

### THE CONSTANT THREAT OF FLOODING

Flooding is a leading cause of fatalities and economic losses in the United States, especially as a result of natural disasters. New and emerging technologies are needed to increase the resilience of communities to flood disasters and to provide flood predictive analytic tools to the Federal Emergency Management Agency (FEMA), state, local, tribal, and territorial (SLTT) governments to reduce future flood fatalities and resulting economic damages.

### DEVELOPING GUIDELINES, PLANNING TOOLS AND TECHNOLOGIES

The Flood Project will develop new processes, products (sensors, data sets, analytic tools, imagery), and standards to improve operations and outcomes in support of FEMA (to include the Federal Insurance and Mitigation Administration National Flood Insurance Program, flood assistance programs, and dam safety programs), other federal agencies, and the insurance industry. The Department of Homeland Security Science and Technology Directorate (S&T) has developed low-cost, network-connected flood sensors to improve regional and local flood prediction; new machine-learning algorithms to detect structures in high-resolution satellite imagery, which will in turn create a national structures inventory to improve flood insurance risk evaluations and underwriting; and a variety of standards and specifications to support individual and community investments in flood-proofing products.

S&T is conducting research to develop tools to enhance community resilience to include Internet of Things (IoT) sensor and alerting resources, advanced remote sensing and situational awareness capabilities, improved flood data, predictive flood models, and analytical services. These innovations are assisting stakeholders in supporting their planning, disaster response and recovery, and investment decisions related to floods.

### PROJECT IMPACT

When modeling compound flooding scenarios, multiple applications may be required to fully address riverine flooding, high tides, sea-level rise, and changes to mitigation structures. Using S&T's FloodAdapt modeling, communities can save time

and effort with a single model and a community-driven scenario. Users can run the same scenario to explore virtual mitigation activities and improvements to determine productive mitigation planning activities.



### ACCOMPLISHMENTS

- S&T's [low-cost flood sensors](#) were deployed in Louisiana during Hurricane Ida
- Deltares USA implemented Community Oriented Decision Support for Compound Flood Events performance testing and validation in Charleston, SC

### UPCOMING MILESTONES

- Complete acceptance testing to include validation reports for the FloodAdapt model development and the linkages to the assessment tools (Q1 FY24)
- Implement flood modeling system in Maryland for research and development and demonstration of FloodAdapt (Q3 FY24)
- Complete testing of Fiber Reinforced Polymers composites on concrete dams and spillways (Q3 FY24)

### PERFORMER/PARTNERS

- FEMA, Washington, DC
- U.S Army Corps of Engineers, Champaign, IL
- Deltares USA, Inc, Silver Spring, MD
- Pacific Northwest National Labs, Richland, WA
- Maryland Department of Emergency Management, Reisterstown, MD