e-Navigation and River Information Services:

The waterway of the future: leveraging the power of information

ERDC
Engineer Research and Development Center

Inland Waterways Users Board

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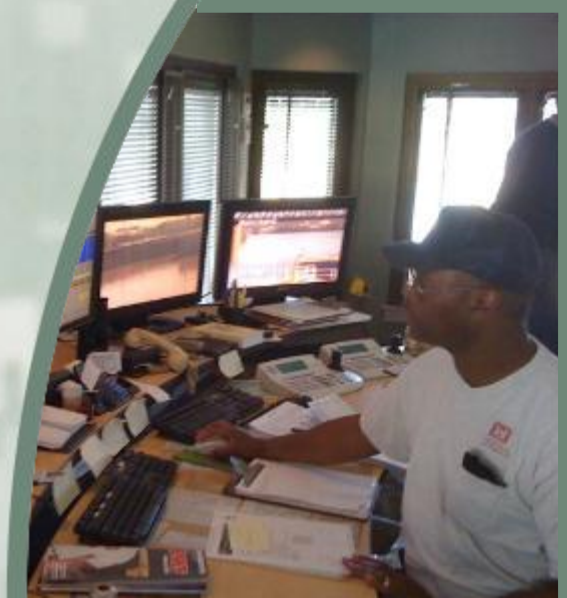


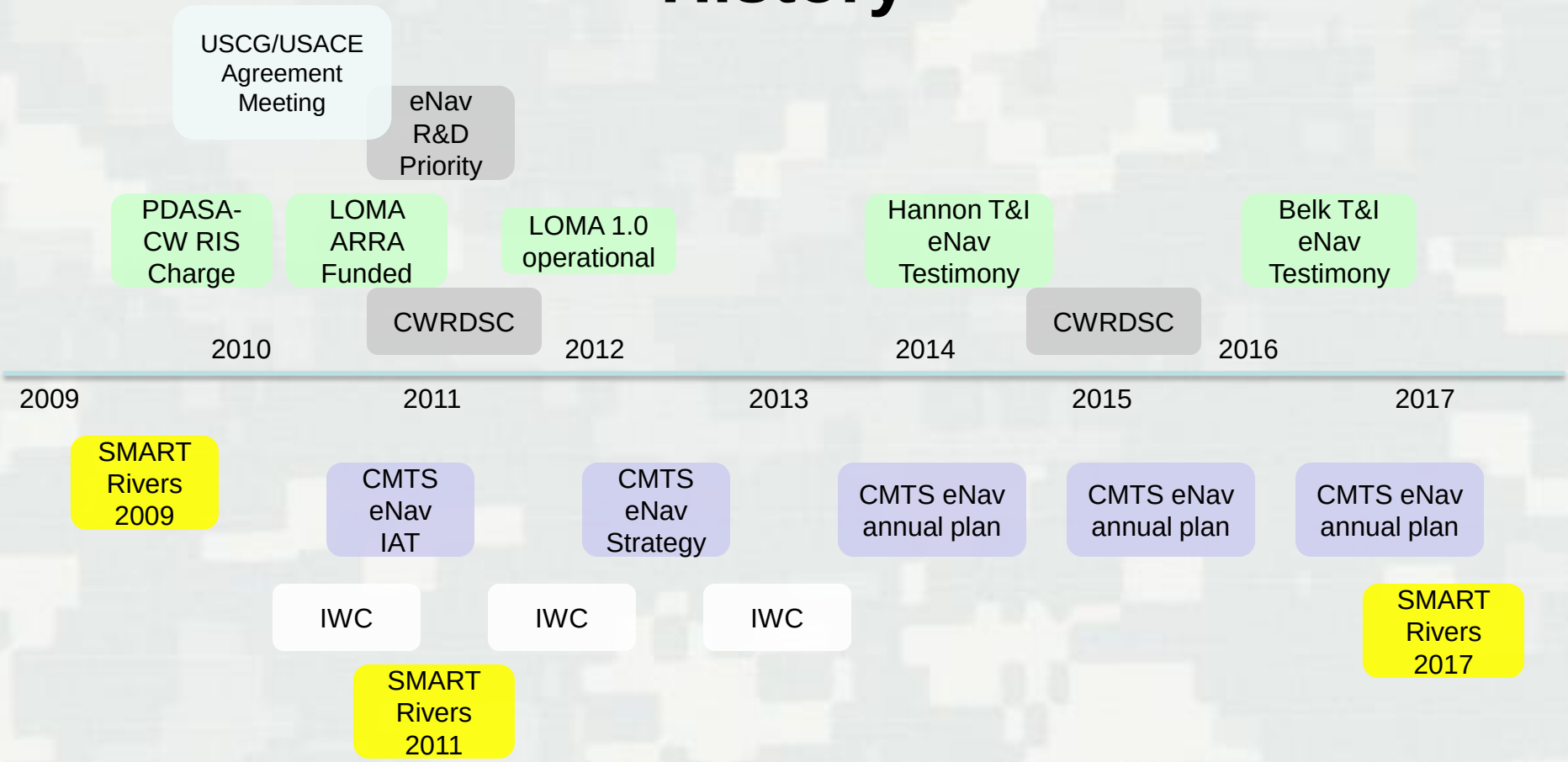
US Army Corps of Engineers

COASTAL AND HYDRAULICS LABORATORY

Outline

- Background and history
- Vision – the waterway of the future
- e-Navigation and River Information Services
  - e-Nav concept
  - RIS technical and operational services
- Where we are today
  - Existing technical and operational services
  - Developing capabilities
- Making them all work together

USACE River Information Services History



The waterway of the future

- Vessel pilots are delivered real-time waterway information when and how they need it
- Vessels move efficiently and safely through well-maintained infrastructure
- Waterway conditions are predicted and communicated to all stakeholders who need them

e-Navigation concept

International Maritime Organization definition:

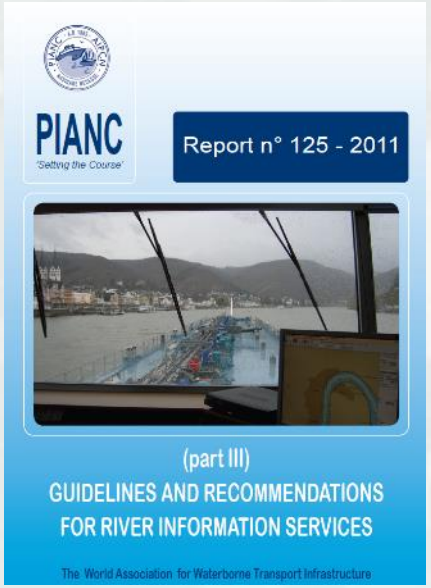
"e-Navigation is the harmonised collection, integration, exchange, presentation and analysis of maritime information onboard and ashore by electronic means to enhance berth to berth navigation and related services, for safety and security at sea and protection of the marine environment"

