

How Automatic Identification System (AIS) Is Being Used to Improve Navigation Safety

ERDC

Engineer Research and
Development Center

Lock Operations Management Application

Michael Winkler

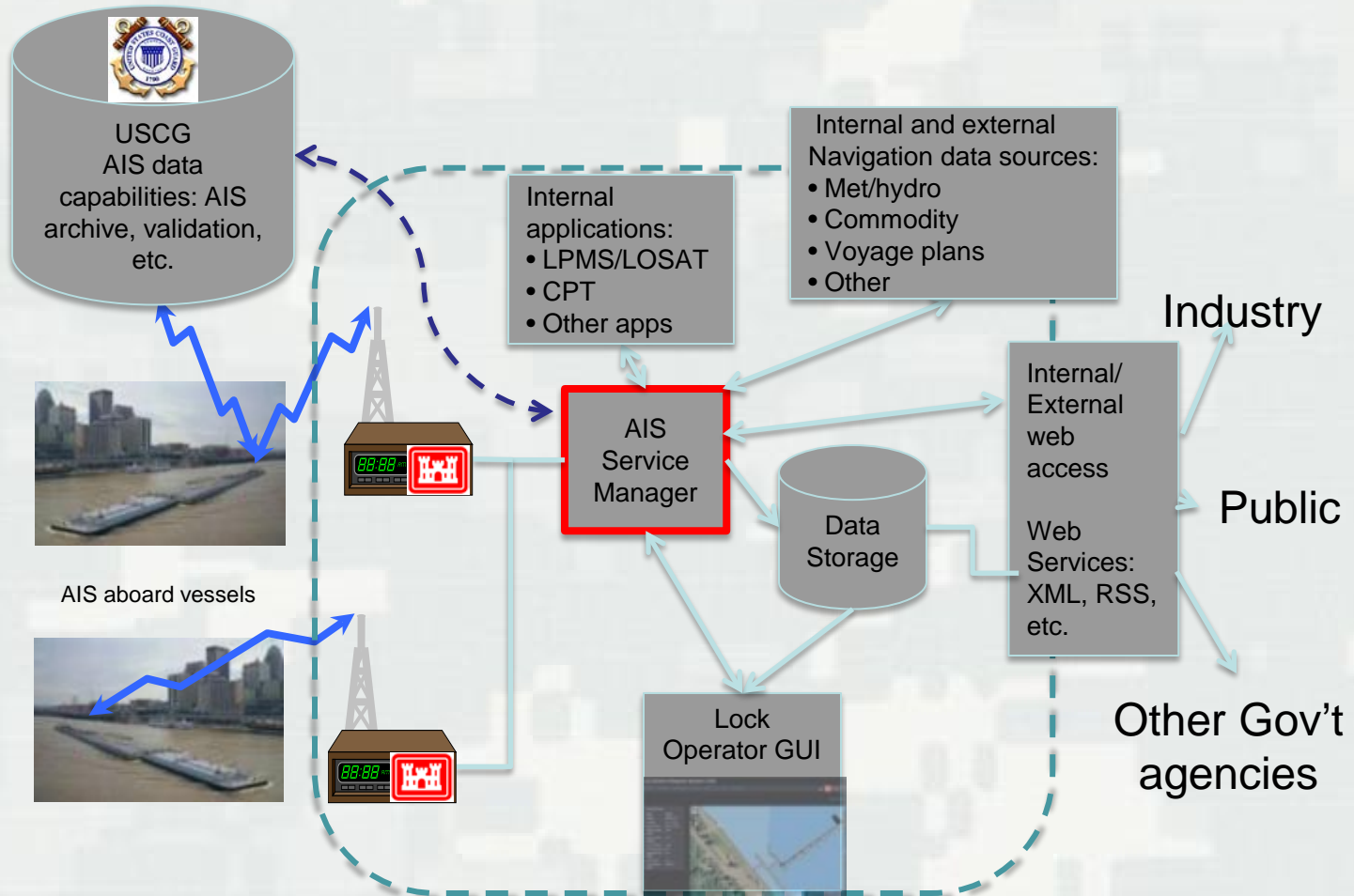
June 2016



US Army Corps
of Engineers®



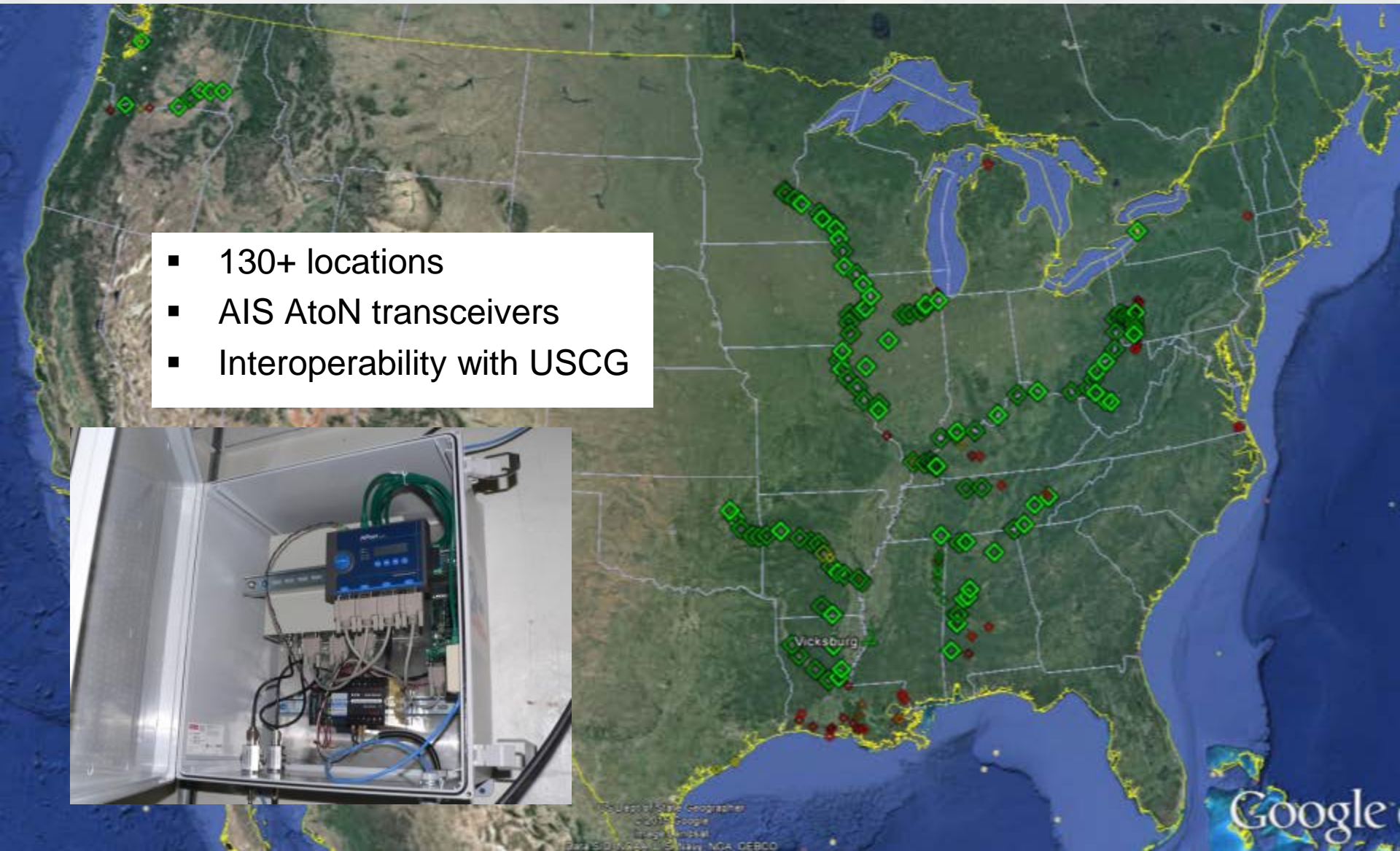
LOMA system overview



LOMA AIS equipment deployment

(February 2015)

