Homeland Security

Science and Technology

Getting Ahead of the Storm Surge: ADCIRC Model

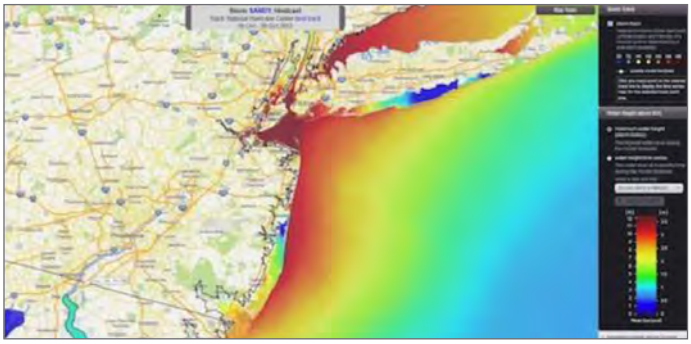
A DHS Science and Technology Center of Excellence Solution

See the Storm Surge Before It Happens

A Department of Homeland Security (DHS) Science and Technology (S&T) Coastal Resilience Center of Excellence model is helping the U.S. Coast Guard (USCG) and Federal Emergency Management Agency (FEMA) get people and property out of the way of life-threatening storm surges with highly accurate predictions of a storm's impacts.

ADCIRC Predicts Floods

The **ADvanced CIRCulation (ADCIRC) storm surge model*** combines rain, atmospheric pressure, and wind forecasts to predict when, where, and to what extent flooding will inundate a coastal community with greater precision than other available models. This enables decision-makers to identify which locations will become unsafe and plan for mitigation and response before severe storms occur.



Maximum Water Inundation Forecast, Hurricane Sandy, Oct. 22, 2012, 8:00pm EDT

The ADCIRC Model is Used to:

- Inform nearshore marine operations
- Predict hurricane storm surge and flooding
- Model oil spill movement in nearshore areas
- Model tides and wind-driven water circulation
- Model the impact of potential sea level rise on coastal communities

Real Users, Real Results

- FEMA is using the ADCIRC model to update the National Flood Insurance Program coastal inundation maps.
- The U.S. Army Corps of Engineers uses the ADCIRC model for hurricane protection system design.
- The Louisiana Governor's Office of Homeland Security and Emergency Preparedness used ADCIRC model results to prepare for and respond to Hurricanes Gustav and Ike.
- National Weather Service forecast offices, USCG, and the North Carolina Division of Emergency Management use the ADCIRC model results to help guide storm response.
- The National Oceanic and Atmospheric Agency's (NOAA's) Extratropical Surge and Tide Operational Forecast System uses ADCIRC ahead of Nor'easters.
- NOAA funds an effort to deploy, extend, and support ADCIRCViz work with the National Hurricane Center storm surge team.
- ADCIRC has been run for all U.S. landfalling hurricanes for the past seven years.

ADCIRC Helps the U.S. Coast Guard Respond to Hurricanes

The USCG used ADCIRC model results during Hurricanes Arthur, Irene, Isaac, and Sandy to aid storm-related decisions, such as deployment locations and maintaining continuity of operations.

"Your academic research and development of a user-friendly storm surge model has been invaluable to the Coast Guard ... The fidelity of your model gives the Coast Guard a defensible method of determining high-risk areas during major weather events."

~ R.C. Parker
Vice Admiral
U.S. Coast Guard

* *Winner of the DHS Science and Technology Impact Award, 2010 and 2012. DHS S&T Office of University Programs funding contributes to the development of the ADCIRC model Real Users, Real Results.*

To learn more about the ADCIRC model, contact the DHS S&T Office of University Programs at ***universityprograms@hq.dhs.gov.***