MSC85/26/Add.1 annex 20

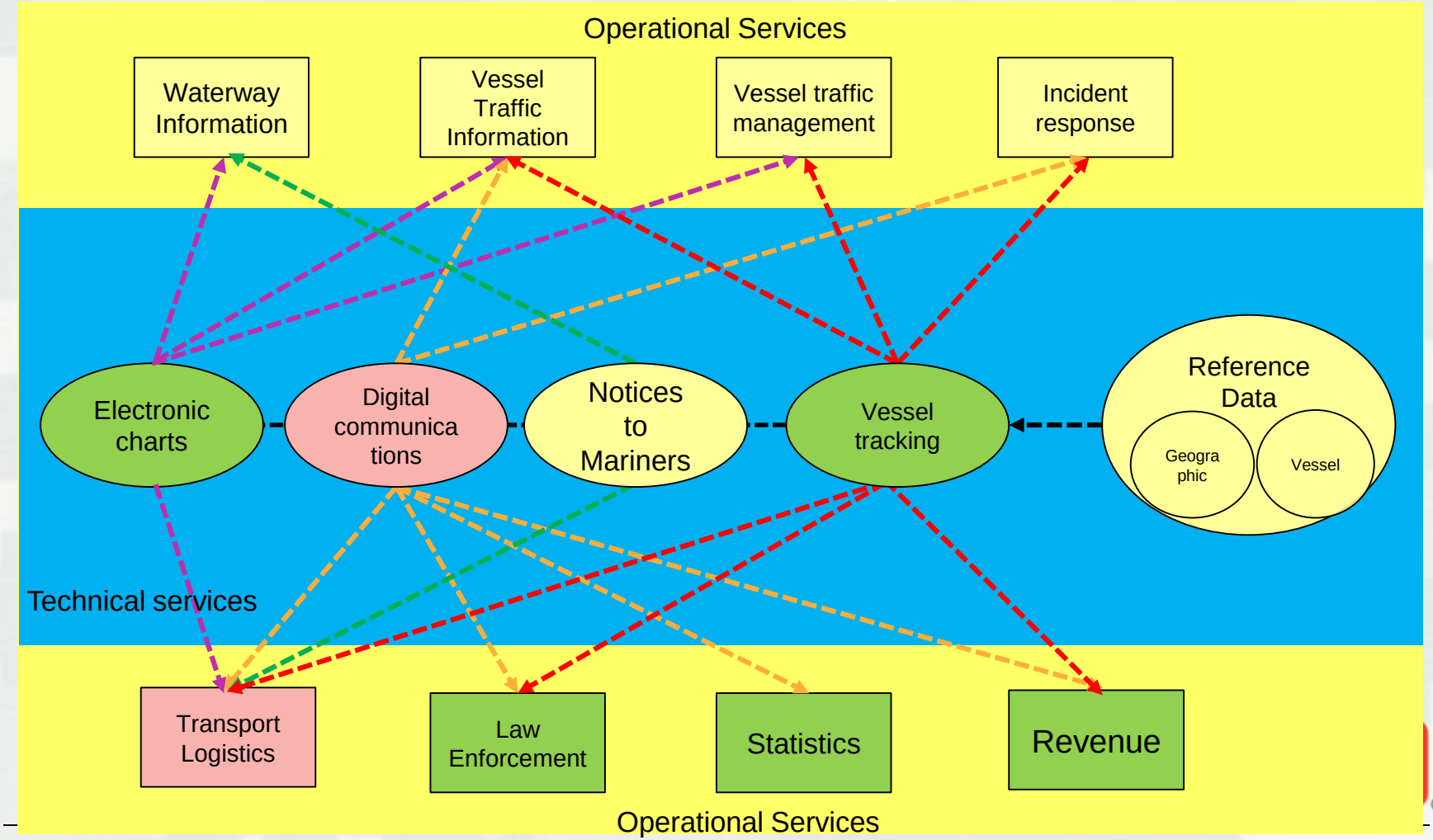
River Information Services (RIS)

What are “services?”

- Operational Services:
  - Waterway information
  - Vessel traffic information
  - Vessel traffic management
  - Incident response support
  - Logistics support
  - Law enforcement support
  - Statistics
  - Revenue support
- Technical Services:
  - Electronic charts
  - Communication
    - Voice radio
    - Digital radio
    - Internet web services
  - Vessel tracking
  - Notices to mariners
  - Authoritative reference data
    - Geographic
    - Vessel
    - Cargo/commodity