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

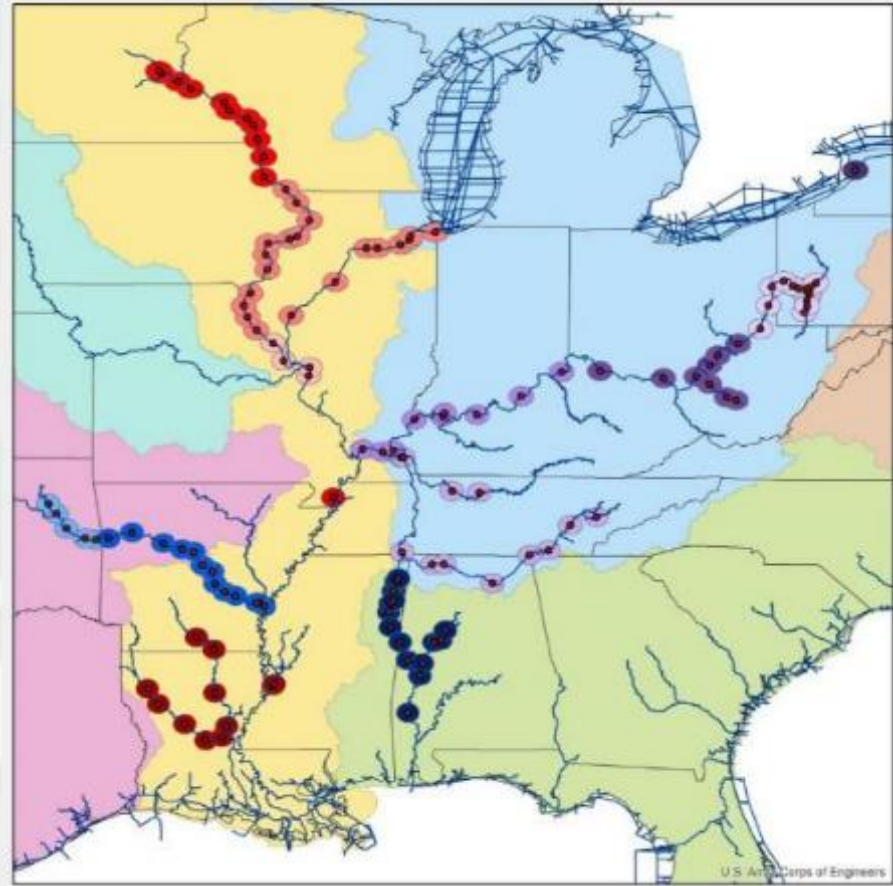


FY15 Product Development

LOMA AIS Coverage (nominal – 12nm)

