Evaluation of the Radar Stage Sensor Manufactured by Forest Technology Systems, Incorporated—Results of Laboratory and Field Testing

A Data management plan created using the DMPTool

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1. Project and Contact Information

What is the name of the project?

Evaluation of the Radar Stage Sensor Manufactured by Forest Technology Systems, Incorporated—Results of Laboratory and Field Testing

What is the name of the USGS Center/Program that oversees the project?

U.S. Geological Survey Hydrologic Instrumentation Facility

Summary description of the project.

Two identical Radar Stage Sensors from Forest Technology Systems, were evaluated to determine if they are suitable for U.S. Geological Survey (USGS) hydrologic data collection. The sensors were evaluated in laboratory conditions to evaluate the distance accuracy of the sensor over the manufacturer's specified operating temperatures and distance to water ranges. Laboratory results were compared to the manufacturer's accuracy specification of ±0.007 foot (ft) and the USGS Office of Surface Water (OSW) policy requirement that water level sensors have a measurement uncertainty of no more than 0.01 ft or 0.20 percent of the indicated reading. A field test was conducted on one sensor at a USGS field site near Landon, Mississippi, from February 5 to March 29, 2016, and field data were compared to data collected from a Sutron Accubar Constant Flow Bubble Gauge.

What is the project start date?

11/01/2015

What is the project's expected end date?

06/30/2016

Are there additional information available?

Who is the main point of contact for the project and its data?

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Are there collaborating/funding agencies and organizations?

2. Plan and Acquire

How will the data be acquired?

During temperature testing, distance and temperature data were acquired using automated test software. During distance to water testing, water level and distance data were acquired manually on paper by a technician, and later digitized for analysis. During field testing, distance and water level data from the instrument under test and the reference instrument were recorded by a CR1000 data logger manufactured by Campbell Scientific, Inc.

If acquiring existing datasets, include more information.

If collecting new data, include more information.

During temperature testing, the temperature from the walk-in temperature chamber and distance measurements from each RSS were recorded every 5 minutes by the automated test software.
During distance to water testing, distance data from each radar, and level data from two reference Model 56-0540 shaft encoders from Sutron Corporation were recorded manually on paper at every distance set point.
During field testing, distance data from the RSS and water level data from the Accubar Constant Flow Bubble Gauge by Sutron Corporation were recorded every 15 minutes using a CR1000 data logger from Campbell Scientific, Inc.

What is the estimated volume of the data collected, transformed, and/or generated?

Four data files were collected, each less than 1 megabyte in size.

Will the data be static or frequently updated?

The data will be static.

Are the appropriate equipment and staff resources accounted for in the budget?

Instrument evaluations are planned in the HIF budget.

3. Describe/Metadata and Manage Quality

How many new datasets will be created?

Four new datasets were created

What are the data types and formats, in which the data will be maintained?

All data will be maintained in comma seperated value (csv) format

Briefly describe the data processing steps or provide the scientific workflow.

Data from temperature testing and field testing were recorded digitally in comma separated value format. When analyzing data from field testing, relevant data from the bubbler were copied onto the same file as the radar data for comparion purposes. Measurement time stamps from each sensor were aligned.
Data from distance to water testing were recorded on paper, and later digitized for analysis using a personal computer.

How will the metadata for each dataset be created?

Metadata will be created using the USGS Core Science Analytics, Synthesis, and Libraries (CSAS&L) - Online Metadata Editor (OME) available at https://www1.usgs.gov/csas/ome/editor.htm .

Which metadata standard will be used to describe each dataset?

The OME creates metadata that are compliant with the FGDC Content Standard for Digital Geospatial Metadata (CSDGM). Currently the OME can produce records that follow either the original ('core') CSDGM, or the Biological Data Profile of the CSDGM. Data for this project do not include species information, so 'core' CSDGM will be used to produce the metadata.

What procedures will be used for ensuring data quality (QA/QC)?

For all radar temperature testing a known reference radar, model H-3613 from WaterLOG, is installed in the chamber alongside the radar under test. All radars are mounted on a rack aimed at a reflective plate, and the air gap between the radar and plate does not change during the test. The reference radar is used to monitor the test configuration for anomolies.
During distance to water testing, a pair of Model 56-0540 shaft encoders from Sutron are used to monitor changes in the air gap between the radars under test and the water surface. The radars are mounted to a plate at the end of a metal arm that can be moved vertically along a metal beam. The first encoder tracks the change in height of the arm as it is moved through various set points. The other encoder uses a float system to track changes in water level.

4. Backup/Secure and Preserve

Where will the data be stored in the short-term?

Temperature test data is stored on the PC that controls the testing, which is also backed up to an external hard drive. Copies of this data are stored on the hard drive of the lead scientist.
Distance test data is recorded on paper, and the test data sheets are stored in a file cabinet in the office of the lead scientist. Digitized copies are stored on the hard drive of the lead scientist.
Field test data is stored on the PC of the lead scientist, with copies stored in email.

What will be the approach for routine backup of the data?

Data on Hydrologic Instrumentation Facility computers are backed up routinely, and most data have been stored in multiple locations.

Describe any potential access restrictions.

There are no access restrictions

What will be the final format of the data product?

The data is in an open file format - comma separated value (csv).

Where will the data and metadata be preserved in the long-term?

Data will be preserved and made available to the public via ScienceBase

If costs are associated with long-term storage, how will they be provided for?

The data is being stored in ScienceBase. The cost of storage will be paid by the USGS.

5. Publish and Share

How will the data be shared and made available to the public?

Data will be entered into the USGS Science Data Catalog, which provides seamless public access to USGS research and monitoring data.

Will there be access or use restrictions on the data?

There will be no access or use restrictions on the data.

How can someone overcome any access restrictions?

There are no access restrictions on the data.

Identify any anticipated publications or electronic outlets resulting from the data.

An USGS OFR (Open File Report) will be published describing the test and including references to the data. Kunkle, G. A., 2017, Evaluation of the Radar Stage Sensor Manufactured by Forest Technology Systems, Incorporated—Results of Laboratory and Field Testing

Where will metadata be stored to enable data discovery by the public?

Metadata and data will be entered into the USGS Science Data Catalog, which provides seamless public access to USGS research and monitoring data.

How and where will you obtain a digital object identifier (DOI) for the data?

A digital Object identifier will be created during the USGS ScienceBase Data Release creation.