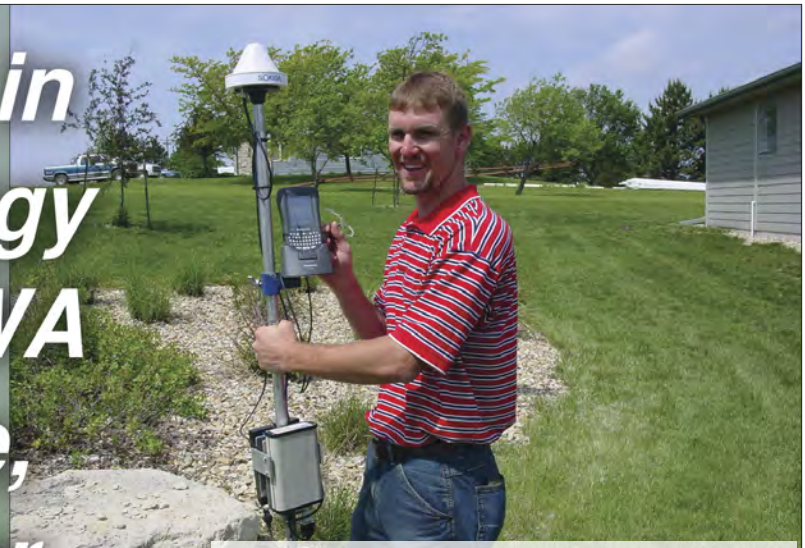
By Pete Koenig, GIS Coordinator, KRWA

Changes in Technology Help KRWA Map More, and Better



KRWA staff member Dan Beyers shows the equipment needed to conduct data collection in 2004.

The Kansas Rural Water Association GIS/GPS Department has undergone some significant technological advances in recent years. Since 2002, KRWA has been collecting GPS data for cities and rural water districts in Kansas. The technology that KRWA staff utilizes has improved over the years and so has the technology that is available to the end users in manager, operator and administrative offices across Kansas.

From 2003 to 2008, KRWA provided GPS mapping services to 34 rural water districts and 22 cities. In July 2008, the Kansas Water Office initiated a subsidy program which would pay up to fifty percent of the costs up to a maximum subsidy of $4,000. This program is a benefit of the Clean Drinking Water Fee that systems pay. Since 2008, 159 cities and RWDs have taken advantage of the subsidy and utilized GPS technology to record location and attribute information for their utilities. By year, the number of mapping projects qualifying for the subsidy program is listed in the chart below.

Utilizing new technology (such as GPS data collection) for locating services and archiving practices was virtually unheard not many years ago. The traditional practice of recording locations on as-built maps or trying to remember information was the accepted practice for utility operators. Since technology has improved, the acceptance and utilization of that technology also needs to improve. The operators, managers and administrators who proactively contacted a GPS mapping contractor are to be commended for their efforts. Future generations of utility staff members will benefit from the data that has been collected by incorporating it into software and programs that have not even been developed yet. Eventually, management tools that will assist an operator in daily operations will be available, and those tools will be able to import data that was collected by progressive staff members.

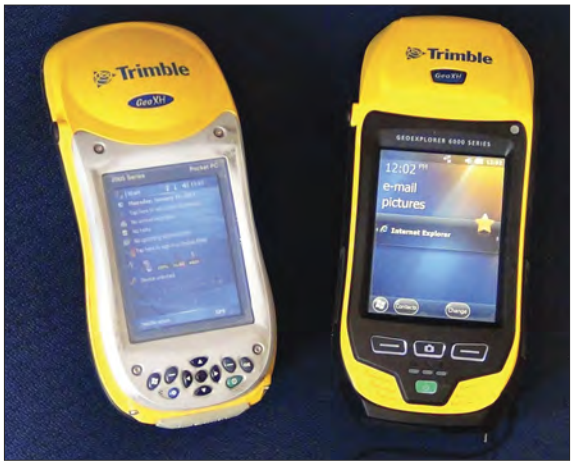
Number of mapping subsidies by year

Calendar Year	Number Approved	Fiscal Year	Number Approved
2008	43	09	84
2009	58	10	20
2010	21	11	32
2011	32	12	18
2012	5	13	5
Total	159	Total	159

