

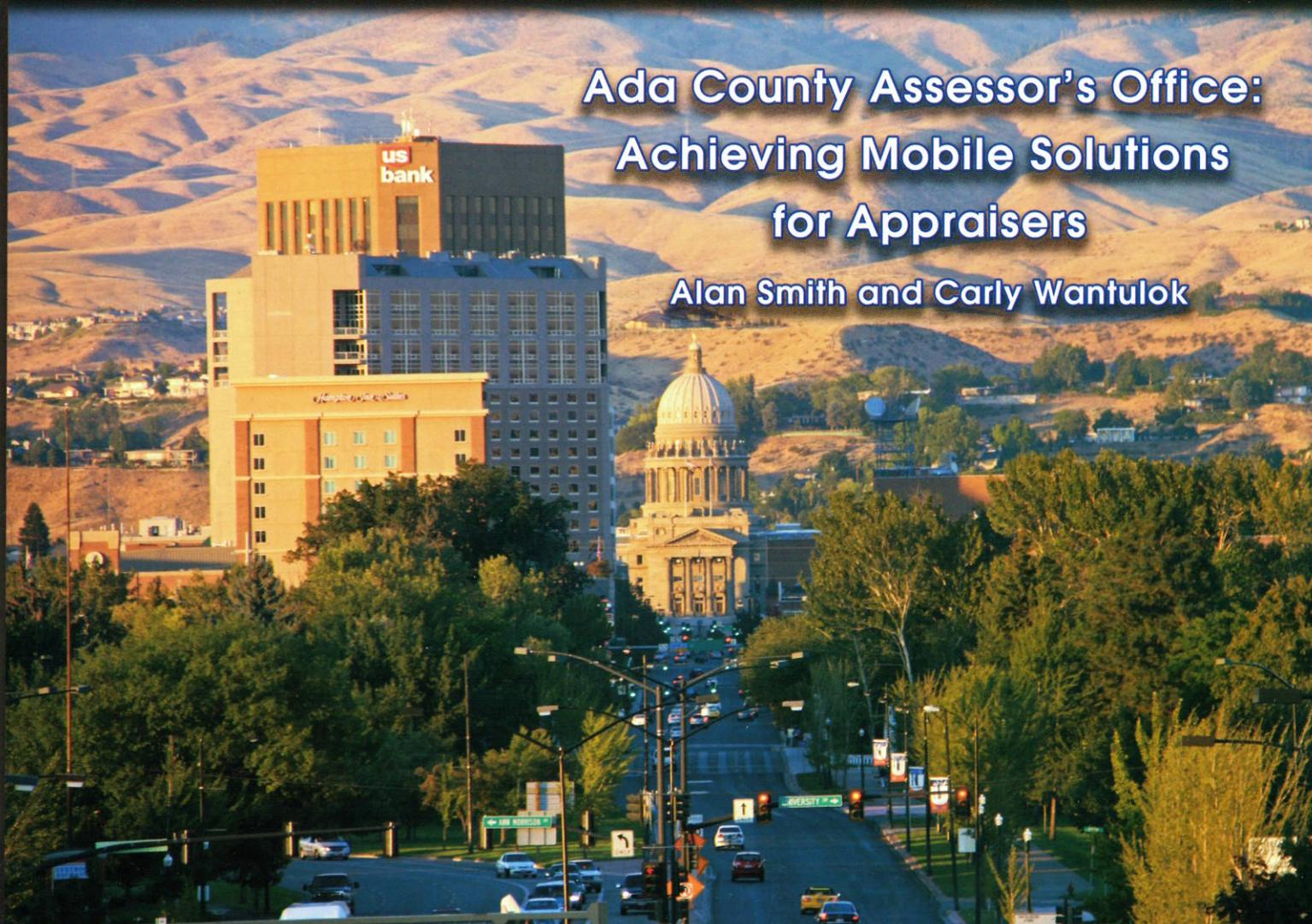
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MAGAZINE OF THE INTERNATIONAL ASSOCIATION OF ASSESSING OFFICERS