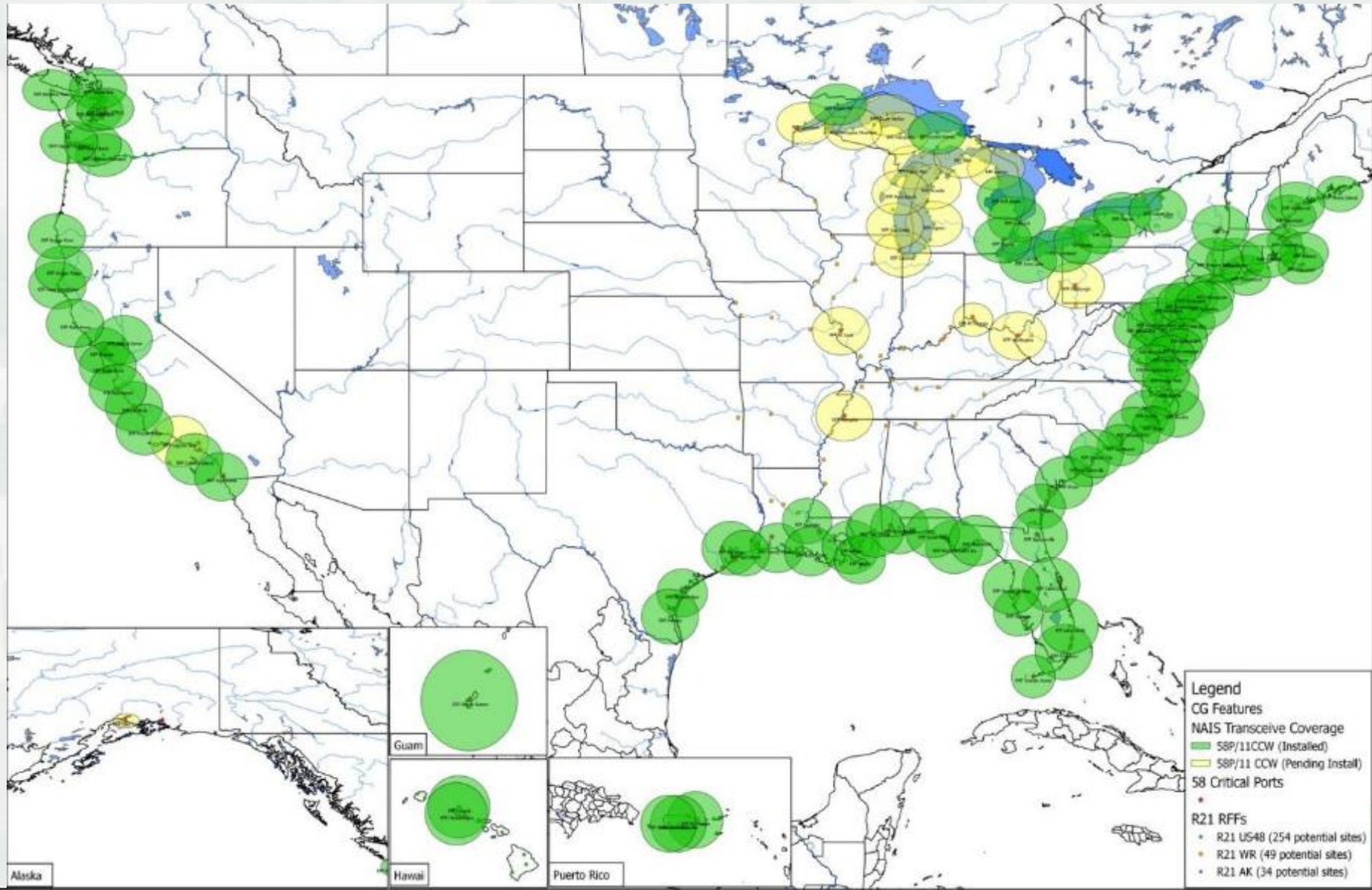


- LOMA coverage: 3,878 river miles
- 32% of USACE-maintained 12,000 miles

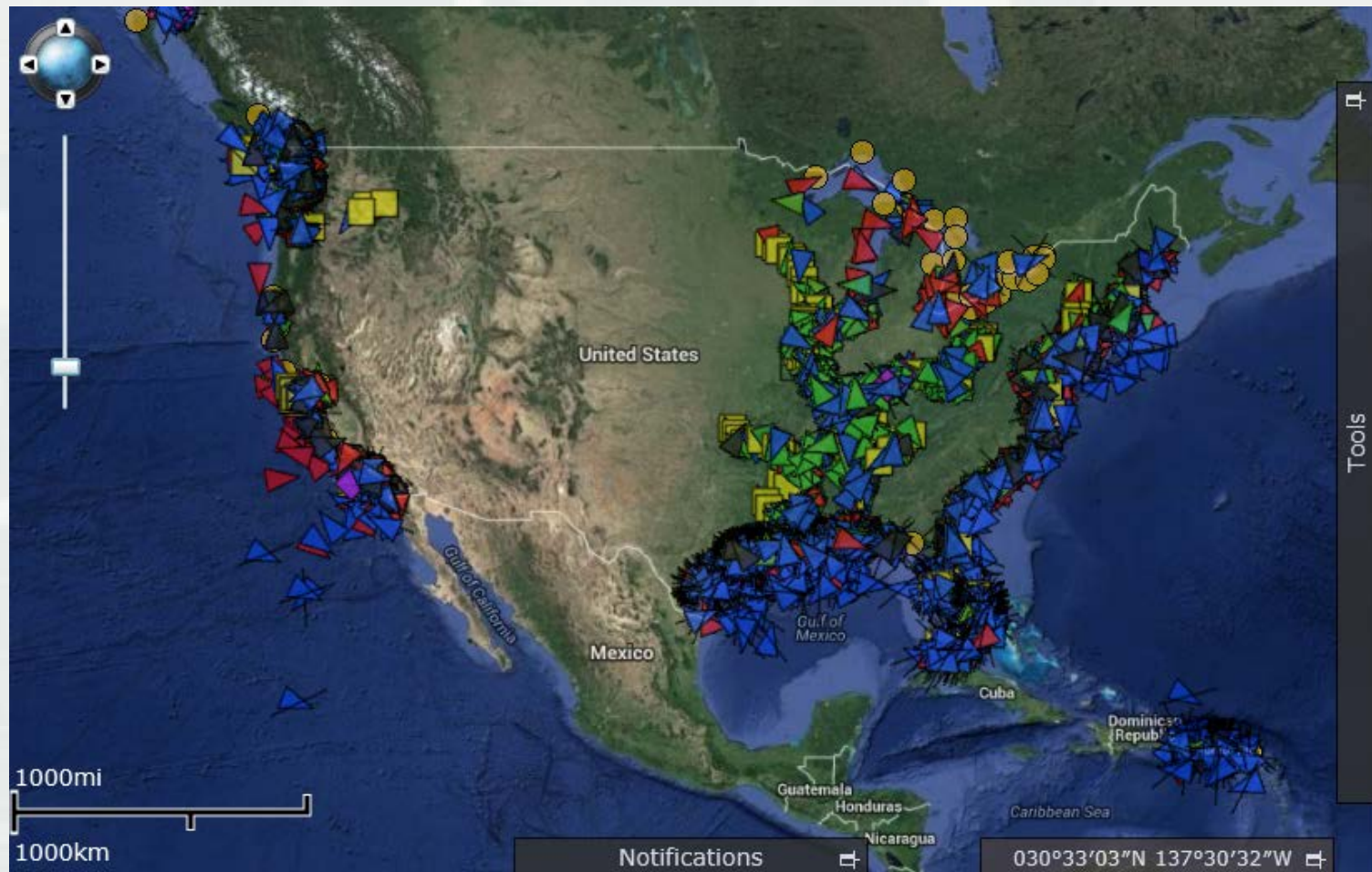


USCG AIS coverage

Nationwide AIS (NAIS) program

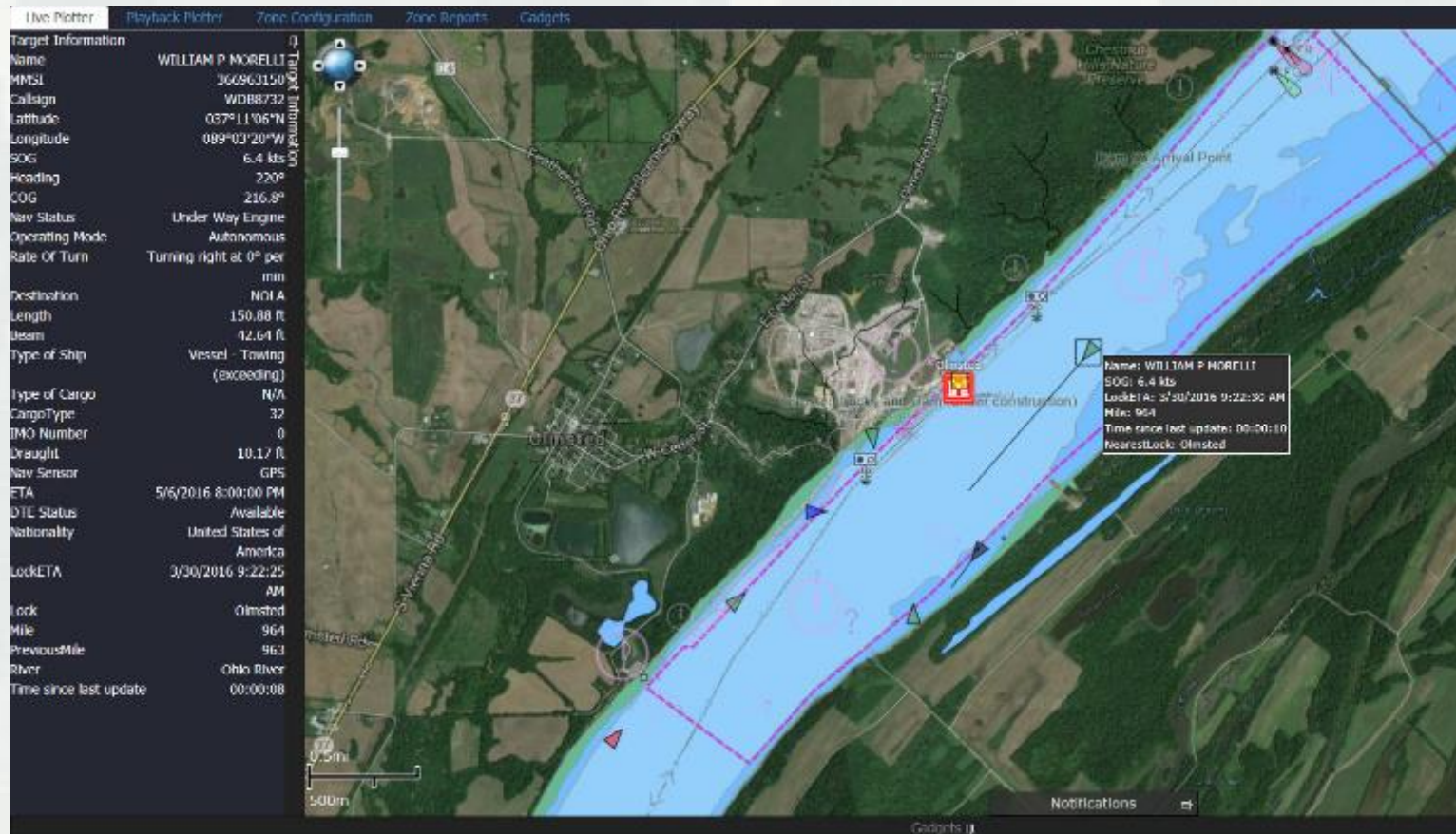


Full LOMA Feed

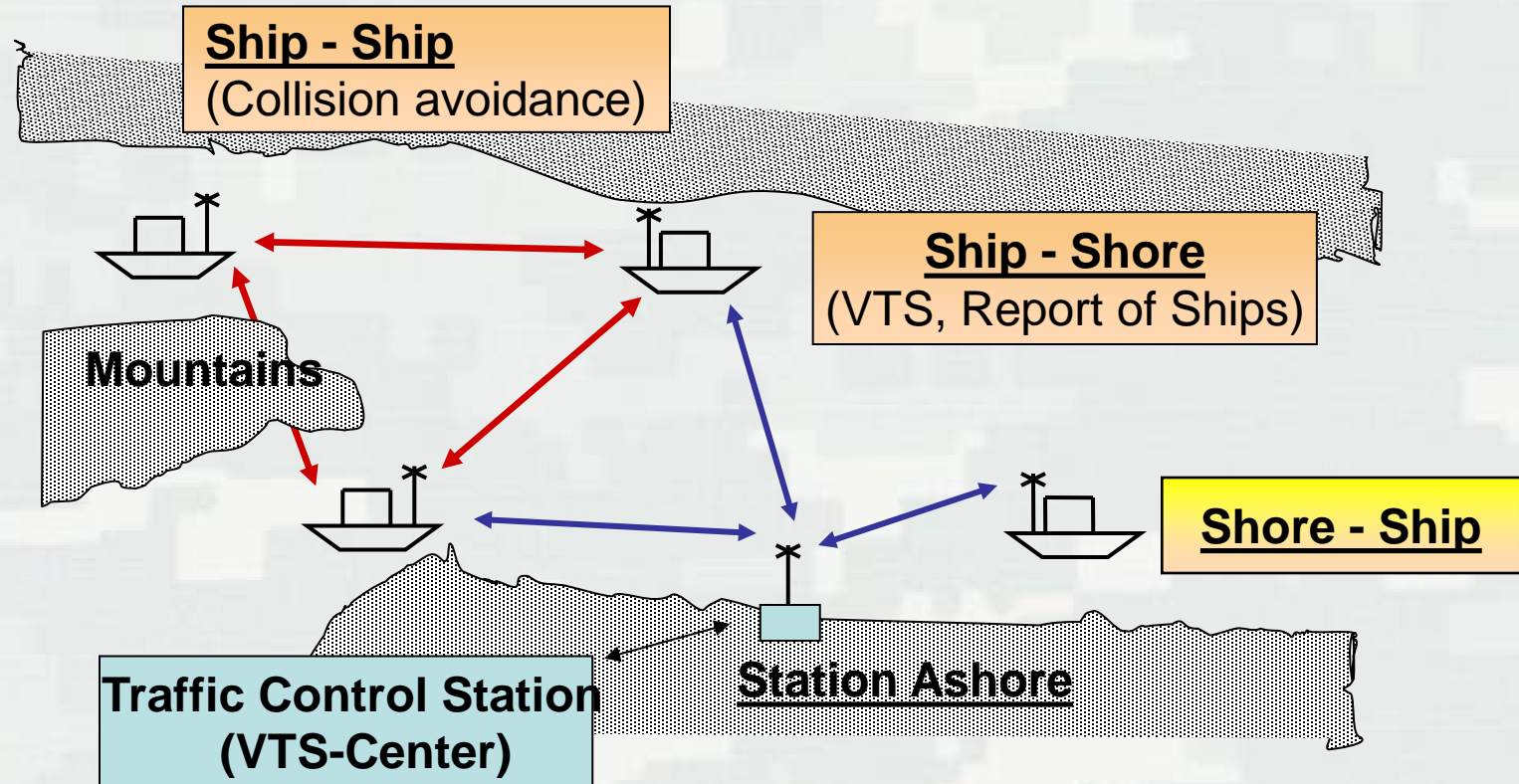


Current LOMA Capabilities

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



AIS System Overview



Olmsted & LOMA



**375' Wide
Nav Pass**



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New AIS Information

