

Project Title: Supporting Secure and Resilient Inland Waterways - Phase Two
Project Abstract (Brief Description): The inland waterway system serves thirty-eight states across the U.S. and carries one-twelfth of U.S. freight across nearly two hundred commercially active lock sites. Unexpected disruptions to the system due to natural disasters, vessel accidents, or terrorist attacks can cause non-navigable water levels or destroy major navigation infrastructures, resulting in closures of the inland waterway. During a long term closure event, barge cargoes need to be offloaded from the waterway and transported to their final destination via an alternative land-based transportation mode which is challenging because the existing capacity of accessible terminals and alternative modes of transportation may not be sufficient to handle all of the disrupted cargo. As time elapses during a closure, the value of the disrupted cargo decreases in terms of economic value, societal benefit, and customer satisfaction. In order to mitigate negative disruption impacts, key maritime stakeholders including the U.S. Coast Guard (USCG) and U.S. Army Corps of Engineers (USACE) need pre- and post-disruption response plans which support prioritizing and redirecting disrupted barges in order to minimize the total value loss of the impacted system. We propose to extend our current Phase One project by expanding our current model to consider uncertainty into the decision. Future commodities transported, barge traffic, and water and land capacities are all unknown parameters that will be considered.
Describe Implementation of Research Outcomes: We are extending our current CPTAP model to consider uncertainty into the decision. Data and distributions are being defined for four unknown parameters; water transport time, offload time, land transport time, and terminal capacity. The simulation model design is underway. We are preparing to present the work at the upcoming Industrial and Systems Engineering Conference in May 2018.
Impacts/Benefits of Implementation (actual, not anticipated) <i>To be determined upon conclusion of the project:</i>
Web Links: martrec.uark.edu
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): \$50,000+\$25,000=\$75,000
Project Start and End Dates: 07/01/17-09/30/18. Project complete
Principal Investigator(s) and Contact Information: Heather Nachtmann (PI) and Justin Chimka (Co-PI)
Principal Investigator Institution (University): University of Arkansas