Ada County Assessor's Office: Achieving Mobile Solutions for Appraisers

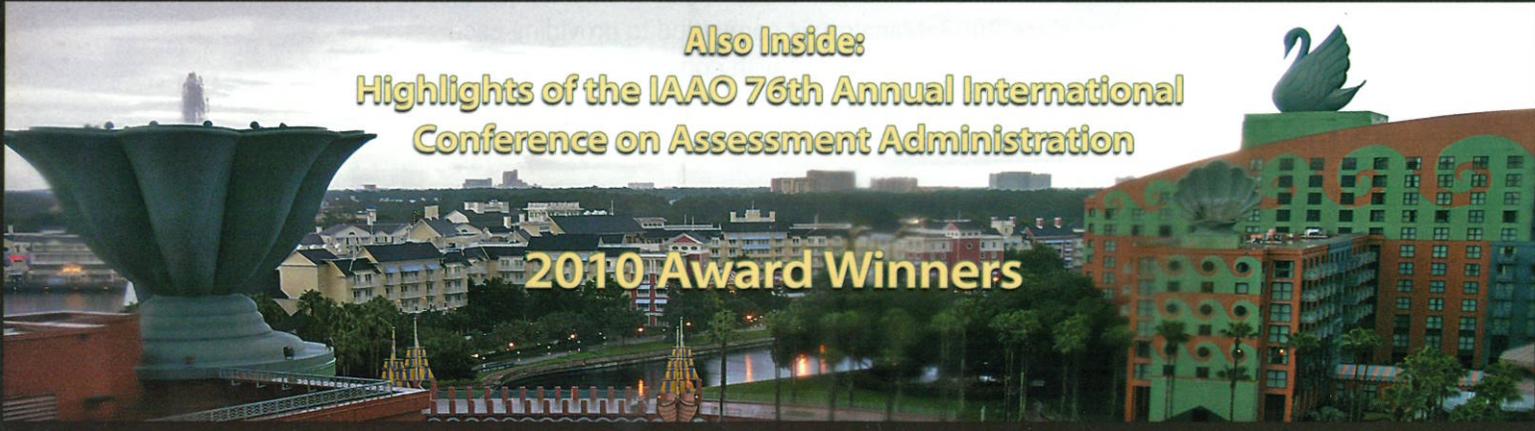
Alan Smith and Carly Wantulok



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Ada County Assessor's Office: Achieving Mobile Solutions for Appraisers

Alan Smith and Carly Wantulok

(Article photos by Carly Wantulok, Mark Southard, Diana Starkey, and Alan Smith)

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When the Ada County (Idaho) Assessor's Office applied for the ESRI Mobile Government Grant Program in November 2009, it was in the midst of adapting the existing system of paper files into an electronic data system to streamline information and make it available to appraisers on an as-needed basis from their computer terminals. The grant program was available to government institutions and contractors interested in or currently developing mobile data applications. The number of recipients was limited to 20 entities nationwide. While the competition was stiff, the effort to gain additional support and resources seemed worth the effort

When the office was accepted into the grant program, it gained several valuable tools and support, including a Trimble Juno hand-held computer, Arc GIS mobile enterprise software, and training. In addition, as part of the program, the office is undergoing a 1-year development and documentation process, in which applications developed by grant recipients are shared.

Project Vision and Objectives:

