RECLAMATION
Managing Water in the West

Research Update

S&T Program Project ID 7876
Bulletin 2017-08

Bottom Line

This research project field tested the Mobile Information Collection Application (MICA), a tablet app developed by the U.S. Army Corps of Engineers, for use in Reclamation tasks. It proved both efficient and extremely functional, combining the tasks of global positioning system location, form data collection, photograph, and video capture into one device.

Better, Faster, Cheaper

Tablets offer a less expensive, more portable alternative to laptops. With the added functionality of MICA, tablets can be efficiently used as a single-device solution for a wide variety of tasks across Reclamation.

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Using Tablet Computers for Field and Laboratory Work

Mobile Information Collection Application (MICA)—a versatile tablet app for real-time, location-specific collection of field data, photographs, and notes

Problem

Reclamation's field and laboratory work require the ability to gather and process various types of data, such as global positioning system (GPS) locations, form data, photographs, videos, and notes. Such data are used to accomplish tasks ranging from field inspections of infrastructure to emergency responses. Reclamation has a need for a single device that is cost effective, easy to transport, and equipped with an app that combines the functionalities of a camera, GPS, and notepad into one tailorable interface to guide users through the data collection process. Laptops are expensive and cumbersome to transport and use in the field. Tablets are a less expensive, more portable alternative. For tablets to have maximum utility for field and laboratory work, however, they require an app that combines all necessary functionalities. The goal of this Reclamation Science and Technology Program research project (which evolved from a winning Reclamation Research Jam idea) was to determine if tablet computers (such as the iPad) can be used to efficiently carry out Reclamation's field and laboratory work by locating a suitable app.

MICA combines the functionalities of a cell phone, camera, GPS, and notepad all into one device.

Solution

Various avenues for custom app development were investigated, including internal development, commercial purchase, a hack-a-thon challenge, and collaboration with a university. Each avenue had obstacles to implementation. Then, at a collaboration meeting between Reclamation and the U.S. Army Corps of Engineers (USACE), USACE introduced the Mobile Information Collection Application (MICA), a tool developed by its Information Technology Laboratory (USACE-ITL). The MICA app is ideal for field data collection across many Reclamation departments and is modifiable for specific tasks.

MICA was originally designed for emergency management situations. It combines the functionalities of a cell phone, camera, GPS, and paper notepad into one device that collects all relevant information digitally, automatically organizes it to a given GPS point, and then provides real-time updates to a central, web-based server where it is mapped. MICA enables much more rapid data analysis and decisionmaking than if the data were transcribed by hand.

Application and Results

MICA was used during a field test at the Mni Wiconi Core Pipeline in Pierre, South Dakota, to collect data on the cathodic protection system. The pipeline consists over 100 miles of pipe, with impressed current and galvanic anode cathodic protection systems. The MICA form interface was used to create custom forms for cathodic protection system testing—a simple process that could be tailored to various tasks across Reclamation. Data were collected at over 300 test stations and rectifiers, and photographs and test data were GPS-located and uploaded to a map each evening to track progress. MICA was also used to test the Navajo Indian Irrigation Project Block 8 cathodic protection system near Farmington, New Mexico, as well as for a corrosion inspection at Little Oso Dam in Pagosa Springs, Colorado.

The GPS coordinates at each test site are now used to guide yearly testing, which saves time when locating hard-to-find test stations. The data are already organized electronically and ready for analysis. A few bugs were discovered in the software, and the USACE-ITL staff were very responsive with solutions.

Future Plans

To harness the full potential of MICA across Reclamation's many disciplines, it would be ideal if researchers could tailor the app for the specific data they will collect and make it compatible with Reclamation's existing data management and storage systems.

In 2016, interested persons within Reclamation met and concluded that the best way to obtain an app for widespread use across disciplines would be to make an untethered, open source version of MICA available to Reclamation staff and collaborators. This idea was proposed to USACE, and discussions are ongoing to investigate whether such a version of MICA can be made available to participating Federal agencies, who could then build upon or tailor the app for their specific purposes.

An additional idea proposed to USACE was to incorporate MICA and database integration into Reclamation's Water Prize Competition Center. If MICA can be released, Reclamation can provide the code in a prize competition for further development by the general public for use in specific Reclamation projects. Reclamation will continue to collaborate with USACE to pursue the use of MICA in a prize competition.

"MICA was extremely easy to learn and use for field testing of cathodic protection systems. The absence of entering data from handwritten notes saved time and allowed us to see the information on a map for future use."

Daryl Little
Materials Engineer,
Reclamation's Technical Service Center

"The visual aspect of MICA is impressive. It will help locate test stations, even after changes in terrain. Using MICA reduces the amount of equipment you need to carry during long hikes."

Paraphrased from conversations with:

Steve Schelske
Civil Engineer, Reclamation's Great Plains Region

Collaborators

U.S. Army Corps of Engineers

U.S. Army Corps of Engineers' Information Technology Laboratory

More Information

https://www.usbr.gov/research/projects/detail.cfm?id=7876

https://www.usbr.gov/research/projects/detail.cfm?id=6816

https://www.usbr.gov/research/projects/researcher.cfm?id=2352