U.S. Department of Homeland Security
United States Coast Guard

Navigation Technologies – Current State, Future Possibilities, Gaps, Barriers

CAPT Scott Smith

Office of Navigation Systems

U.S. Department of Homeland Security
United States Coast Guard

- A little about the Coast Guard
- Current State of Navigation Efforts
- Concerns/Challenges/Gaps

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DHS Programs	USCG Statutory Missions
Maritime Security Operations	Ports, Waterways and Coastal Security (PWCS) - Operational Activities
Maritime Law Enforcement	Drug Interdiction
	Migrant Interdiction
	Living Marine Resources (LMR)
	Other Law Enforcement (OLE)
Maritime Prevention	Ports, Waterways, and Coastal Security (PWCS) - Prevention Activities
	Marine Safety (MS)
	Marine Environmental Protection (MEP) - Prevention Activities
Maritime Response	Search and Rescue (SAR)
	Marine Environmental Protection (MEP) - Response Activities
Defense Operations	Defense Readiness
Marine Transportation System Management	Aids to Navigation (AtoN)
	Domestic Ice Operations

MTS Functional Programs

- Bridge Admin

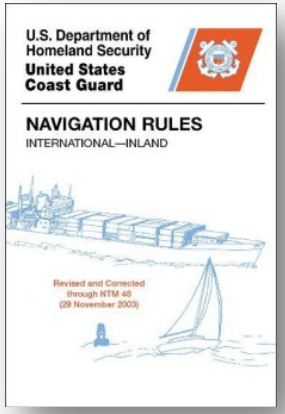
- Electronic Nav

- Visual Nav

- Domestic Ice

- Ice Patrol

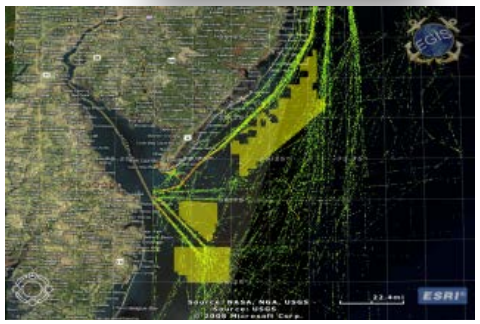
- Nav Standards



- Great Lakes Pilotage

- Polar Icebreaking

- Vessel Traffic Service



- CMSP

- Ocean & Transport Policy

- Waterways Mgmt

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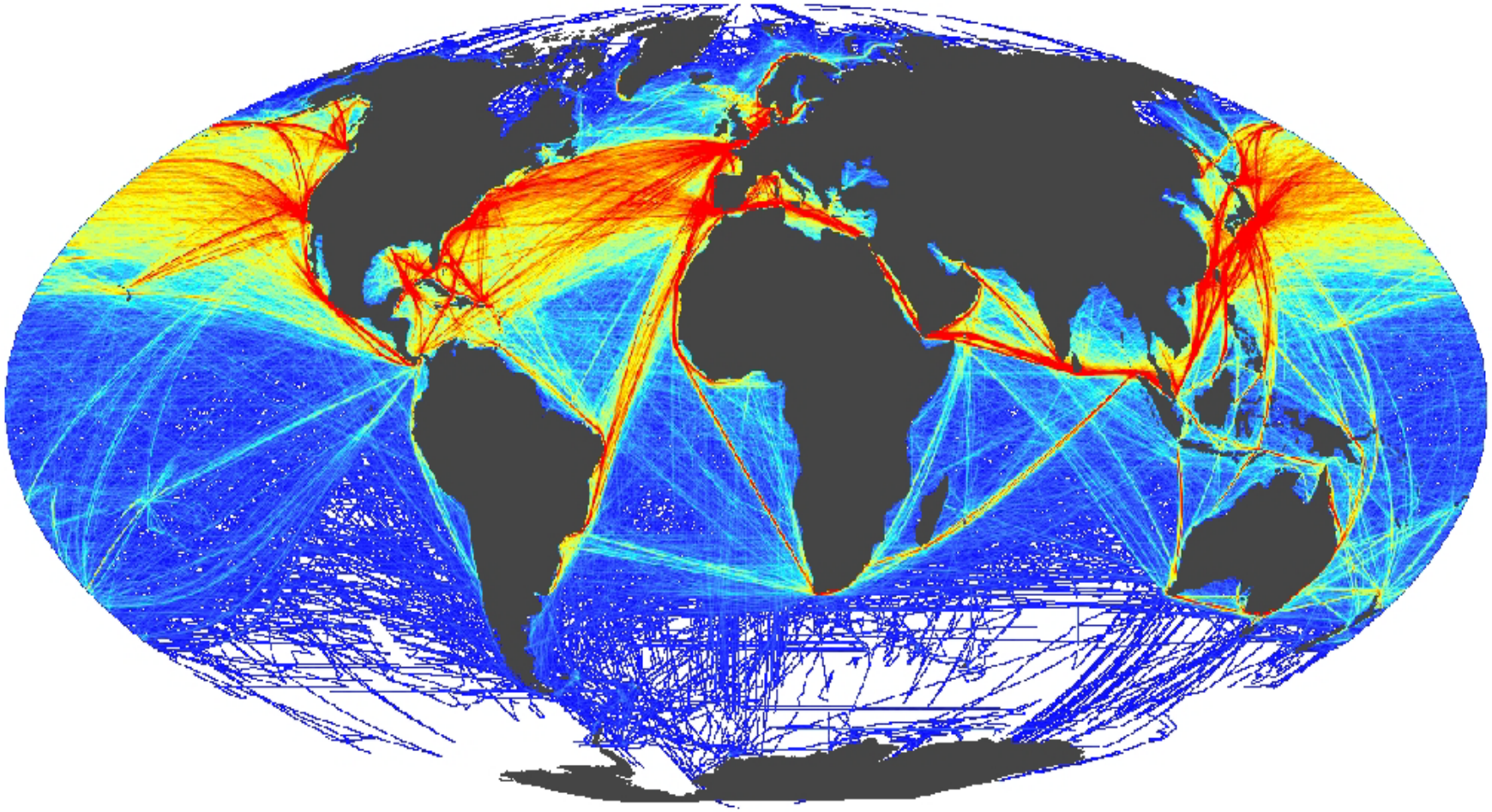
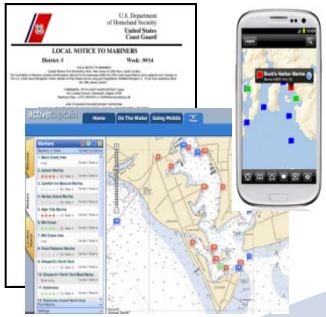
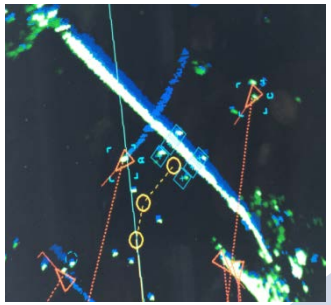


MTS is IMPORTANT!

Future of Navigation Roadmap





DESIRED OUTCOMES

- Improve Service Delivery of the Mariner
- Improve Mariner Situational Awareness
- Efficient Use of Existing Resources
- Improve Program Management
- Improve Waterway Resiliency
- Inform Capability/Acquisition Decisions

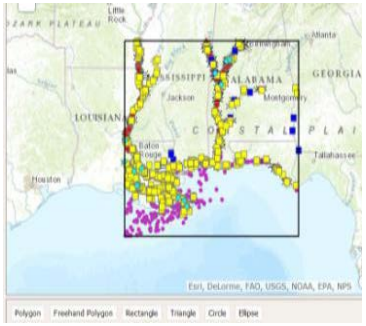
International Standards
- IMO
- IALA
- IHO
- IEC
- ITU

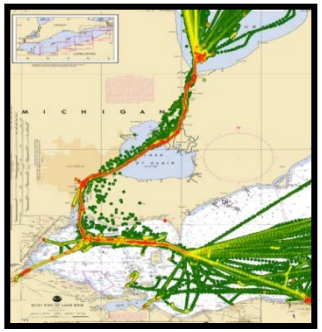
Equipment Standards, Regulations, and Policy
- AIS Regulations
- ECDIS Regulations
- ECS Policy NVIC 01-16
- RTCM Standards
- Public Outreach