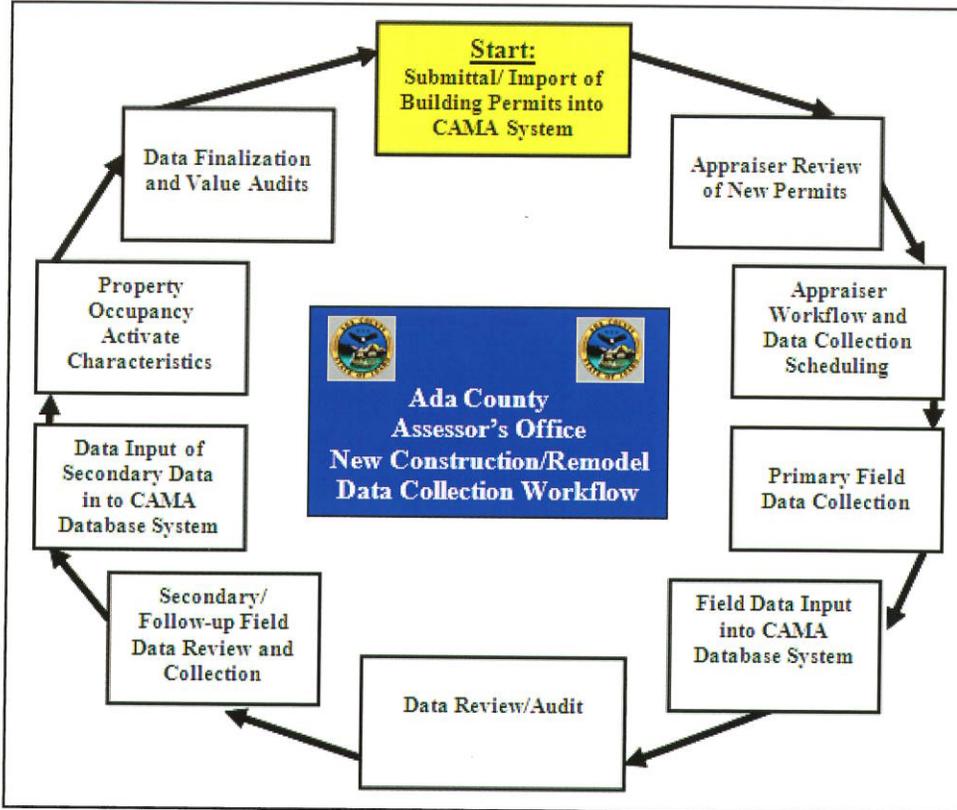
The Ada County Assessor's Office electronic mobile data collection initiative encompasses the full integration of computer-aided mass appraisal (CAMA) and geographic information system (GIS) technology into a mobile platform. The foundation of this system is the integration of a mobile electronic database with a GIS interface that maps appraiser workflows on properties with active building permits. Depending on the permit

type, the property form may be blank, for a new construction permit, or populated for a remodel permit in which property characteristics are already present. By utilizing geocoding to map the workflow and rank the priority status of active permitted properties, the system allows for efficient recordkeeping as well as tracking progress on properties under construction or being remodeled.

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Figure 1 illustrates the current system for new construction and remodel-permitted properties, a multiple-step process in which appraisers are collecting and entering data into the CAMA system. While this system is currently paper-driven, within the proposed electronic mobile system appraisers will utilize a GIS interface to navigate, access, and update property characteristic data via the electronic data collection template loaded onto

Figure 1. Current Ada County new construction/remodel workflow diagram



invigorated by the opportunity to obtain additional resources from both the equipment and support standpoints. Within the comprehensive plan, benchmarks for progress were established, and each phase of the project was plotted on a timeline, as illustrated in figure 2. As development has proceeded, the actual progress to date has been plotted, and the expected timeline for future phases has been amended. This instrument has brought focus to the group and also allowed accurate documentation of the development and implementation process.

Initially the office formed a committee of 12 individuals interested in working on mobile appraisal data collection. These employees had previously been part of the team that created the virtual packet for the appraisal department in an attempt to move away from cumbersome paper files toward a centralized electronic database of property documentation.

This committee was divided into three teams: the research team, the software development and system integration team, and the field testing and process implementation team.

