

Project Title: Supporting Secure and Resilient Inland Waterways
Project Abstract (Brief Description): To mitigate inland waterway disruption impacts, we developed the cargo prioritization and terminal allocation problem (CPTAP) to minimize the total value loss of disrupted barge cargoes. CPTAP is formulated as a nonlinear binary integer program, and problems of realistic size can be efficiently and effectively solved with a heuristic approach. The final solution identifies an accessible alternative terminal for each disrupted barge and the prioritized offload turn that each barge takes at its assigned terminal. Implementation of CPTAP results in reduced cargo value loss and response time when compared to a naïve minimize distance approach. This project extends our earlier work through CPTAP model enhancement, expanded application, and improved solution approach development.
Describe Implementation of Research Outcomes (or why not implemented): We have developed a linear approach to extend our Cargo Prioritization Terminal Allocation Problem (CPTAP) modeling capability. This new approach, when validated, may allow us to solve realistic response scenarios more quickly. Project results have been submitted to one transportation-related conferences, related journal articles will be submitted, and practitioner publications will be developed. The overall research objective is to provide timely knowledge and awareness of what cargoes should be prioritized for offloading during disruption response and what infrastructure exhibits low resiliency in terms of modal capacity to potential attacks or natural disasters against inland waterway transportation systems. Ongoing work is enhancing the optimization approach to CPTAP to provide real-time decision support for disruption response stakeholders to minimize the total value loss of cargo disruptions on the inland waterways.
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): \$158,000 MarTREC + \$79,119 Salary Release = \$237,119
Project Start and End Dates: 08/01/14-06/30/17. No cost extension granted to 06/30/18
Principal Investigator(s) and Contact Information: Heather Nachtmann Ph.D and Justin Chimka Ph.D
Principal Investigator Institution (University): University of Arkansas