Tactical Application Tests
- WR JCTD
- Deploy AIS ATON
- Work w/ FON IAT
- Smart Bridges
- Role out eMSI
- Public Outreach

Policy Analysis and Development
- National Level WAMS
  - Atlantic and Gulf Cost SeaCoast
  - Pacific Cost SeaCoast
  - Deep Draft (12' and Above)
  - Shallow Draft (below 12')
  - ICW
  - Western Rivers
- Incorporate Test Bed Lessons Learned
- Public Outreach

Policy Implementation
- WAMS 2.0
- Public Outreach





Improving Service Delivery
- Modernize Physical System
- Incorporate eATON into Design System
- Modernize Delivery of MSI (eMSI)
- Improving Notification of ATON Changes
- Understanding Users Requirements
- Develop Data-driven, Risk-Based Analysis Tool

Efficient Use of Existing Resources
- Effective use of AFC-43 Funding
- Effective Use of AFC-30 Funding
- Effective Use of AC&I Funding
- Modernize Physical System

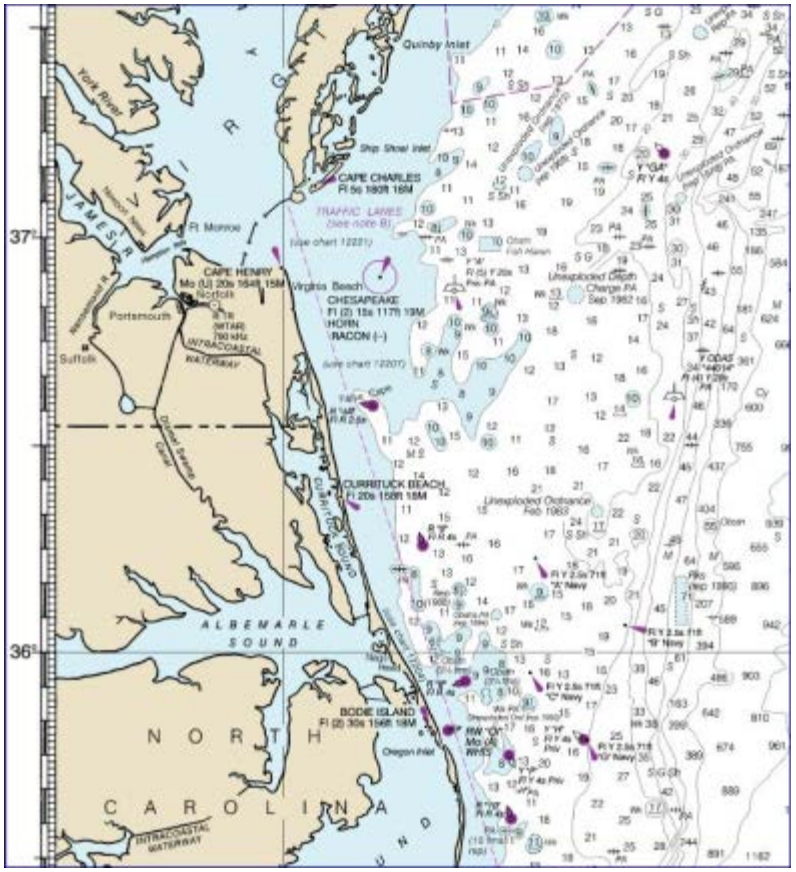
Improve Program Management
- Improved Program Metrics
- Better Information to Ops Cdrs
- Improved Program Oversight
- Improved Program Visual Analytics
- Centralizing Maintenance & Logistics
- Modernize Physical System
- AIS Analysis Support

Improve Waterway Resiliency
- Digital Lightship
- Incorporate eATON

Informing Capability/Acqusition
- WLB Mid Life
- WLB Repurpose
- WLR/WLIC/WLI Recap
- WLM Mid Life
- NAIS System

Improving Service Delivery

- Incorporate eATON into system design
- Modernize Delivery of Marine Safety Information
- Modernize physical ATON system – Waterway of the Future
- Improve public notification of ATON changes and proposals.
- Understand current user requirements for U.S. Aids to Navigation System (USATONS)
- Develop Risk Based Analysis and Program Management Tool



