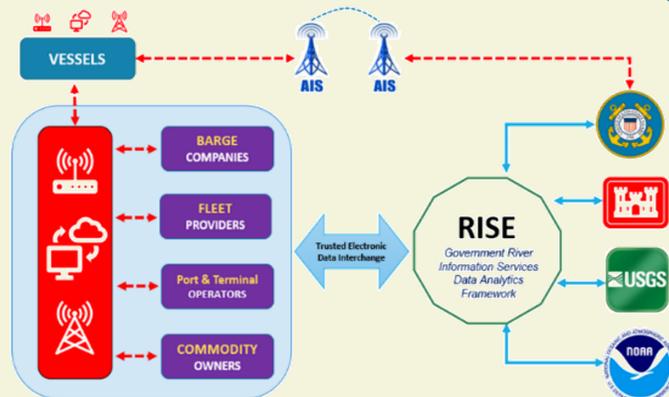


AI in the US Inland Waterways Industry

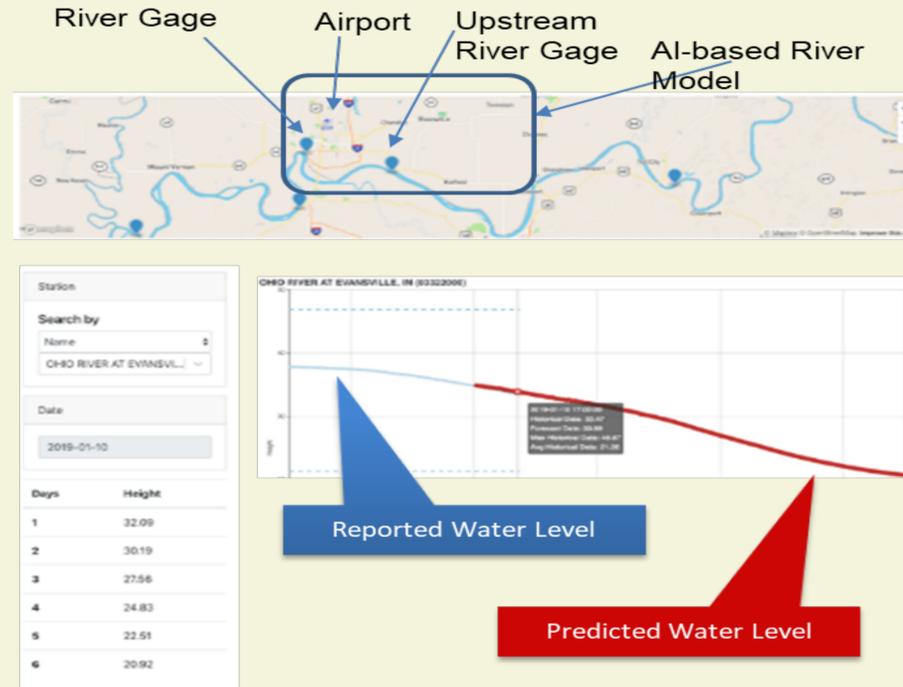
David Sathiaraj, Director of Data Science, Trabus Technologies
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River Information Systems Enterprise

- State-of-the-art cloud-based predictive analytics and information exchange framework for users of U.S. inland waterways
- Collaborative effort between US Army Corps of Engineers, Trabus Technologies, USGS, NOAA, DHS S&T, USCG, and marine industry to enhance navigation, safety and security

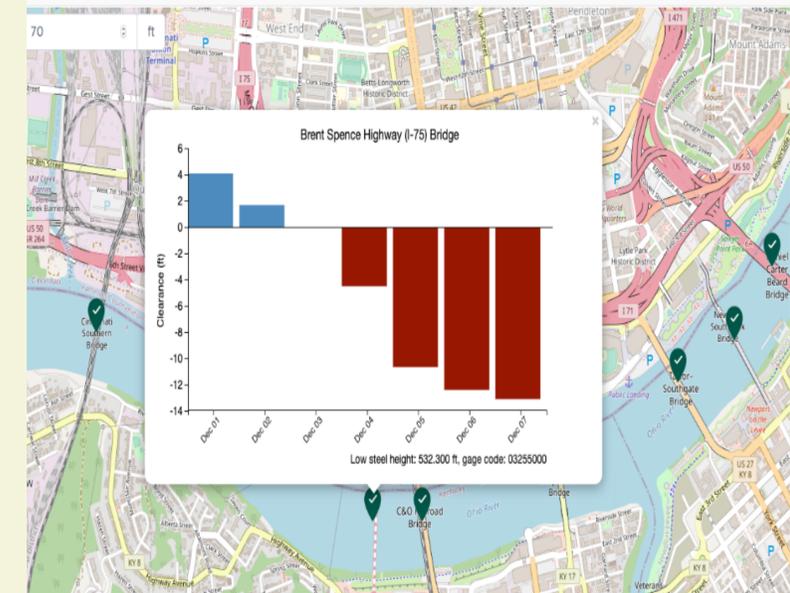


River Level Predictions



- Area covered: Mississippi, Ohio, Missouri, Illinois and other smaller rivers.
- Accuracy of predictions range on average from 85-92% out to 7 days in advance
- Predictions used to predict bridge air gap clearances, assist in voyage planning operations and barge load optimizations (reducing intermodal transfers)