- AToN discrepancy
- Synthetic AIS AToN
- Virtual AIS AToN
- Geographic Notices
- Vessels awaiting lockage
- Lock status
- River current
- Water depth
- Weather



AIS transmit capability

- LOMA capabilities:
 - ▶ Text messages, water levels, weather, geographic notice and other messages
- Development work with US Coast Guard
 - ▶ Build on USCG developments
 - ▶ Integrate USACE and USCG AIS capabilities
 - Information transmitted where it's needed, regardless of who operates the transceiver
- Test beds:
 - ▶ Louisville
 - ▶ Port of Pittsburgh
 - ▶ Lower Ohio River

Safety Text

Destination: JODY MCMINN

☒ Send Broadcast

Message: HOLD AT LOWER APPROACH

Send



Acquisition Directorate
Research & Development Center

USACE AIS Transmit Technical Support Summary Report

Distribution Statement A: Approved for public release; distribution is unlimited.
September 2014



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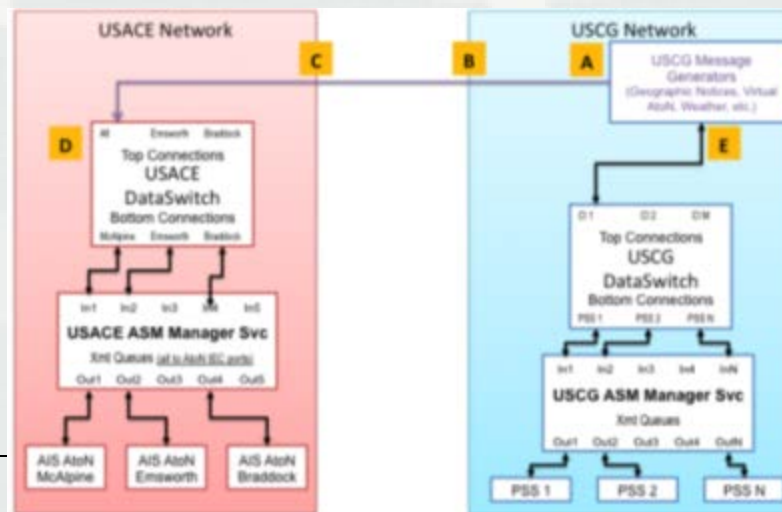


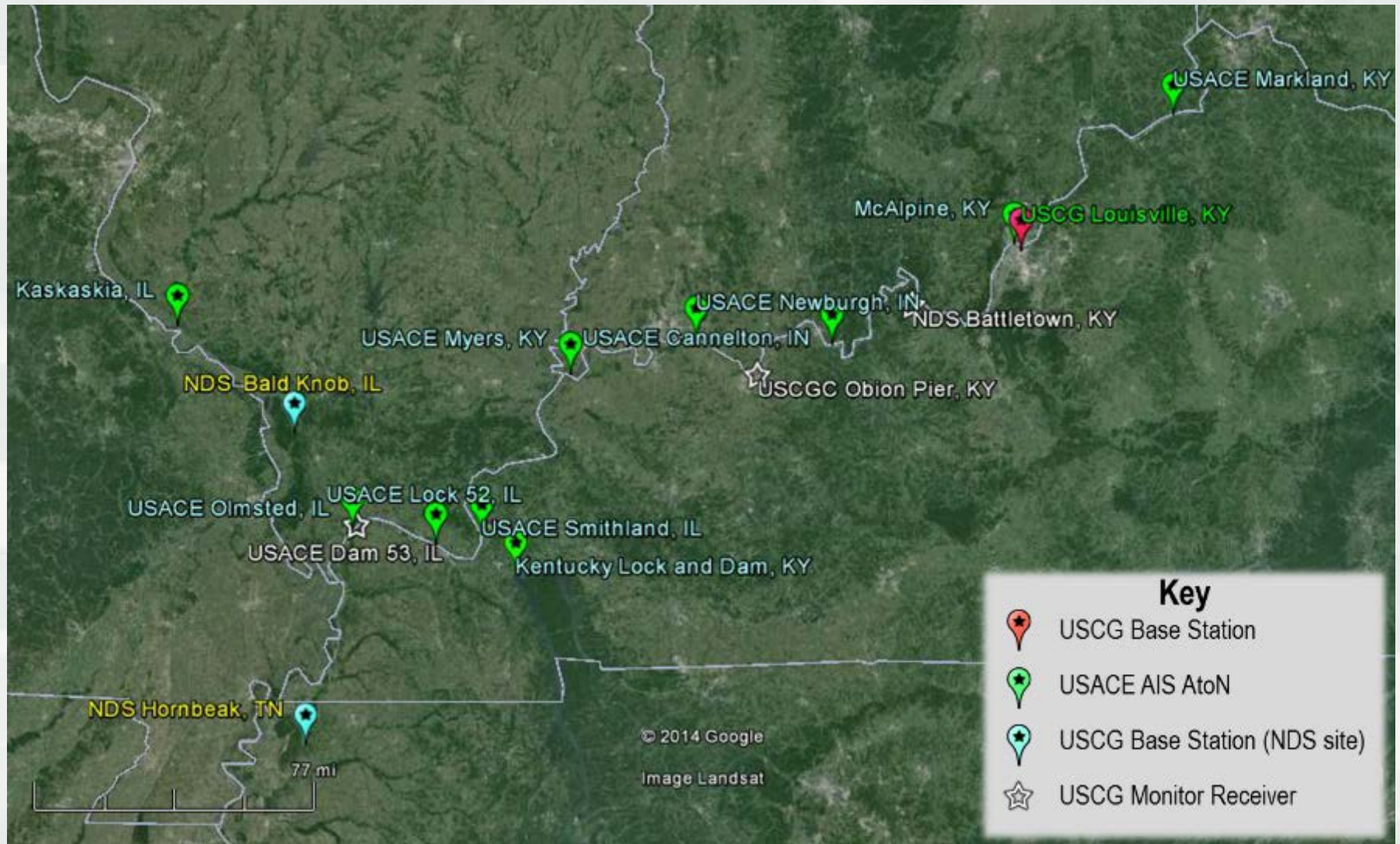
Figure 9. Initial USCG - USACE integration architecture.

