A New Strategy for Water Quality Monitoring

Dredging Operations Environmental Research (DOER) Program

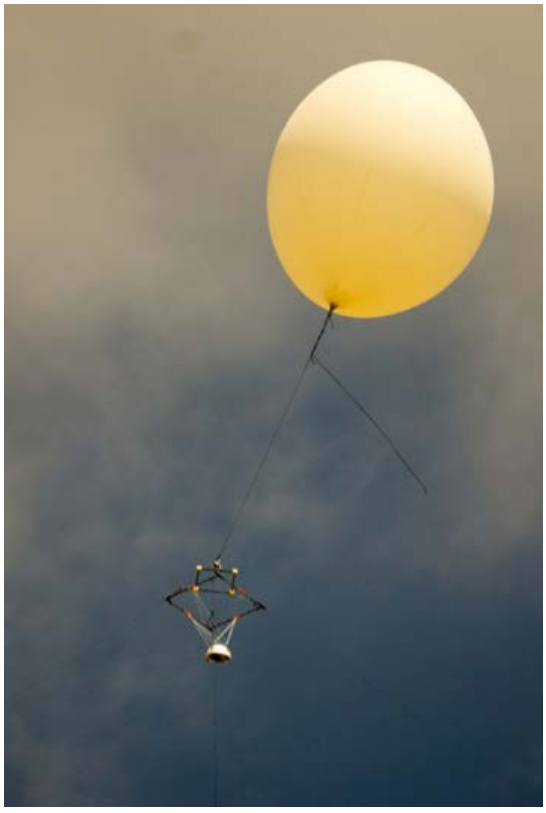
U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

Problem

Suspension of sediments during dredging and dredged material disposal operations continues to be a primary concern of regulatory agencies charged with the protection of environmental resources. Consequently, almost all dredging projects incorporate some level of regulatory compliance monitoring effort dedicated to measuring sediment resuspension. When criteria are exceeded regulatory responses are triggered, ranging from collection of additional samples to modification or even cessation of the dredging operation. For numerous reasons the existing generic approach to compliance monitoring is frequently ineffective in both adaptively regulating dredging projects and ensuring true environmental protection. Current techniques and technologies seldom demonstrate any linkage between turbidity and suspended sediment measures and adverse biological response. Compliance monitoring as currently conducted provides no evidence that environmental resources are actually being protected.

Study Description

This project will develop and test alternative technologies to characterize turbidity and suspended sediment and water quality parameters at select dredging projects as currently conducted during compliance monitoring. This will be achieved by characterizing the water quality parameters at locations relevant to the biological resources of concern, including submerged aquatic vegetation beds. This will be accomplished via the deployment of small unmanned aerial systems (UAS; < 5 lb), including balloon technologies. The platforms will be used to increase spatial documentation of a dredge plume. Development of these new applications are made possible by the miniaturization of cameras and other sensors. The project is designed to demonstrate the capability of unmanned technologies and how they may be used to improve USACE ability to monitor turbidity and suspended sediment.



Products

This research task is demonstrating such technology in one dredging project in the Atchafalaya River basin in FY16 and a second dredging project along the Louisiana gulf coast in FY17. Written deliverables will be a Technical Note/Report for each demonstration project and a journal article summarizing findings and lessons learned, which will help direct future dredging practices at Corps Districts.

Summary

Alternatives for characterizing turbidity and suspended sediment near-field impacts during dredging operations as currently conducted during compliance monitoring will be improved to more completely understand the potential exposure to sensitive aquatic resources. Unmanned aerial technologies offer a more viable and flexible alternative to conventional platforms such as manned monitoring vessels. This approach will produce evidence-based information about the plumes scale to help engage the process of leveraging better-informed regulations and dredging strategies. Findings of the proposed research will also help direct future dredging assessment and management practices worldwide.

Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.

16-06

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October 2017