**Statistics provided by Tina Rajala, Kansas Water Office*

KRWA updates again; new equipment and software

When KRWA first began using GPS technology to collect infrastructure locations, the equipment that we used was top of the line. The Sokkia Axis III receivers and antennae were superior to any other on the market. With the support by the Kansas Corporation Commission, KRWA initially tested equipment that was accurate to within three feet on 98 percent of the points collected. In 2002, that was a fantastic degree of accuracy! That technology prevailed for several years until the advent of the handheld GPS units which employ the use of more powerful receivers in the antennae, and more robust mapping software to interpret the signals received. Those first handheld units made all-day work much easier compared to hefting around 20 pounds of antennae, a pole, battery, cables and electronics. Try getting over a four-barb wire fence with an angry Angus bull after you! Been there, done that! But the advantage of the new technology,



The Trimble GeoExplorer 6000 hand-held (shown on right) has a faster processor, greater memory, new operating system, built-in camera, floodlight technology (which allows better data collection in hills, trees or "urban jungles"), Wi-Fi, Bluetooth and available cellular modem which makes it superior to the previous 2005 GeoXH (on left).

accuracy and reliability was also compromised. As a result, KRWA kept using the older, but more reliable pole-mounted units until a new generation of handheld equipment was developed. The newer units, introduced in 2005, were able to incorporate software that would allow sub-foot accurate GPS readings. Thus started a new, busier time of mapping at KRWA! KRWA was able to collect data much more efficiently without compromising the accuracy that we had come to expect.

The newer units, introduced in 2005, were able to incorporate software that would allow sub-foot accurate GPS readings. Thus started a new, busier time of mapping at KRWA!

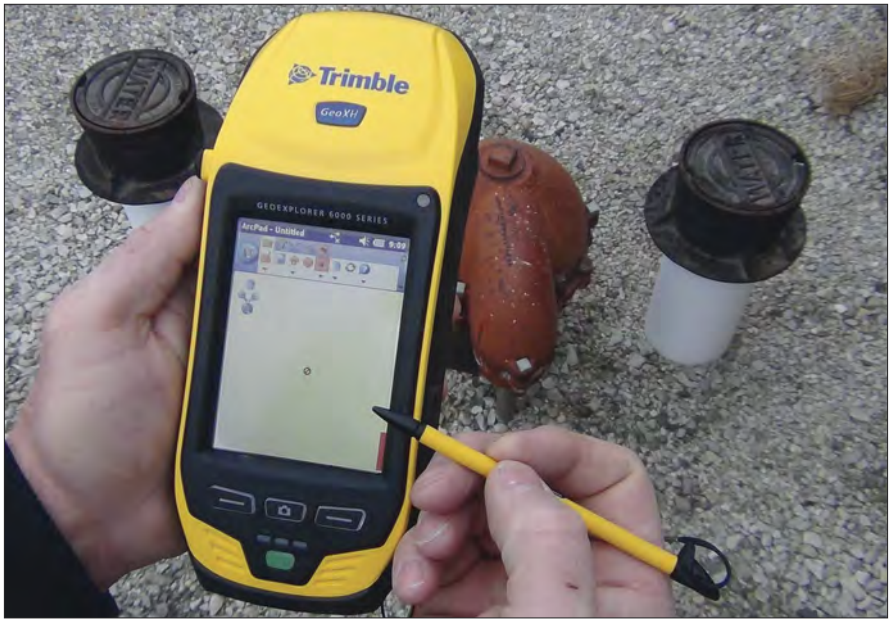
Trimble units arrive

The Trimble GeoXH units that KRWA purchased in 2005 incorporated software advances that allowed KRWA to collect data with exceptional accuracy. H-star technology in the units, coupled with GPS Correct software that was running in the ArcPad mapping platform, provided consistent sub-foot accurate data collection. KRWA Tech Assistant Mark Thomas and I have been very pleased with this hardware/software combination. Several water systems have asked us what type and brand of equipment that KRWA uses. We've always expressed our satisfaction with Trimble and ESRI, but have been thorough in suggesting to systems that what works well for KRWA may not work as well for someone else. It also may be "too much" for some systems that are only looking for one aspect of data collection or navigation compared to many aspects that KRWA must focus on. Regardless, it is wise to define what the needs are prior to looking for hardware and software for GPS data collection and usage.