eMSI Demonstration

- What
 - ▶ Distribute electronic Maritime Safety Information (e-MSI) information using the Automatic Identification System (AIS)
- When
 - ▶ A one-two year demonstration project starting late 2015/early 2016
- Where
 - ▶ Along a reach of the Lower Ohio River and adjacent reaches of the Mississippi River upstream and downstream from Cairo.
- Who
 - ▶ a group of volunteer towboats will be configured to receive and display information transmitted over AIS
- Why
 - ▶ work with a group of operators during the demonstration to gain practical experience on distributing e-MSI via AIS and other means and to learn what benefit system users have gained from the service
 - ▶ To establish the coverage of the existing transmitters and determine where there are “holes” in coverage



eMSI Transmitters



Data Sources

Source	Information	Update Rate
USCG AToN Data Base	Real, Synthetic, Virtual AIS AToNs	As updated
USACE Lock Management Data Base	Vessels awaiting lockage, Lock status	As updated by lock master
NOAA	Weather	Hourly
Weather Stations	Weather	Every minute
NOAA/NWS/USACE	Water Depth	Hourly
ORFC	Predicted Current	Daily
Olmsted Notice to Navigation Interest	Restricted areas, traffic patterns	As needed

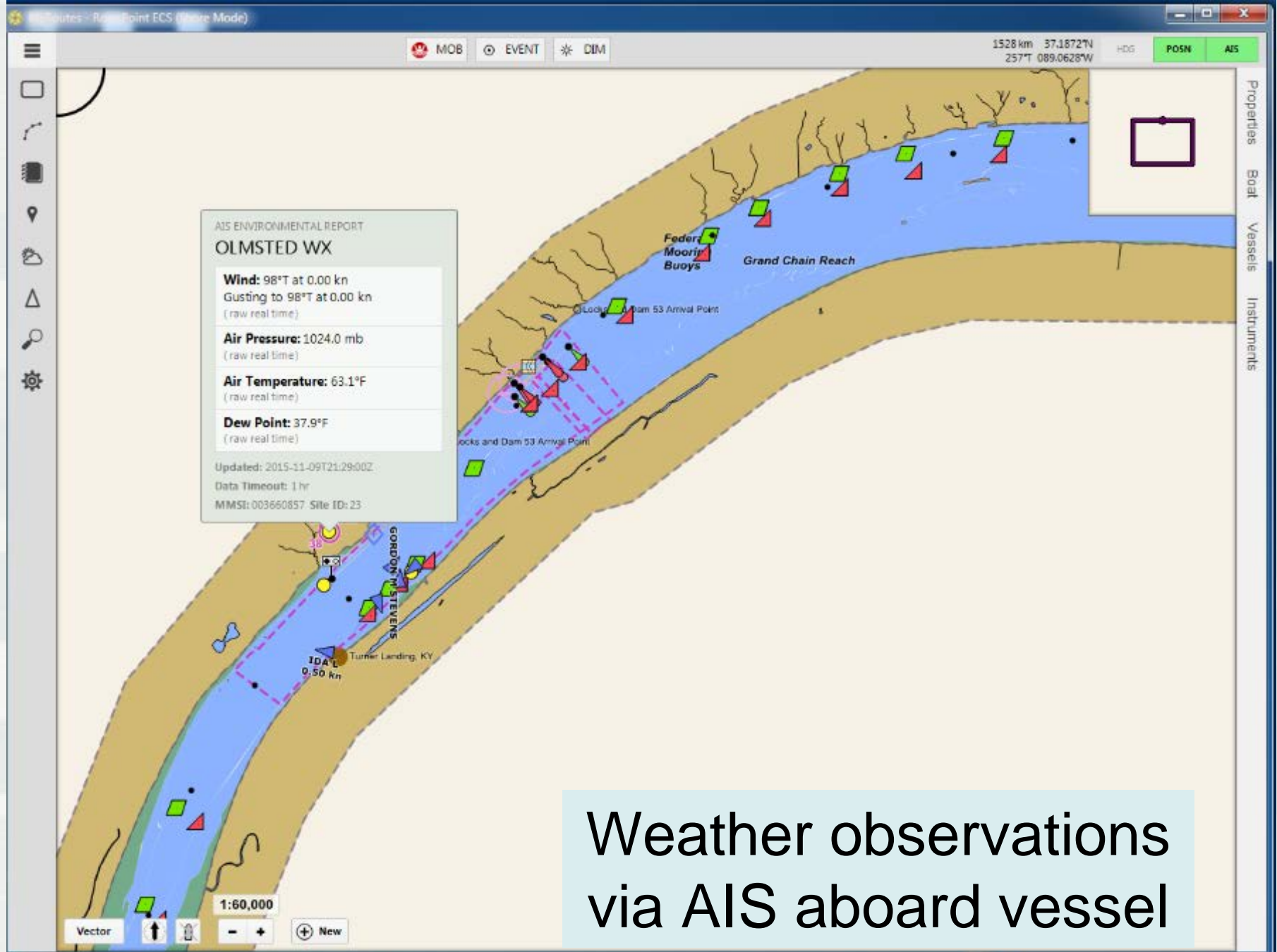
LOMA - Transmit

• Additional information provided as overlay to IENC:

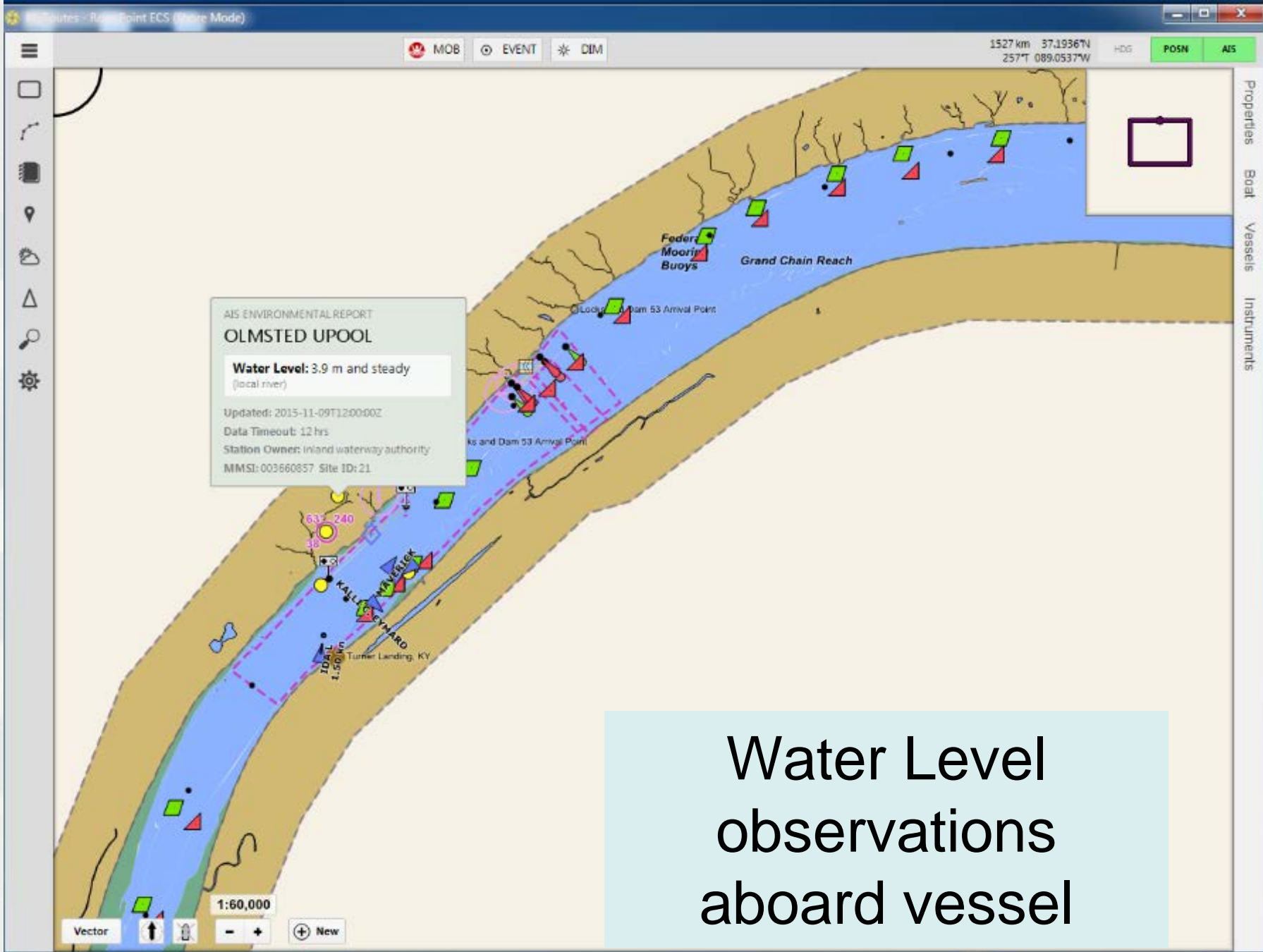
- Weather
- Water levels
- Lock status
- Lock Currents