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Regulatory/Policy Support

- Expanded AIS carriage regulation 01 March 2016
- RTCM ECS Standards version 6
- NVIC Feb 2016
  - Updated policy allows use of official electronic charts in lieu of paper
  - Majority of commercial users carry acceptable ECS

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Concerns, Challenges and Gaps

- Over Reliance on Technology
- Training
- Reaching the Masses
- Cyber Security
- Resources
- GPS Vulnerabilities
- Unmanned Maritime Systems
- Alternative Uses of our Ocean Space –Marine Planning
- Panama Canal Expansion

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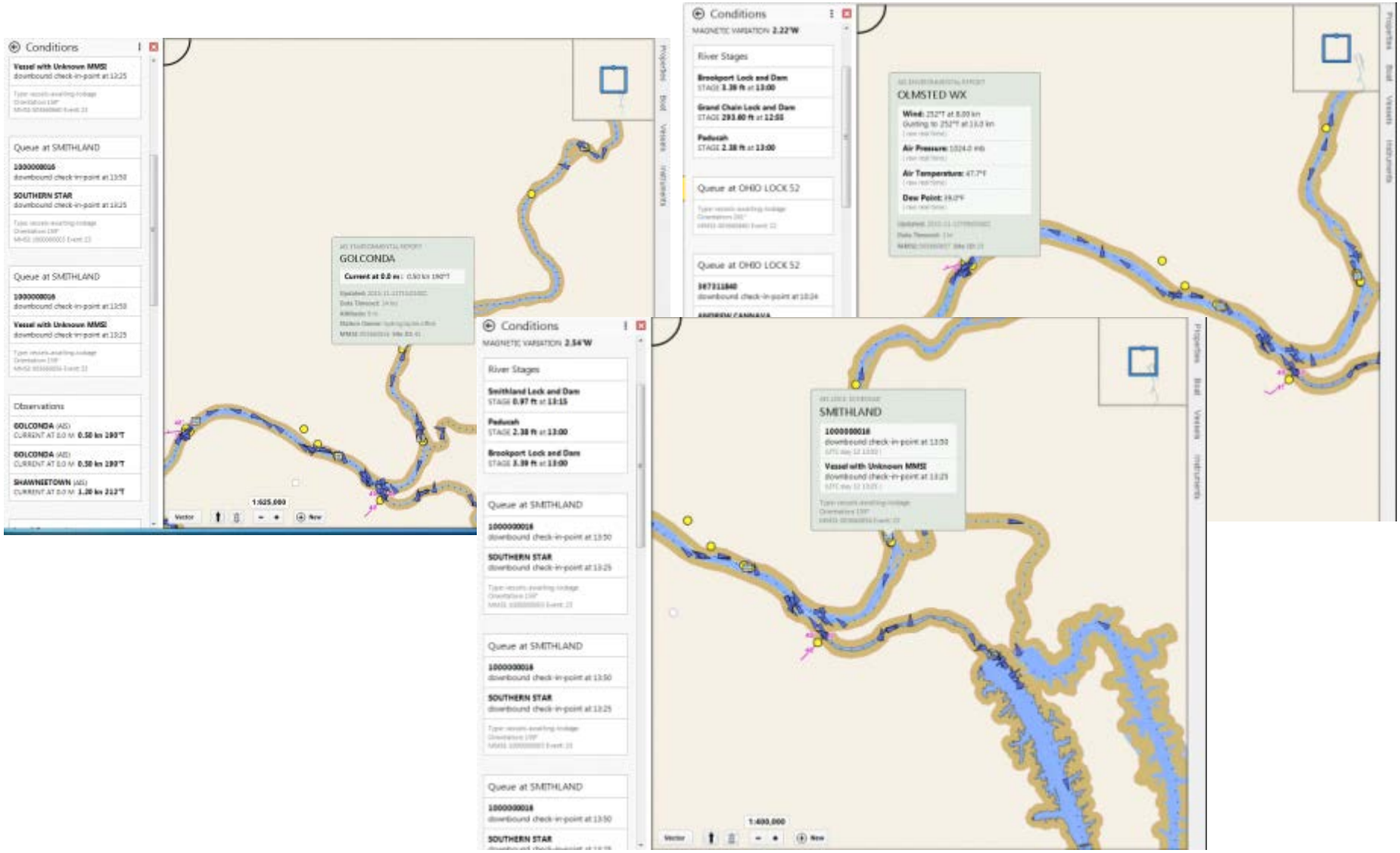
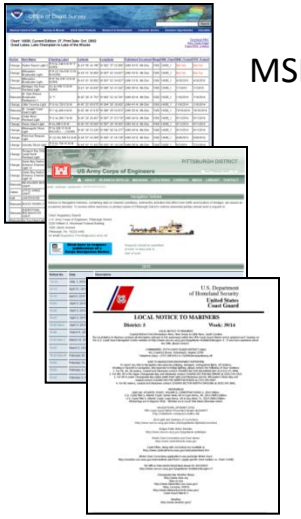
QUESTIONS?


