EARLY WARNING FLOOD SENSORS

Flooding is the nation's leading natural disaster, resulting in catastrophic loss of life, property damage and economic impact. Over the past 30 years, flooding is estimated to have cost more than $8.2 billion in damages and averaged more than 105 fatalities per year. Some of this devastation could be prevented with deployable Internet of Things (IoT) technology, which monitors flood-prone areas in real time for rapid detection to alert officials, industry and citizens to potential threats.

GOVERNMENT, INDUSTRY MEETING COMMUNITY NEEDS

During the last four years, the Department of Homeland Security's (DHS) Science and Technology Directorate (S&T) worked with companies that were awarded Small Business Innovation Research (SBIR) funds to design, develop and test a network of inexpensive, deployable flood inundation sensors. The sensors were part of a scalable, wireless network that rapidly measures rising water and can report flood conditions back to operations centers, first responders and citizens.

STAKEHOLDER FEEDBACK FROM THE LOW-COST IOT FLOOD INUNDATION SENSORS

In August 2020, five stakeholders held a group teleconference to discuss their experiences using the flood sensors, as well as their path forward for future monitoring. The following are some of their observations:

"The low-cost sensors exceeded expectations for reliability and accuracy when compared to U.S. Geological Survey stream gauge data. To reduce loss of life, Charlotte-Mecklenburg Storm Water Services is accelerating their use of low-cost flood sensors for public notification of roadway and structure flooding."

—Josh McSwain, Project Manager, Charlotte-Mecklenburg Storm Water Services, Charlotte, NC

"Norfolk's coastal environment impacts roadways with tidal flooding in a city whose elevation is generally 0 to 10 feet above see level. Norfolk is exploring the use of low-cost flood sensors with a goal for integration with real time traffic alerts (i.e., WAZE). We are encouraged that DHS S&T is working on commercialization efforts to drive unit prices down."

—Kyle Spencer, Deputy Chief Resilience Officer, City of Norfolk, VA

"After major flooding events in 2016 and 2018, our participation in the flood sensor project helped us refine our models to better understand areas that could be impacted. Additionally, the data has been useful in establishing and evaluating micro-climate forecast modeling, which we continue to develop with NASA, as an advisory warning tool during flash flood-type events."

—Brian Cleary, Capitol Project and Flood Warning System Manager, Howard County, MD

"The accuracy requirements for the Kentucky Division of Water Dam Safety Program were completely met by the low-cost flood sensors. The data integration with Contrail® will allow for enhanced monitoring capabilities at remote sites where most non-federal, high-hazard dams regulated by Kentucky do not have advanced monitoring and warning systems."

—Carey Johnson, Assistant Director, Kentucky Division of Water, Frankfort, KY

"The low-cost flood sensors are beneficial for towns and counties to monitor flooding and assist with mitigation of flood risks. We look forward to expanding the "Adopt A Gauge" program, whereby local governments and civic groups keep an eye on the gauges and help check for issues."

—Gary Thompson, Deputy. Risk Management Chief, NC Emergency Management, Raleigh, NC