Message Version	3
Altitude	Not Available
Latitude	037°11'16"N
Longitude	089°03'31"W
Owner	Inland Waterway
	Authority
Data Timeout	12 Hours
Report Type	StationID
Time	2/26/2016 11:45:00
	AM
Name	OLMSTED UPOOL
Report Type	Water
Time	2/26/2016 6:00:00
	AM
Data Description	Controlled Real Time
Water Level Type	Relative to Datum
Water Level	36.87 ft
Water Level Trend	Increasing
Reference Datum	Local River
Forecast Water Level Type	Relative to Datum
Forecast Water Level	Not Available
Forecast Duration	Cancel
Nationality	Not found
Mile	964
River	Ohio River
Time since last update	00:03:24





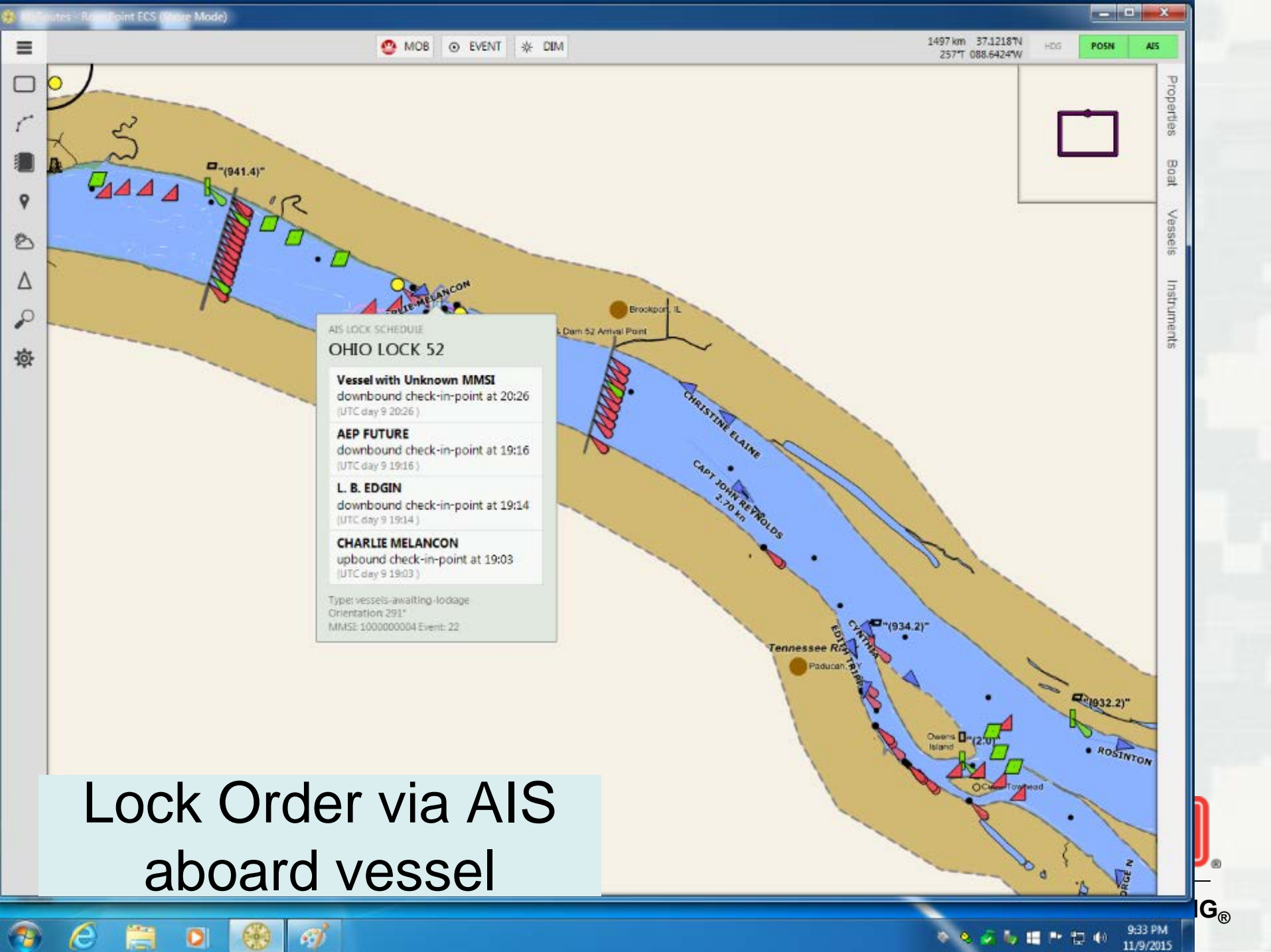
9:33 PM
11/9/2015



Water Level
observations
aboard vessel

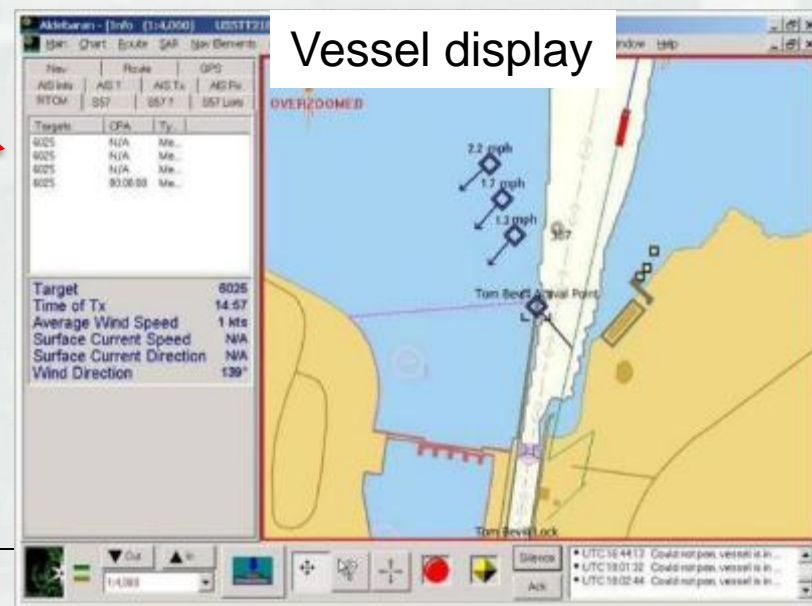
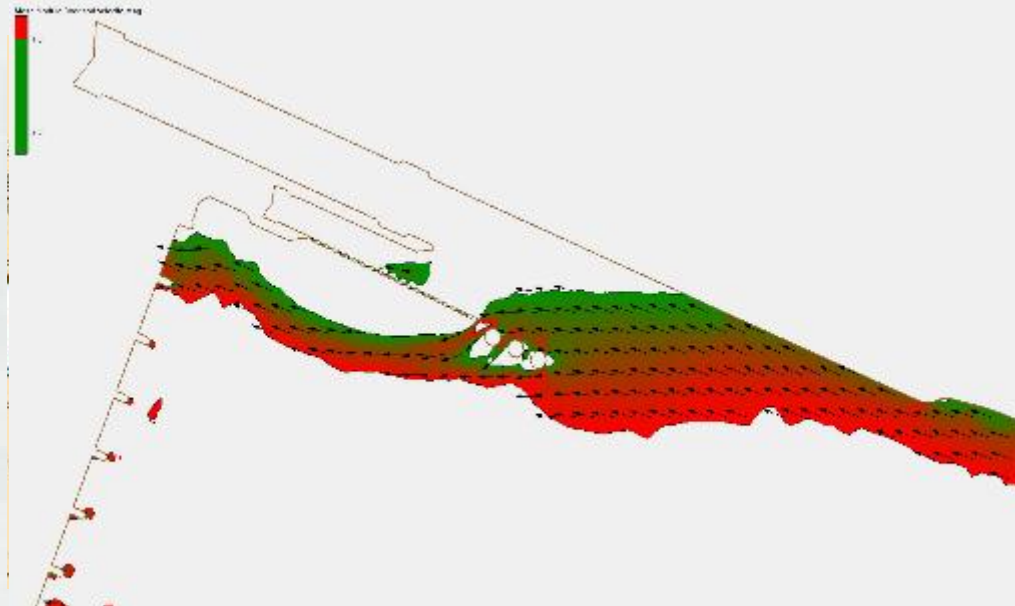
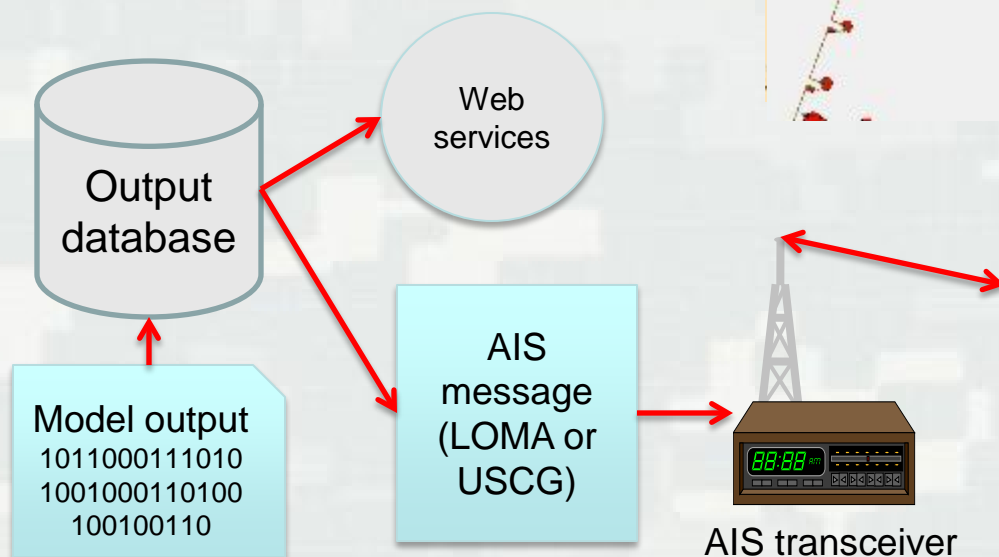
Lock Order Message





Lock Approach Current Models

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



William Strait



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Virtual Aid to Navigation

Lock Operations Management Application (LOMA) v1.1.44
LPMS Support Contact Logout (mfwink)

US Army Corps of Engineers

Live Plotter Playback Plotter Zone Configuration Zone Reports Gadgets

connected

Target Information

Name	WK
MMSI	993683000
Latitude	035°05'57"N
Longitude	090°10'32"W
AtoN Type	Starboard hand Mark
Position Accuracy	High
Type of electronic position fixing device	Surveyed
Dimension A	0
Dimension B	0
Dimension C	0
Dimension D	0
Off Position	On position
RAIM	RAIM not in use
Virtual AtoN	Virtual AtoN
Assigned	Autonomous and continuous mode
Nationality	Not found
Mile	727
River	Mississippi River
	Mouth of Ohio River to Baton Rouge LA
Time since last update	00:00:27