Conditions
Vessel with Unknown MMSI
downbound check-in-point at 12:25
Queue at SMITHLAND
1000000016
downbound check-in-point at 13:50
SOUTHERN STAR
downbound check-in-point at 13:25
Queue at SMITHLAND
1000000016
downbound check-in-point at 13:50
Vessel with Unknown MMSI
downbound check-in-point at 13:25
Observations
GOLCONDA (AIS)
CURRENT AT 0.0 M: 0.50 kn 190°T
GOLCONDA (AIS)
CURRENT AT 0.0 M: 0.50 kn 190°T
SHAWNEETOWN (AIS)
CURRENT AT 0.0 M: 1.20 kn 212°T
GOLCONDA
Current at 0.0 m: 0.50 kn 190°T
1:625,000
Conditions
MAGNETIC VARIATION 2.54°W
River Stages
Smithland Lock and Dam
STAGE 0.97 ft at 13:15
Paducah
STAGE 2.38 ft at 13:00
Brookport Lock and Dam
STAGE 3.39 ft at 13:00
Queue at SMITHLAND
1000000016
downbound check-in-point at 13:50
SOUTHERN STAR
downbound check-in-point at 13:25
Queue at SMITHLAND
1000000016
downbound check-in-point at 13:50
Queue at SMITHLAND
1000000016
downbound check-in-point at 13:50
SOUTHERN STAR
Conditions
MAGNETIC VARIATION 2.22°W
River Stages
Brookport Lock and Dam
STAGE 3.38 ft at 13:00
Grand Chain Lock and Dam
STAGE 293.60 ft at 12:55
Paducah
STAGE 2.38 ft at 13:00
Queue at OHIO LOCK 52
Queue at OHIO LOCK 52
367311840
downbound check-in-point at 10:24
OLMSTED WX
Wind: 252°T at 8.00 kn
Gusting to: 252°T at 11.0 kn
Air Pressure:
Air Temperature:
Dew Point:
SMITHLAND
1000000016
downbound check-in-point at 13:50
Vessel with Unknown MMSI
downbound check-in-point at 13:25
1:400,000

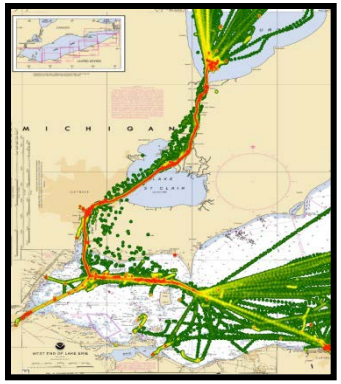
CURRENT STATE

MSI

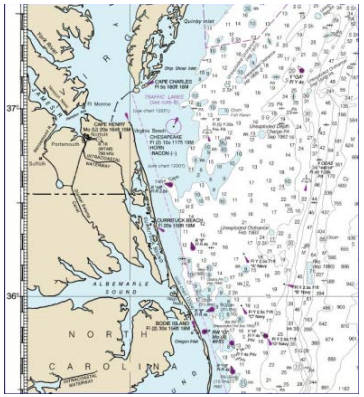


Nautical Pubs

AIS



RNC/ENC



ECDIS/ECS

Physical ATON

Web based
environmental data

GNSS

GNSS Augmentation

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BARRIERS

Transmission challenges
Common Waterway IDs
Standardized Equipment

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The Way Forward

Transmission challenges
Common Waterway IDs
Standardized Equipment