

Maintenance

November 2025

Project Title:

Evaluation of Unmanned Surface Vessel-Based Topographic and Bathymetric Survey System in Flood Conditions

Task Number: 3926

Start Date: January 1, 2022

Completion Date: November 30, 2025

Task Manager:

Larry Baumeister
Transportation Engineer
larry.baumeister@dot.ca.gov



DRISI provides solutions and knowledge that improves California's transportation system.

Evaluation of Unmanned Surface Vessel-Based Topographic and Bathymetric Survey System in Flood Conditions

Investigate the use of unmanned survey system for use in hydraulic studies.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) conducts topographical and bathymetric surveys vital for modeling channel water flow and early detection of bridge scour. Deep water surveys can be especially hazardous under wind and flood conditions such as fast flowing currents, submerged and unobservable debris, blockades, sensitive habitats and the potential of getting stuck on mud.

A small Unmanned Surface Vessel (USV) platform with integrated topographic and bathymetric mapping sensors will enable surveys to be conducted in challenging environments such as high-flow flood conditions and shallow water where using a manned boat is unsafe.

WHAT ARE WE DOING?

A research team specializes in technologies such as laser scanning, multi-beam echosounder (MBES), unmanned aerial vehicles (UAV), will develop a teleoperated USV with topographic and bathymetric sensing system.

WHAT IS OUR GOAL?

The goal is to improve efficiency and safety by developing a fully integrated bathymetric mapping system on a USV that can be deployed rapidly and safely in shallow and deep water conditions.

WHAT IS THE BENEFIT?

The USV mapping system will enable Caltrans to perform early detection and identification of bridge scour. It will improve the safety of the traveling public, reduce the hazards and exposure of sending manned boats and/or divers into swiftly flowing water.

WHAT IS THE PROGRESS TO DATE?

As of November 2025, the current progress is: This research task ends on 11/30/2025. The final report for this research has been finalized. The final report documented both the prototype development and the testing of the USV. The contract manager is starting the research closing process. For more information contact the task manager.

IMAGES



Image 1: EchoBoat 160 for Seafloor Systems

The contents of this document reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the California Department of Transportation, the State of California, or the Federal Highway Administration. This document does not constitute a standard, specification, or regulation. No part of this publication should be construed as an endorsement for a commercial product, manufacturer, contractor, or consultant. Any trade names or photos of commercial products appearing in this document are for clarity only.