The research team was charged with contacting other agencies and jurisdictions both within the state and throughout the country. The objective was to create a

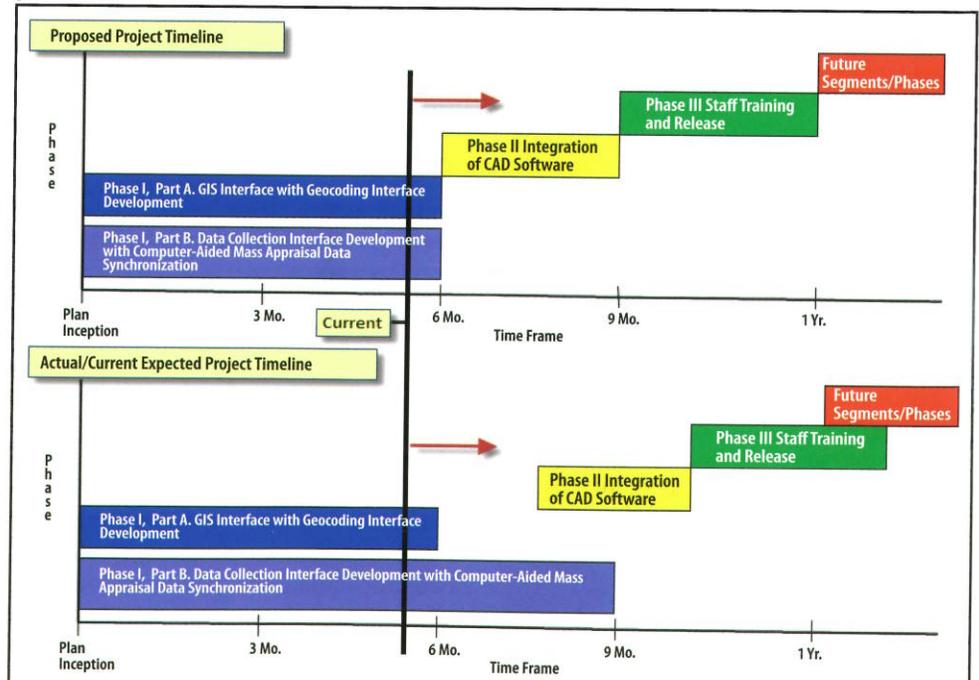
the mobile device. Appraisers also will be able to view building permit and other pertinent property information, as well as utilize the mobile device to measure, photograph, and map workflow of parcels with active building permits.

Along with these features, the integration of CAD software such as Apex Medina Mobile could provide field input of building footprints and area calculations, which would populate the electronic data collection form on the mobile device. Upon return to the office, the mobile device would go through a process of synchronization with the CAMA system to update characteristic values of inspected properties as well as the building permit database. This synchronization would in turn update the county GIS system to show the work completed and provide a map of workflow for future data collection. These streamlined processes will culminate in increased levels of accuracy, productivity, and efficiency for the appraisal system. In addition, by using a multifunctional computerized platform, appraisers will be able to do much more, while carrying much less, in the field.

Project Implementation: Research and Development

When it was announced that Ada County had been accepted into the mobile government grant program, the office was

Figure 2. New construction/remodel mobile data collection project timelines: proposed versus actual





catalog of the devices and programming that other offices are using, to determine what had been successful, and to identify what struggles had been encountered. To this end, the research team conducted an extensive study, contacting 1,324 jurisdictions in more than 40 states. Among the variety of information sought, municipalities were asked what types of hand-held devices were being used, who wrote the mobile data collection programs, whether the devices had GIS capabilities, what kind of problems were encountered, and whether similar processes were used for commercial and residential properties. This process yielded several excellent contacts and an abundance of information.

The usage results are summarized in table 1. Overall, the survey found that the majority of assessor's offices were not utilizing mobile data collection procedures. However, those jurisdictions that did practice mobile data collection utilized Arc View or related applications to provide a GIS interface to their mobile appraisal programs. Another reverberating theme was the lack of usage of PDA or small hand-held devices from mobile data collection systems. One underlying reason is the lack of processing power necessary to run applications of mobile GIS and database information collection systems in tandem. Of the jurisdictions collecting mobile data, the list of computer hardware utilized to collect data was relatively short, as follows:

- Motion 800, 1600, and 1700 tablets with Apex Nexus touch-screen sketching software
- Tough Book computer systems
- Dell Latitude XT & IBM regular laptops
- Toshiba Tablets
- IBM Lenovo Convertible
- iX104C Lite (Xplore technologies) with CAMA application that uses SQL as a database, Arc-Interface, Arc-Info, and Map Objects front end Digital Leica Distometers with Bluetooth capability for sketching
- Fujitsu pen tablet PCs (Fujitsu Lifebook T5010 Tablet PC and the Stylistic ST6012 Tablet PC).

