



DIGITAL PEN REVOLUTION IN FIELD DATA MANAGEMENT

ADAPX'S KEN SCHNEIDER LOOKS AT THE REVIVAL OF THE DIGITAL PEN AND PAPER FOR FIELD DATA CAPTURE



Organizations capture field data on a daily basis. How this information flows from the field back to a central geodatabase is critical since it is this data that influences important decisions.

Field Data Management Today

The field data management space is best described as disjointed. Industries including engineering, construction, utilities, military, natural resources, government and others have substantial workforces collecting mission-critical information in the field. These organizations are confronted with a major challenge – processing and managing this data quickly and efficiently in order to fuel informed decision-making.

A number of data management options exist, however there is a great demand for more reliable methods as evidenced by today's highly competitive, fast-paced world where timeframes are shorter than ever. The focus is on faster, more accurate, more efficient processes — and getting better results. Meanwhile, using pen and paper is still the most common way of gathering important information in business. As this work has been done manually, the process has been slow and tied up valuable resources.

Field employees are faced with an array of extreme environments ranging from construction sites to underground tunnels to suspended harnesses to battlefields to other high stress or emergency situations. Current methods of data collection and information dissemination across distributed teams are time-consuming, often inconvenient and prone to errors.

Pen and paper is a tried and true method that has been used for decades. Gathering around a map or document and making notes directly on it, is familiar and comfortable for most field workers. However,



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The Digital Pen on site

transcription of field notes is costly, and manually re-typing is redundant, time-consuming and difficult because notes are often hard to decipher later, and some key points may be buried in pages or lost, never making it into the analysis.

Rugged PCs, tablets and PDAs are relatively newer technologies used for data management purposes. Data is entered in digital format to begin with, making dissemination easier – theory. But as it turns out, user adoption has been limited by practical factors – these devices are not always convenient in field situations, workers are resistant to changes in business processes, and reluctant to bringing expensive devices into difficult environments. In many instances, these tools are also not appropriate for the situation or durable enough to withstand extreme weather. In addition, PCs and tablets are heavy, have limited battery life, are hard to see in bright sun, and require a great deal of focus from the user in order to use it. PDAs are highly portable, but they are hard to use because they are too small to provide

spatial perspective. As a result, field employees tend to gravitate back to familiar, more convenient paper versions like notebooks, maps, charts, forms and other documents.

While certain technologies require users to adopt a new way of doing business, pen and paper technology has evolved to meet the existing needs and practices of the large mobile field workforce.

Field Data Capture Challenges

A U.S.-based engineering firm was struggling with this very thing – how to best capture and share mission-critical field data to make better informed and more timely decisions. The company collects a high volume of geospatial information relating to every project. Their existing practices involved engineers collaborating in the field and literally huddling around paper maps to discuss and determine what goes where, noting important data directly on these paper maps or drawing freehand sketches. There was often a long time delay before this data made its way into geodatabases back

in the office. Mistakes were inevitably made while deciphering field notes and sketches from multiple engineers during the data entry process causing further delays in important data analysis.

With long-term projects on the horizon, the company realized they clearly needed a more efficient data management system in place. They also concluded that the engineers' "huddle and scrawl" method of gathering around a map would be difficult to change. As they researched alternative methods and available technologies, it became evident that many solutions on the market would require their engineers to drastically change current business processes and undergo time-consuming and costly training, an option that was far from ideal.

A Viable Solution: Capturx built for ArcGIS Desktop

During this time, the company discovered a promising solution developed by Adapx that would allow them to maintain the same exact collaborative data collection approach out in the field, while improving the data management processes back in the office. Simply put, the Capturx solution provided personnel with the familiarity and comfort of using a regular pen and paper with the ability to instantly turn ink into digital data.

The solution has three key components:

- A digital pen – portable and durable enough to withstand even the most extreme environments,
- Digital paper – ordinary paper is printed, or "watermarked," with a series of dots (called an Anoto pattern) allowing the digital pen to determine its location on the map which translates into coordinates on the globe.
- Capturx for ArcGIS Desktop software – converts handwriting to text (or saves as handwriting), translates complex sketches and industry standard icons, and integrates notes geospatially with maps or with Microsoft Office OneNote so data is available to modify further or share as needed.