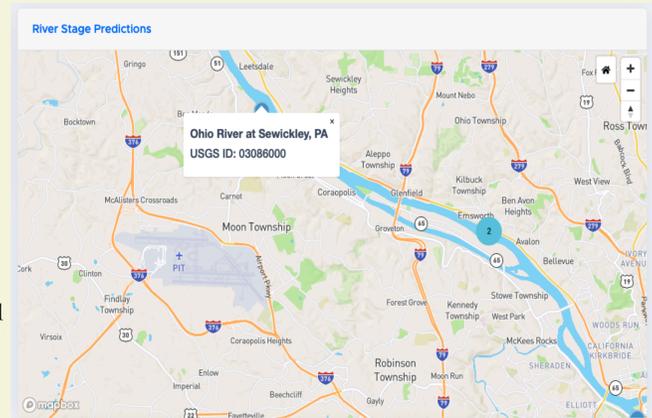
Bridge Air Gap Clearance



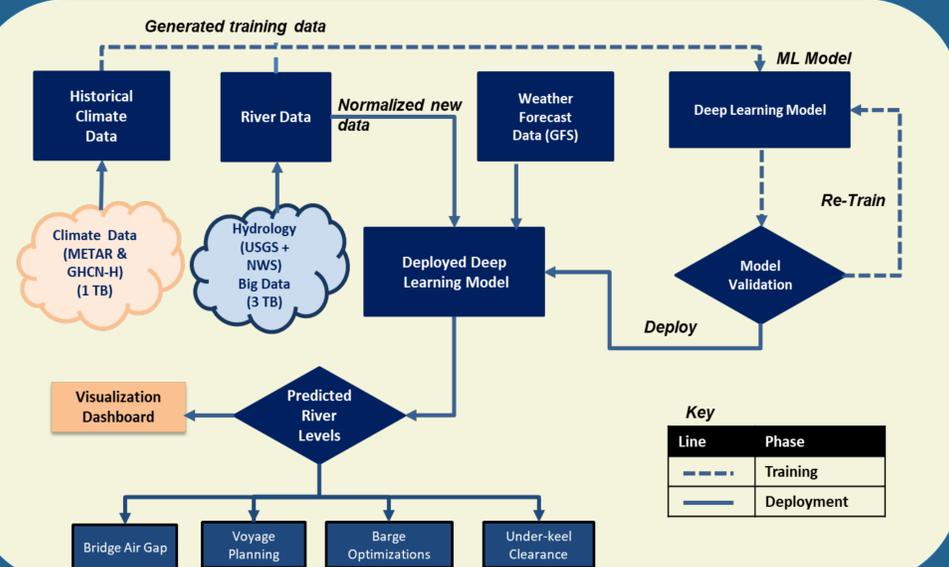
- Uses RPAT to predict bridge air gap clearances 7 days in advance
- Area covered: Mississippi, Ohio, Missouri, Illinois, Tombigbee, Arkansas, Tennessee, Allegheny, Cumberland, Monongahela, Columbia Rivers, and other smaller rivers
- Applications: Safe transit under bridges for voyage planning, intermodal transportation coordination

River Level Predictive Analytics Toolkit (RPAT)

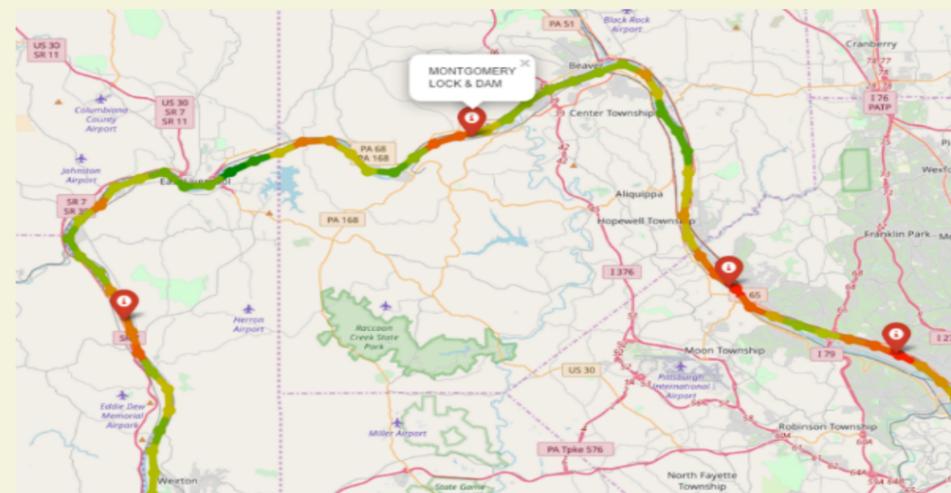
- Models constructed by training a Deep Learning algorithm to learn from 10+ years of historical river (from USGS) and precipitation data (from NOAA)
- 356 models trained and deployed along U.S. inland waterways
- About 350k points/model with 175 million points of information processed, daily



Model Schema



Travel Time Predictions



- Uses Automatic Identification System (AIS) data to derive time of travel estimates along Inland Waterways
- Machine Learning used to predict travel time for future voyages along U.S. inland waterways
- Enhances voyage planning by alerting voyage planner and tow boat captains of changes in river traffic as tow proceed on their intended track.
- Improved situational awareness would be helpful in voyage itinerary decision making
- Identify areas of vessel traffic congestion on rivers