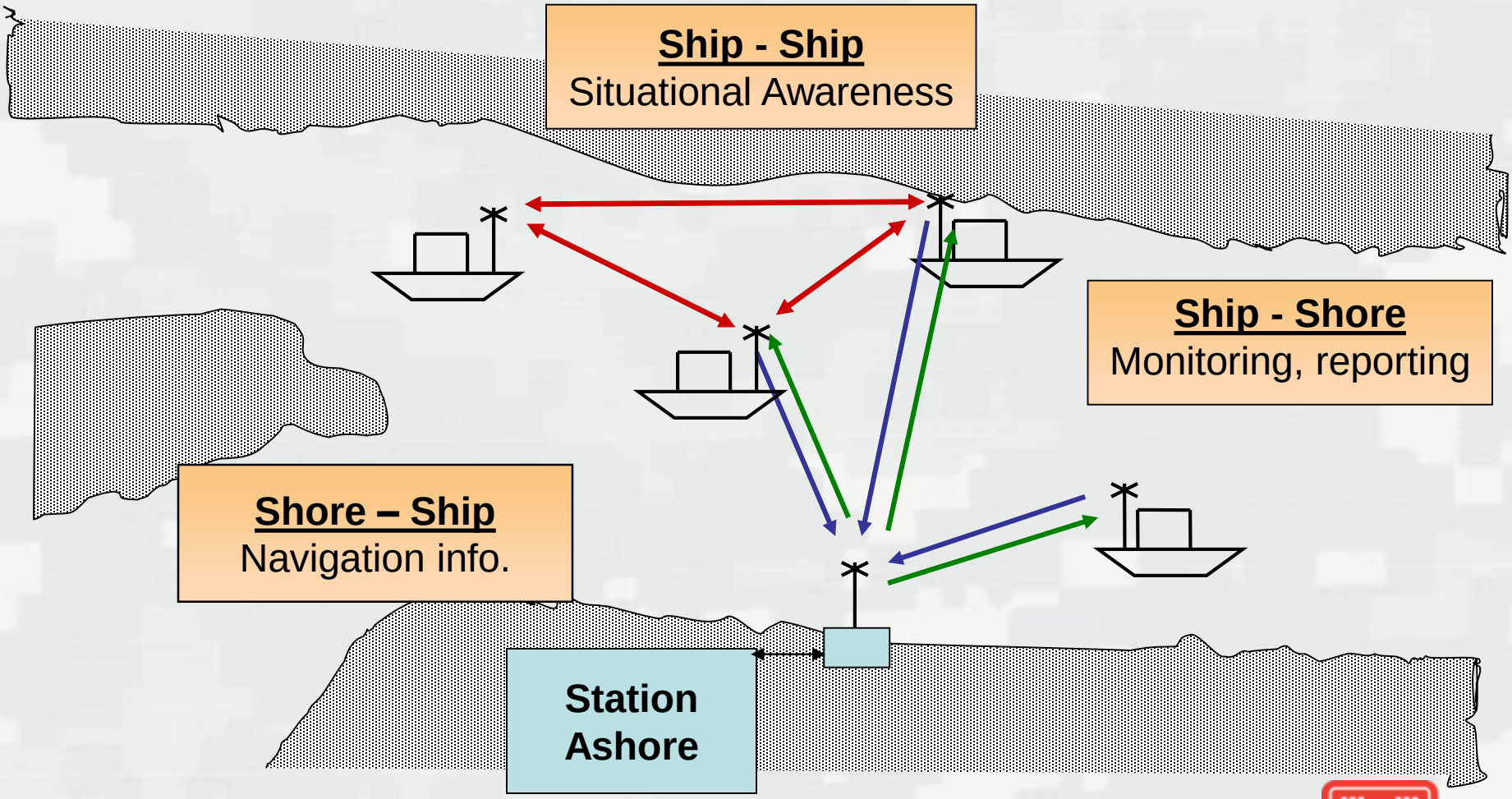
RIS Technical and Operational services



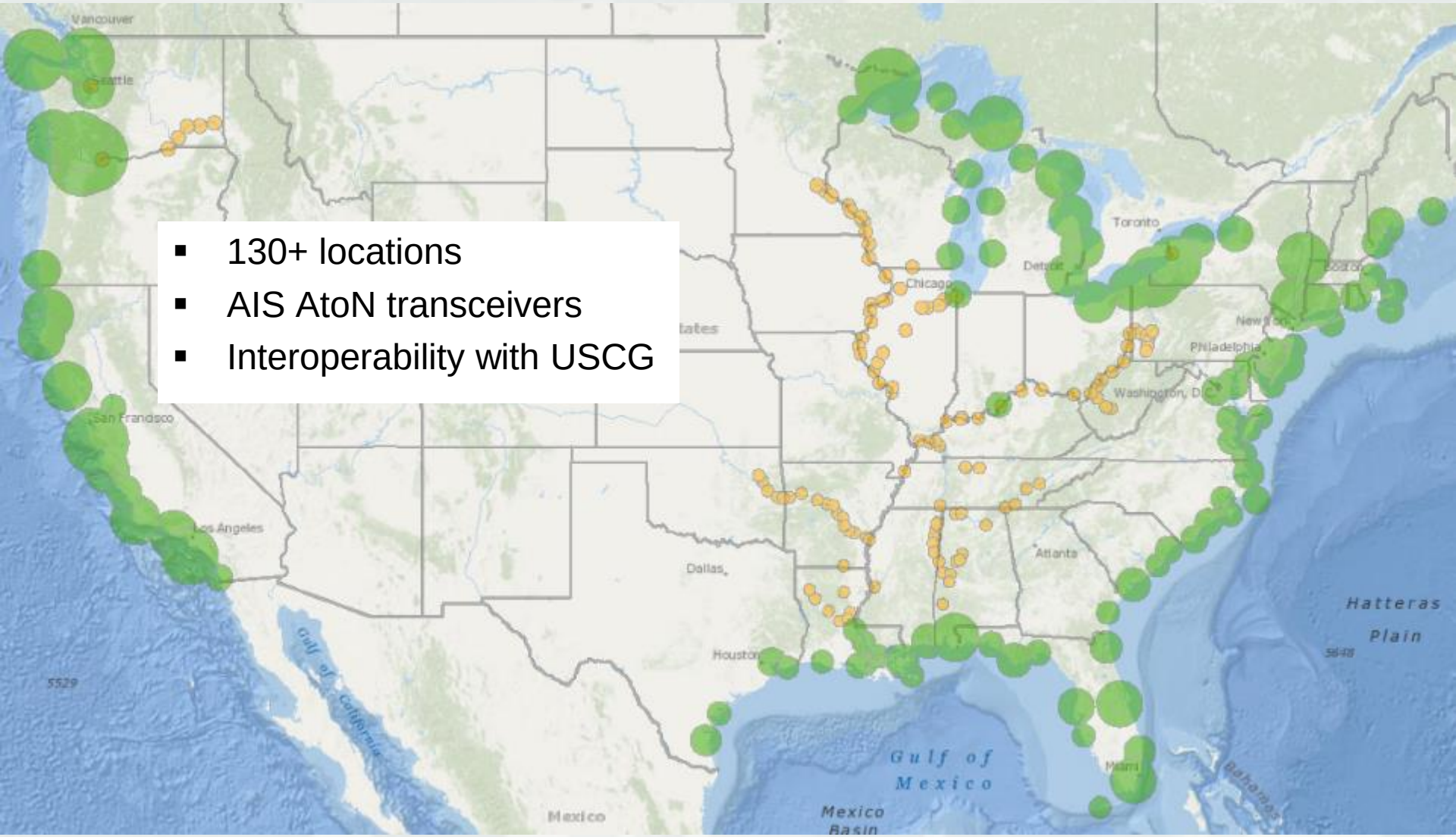
Lock Operations Management Application (LOMA)

- LOMA is the delivery system for real-time navigational services
- Goals:
  - Increase lock operator situational awareness
  - Provide vessel operators better information
  - Provide better information to Corps management
  - Exchange information with external users
- The Automatic Identification System (AIS) is the central LOMA technology

Automatic Identification System (AIS)



