By Mark Thomas, KRWA GPS Mapping Coordinator

# Adapting GIS to Mobile Devices

For the past year or so, there have been an increasing number of water system operators inquiring about mobile applications for using GPS data. In today's world there is an app for everything, so I cannot blame these people for wanting to be able to use their GPS data in a mobile environment without spending a lot of money. The main criteria that I believe needs to be met is being free, and user friendly. Readers who attended the KRWA water system training session in Manhattan on January 8 will recall David Rinaldi of Leavenworth RWD 7's session on mobile GIS. David spoke about a few different apps, one of them being Google Earth.

There are multiple reasons why I believe Google Earth makes sense as an app for water operators. The main one being that Google Maps is so Mainstream, as most people have already used it looking up driving directions or to just get a bird's eye view of certain areas. While doing this, you can also view you're water system infrastructure while incorporating GPS. Google Earth is not that much different than Google Maps as far as usability, and importing RWD or city GPS data is relatively simple.

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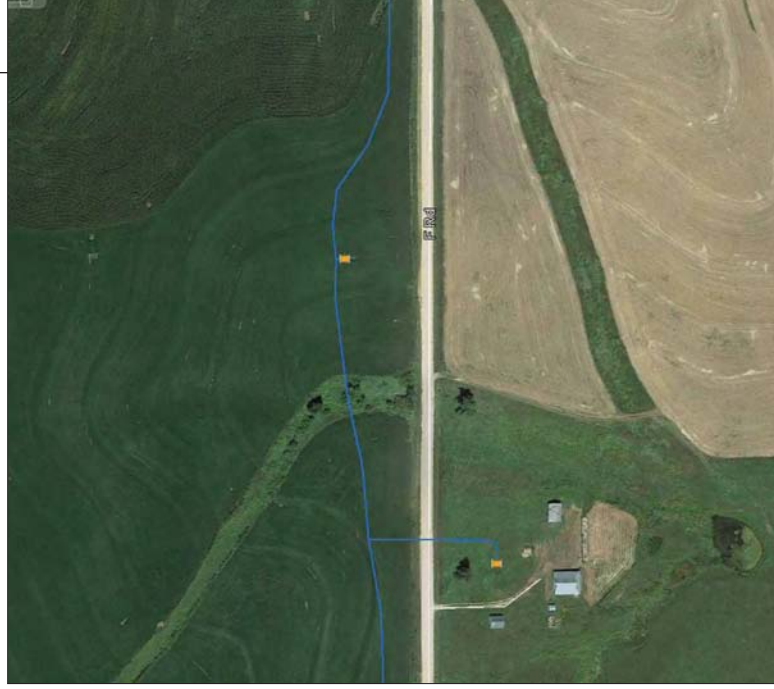
Most people who professionally collect GPS data, whether it be KRWA, engineering firms, etc., normally collect data in a shapefile or file geodatabase format. The data is typically kept in these formats in most GIS departments and firms. In order to import data into Google Earth, you need to either convert an ArcMap document (mxd) file, into a .kmz file, or convert the separate shapefiles, (.shp), into .kmz files. For purposes of keeping it simple, I would recommend just converting the ArcMap document into a .kmz file. The conversion can be done with some different software's including ESRI based ArcMap which is what KRWA uses.

Another feature I like with Google Earth is that the aerial photography will always be current and of high-resolution. In addition to this, you can pick what year of imagery you want for the background layer. The oldest aerial you can use is 1991, then there is a gap to 2002 with most years up to 2014. The aerial photos prior to 2012 do not have as good a resolution, but work well as a reference to see what certain areas looked like in years past. This would come in handy if one would like to figure out why a water line is


**This Google Earth image has extremely high quality resolution. The green line is a GPS-mapped rural water line; the red line shows the location of the service line to this user. This screenshot was taken at about 1,032 feet above ground. Zooming in continues to provide excellent resolution of the image.**


**This 1991 aerial photo reveals how this farmstead appeared at the time. The landowner insisted that the rural water line be installed to the back of the house yard.**




**Here is that same property in 2014 – with the same owner's revered house yard now planted to corn. New operators at rural water districts will find using multiple years of aerial photos in Google Earth valuable in trying to gain an understanding of why their water system has pipelines in locations that otherwise may not be easy to explain.**

located a lot farther from the road than what you think it should be. There is a good chance that something used to be there that caused the original construction plans to have the line go around it.

## Ipads, tablets, smart phones are not data collectors

With so many people using ipads, tablets, and smart phones with integrated GPS chips, the question is going to come up about whether I think people should be collecting data with these devices. My answer to that would be it is completely up to the system personnel. According to multiple sources, the accuracy of such devices is ten to twenty feet depending on the satellite constellation at the particular time. If you are satisfied with that level of accuracy for your map data, then go ahead, but if the rest of your data has been collected with a sub-foot accurate unit, in my opinion you would be going in the wrong direction. These devices will be great in the field as far as navigating to covered water meters or sewer manholes, because if it can get you to within ten feet you're probably going to find it. If you start collecting data with an ipad or smart phone, and then navigate to those points that are already ten to twenty feet off, it might make navigating a lot more difficult. In other words, the inaccuracy is compounded.

If your water or wastewater system or other utility has collected GPS data and would like to be able to use Google Earth, here's the process. All that is required is a free download of Google Earth. In order to view the data you'll need the .kmz file, which KRWA or anybody with the resources can create and email to the utility. Then it's easy as opening up the .kmz file and Google Earth takes you directly to your water system or other utility. This file can run on either desktop or laptop computers in the home or office, or phones, and on tablets. Operators without a smart phone will find the desktop version to be very useful. Users can zoom in tightly to certain areas and use the measuring tool to locate certain features. The high-resolution aerial makes it easy to measure from fence rows or corners of houses, or any other physical feature that shows on the Google Earth map. The advantage of moving towards the use of Google Earth is that of all resources that are available, this technology is likely to be available for a long, long time to come. And, it's free – and it's extremely user-friendly. No more loading of free-viewing software is required.

## See you at the conference

If you have any questions concerning GPS mapping or how KRWA may possibly be of help, please send an email to me at mark@krwa.net – and for sure, try to catch up with me during the KRWA conference on March 24 – 26 at Wichita. I hope that readers will also invest their time in learning about new mobile technology at the session on Thursday, 3/26 at 9:30 a.m. – "Using GIS Digital Mapping Technologies". This presentation will be made by David Rinaldi, Manager of Leavenworth RWD 7; David is very experienced with GIS development.

*Mark Thomas has been a GIS Mapping Tech since September 2006. Mark has a bachelors degree in geography from Kansas State University and has specialized studies in ESRI's ArcView and ArcPad software. Mark lives in Seneca with his wife Michelle and their sons Trent and Levi.*