



ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

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Response Summary:

The USACE Philadelphia District (NAP) has the need to determine the sediment type and thickness of sediment deposits, as well as depth from the water-sediment interface down to rock, in a wide range of coastal environments. Specifically, NAP's Survey team recently acquired a chirp sub-bottom profiling system to address this need. While the manufacturer did provide a basic overview of system operation, they did not provide training on either appropriate geophysical survey design or system settings during data collection. Accordingly, NAP requested assistance from ERDC to provide an in-the-field demonstration and instruction on the operation of their specific system, as well as a more general overview of geophysical survey planning. In addition, ERDC provided a real-time demonstration as to how various system settings can optimize – or miss – features being mapped.

Period of Performance:

14-17 April 2019.

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

Dredge cost estimates are based on the volume and nature of the sediment to be moved. Without geophysical surveys, the amount of sediment to be removed, and its nature (e.g. all sand vs. heterogeneous material) are usually estimated from sediment cores. Unfortunately, sediment cores are expensive to collect and have limited spatial relevance. Geophysical sub-bottom surveys provide significantly more accurate measurements of sediment type and volume, and can be collected concurrently with bathymetric data during a standard survey. The result is a significantly more accurate estimate of material to be removed at a higher resolution and lower cost than traditional coring efforts. These more accurate estimates further reduce any dredging costs associated with uncertainties in the volume and geology of the material to be removed.

Deliverable:



ERDC scientist Dr. Heidi Wadman joined NAP's survey team for two days in April of 2019 to provide an overview of the capabilities of NAP's chirp sub-bottom profiling system (Klein KChirp 3310). Given that planning a sub-bottom survey is very different from a standard bathymetric survey, the field effort commenced with Dr. Wadman providing an overview on chirp data collection strategies, with a focus on the different types of line orientation and spacing options needed to optimize sub-bottom mapping. Following this overview, NAP and ERDC reviewed the specific abilities of NAP's sub-bottom towfish, and assessed the current towing configuration. Subsequently, several different regions were identified by NAP for test collections, where the geology of the selected sites were representative of the wide range of geology found in NAP's area of responsibility. At each site, Dr. Wadman provided an overview of how the survey lines would need to be oriented for optimal data resolution, and provided training on determining the most effective system settings. Ultimately, NAP was provided sufficient information to better plan future surveys, and a team was identified for more training by ERDC to allow future collection of these data with minimal ERDC involvement.

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