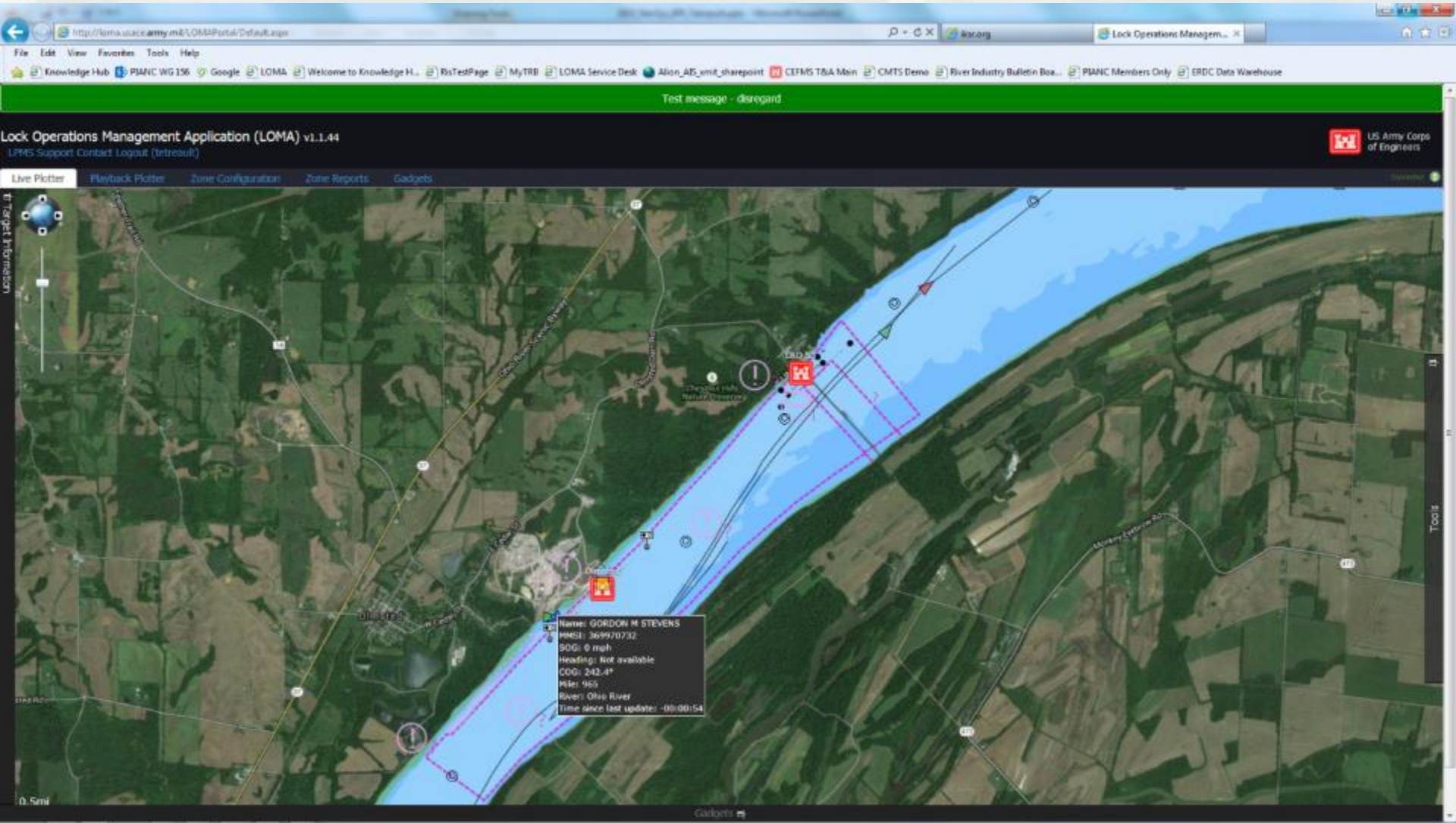
USACE and USCG AIS coverage



- 130+ locations
- AIS AtoN transceivers
- Interoperability with USCG

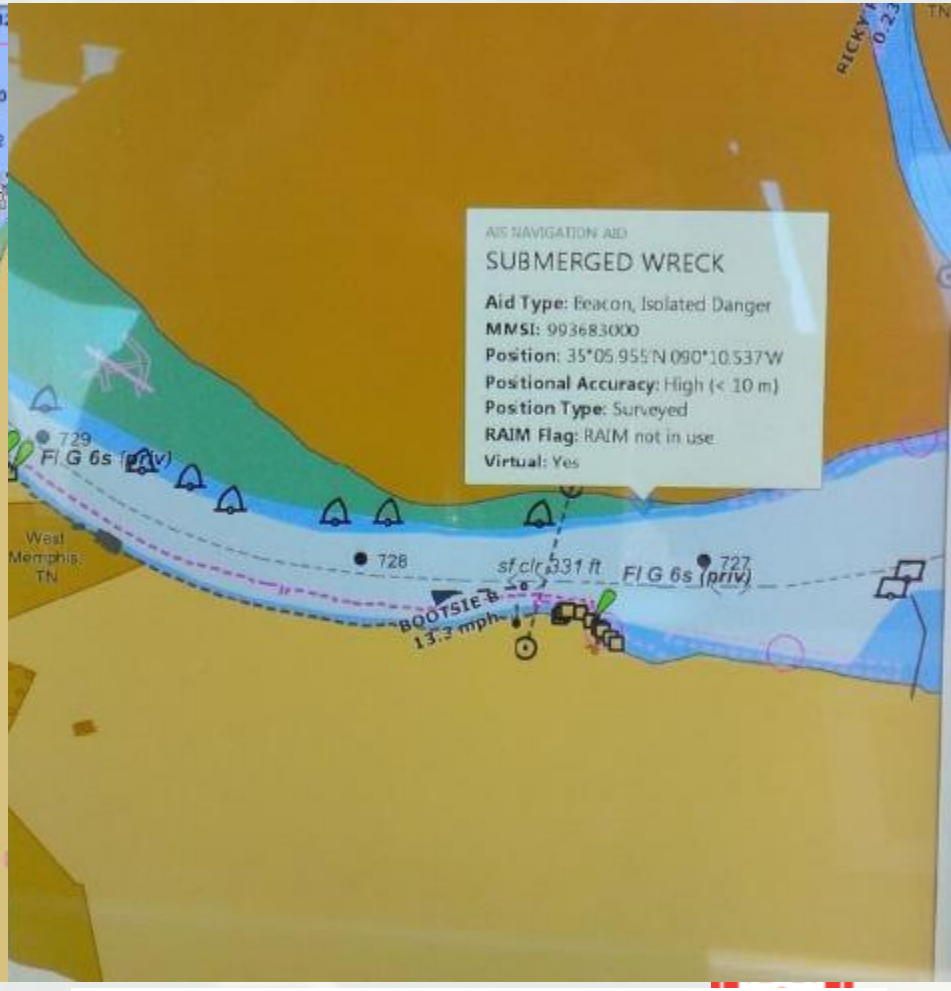
LOMA Capabilities

- Lock operator situational display
- AIS vessel information
- Zone Management
- Playback capability



