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Ingenious, low-cost sensors aid in flood prediction

September 18, 2012

In the aftermath of the 2008 Iowa flooding, Iowans realized the great need for better stream monitoring and flood prediction. Researchers and engineers with the Iowa Flood Center (IFC), established at the University of Iowa in 2009, and at IIHR–Hydroscience & Engineering in the UI College of Engineering developed a way to meet this need and detect rising stream waters using sensors.

These sensors are relatively small, measuring only about one foot wide and two feet long. The IFC orders parts for the sensors, and a team of engineers and students assembles the sensors before travelling into the field to set the sensor up at a stream. One of the design engineers on the project, Dan Ceynar, says the small sensors are more practical to use in some areas than more expensive instruments.

“One thing that became apparent after the flood was the need for a low-cost sensor network in areas where it would not be feasible for expensive sensors, such as in small, rural communities,” Ceynar says. Senior electrical engineering students, along with professional researchers and engineers developed the sensors now used on streams throughout Iowa. Ceynar says students continue to remain very involved on the project, helping both in the lab and in the field.

Working with the Iowa Department of Transportation and the Department of Natural Resources to select locations, the IFC team attaches the sensors to bridges. The sensors, powered by solar panels, send ultrasonic signals down to the water. Those signals bounce back to the sensor, which then uses a cell modem to send the data of the stream level to the Iowa Flood Information System, which has a publicly accessible website. The information is gathered approximately every 15 minutes, so users can see the data almost immediately.

Sara Steussy, a research support coordinator with the IFC, says the first batch of 50 sensors went up in 2010, the second set of 50 in 2011, and a handful have been deployed in 2012. In total, 129 sensors are currently retrieving stream level data, and the IFC is looking to add more. Currently, the Fund-a-Sensor program allows Iowans to support the project.

“Fund-a-Sensor allows individuals to support the expansion of the statewide stream sensor network,” Steussy says. “One can view potential sensor locations online and see which sensors will provide data and information for their community.” Members can vote for a new sensor location on the fund site. The effort began in August and will run through November. Each sensor costs \$3,000, and the IFC hopes to add 100 more across the state.

IFC’s Fund-A-Sensor web page:

<http://ifis.iowafloodcenter.org/ifis/fund/>

IFC’s Stream Stage Sensors web page:

<http://iowafloodcenter.org/projects/stream-stage-sensor/>

Flicker photo site:

<http://www.flickr.com/photos/ifc-iihr/collections/72157625905373906/>

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