion on 811 comments and questions were centered on schema and if the group thought that a rigid schema was a good idea to implement and possibly be a quicker process. Attendees discussed that, in general, a good data steward and data keeper is required. However, it was noted that some counties view AGRC as the expert and look for them to understand and implement the guidelines. Other larger, GIS-experienced counties can determine the information on their own and instead want data symbolized consistently and roadway designations standardized for state routes, US highways and interstates.

Another 811 discussion topic within the group focused on the preferred process for submitting data prior to acceptance by a city. The majority of the group believed that data should be submitted prior to actual acceptance, but there are obvious concerns for liability with the data (e.g., when will Google receive the data and what if the data does not display and/or attribute correctly). For those roadways under “preliminary/under construction classification” there are also concerns for liability. Attendees noted that a well-defined process is needed to properly identify roads prior to the data being “recorded.” Further, some cities have two (2) datasets, one for SLVECC and one for their use that holds roads to be built. A county attendee brought up the question of whether Google Earth software could be used to draw roads for FHWA. Group leaders discussed that FHWA will not allow third-party data and 911 datasets have risk/liability associated, so private vendors, in general, do not want to be involved. Attendees added that some of these risk issues with data are now being addressed in autonomous driving.

Cedar City ARNOLD Workshop (June 8, 2016)

On June 8, 2016, a technical workshop was held in Cedar City to provide an overview discussion and technical workshop of the FHWA ARNOLD program, UDOT program involvement and project status

updates. The consultant team provided a detailed ARNOLD background PowerPoint presentation to the attendees.

The main focus of the first session of the workshop was to provide discussion on the current data submission process. Attendees mentioned that Washington County performs its own addressing updates and will soon be editing streets through a feature service, following a similar model by the City of St. George and the City of Hurricane which are currently using this process. The process includes using ArcGIS Server/SDE direct access and having SDE geodatabase editor tracking enabled. Washington County regularly provides updated copies to the server. Attendees mentioned that Sevier County follows the addressing process setup by Wayne and Piute counties and they check all their data and submit it daily to AGRC. The two counties said that they work with every city adjoining the counties. Sevier County creates addresses/streets within the County Planning and Zoning departments.

Attendees then discussed if anyone has been utilizing the AGRC addressing application. No one in attendance mentioned that they have been. This discussion was followed by a discussion on shared portal access and issues which have arisen among the group attendees. Issues such as data security and data user access were discussed.

A final discussion in the first session included the topics of adding new roads into the database and the processes of which the attendees were aware. An attendee mentioned an example in the City of St. George. As soon as preliminary engineering plats are developed, they add the road data into a separate dataset using a feature service. However, when data is recorded through the county, it is considered "official". Additionally, private roads are not approved by the City, but they are recorded and would need to be marked as "Private" when submitting to AGRC. A brainstorming discussion began on the topic of when does a road in the database stop being a driveway and become a private street? It was determined among the group that the switch of a driveway to a private road is a local judgement to determine status. Local participation is also necessary to identify the planned versus recorded status for roadways. More specifically, planned/under construction information should be available for 811/911 where the recorded and approved are then coded for Certified Mileage Program.

The second session workshop began with discussing the overall timeframe of project, and that NG911 may actually drive the project schedule. The goal is to try to stay ahead of 911 requirements. AGRC will try to have a proposal for local review in the fall of 2016. Attendees voiced support for a collaborative effort including AGRC, UDOT and local agencies, 811, and 911 as part of the proposal scope of work development process. It was mentioned that there is a need for representation of some of the 29 counties to assist with development of the proposal scope language. An email will be sent out for volunteers to offer their assistance.

The group also discussed the need for the 911 data schema to be completed as soon as possible and hopefully be in place for the 2017 HPMS submission timeframe. Sevier County offered to be a

prototype county to test the schema. The consensus was that instead of waiting for finalized 911 GIS/schema, Utah should move forward with its current schema/versions.