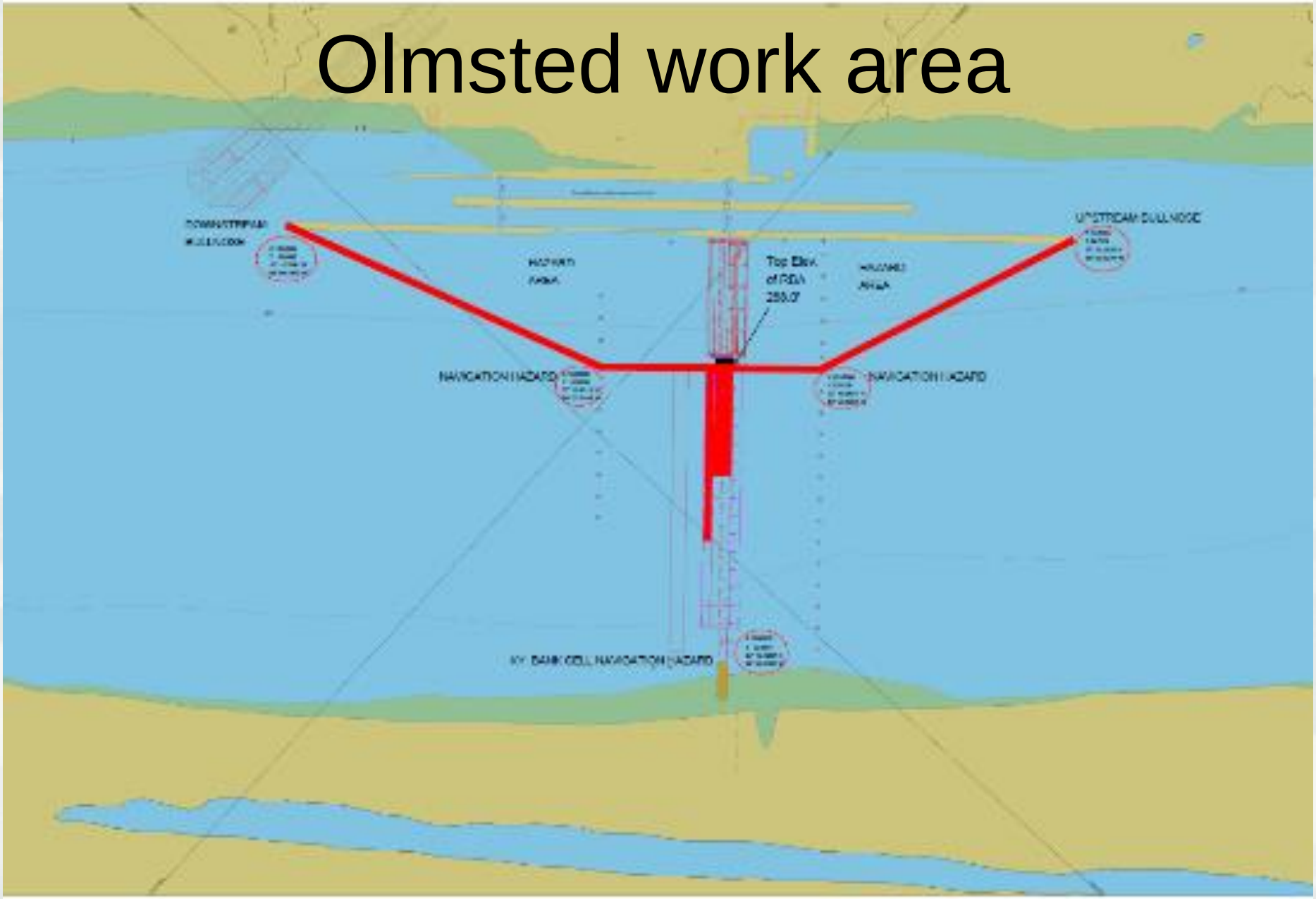
Virtual AtoN

AIS V-AtoN in area where ice and tidal range prohibit physical AtoN

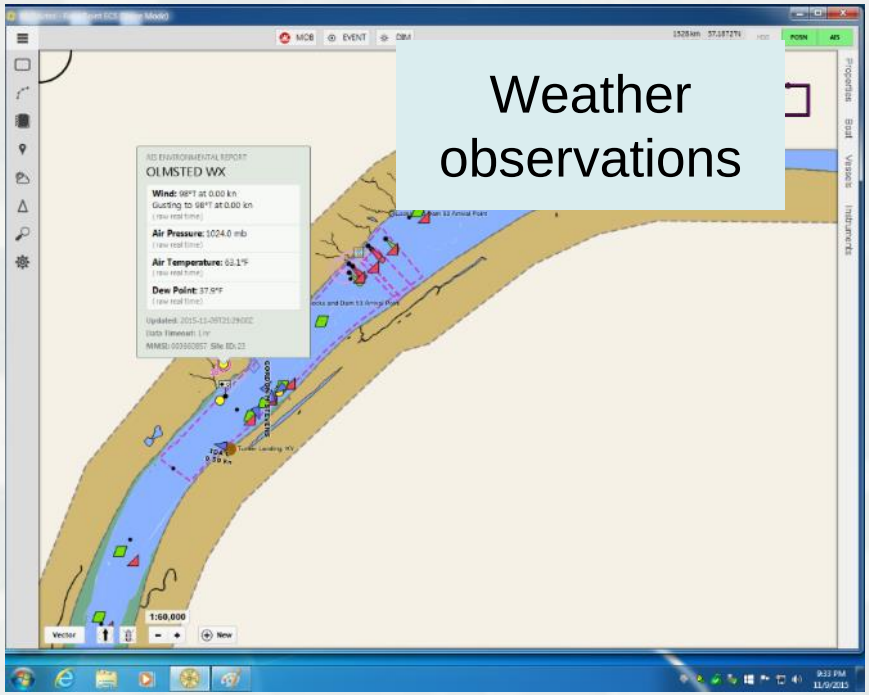


AIS V-AtoN marking submerged wreck in swift river waters

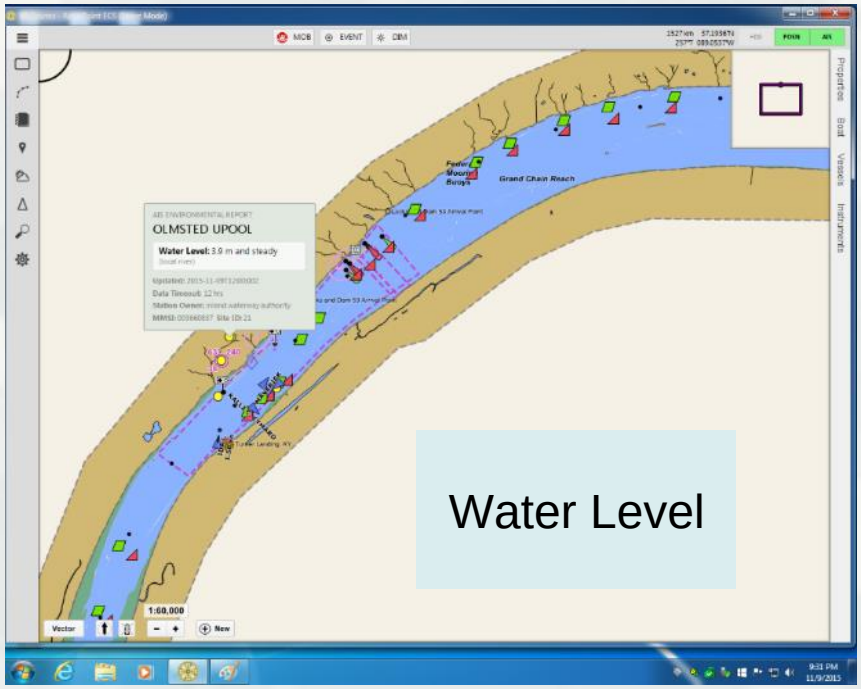
Olmsted work area



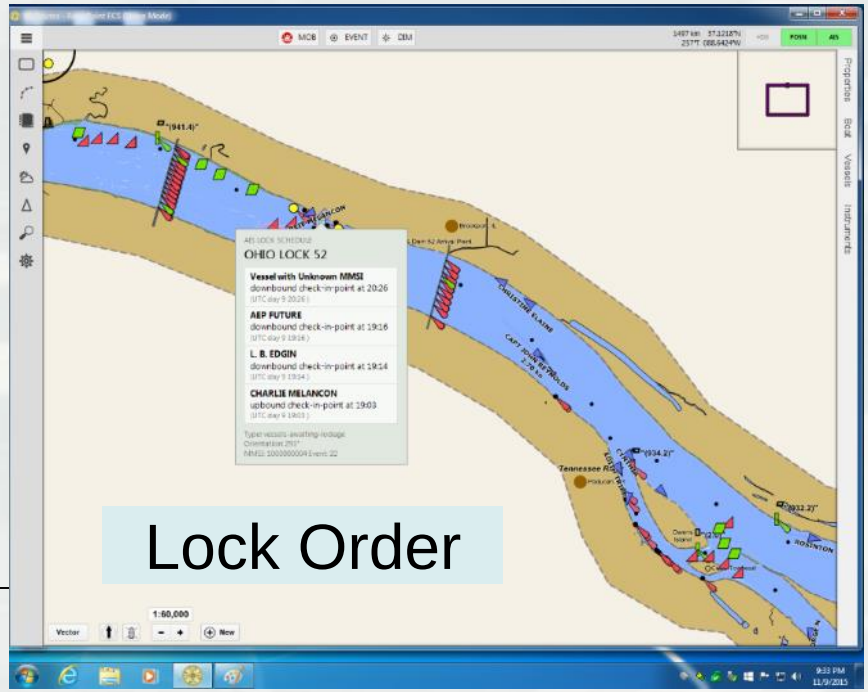
Information delivered to vessels via AIS



Weather observations



Water Level



Lock Order

Lock Operations Management Application (LOMA) v1.1.174 Application Certified for Unclassified

LPMS | Support | Contact | Logout (Michael.F.Winkler)

Live Plotter | Playback Plotter | Zone Configuration | Zone Reports | Gadgets

Target Information

Name	WILLIAM JAMES
MMSI	366999267
Callsign	AAAG
