



ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

Response Summary:

The Jacksonville District conducts planning and design for a wide range of coastal projects. The District recently led the South Atlantic Coast Comprehensive study where regional storm hazards were modeled in high fidelity by ERDC engineers and scientists. The District requested guidance and training on the details of the SACS modeling and on accessing the numerical modeling and statistical hazards from the Coastal Hazards System (CHS). Specific training requested included state-of-practice coastal engineering methods and StormSim tools developed at ERDC that provide modern engineering numerical and stochastic analysis and seamless integration with CHS.

SAJ requested basic knowledge and tech transfer on the following topics:

1. Base course info on methods and numerical tools for wave runup, overtopping, wave forces, stability, damage, toe stability, erosion, etc.
2. Case studies that cover rubble mound structures, levees, waterfront floodwalls, floodwalls at the dune line, etc. Documented actual costs to implement such structures and ERDC's expertise on large granite vs coquina/limestone vs concrete in places like Puerto Rico is welcomed.
3. Examples of how to properly use CSHORE for these types of analyses.
4. Synthetic storms and statistical simulation techniques for inundation protection projects.
5. Comparing the following techniques for coastal inundation projects:
 - a. Simple event-based (return period) methods vs. more complex simulation techniques.
 - b. Storm peaks with intra-storm time-dependent methods vs. inter-storm time-dependent vs non-time-dependent methods.
 - c. Boussinesq vs phase-averaged modeling.
 - d. Model accuracy improvement vs. time spent/workload.
6. Discussion of best practices during design, P&S development, and construction.
7. Plans and Specs.

SAJ specific projects include:

1. SAJ recently completed the Jacksonville Harbor Feasibility study, but O&M of the north and south jetties are still on-going. ERDC's expertise will aid in addressing potential wave impacts and changes to the inlet hydrodynamics related to changes in the jetty.
2. SAJ is being tasked with breakwater design to protect Ft. Sumter in Charleston, SC. Use of CHS data and StormSim tools is desired.
3. SAJ's Puerto Rico Feasibility Study is currently proposing structures for the San Juan Bay, which will need to be assessed for their potential impact to navigation assets/channels (i.e. reflected wave from a breakwater in San Juan Harbor might affect ship handling, life safety, and efficiency).



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers
Operations and Maintenance navigation and dredging missions

Victor Gonzalez and Jeffrey Melby
Coastal and Hydraulics Laboratory • Victor.M.Gonzalez@usace.army.mil;
Jeffrey.A.Melby@erdc.dren.mil

DOTS ID: DOTS-21-R58



ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

4. St. Augustine Inlet North Jetty CAP study/local project tie in.
5. At Baker's Haulover Inlet in Miami-Dade County, a new Inlet Management Plan has been proposed that includes lengthening the North Jetty. ERDC's expertise will aid in addressing potential sediment bypassing impacts and changes to the inlet hydrodynamics related to changes in the jetty. SAJ would also like to discuss the latest industry standards for assessing the proposed modification if performed by local sponsor via 408, or the ability to design it ourselves.

Other pertinent topics the instructors deem helpful will also be encouraged to be discussed.

Desired products: Training/Workshop, Technology Demonstration

Period of Performance:

August 1, 2020 – September 30, 2021

Benefits of the Response to the USACE Dredging/Navigation Program:

The USACE Dredging/Navigation Program is benefited by the development of technical methods to determine comprehensive high-fidelity coastal storm hazards and resulting engineering response and risk and by transferring these technologies to USACE districts. The Program's research component benefits from the continued collaboration and technology development between ERDC and SAJ in the topic areas of coastal storm hazards and responses.

Deliverable:

The DOTS response resulted in technology transfer of SACS modeling results, multivariate stochastic modeling and simulation methodologies, CHS data standards and access, and StormSim engineering and stochastic modeling tools to SAJ. The training provided comprehensive coverage of the latest engineering methods for numerical and stochastic modeling of coastal engineering response and provided training on tools for applying these methods along with representative examples.



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers
Operations and Maintenance navigation and dredging missions

Victor Gonzalez and Jeffrey Melby
Coastal and Hydraulics Laboratory • Victor.M.Gonzalez@usace.army.mil;
Jeffrey.A.Melby@erdc.dren.mil

DOTS ID: DOTS-21-R58