

The Location of Things

By Tom Coolidge

The buzz about the Internet of Things (IoT) seemingly is everywhere these days. You know, IoT is the notion of an always aware knowledge of the state of things made possible by a huge number of sensors in interconnected devices. Typically this state includes identity, status and other relevant information. This is interesting and valuable. But what good does knowledge of a problem occurring in an object do if you don't know where to send the repair person? And if a sensor alerts you to a situation indicating one of your colleagues is in trouble, wouldn't it be nice to know where to send help? The IoT only realizes its full potential when it also includes location. That's why I am even more excited about a notion I think of as the Location of Things.

Think about the Location of Things in the context of pipelines and gas utilities. These are classic geographic businesses. Pipe network assets and customers are distributed across service territories. Often these service territories span hundreds or even thousands of square miles. As a result, often many employees and contractors working for these organizations are based away from the headquarters in offices or depots placed throughout the service territory. And, this distributed workforce works every day in the field, perhaps far from any fixed company property. So, with everything and everyone being somewhere, location is critically important.

While pipe network assets are fixed in location, pipelines and gas utilities are not static businesses. They are very much alive. Changes are always occurring. And, sometimes changes occur rapidly. Moreover, field crews move frequently from one assignment to another. Knowing at all times what is going on within and around a pipe network is essential to those responsible for making sure that it always performs as expected. It also is important to those who need to factor a pipe network's current operating condition and workforce location into their thinking for decision-making and activity planning.

So pipelines and gas utilities focus on collecting in as close to real-time as possible data about three types of assets. You can think of these as the three Ms. If it *moves*, if it is *measured*, or if it is *monitored*, you can be sure someone needs to know the latest about it.

Fans of Harry Potter at this point undoubtedly are thinking of Marauder's Map. Marauder's Map was a magical document. It showed almost every feature of the castle and grounds. And when the

possessor of Homonculous Charm cast the charm upon the map, movements of every person in the mapped area were tracked through labelled dots that moved around the map in real-time. The magic of Marauder's Map is make believe, but today Esri and its pipeline and gas utility customers are making this map "magic" real.

This is how.

To make real-time awareness possible, pipelines and gas utilities deploy a range of data collection technologies. They deploy sensor networks to continuously stream to a control center remotely monitored data on relevant operating parameters. They also outfit their service fleet with Automatic Vehicle Location technology or AVL. These and other sensors stream a large number of data points continuously, 24 hours a day, 365 days a year.

The ArcGIS Platform today is capable of consuming that streamed real-time data, displaying it on a dynamic map comprised of many layers from multiple internal and external sources, and empowering users to work with all of that data through an intuitive map interface. It is the ultimate integration and collaboration platform. Unlike Homonculous Charm, which only worked for its possessor, the ArcGIS platform enables all employees and contractors to distribute, use, make and share maps.

Thankfully, the advocates in the pipeline and gas utility industries of real-time GIS include many beyond the relatively small number of GIS professionals who for years tended the first mapping applications known as Automated Mapping / Facilities Management (AM/FM). The reason for this is that within the past ten years virtually everyone has gotten into mapping. It's hard to imagine, but it was just ten years ago that Google acquired the technology created by two Danish brothers, Lars and Jens Rasmussen. This technology formed the basis of Google Maps and enabled all of us in our personal lives to begin using digital maps. Today, virtually everyone uses maps as an integral part of their everyday life. And, as we know, what we do in our personal lives informs expectations for what we want to do in our professional lives. The push for modern workplace mapping is largely fueled by how we use and leverage maps in our personal lives.

There are many challenges remaining that need resolved for the Location of Things to reach its full potential. Among those are the volume of data and the speed with which data change occurs. As discussed, sensors and other automated data collection systems are continuously streaming in data points 24 hours a day, 365 days a year. The result is Big Data, and the big demand for better solutions that help decision-makers make sense of all of this data in ever-shorter analysis and decision cycles. GIS

plays a big role in meeting this challenge, too. It has long been observed that maps enable users to spot trends, patterns and answers better than in other presentation formats.

Together the pipeline and gas utility industries and Esri are opening the era of real-time GIS. It is all about the Location of Things. The prospect of further advances in real-time GIS is great as all involved build on the momentum generated by the significant progress of the past few years. Stay tuned to see how the Location of Things – that large and growing collection of sensors in interconnected devices that's on top of the state and location of everything that moves, is measured or is monitored - can make an even greater contribution to the success of pipelines and gas utilities, and those they serve.