Latitude	32°54'05"N
Longitude	091°03'40"W
SOG	0 mph
Heading	Not available
COG	272°
Nav Status	Moored
Operating Mode	Autonomous
Rate Of Turn	Not available
Length	164.00 ft
Beam	
Type of Ship	
Type of Cargo	
CargoType	
IMO Number	
Draught	
Nav Sensor	
DTE Status	
Nationality	
Lock	
Mile	
River	
Time since last update	00:03:46

Target Information

NTSB Marine Accident Report

4. Recommendations

As a result of its investigation, the National Transportation Safety Board makes the following safety recommendations to the US Army Corps of Engineers:

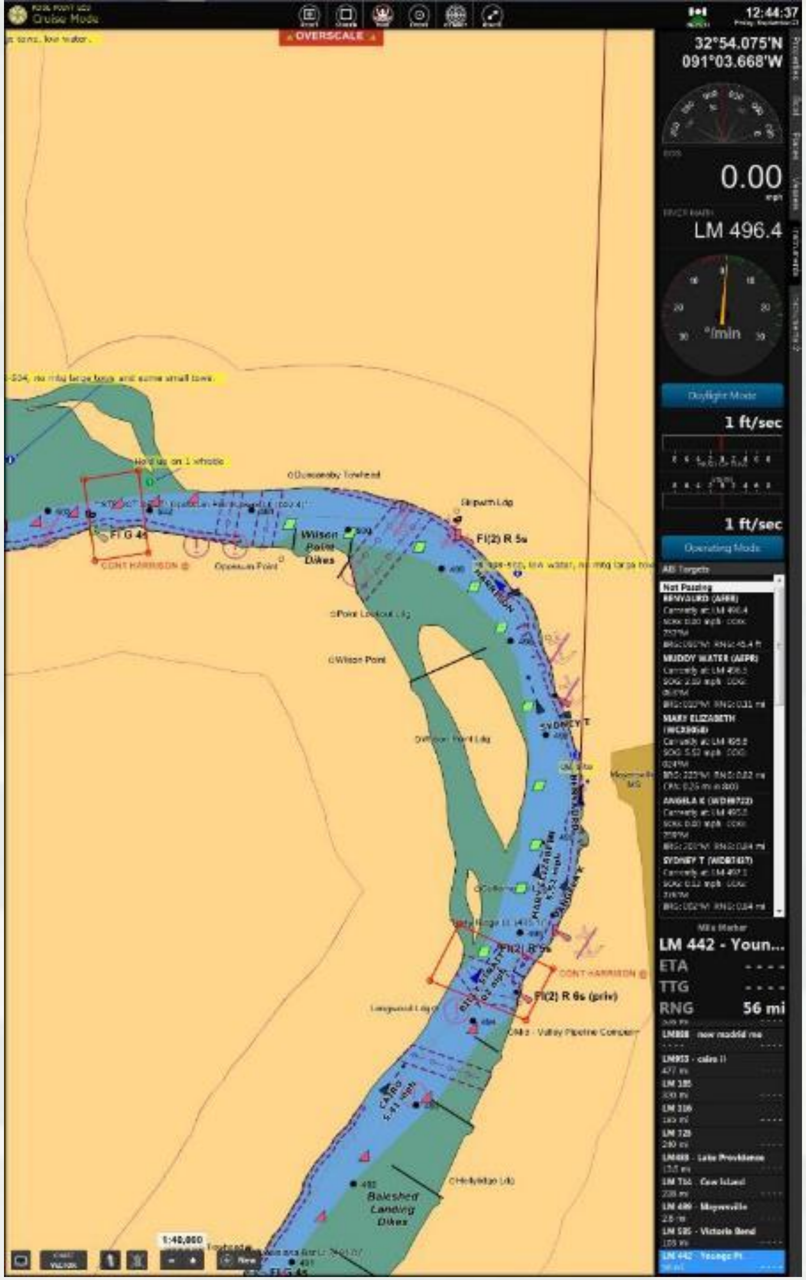
Specify in the information you provide to the public how far US Army Corps of Engineers projects extend into the waterway. (M-15-13)

