



Alistair Maclenan and Jeff Allen, Coler & Colantonio Inc., USA, investigate the use of GIS in pipeline management.

The internet encyclopedia 'Wikipedia' defines 'Enterprise Asset Management' as 'the monitoring of the physical assets of an organisation to avoid a loss of profits due to breakdowns'. With regards to a pipeline network this is possibly one of the most accurate descriptions available as it encapsulates all the reasons why companies must invest time and money in their infrastructures. 'Monitoring' includes operating, maintaining, repairing and replacing. 'Physical' means not only what the asset is, but where it is in the world and where it is in relation to all the other assets, whilst avoiding the 'loss of profits' is key to any application being of use to an organisation. Geographical Information Systems (GIS) meet each and every one of these criteria, hence why the use of GIS increases year-on-year throughout every industry.

A GIS will represent the information held in a database, not by using a table of figures, but by considering everything in the database as either a point, a line or a polygon. Ignoring this confusing jargon, the end result is a map. Since the development of GIS in the 1960s people have realised that looking at a map is ever so much simpler and more useful than looking at a table of figures. Now with computer power what it is, this capability can be on every staff member's desk and those people, who need to manage the priceless asset that is

LOOKING TO THE FUTURE WITH

GIS

a pipeline network, can easily do so.

For the last 15 years Coler & Colantonio Inc. has been providing GIS products that are vital components in pipeline management workflows for oil and gas companies. The company has offices across America and has recently expanded to Europe. Jeff Allen, a Partner in the firm with overall responsibility for the geospatial solutions that the company provides, believes there are many benefits of using GIS at the heart of a pipeline asset management system. "Whether the pipeline is in the planning phase, under construction or has been in place for years, a GIS is invaluable in planning and managing every single component," says Allen. "Once the data is 'spatially enabled' previously laborious tasks such as creating Alignment Sheets (printed datasheets of specific parts of the pipeline showing all the information for that section) or planning reroutes is simply a matter of using the GIS."

Collection of data

The company has created a number of utilities that are used in the field to collect data from those working on the ground. With accurate GPS (Global Positioning System) information, field surveying has become a much faster and less expensive operation and directly inputting this information into a central GIS database ensures that these time and financial savings are maximised. The utilities have been created to run on ruggedised laptops and more recently handheld devices. Coler & Colantonio also helps many companies derive geo-information from data they already have in their existing databases, from aerial photographs they may have acquired and from a huge number of other sources. "Look at any pipeline infrastructure database and you will be hard pressed to find any information that can not be spatially enabled," explains Allen.

Planning a pipeline with GIS

Geospatial implications start at the initial concept of a new pipeline facility. Business development needs to know where the potential customers are, where the competition is, where existing facilities are and their capacity. An enterprise GIS system can help answer these questions and allow easy access to disseminate and analyse this information.

In the design stage, selecting a route and understanding all the impacts to its eventual approval and

installation is critical. Moving a pipeline on a map is infinitely easier than moving it in the real world. These design engineers can evaluate topological constraints, potential environmental and historical impacts, land and property right acquisition concerns and future security threats. These are all easily done by spatially integrating the proposed route with other external spatial datasets. Actual versus proposed progress of the installation can be displayed graphically in real time and impacts to permit windows and in-service deadlines can be evaluated. Inventory surveys are now spatially enabled and the time required to produce as-built data for operations is dramatically reduced.

Benefits for existing pipelines

With the facility in service, management of the pipeline can be dramatically enhanced with the aid of the enterprise GIS, the Coler & Colantonio version is called Intrepid™. Inspections and patrols can now be scheduled and performed and combined with other activities in the geographic area. Super techs, trained in various tasks, can be dispatched with their daily work orders in the most expeditious routes. Real time threats and SCADA data can be displayed within the mapping system and overlaid with external geospatial dataset such as weather, acoustic, and political unrest.

Vital for risk management

With the investment in time and resources necessary to design, construct, and maintain a facility one of the largest returns on the investment for GIS technology is in risk management. The power to focus resources to protect the pipeline and extend its in-service life at its most vulnerable locations, is key. The enterprise database allows an organisation to collect all its inspection and maintenance history and assign it to its proper location along the facility. This enables the risk and integrity engineers to evaluate and rank each section of the pipeline for its potential risk and consequence of failure. This geocentric focus allows the company to concentrate its resources in those areas that prolong the life of the facility and ultimately offer increased protection to the public.

Conclusion

The company continues to thrive in this sector. The systems provided have geospatially enabled workforces; it is an idea whose time has arrived and will only become more commonplace as the industry moves forward in the decades to come. ●●●

