BIL MarTREC Tier 1 UTC Project Request Form
Completed form should not exceed 2 pages
Return to Amy Shell at shell@uark.edu

Submission Date: 2/8/24
Lead Recipient/Grant Number: University of Arkansas / 69A3552348331
Principal Investigator Institution: Texas A&M University
Center Name: Maritime Transportation Research and Education Center
USDOT Research Priority: Preserving the Existing Transportation System
Primary USDOT Strategic Goal (*select drop down*): Economic Strength and Global Competitiveness
Principal Investigator(s) with ORCID(s) and Contact Information: Dr. Bruce Wang, ORCID: 0000-0003-0645-273X, Email: bwang@tamu.edu, phone: 979-845-9901.
Project Partners: USACE
Project Type (*select drop down*): Applied Research
Project Research Topic Type (*select drop down*): Maritime Sustainable and Resilient Infrastructure
Transportation Modes Involved (*check all that apply*): ☒Waterway ☐Road ☐Rail ☐Pipeline ☐Other
Research Project Funding: Total USDOT $120,000 + Matching funds $60,000=Total $180,000. (the budget is evenly split between the two years). Technology Transfer - $10,035.
Project Start and End Dates 3/01/2024 – 2/28/2026
Project Title: Continuous decision plan for optimizing budget allocation for dredging projects considering shoaling effect within a multi-year horizon.
Project Abstract (Brief Description): Dredging is a constant operation to maintain the waterway shipping capacity along the rivers, coastal lines as well as ports and harbors. The goal is to achieve a maximum network capacity to support the regional and national economies within the range of a given budget. Shoaling happens after dredging to partially offset or undermine the dredging benefits. Wisely spending the dredging budget over the selected timeframe for a network capacity by considering the shoaling effect is the objective of this proposed research. This proposal assumes shoaling at each location/section follows a known probability distribution with a given draft. This project aims to improve the previous research by developing an innovative model for potentially systematically considering the route-based draft capacity after dredging. Previous models consider route-based minimum dredging instead. The multi-year decision making process shows compelling advantages over the continued, multiple, single-year, independent decisions. An important feature of the proposal is that it considers the first-year impacts on the remaining years. This project will specially consider interdependency of project effects on the network.
USDOT Priorities: This project supports USDOT Strategic Goals: Economic Strength and Global Competitiveness, and Transformation. The methods and algorithms will further improve optimization of the waterway capacity through a more systematic modeling of effective draft along navigational paths and therefore a more effective allocation of dredging fund through its funded projects.
Outputs (results of the work performed): These technical tasks are planned for the project: (1) Literature review, (2) Problem formulation development, (3) Algorithms and special properties of the problem, and (4) Numerical tests. Task 1 will be carried out during the first five months of the project while Task 2, 3 and 4 will start in the 5th month, 10th month and 15th months respectively with durations of five, five and six months respectively. The final report will be finished by the end of the project (24th month).

Outcomes/Impacts: The objective of the proposed research project is to develop a stochastic, integer programming model and algorithms aimed for exact optimal solution to the dredging project optimization over multi-years to maximize shipping capacity while minimizing the costs considering the limited budget for this project. The model and algorithms will be tested on select waterway system with historical data about their optimality and computational efficiency.

Technology Transfer Activities: The US Army Corps of Engineers will have an opportunity to examine and apply our developed models in its decision making. USERDCT research managers and staff are expected to directly involve in this entire process of research to provide advice and support. Paper publications in transportation or related journal(s) and presentations at conferences such as the TRB annual meeting.

Final Research Report: Upon completion of the project, provide a URL link to final report will be provided

Project Deliverables: ☒ PI agrees to submit all deliverables within 4 weeks after the project end date.

Data Management Plan (DMP): ☒ I have reviewed and agrees to adhere to MarTREC DMP. Proposed project DMP must be attached to the submission email along with this form.

Center Director Approval Signature and Date: 04.01.24