

THE CHALLENGE: IMPROVING OUR MARINE TRANSPORTATION SYSTEM'S RESILIENCE

The Department of Homeland Security (DHS) U.S. Coast Guard (USCG) is responsible for ensuring the safety and economic security of U.S. maritime ports and waterways. The USCG is authorized to establish, maintain, and operate maritime aids to navigation to maintain travel along inland waterways and to prevent disasters, collisions, and wrecks of vessels. Under a charter signed by the USCG and the DHS Science and Technology Directorate (S&T), S&T will develop and transition software systems, tools, and data management systems to improve waterway health data sharing with the public and logistics management within the U.S. Army Corps of Engineers (USACE) and USCG.

Through the charter, S&T will improve the marine transportation system's (MTS) resilience to changing conditions and disasters by providing analytical visualization tools, data, and technologies. These products will provide USCG waterway managers with more effective and user-friendly capabilities to prepare for, mitigate, respond to, and recover from incidents or disasters affecting the MTS. Significant technological innovation is required to optimize riverine information gathering and dissemination for the benefit of mariner safety and commerce.

THE SOLUTION: RIVER INFORMATION SYSTEMS ENTERPRISE

S&T is partnering with the USACE and the USCG to develop the river information systems enterprise (RISE). RISE is a cloud-based platform that will synchronize the collection, integration, analysis, and exchange of information between the marine industry, USCG and USACE. This effort also includes innovative approaches that leverage artificial-intelligence (AI) and machine-learning (ML) techniques to develop decision support tools for river information services.

In collaboration with the USACE engineering research and development center, S&T will use ML and "big data" enterprise architecture to improve river transportation management. The architecture will consolidate waterway conditions to automate bidirectional communications with commercial river traffic, lock and dam operators, and port commanders to better manage waterway infrastructure operations.



IMPACT TO MTS

RISE is an AI/ML architecture that will tie together various MTS elements used by the USCG and USACE to monitor waterway conditions and activity. These elements will allow the USCG and USACE to predict river conditions, alert mariners to traffic conditions along inland waterways, provide notice to mariners and waterway health information to the public more efficiently, position assets and resources more effectively, and allow mariners to predict waterway travel more accurately.

RISE will cohesively tie together MTS information, providing government stakeholders a cohesive view of waterway activity and health, thus enabling greater cross-organizational cooperation and governance.

PERFORMERS/PARTNERS

- Trabus Technologies, San Diego, CA
- USACE
- USCG