

Keeping It All Together

Around this time of year, it's customary to reflect on the year gone by and to begin looking forward to the year to come. That reflection often leads to making a wish list that captures things desired to satisfy unmet known needs and to prepare for expected new ones. One wish expressed to us as a priority, especially by vertically integrated gas companies, is the desire for a pipe network feature to be able to participate efficiently in both a linear referencing and a geometric or facility network. Here are three background points and the good news for the future.

1. Vertically integrated gas companies typically operate transmission and distribution pipe networks, and maybe also gathering pipe networks. Generally, transmission operators tend to use linear referencing as the language of expressing location along a pipeline. They don't tend to build network models, but distribution and gathering operators do just the opposite. For them, network models are the norm for location, connectivity and analysis purposes.
2. Then, there's the wrinkle added by pipeline integrity regulation. A recent change in the United States subjects certain high-pressure distribution mains to regulation as transmission pipe. That introduces a reality that how a pipe is regulated is not necessarily how it's operated! The GIS needs to be flexible to accommodate this duality. It also reinforces the premium placed on the ease with which data can be modified, as it is likely further changes are ahead.
3. The requirements of pipeline integrity and other applications include the need for data on many factors beyond those of the physical pipe network itself. These include a pretty wide range of factors about the natural and man-made environment in which a pipe network operates. They also include additional factors or data that relate to all or a part of the pipe network. All of these are referred to as "events." So, events for a transmission pipeline include not only physical components (Coating Type, Valves, Tees, Wall Thickness, etc.), but also abstract designations (Department Of Transportation Class, Pressure Test, Risk Scores, Maximum Allowable Operating Pressure, High

Consequence Areas, Depth of Cover, Road Proximity, etc.). This leads to the reality that data for transmission pipelines, especially, can contain a very large number of events.

A Key Impediment

One of the larger impediments to linear referencing and network modeling working on the same geodatabase was the inability of the GIS to efficiently keep all related data together as edits to the geodatabase occurred on account of changes to a pipe network, such as in the case of a reroute or realignment. To date, an edit to the pipe network didn't automatically keep related events coincident. As a result, each and every one of the events needed to be separately relocated. And, for pipelines existing for any period of time, the number of these related events, as discussed earlier, could be considerable. Moreover, the further challenge then was to adjust all measures up the pipeline. This added considerably more work, and time.

A Solution

This year, operators of pipe networks got early glimpses of three Esri initiatives that will begin rolling out in 2015. These are the ArcGIS Location Referencing for Pipelines extension, the Utility and Pipeline Data Model, and the Facility Network. Together these three initiatives will enable pipe network operators to adopt an enterprise approach to solutions and required data. All three work with a geodatabase in which components of a pipe network are modeled and stored as simple point and line feature classes.

In the case of resolving the impediment, ALRP directly addresses this and provides the breakthrough automation needed to fundamentally change how pipelines use linear referencing and network modeling on the same geodatabase. With ALRP, when you perform a reroute or realignment, for instance, all of the related events are automatically moved as well. And, ALRP's rule-based location referencing allows you to define how event measures and route associations should react to network changes or edits.

Here's to the year ahead and to the advent of a new era for GIS in pipelines and gas utilities!