As software packages became more robust and CPU intensive, the older GeoXH units that KRWA used became "slower". In reality, the units were still the same as they always were, however, the software upgrades running on the units required more memory and processor speed to keep up with the pace of data collection that we are accustomed to. Recently, KRWA purchased a new Trimble GeoExplorer 6000 series GPS unit. The operating system is new, the processor is far faster and the receivers in the antennae have also been upgraded. Other integrations include a built-in camera, wireless technology that allows the user to stream-in data layers and correction services on demand and in the field, and an upgraded battery that is lighter and lasts longer than the previous model's. In all, this new model is a welcome addition to the KRWA mapping department because it handles the updated software more effectively which in turn allows KRWA to collect data more efficiently. That in turn reduces costs for cities and RWDs that KRWA works with.

The software that KRWA has been using since 2002 has undergone significant changes as well. The expected, customary changes in cosmetics and interface are a pleasant addition, but the really exciting improvements are the on-line capabilities. KRWA has a computer network that is connected to the Internet to allow KRWA to do the work we do. The technical assistance that Greg Duryea, Elmer Ronnebaum and Laurie Strathman provide from the KRWA office on a daily basis via email and phone responses is enough to keep some offices inundated for a week! The KRWA mapping department is tied into that network; we have several remote hard drives to allow the storage and retrieval of data. Aerial photography files are very large and require a great deal of memory. The KRWA mapping department has more than six terabytes (Tb) of memory space at its disposal. A terabyte is 1000 gigabytes. Some of those drives are full, others have just been added, and one is a mirror for backup purposes. This has all been acquired since the start of KRWA mapping. Now, due to the capabilities of the software, it is almost unnecessary! ArcView 10, which is ESRI's flagship GIS software package, has the ability to add layers that are not stored locally on a network computer! Aerial files, for example, are now accessible from cloud services such as Bing, Google and smaller private companies that capture aerial photography and/or satellite imagery.

Aerials, parcel data, road data, address information and other data sets can also be seamlessly imported into a digital map which saves time and memory space. Using an online service also provides the most up-to-date information from providers such as GIS departments, central data repositories and companies like ESRI. I recommend that end users contact their county GIS department to arrange for an agreement to exchange updated parcel data. Sharing not only provides current data sets to users but also strengthens a global network of GIS departments and professionals who can offer their expertise in times of crisis or natural disasters. Tornado-ravaged communities in Kansas could have benefited had their information been shared with another GIS department. There are now several communities, including Enterprise and Leavenworth, that have learned from those previous disasters and have established agreements with neighboring GIS departments to better address a disaster swiftly and productively. Concerns for security and privacy can easily be alleviated by setting up secure log-in and password protection.



KRWA staff member Mark Thomas demonstrates KRWA's new Trimble GeoExplorer 6000 Series data collector.

Those systems and utilities in Kansas and throughout the country that are taking advantage of available hardware and software improvements are realizing the benefits of GPS and GIS. Data archiving, infrastructure maintenance, benefits from sharing data, locating services and new map creation are just a few examples of GPS/GIS benefits. Many utilities in Kansas have shown leadership by taking the first step by collecting GPS data of their utilities.

To learn more about what GPS/GIS can do for your community, I encourage you to attend the 2013 KRWA Conference & Exhibition. On Wednesday, 3/27, at 10:45 a.m., Leo Haynos of the Kansas Corporation Commission will be discussing the creation and operation of the Kansas Notification Center with a demonstration from One Call Concepts and enrollment in the online location service. At 1:30 p.m. on 3/27, Jeff Culbertson of Leavenworth County and David Rinaldi of Leavenworth RWD 7 will be demonstrating what they are accomplishing with GIS. I will be available to discuss GPS data collection processes. And, Tina Rajala of the Kansas Water Office will also be in attendance to answer any questions about the Mapping Subsidy Program. I hope to see you there.

I want to encourage water, wastewater, gas, electric and any other utility to consider GPS mapping technology. KRWA is ready, willing and able to provide this service to anyone. Give us a call if interested. It's amazing what can be done with this technology.

Pete Koenig is GPS/GIS Mapping Coordinator at KRWA where he has been employed since 2004. He also has worked on KAN STEP projects and has been involved in other Association activities.