



UAS Monitored Sandbridge Beach Evolution During the 2018 Hurricane Season

ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

Response Summary:

The Coastal and Hydraulics Laboratory (CHL) Coastal Observation and Analysis Branch's (COAB) Nick Spore and Alex Renaud utilized Unmanned Aircraft Systems (UAS) to survey changes in the Sandbridge Beach Federal Beach Project within the Norfolk district. The CHL UAS survey team traveled to Sandbridge three times*, collecting data prior to Hurricane Florence's passage (September 7) and later in October after Hurricane Michael had passed (October 23).

Spore and Renaud surveyed the ~8km stretch of beach with a FireFly6Pro Vertical Take-Off and Landing (VTOL) fixed wing UAS, which transitions to forward flight in the air to allow coverage over the long stretches of beach demanded by many federal projects. The team also collected sample UAS hover data to calculate nearshore bathymetry. Spore and Renaud worked with Drs. Brittany Bruder and Kate Brodie to process the aerial imagery into 3D point clouds of the beach, which were then transformed into Digital Elevation Models (DEMs) to assess beach condition and changes. As the proper methodology to utilize Commercial-Off-the-Shelf (COTS) UAS technology to perform these surveys is still under development, the CHL team also used this data collection opportunity to evaluate and improve different survey operations, taking steps to further improve data quality.



Period of Performance:

FY18 Quarter 4. Survey Dates: September 7 and October 23 and associated data processing/analysis

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

This UAS work was a pilot proof of concept for UAS to survey beaches at USACE project scales and provide better calculations of shoreline and volume change at beach nourishment sites following extreme events. By providing more flexible, frequent, and cost-effective surveying of beach sediment projects, UAS beach surveys should allow USACE to improve quantification of the impact of coastal storms on sediment placement sites in the future. Following severe impacts to sediment placement sites, a faster determination of need could support more efficient planning, particularly when limited numbers of dredges are available. The Sandbridge survey data also has captured the projects condition following hurricane season, which will better inform its upcoming renourishment in 2019.

Deliverable:

This response provided UAS generated point clouds, DEM, characterization of beach differences, and orthomosaic imagery of the Sandbridge federal beach project.

* An initial July pre-season collection was rained out.



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

POC: Alex Renaud

DOTS ID: DOTS-18-R63

Coastal Hydraulics Laboratory • Alexander.D.Renaud@usace.army.mil