Use automatic identification system aids to navigation or application-specific messages to mark potential hazards to navigation. (M-15-14)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

CHRISTOPHER A. HART
Chairman

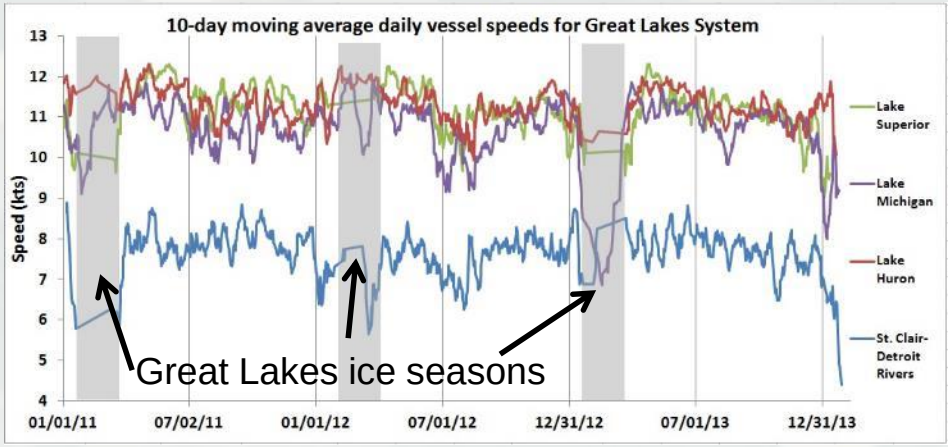
ROBERT L. SUMWALT
Member


Cruise Mode
12:44:37
OVERSCALE
32°54.075'N
091°03.668'W
0.00
LM 496.4
°/min
Daylight Mode
1 ft/sec
1 ft/sec
Operating Mode
Wilson Point Dikes
Fl(2) R 5s
Fl G 4s
Fl(2) R 6s (priv)
CONT HARRISON
Baleshed Landing Dikes
LM 442 - Youn...
ETA
TTG
RNG
56 mi
1:40,000

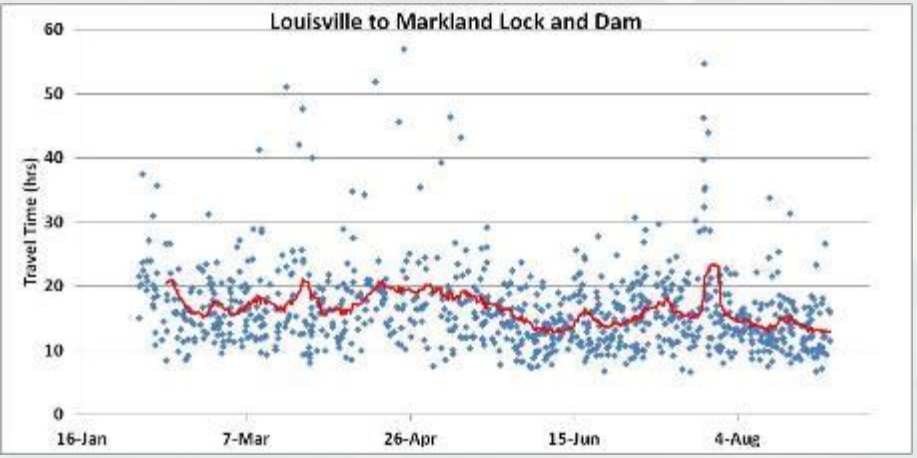

Cruise Mode
12:49:16
32°54.074'N
091°03.669'W
0.00
LM 496.4
°/min
Daylight Mode
1 ft/sec
1 ft/sec
Operating Mode
MUDDY WATER
Fl(2) R 5s
Fl(2) R 6s (priv)
CONT HARRISON
LM 442 - Youn...
ETA
TTG
RNG
56 mi
1:12,000

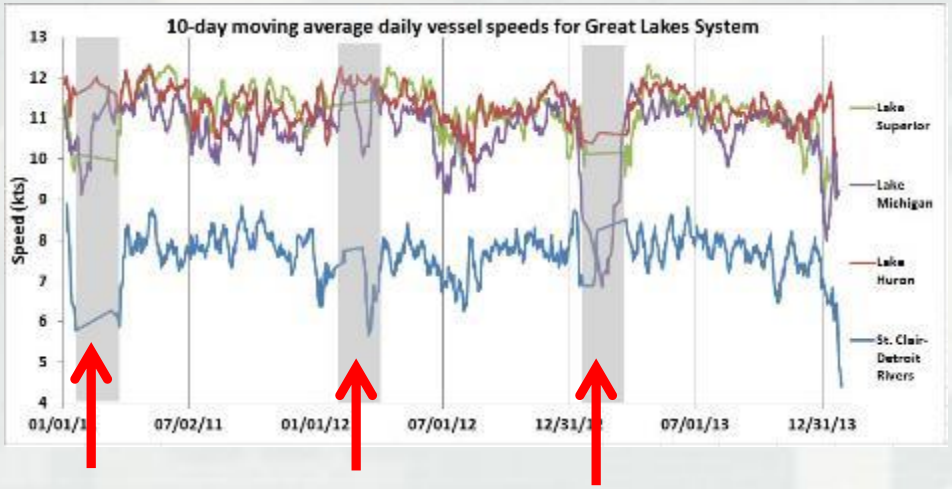
Developing Capabilities: Waterway Performance Monitoring

- Analysis provides performance baselines
- Conditions can be monitored going forward
- Analyses are scalable across time and space: single channels can be monitored for a few hours, or entire coasts can be monitored for years.