Regarding the topic of shared editing and data ownership, the architecture design preference would have restrictions to their own city or county. The current SLVECC model does not have role-based permissions to enable county- and city-based permissions. Role-based permissions will need to be included as part of the architecture. Furthermore, inter-county agreements, where one county assists other counties with their data, should be developed and processes defined to meet different workflow scenarios. There should also be an approval system in place (i.e., AGRC) along with a database reconciliation trigger which is executed when the data inputted affects neighboring cities/counties. Overall, the group believes that the data schema should have a simple feel to the user with ease of management. However most were open to the idea of a complex database schema provided the data was easy to maintain. Kane County expressed that they are happy with data flows to AGRC and that they submit on a regular basis. Beaver County data is also submitted regularly to AGRC, however there are concerns that roads are removed from the system, but those edits are not being removed from system. Iron County added that there is difficulty getting data from local agencies and the priority is maintaining B roads.

City of Price ARNOLD Workshop (June 9, 2016)

On June 9, 2016, the project team met in Price to provide an overview discussion and technical workshop of the FHWA ARNOLD program, UDOT program involvement and status updates. The consultant team provided a detailed ARNOLD background PowerPoint presentation to the attendees.

The first session of the workshop began with the 811 group discussion. Attendees mentioned the importance of oil field road names matching the names that the counties are using. Oil companies are currently using 811 to check road status before grading roads.

Regarding road acceptances and recordings, it was discussed that State statutes say an entity is not required to record a subdivision until the first lot is sold. This statement led to a larger question of what exactly is a public road. FHWA defines a public road as a road that is not gated and accessible 24 hours a day and seven days a week.

Following the 811 discussion there was a discussion on shared data environment solutions. An attendee mentioned that Duchesne County currently uses ArcGIS Server for a shared editing environment for its cities. The City of Roosevelt enters its addressing and roads data in this shared ArcGIS Server environment. All data updates are uploaded to AGRC regularly and AGRC can extract as needed.

Attendees were interested in the identified roadblocks and the learning curve that the City of Roosevelt encountered. The goal was to simplify the process for users and lead to easy acceptance.

Efficiencies were recognized early on after initial set up process. The County received data through emails, and as a result, County data is now being updated more efficiently.

The City of Duchesne added concerns about maintaining and editing two (2) datasets. If it turns out that the expectation is in fact only one dataset, then the State Portal needs to supply a data editing framework for the County to edit and maintain data. Questions arose from the group about timing on when to add new addresses/streets into the database. Some attendees said that they use custom programming code to update addresses. For the City of Duchesne, they specifically developed code that streamlines the database entry process based on phases of construction (e.g., planning, construction, acceptance). AGRC mentioned that they will develop schema and create some preliminary code types to take care of all phases of road development/acceptance requirements.

The second session of the workshop began with a group discussion on ARNOLD database attribute requirements. The City of Duchesne stated that they track ownership in the database. They currently do not map tribal lands. However, they further mentioned that county 'D' roads need to be mapped as they are a legal right-of-way (even if on private land) but not maintained. A larger discussion on road naming then began. Attendees discussed that for a road to be named, it is first defined at the local level and the local agencies set the standard. At the present time, road name aliases are maintained by AGRC/DOT for state routes and U.S. highways with local alias names. UDOT currently seems to be concerned mainly with roads that are tied to receiving federal aid. UDOT is looking for assistance from counties/cities with populating some of the MIRE (Model Inventory of Roadway Elements) safety data. The safety data included is typically maintained by local entities and can easily be provided.

The last major discussion in the second session meeting included shared editing and associated challenges in submitting data to AGCR. AGRC has a data model and desires to have better collaboration with local entities to ensure its standardized model fits user requirements. It was mentioned that most ARNOLD requirements are already being reported, but what is most important about this project is to improve the process for reporting this data and making it available to the stakeholders. For example, standardized schema are important, but some feel that the portal is not necessary. However, they have received feedback that they would like the process to be more open. Some questioned issues centered on geometry/topology issues and whether or not AGRC has issues matching data. AGRC representatives stated that this has not been a major issue.

Some attendees questioned some of the ARNOLD data accuracy standards. Others were interested in additional training in order to ensure the highest level of data quality assurance and control. (i.e., training for the person submitting and editing data in a phased approach). An attendee mentioned that the Local Technical Assistance Program (LTAP) is capable of providing technical assistance on projects and they can offer training courses and other assistance.