While the hardware and software used for data collection varied, the importance of the overall vision of integrated GIS and CAMA systems was common among survey respondents.

While the hardware and software used for data collection varied, the importance of the overall vision of integrated GIS and CAMA systems was common among survey respondents. Fairbanks County Alaska Deputy Assessor Karl McManus reported that his office uses swivel monitor laptops loaded with an "Aurora application that uses SQL as a database, Arc-Interface, Arc-Info, and Map Objects front end." The tablets all have GIS maps, satellite and overfly imagery, topography, soils, and many additional layers. According to McManus, the appraisers are able to edit characteristic data in the field and upon returning to the office dock their tablets and upload the information into the network server.

Meanwhile, a number of jurisdictions had difficulty integrating the technology into the day-to-day workflow. The

assessor's office in Clay County, Missouri, related that it has struggled with implementing the technology into everyday workflow because it was difficult to carry the bulky tablet as well as other necessary equipment including cameras and measuring tapes. Other jurisdictions, including Deschutes County, Colorado, found laptops too cumbersome for fieldwork. For the most part, municipalities that have embraced some form of technology were pleased with the results, despite the difficulties encountered. They thought that changing to a paperless, technologically advanced system outweighed any drawbacks. These results reinforced the importance of having stable and user-friendly processes in place prior to the design and implementation of any hardware or software programs.

Armed with a plethora of information, the research team assumed the task of designing mobile program integration, taking into account the information from other agencies. The team created mock input screens that laid out the data fields necessary for field collection. These screen simulations and lists of the data points to be collected remotely were given to the land records programmer, who had the task of making the vision a reality.

Project Implementation: Software Development and System Integration

With a solid system server-based GIS application and a proven CAMA system, the challenge for the office was not the development of server-based GIS systems, but the integration of GIS and mass appraisal database systems. Currently, the GIS and appraisal systems work in tandem, as the CAMA program has access to geographic data systems to allow appraisers geospatial data on property boundaries, location, sales data, and valuation information. In addition, geographic layering of development service data such as active building permits, utility service location and access, and other land attributes will ensure that appraisers have access to all relevant land records data on valuation of property. With these systems in place, the goal is to create the foundation for fully integrating the GIS and CAMA systems into a mobile appraisal system, as illustrated in figure 3.

Table 1. Survey results of electronic mobile data collection usage by assessor's offices

	Number	Percentage of Total	Percentage of Responses
Total jurisdictions contacted	1,324	-	-
Responding jurisdictions	297	-	22.4%
Jurisdiction does not use electronic mobile data collection:	202	15.3%	68.0%
Jurisdiction uses electronic mobile data collection:	95	7.2%	32.0%

Microsoft Visual Studio 2008 with the ArcGIS Mobile SDK is being used to develop the appraisal mobile application. This application synchronizes spatial and tabular data collected in the field to the features in an SDE geodatabase, which is housed on SQL Server 2005 and accessed via an ArcGIS service. All spatial data are currently stored in SQL Server, and because of a proprietary CAMA system developed and maintained by the office, the CAMA data are stored in DB2.

Because of the multiple database systems, a syncing application will be developed within the CAMA system that appraisal staff members can use each time they sync their Trimble hand-helds with the ArcGIS server. The sync will update the appropriate CAMA tables from the attributes collected in the field, add the appropriate audit data to the log required by the CAMA application, and then sync back the changes and any updates en-



Ada County Appraisers Alan Smith, Mark Southard, and Diana Starkey field-test the Trimble Juno on a new construction site.

tered via the CAMA system since the last synchronization of the data.