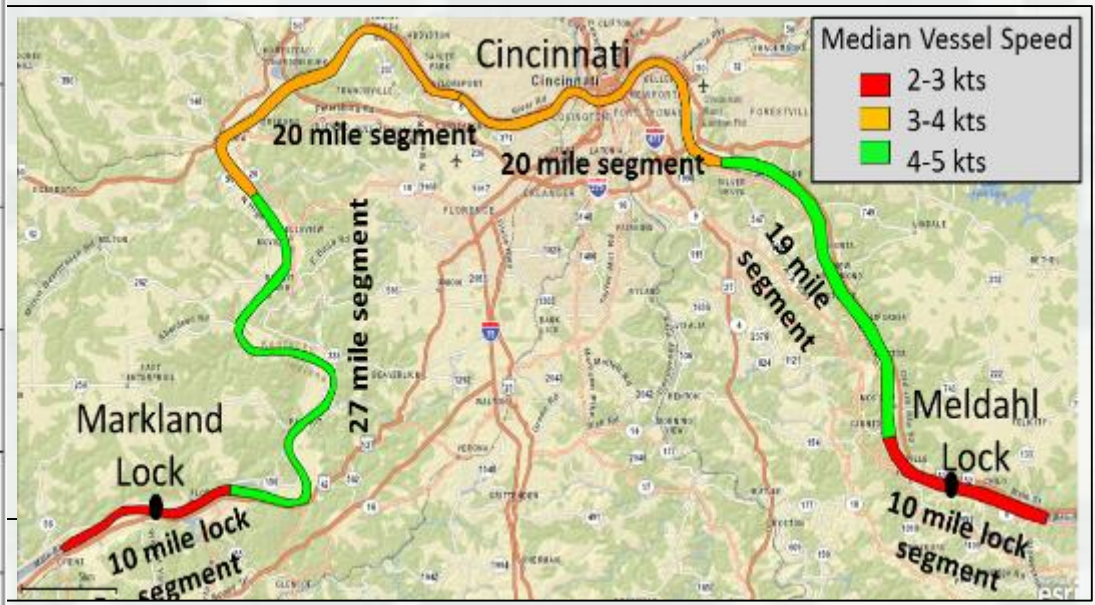


Developing Capabilities: Vessel travel time analysis



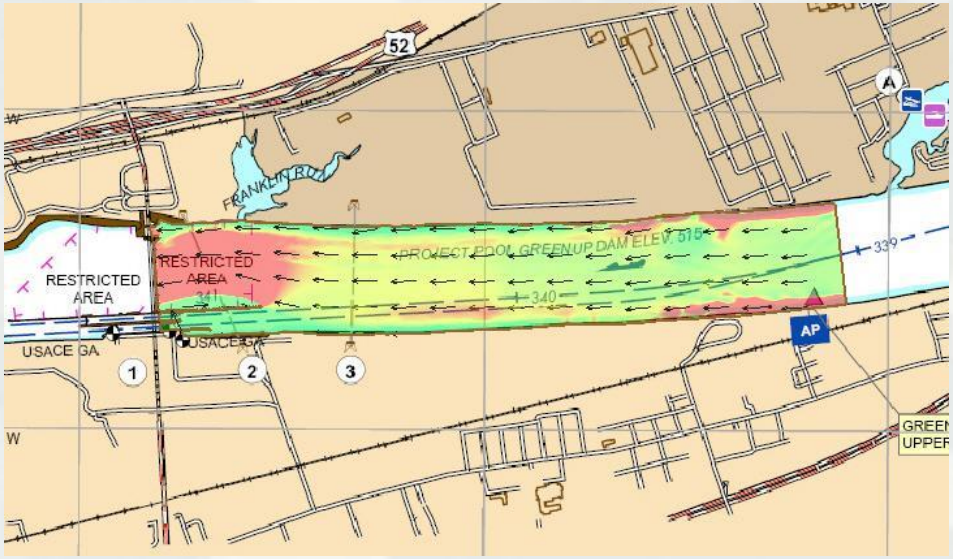


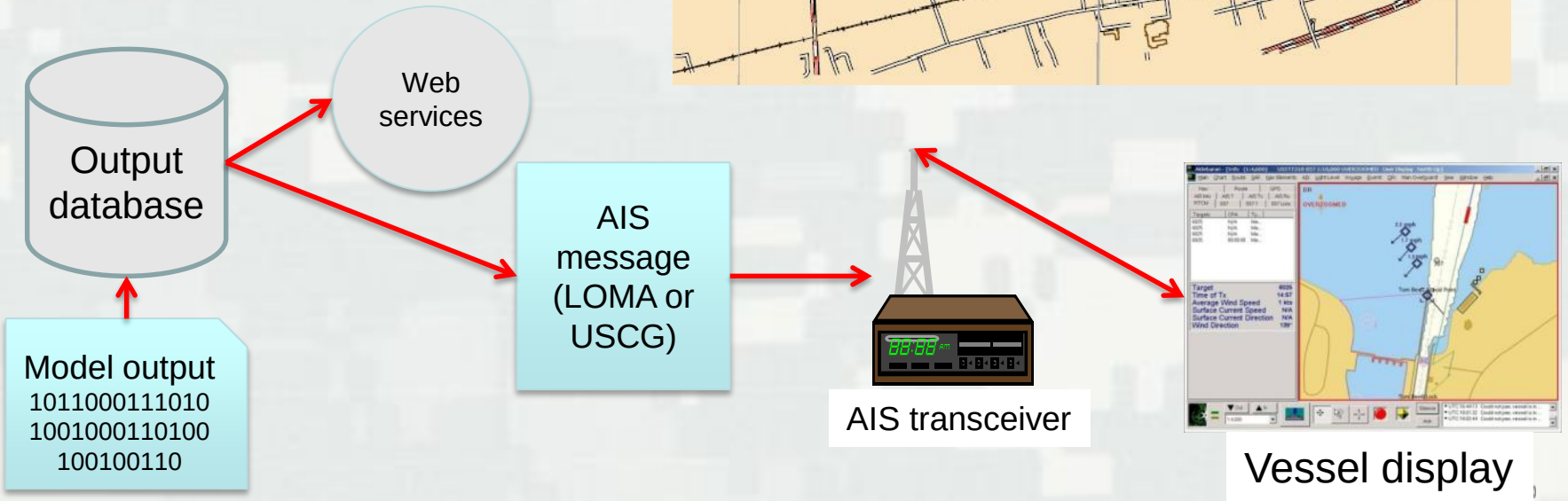
Inland Port Area AOI	Approx. River Mile Distance	Downbound Travel Time (hrs) Mean Standard Deviation 5th percentile # of observations	Upbound Travel Time (hrs) Mean Standard Deviation 5th percentile # of observations
St. Louis, MO	175	27.0 8.5 17.0 211	45.4 12.9 29.3 233
Cairo, IL	215	25.2 12.0 17.0 413	55.1 14.3 36.4 371
Memphis, TN	285	34.4 12.7 23.2 154	52.1 6.1 39.4 47
Vicksburg, MS	125	13.5 4.9 9.5 169	31.5 15.3 19.0 183
Old River, LA	75	7.5 2.8	12.7 3.5



Developing Capabilities: Lock approach current models

- Develop and run current models
- “Library” of output
- Communicate to users based on real-time conditions





Summary

- Vision of the waterway of the future is being worked on
- Operational and technical services are in place
- More capabilities are being developed and there are platforms to deliver them
- Continued work, coordination and cooperation internally, interagency and internationally is ongoing

For more information

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