



Training and Field Demonstration of Chirp Sub-Bottom Imagery for the USACE Jacksonville District

ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

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Response Summary:

The USACE Jacksonville District (SAJ) has several navigation projects which require quantifying the thickness of sediment overlying rock for dredging purposes. Although sediment cores can be collected to provide these data, sediment cores are expensive to collect, do not always capture the entire overlying sediment layers due to material loss during



coring, and do not address spatial variation in sediment thickness and/or the morphology of the underlying rock. Shallow acoustic (chirp) sub-bottom profiling provides three-dimensional maps of sediment thickness and depth to rock and can be collected rapidly and in conjunction with ongoing bathymetric surveys to save on survey costs. Spatial variations in both sediment stratigraphy and rock elevation are clearly mapped via sub-bottom profiling, greatly increasing the accuracy of rock elevation provided to dredging contractors. In addition, significantly fewer cores are needed than usual, as the high-resolution map requires ground truthing at a minimal number of locations, instead of cores collected at set distances apart. SAJ currently owns multiple chirp sub-bottom profilers, but currently does not have personnel who are trained on the appropriate use and processing of these data. Accordingly, they requested ERDC-CHL researcher Heidi Wadman to provide a short-course on the fundamentals of chirp data collection, and the potential applications.

Period of Performance:

A short course was conducted both in-person and remotely 22-26 March 2021 in Jacksonville, FL.

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

Accurate mapping of overlying sediment type and thickness over rock is critical information when planning a deepening project where the newly dredged depth may come close to rock or require its removal. Although some insights can be derived via the collection of sediment cores, coring is expensive and very limited with respect to spatial variability in the elevations of the sedimentary units and rock surface. Chirp sub-bottom profiling allows for a more detailed and accurate map of the above parameters, and further allows for the collection of fewer expensive sediment cores, since the sub-bottom data are used to generate the map, and cores are only needed to validate the sub-bottom interpretations.

Deliverable:

At the workshop, conducted both in-person and remotely to address COVID-19 related requirements for social distancing, the theory of sub-bottom mapping was explained, including specific details on the capabilities and limitations of the specific sub-bottom equipment owned by SAJ. In addition, field demos were conducted in small groups to allow SAJ personnel to observe the basics of data collection in real-time.



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

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DOTS ID: DOTS-21-R33