Current efforts are focused on the data collection workflow and updating of the feature attributes stored in SDE. Once the interface, collection, and sync procedures have been completed, the IT programmer analyst can sync the attribute data between the SQL server and the CAMA

DB2 databases. The next phase of the project will be to integrate sketching of new structures into the mobile solution.

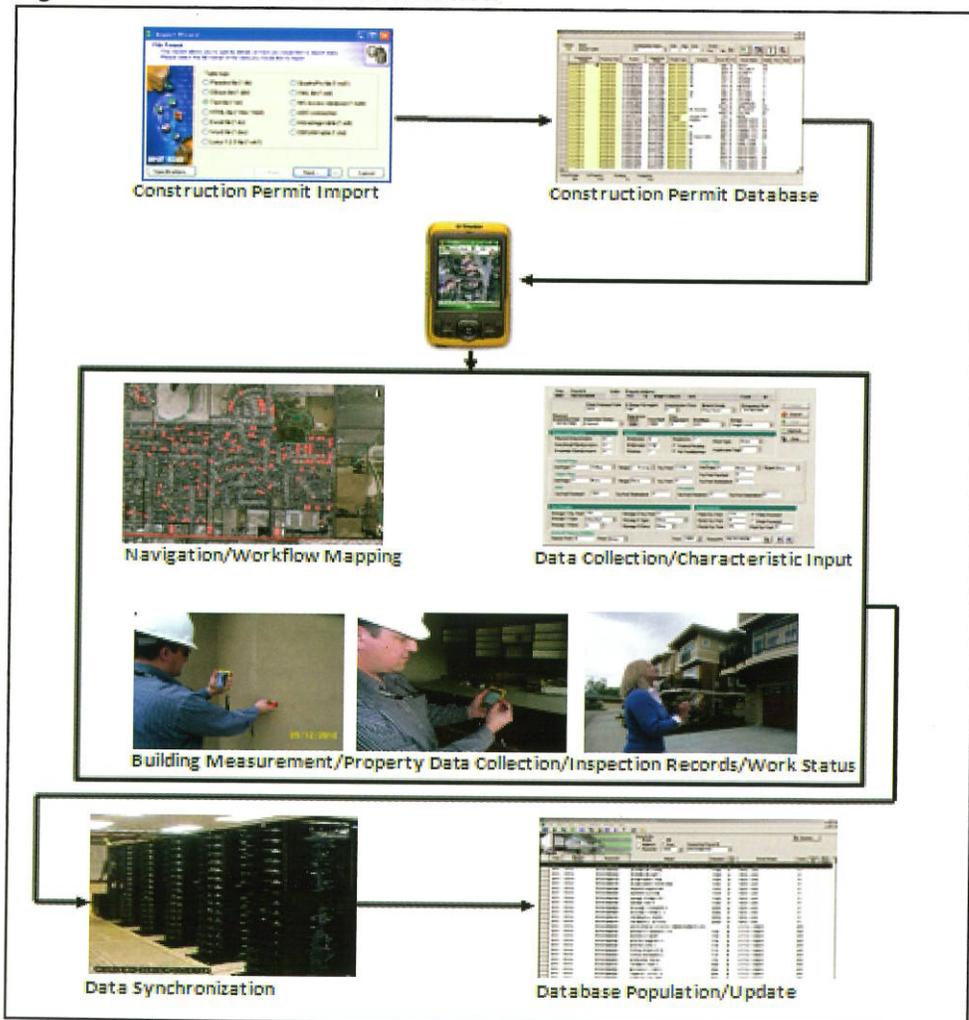
Project Implementation: Field Testing

While the research team tackled data collection, the field testing and process implementation team was responsible for working with the Trimble itself, testing it in the field and communicating with the software development team to provide appraiser-focused development and adaptation of the software to best suit the needs of appraisal data collection procedures. Throughout the design of the systems, field testers were working with the Trimble Juno, as shown in the photos above, to test its capabilities and to determine whether it would suit the long-term needs of the assessor's office for mobile data collection.

