

UNC-RENCI: BLANTON
DHS Coastal Resilience Center
Y4-5 WORKPLAN

1. **Project Title:** Operational Awareness Dashboard for ADCIRC Surge Guidance System
2. **Principal Investigator:** Brian Blanton (RENCI)
3. **Other Research Participants/Partners:** Lisa Stillwell (RENCI), Phil Owen (RENCI)
4. **Short Project Description.** This project will design, develop, and deploy a web-based “operational awareness dashboard” for monitoring ADCIRC Surge Guidance System (ASGS) prediction activities being conducted at several HPC sites. This dashboard will provide a real-time view of ASGS simulations during tropical cyclone events, and will be capable of displaying multiple, concurrent ASGS instances on different HPC resources. This *new capability* will elevate ADCIRC/ASGS prediction activities to a new level of robustness, reliability, confidence and availability by showing all ASGS activities in one web-based application. This new capability also advances ASGS/ADCIRC operational activities as we position for long-term sustainability through continued federal support and industry/commercial subscription services.
5. **Abstract.** Recent tropical cyclones (TC) that threatened the eastern US and Gulf of Mexico coasts have demonstrated that ADCIRC-based storm surge and wave predictions have substantial demand and value to end-users, such as emergency managers, the US Coast Guard, NOAA, and DHS/FEMA. To meet this demand, the core ADCIRC operations community (e.g., DHS/CRC, RENCI, UT, NCSU, Seahorse Coastal Consulting) relies on high performance computing (HPC) assets to compute and deliver real-time storm surge guidance information to end-users. While the ADCIRC and ASGS software has proven to be robust, efficient, and accurate, it remains challenging for ASGS *operators* to have a large-scale awareness of the suite of simulations being conducted during a TC event, since each ASGS instance is run independently of each other, and potentially with different human operators. This presents a significant challenge when it is critical for operators and real-time guidance experts to know what is being computed, at what stage any given simulation is in, and (particularly) when updated results can be expected. We thus propose to develop an operational awareness dashboard (OAD) that monitors multiple, concurrent ASGS instances on different HPC resources and provides a real-time, web-based visualization of the ASGS workflow, progress, and status. The OAD will alert ASGS operators to runtime warning and errors that occur, substantially decreasing downtime and facilitating debugging of ASGS input/output and operational issues. This level of awareness is critical for ASGS operators to determine the current status of ADCIRC simulations, rapidly discover issues on HPC resources that are slowing down prediction runs, recover from software/hardware failures, and make better decisions about where to run simulations in real-time. This functionality and awareness will be essential to presenting the ASGS/ADCIRC operational activities as robust and reliable to end-users as we position for long-term sustainability through continued federal support and industry/commercial subscription services. The OAD will provide operators with detailed real-time detailed information about simulation configurations and status. It will **not** duplicate any functionality of the CERA system since OAD is not a visualization and data access tool. OAD is an entirely separate software platform from CERA.