Together, the pen and paper can be used to specify the type of features to be captured as well as attributes for those features. Each successive stroke of the pen records the items to be added to the digital version of the same map. When the pen is docked into the USB port on any PC, Notes are immediately available and can be accessed with no additional assimilation work or administrative involvement. Using Capturx, the field engineer can check out the latest GIS data, edit it on-site, and post changes back to the central database in an instant.

User adoption of Capturx for ArcGIS Desktop has been high because it was convenient and intuitive to use, and it supported and enhanced existing business processes. Since deployment, the company has experienced significant operational efficiencies and cost savings. By eliminating the need for transcrip-





The Digital Pen in action

tion of data with digital ink, the geospatial information is not only more accurate, it is disseminated faster and more frequently, leading to better informed decisions.

The Future of Mobile GIS and Field Force Digitization

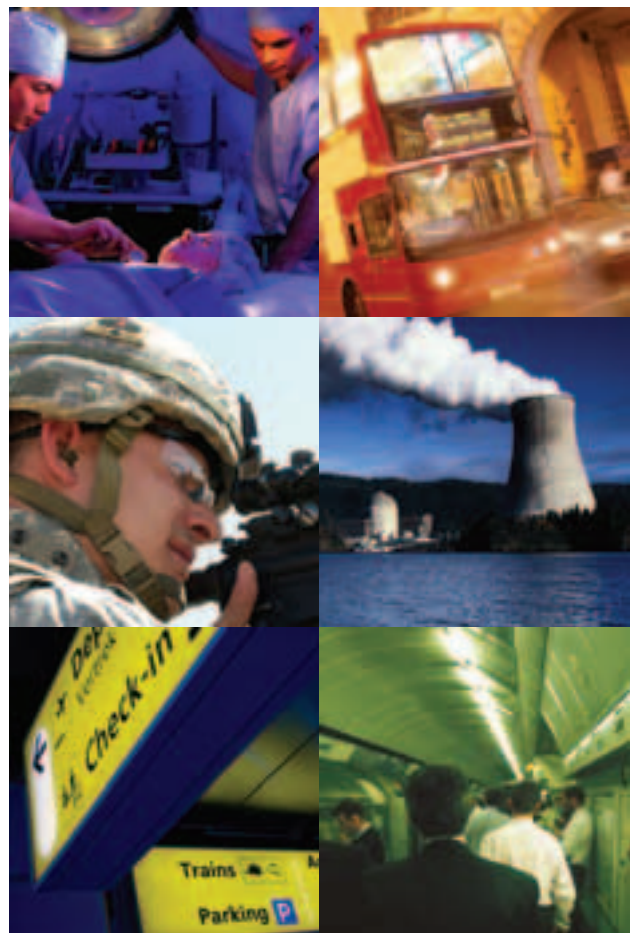
GIS has come a long way with organizations being able to access and modify geographic information easier and quicker than ever before. As mobile computing becomes increasingly "the standard", and specifically as more and more industries discover how to apply the efficiencies that mobile GIS provides, there will be increasing growth in how these applications evolve to meet situation-specific needs.

We are seeing major advances in GIS technologies and ESRI is at the forefront of some very promising developments, in areas such as:

- Cartography – Improving GIS desktop applications through additional cartographic mapping, analysis, and editing tools and providing user-driven usability enhancements
- Servers – Evolving a robust server GIS platform to deliver comprehensive geographic information services through a wide variety of clients and client platforms
- Mobile GIS – Advancing mobile GIS via wireless technology to make organizations and their mobile workforce more efficient and productive.
- GeoWeb – Expanding the access of information by anyone at any time via the Internet.
- Geodata Management – Extending comprehensive geodatabase functionality and geospatial data management capabilities

It is certainly an exciting time in the evolution of GIS. Not only are we witnessing this "rebirth of pen and paper" as it relates to mapping, we are also on the verge of other game-changing technologies that provide operational advantages for a wide spectrum of industries.

Ken Schneider is the CEO and president of Adapx, which is changing the economics of field data management. Ken brings more than 20 years of senior management experience to Adapx, in a wide range of venture-backed technology companies and industry sectors. Ken can be reached at ken.schneider@adapx.com.



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