Testing found that the Trimble unit had some advantages and some disadvantages. First, the size of the unit is conducive to being portable; it is not so unwieldy that it cannot be taken onto a job site for fear that it may be easily damaged. Moreover, the Trimble provides multifunctionality of having onboard GPS, a camera, and a compact and user-friendly operating system. In addition, field testing determined that a device of this size was compact enough to be carried along with measurement instruments, as shown in the photo at top left on the next page.

On the downside, one of the first difficulties encountered was the limited screen size of the hand-held that, along with the reflective screen surface, made it difficult to view on-screen data in bright light conditions; an example of this is shown in fig-

Figure 3. Mobile data collection data flow





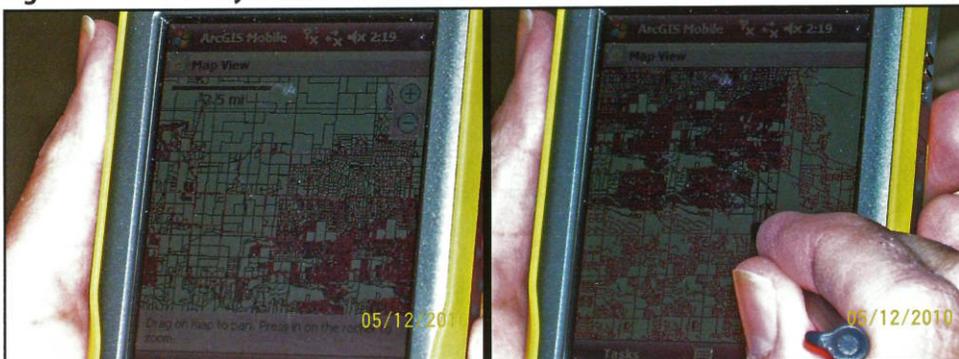
Ada County Appraiser Mark Southard takes a wall dimension measurement with the Trimble Juno.

ure 4. Another difficulty was the somewhat limited storage capabilities of the device. The initial plan had been to load all parcel information and ortho-map images onto the device. However, this massive amount of information slowed the loading and

Figure 4. Trimble Juno's reflective screen in high light conditions



Figure 5. Ada County Assessor's Office mobile GIS data



syncing process, so it was determined that before heading out into the field, appraisers would upload the parcel data for the particular area they would be working in. Once data collection was complete, the appraiser would return to the office to upload collected data into the CAMA database, populating property characteristics.

Although difficulties have been encountered, staff is encouraged by the technological trends and opportunities for development and testing offered by the technology companies.

The Ada County Mobile GIS system is shown in action in figure 5 with newly permitted construction parcels highlighted on the map. With the GPS on the Trimble unit turned on, appraisers can view their current location and are easily able to navigate into the appropriate data collection interface to gather needed characteristics for parcels highlighted in the area. Once data collection forms are finalized and linked for access through the GIS interface, field testing will be able to fully evaluate the Trimble Juno's ability to function as a mobile appraisal device. As this process is undertaken, other devices that offer similar portability and toughness, while providing more memory and greater processing capabilities, such as the Trimble Yuma, may prove to be bet-

ter alternatives, especially for jurisdictions dealing with larger amounts of data.

Looking to the Future

While the overall development of the Ada County Assessor's Office mobile data collection is far from over, it is off to a roaring start. With the foundational steps of development taken, the office is now adapting systems for optimal efficiency and ease of use. While the computer hardware chosen may be different than what was first anticipated, the office will soon have a solid and adaptable software platform that can easily be transitioned to whatever type of computerized device is selected.

Overall, the development process would have been much more difficult without the options provided by the grant program. The development of these systems has generated a renewed enthusiasm among staff members for aggressively pursuing the most efficient, technologically advanced tools and processes. Although difficulties have been encountered, staff is encouraged by the technological trends and opportunities for development and testing offered by the technology companies. Moreover, it is an exciting prospect to develop a system that will provide great benefit not only to the Ada County Assessor's office but also to assessor's offices across the country and around the world. ■

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