5mi
5km

Name: WK
Mile: 727
Time since last update: 00:00:27

Notifications

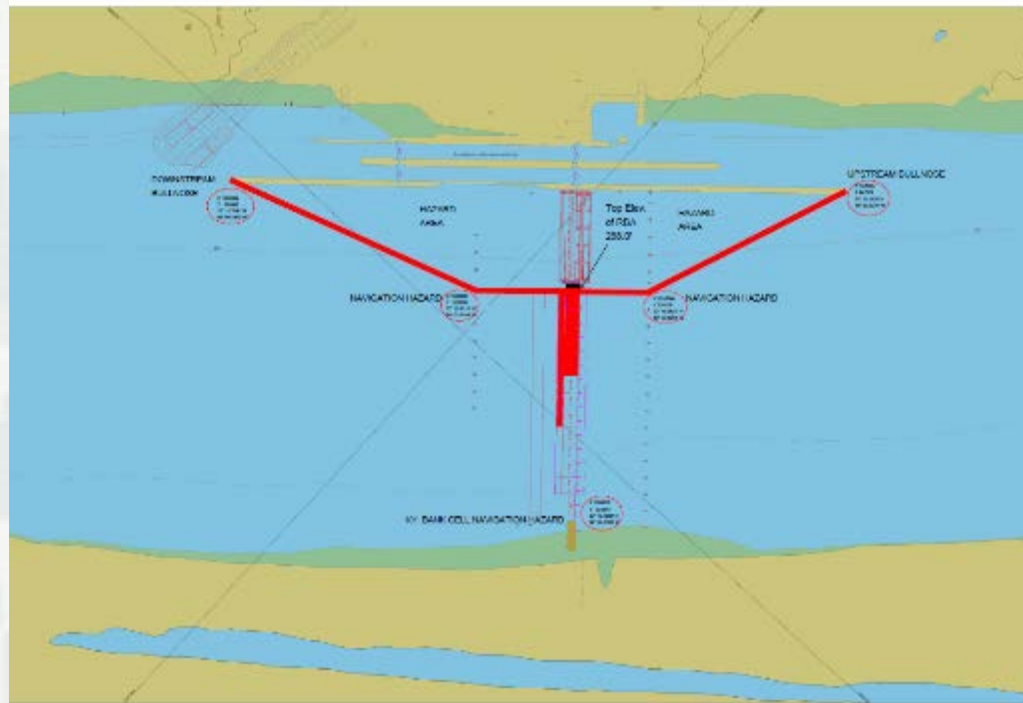
035°05'57"N 090°10'26"W

Gadgets

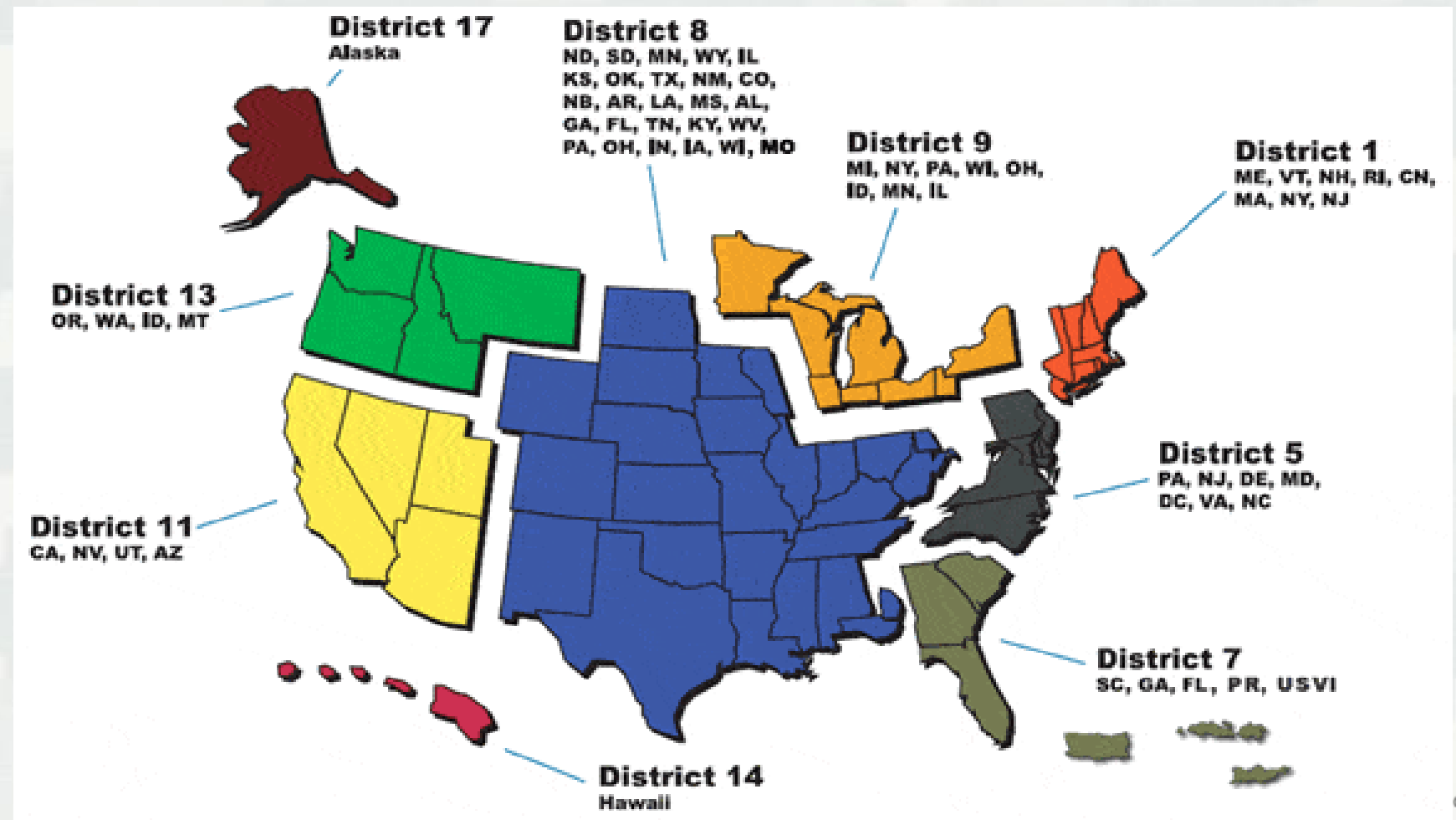
Targets in Vbg-UST MVD_TestLock Status SMART Gate - Demo

Tools

Synthetic Buoys – Olmsted & 53



USCG Districts



USCG LNM

Adobe Acrobat Pro window showing a PDF document titled "Inm0824r2016.pdf". The document content includes:

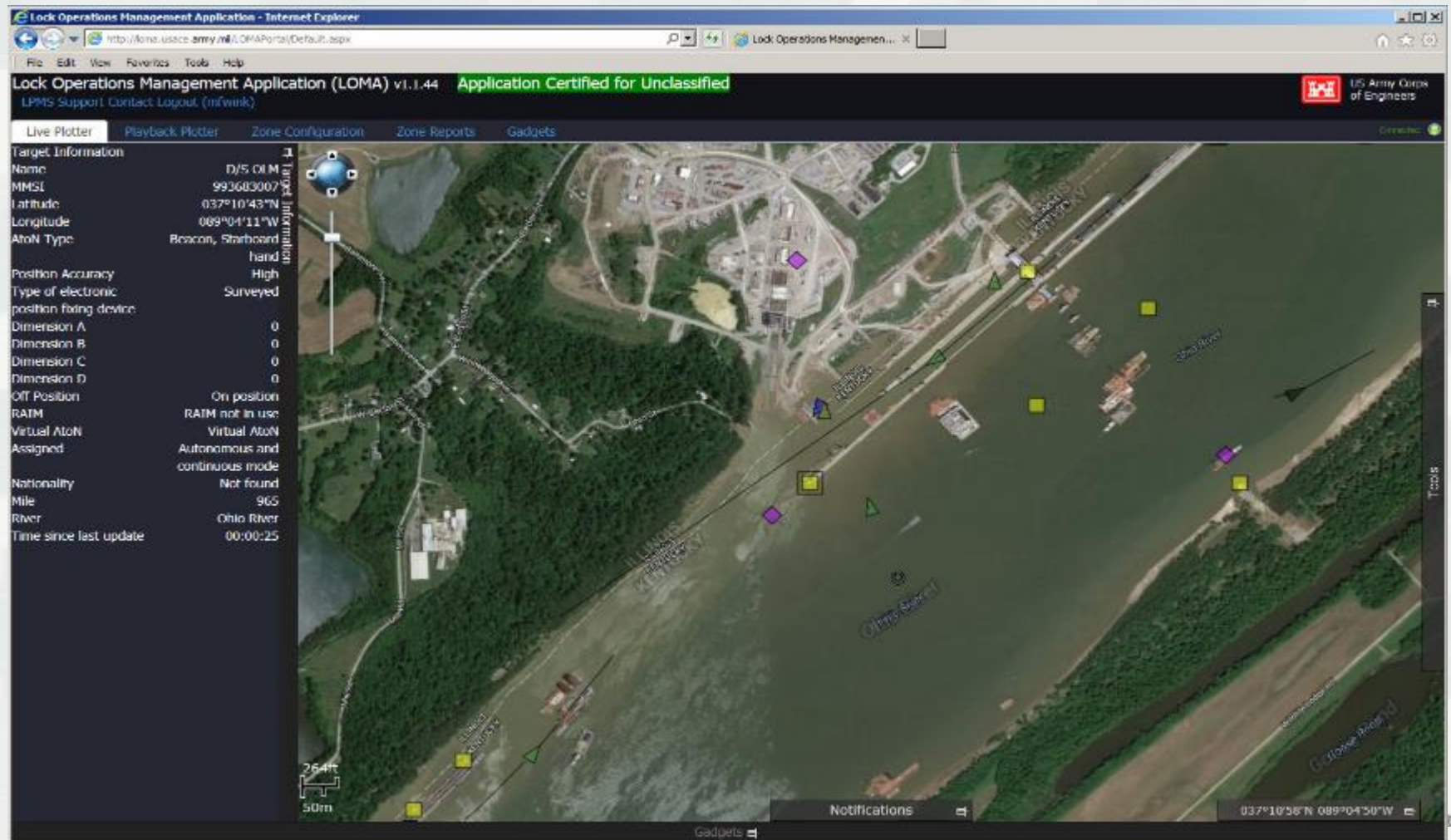
MILE 934.0 - MILE 936.0 - FIREWORKS DISPLAY/SAFETY ZONE
LNM: 24-16

MILE 940.8 - BRIDGE MAINTENANCE
I-24 Highway Bridge; At times work barges may be located channelward adjacent to the navigation piers in both the Illinois and Kentucky spans. Work barges will be removed each night. For more information, mariners may contact the onsite work boat M/V SIR KETTLEWELL via VHF-FM Channel 68 or by calling (314) 607-1699.
LNM: 33-15

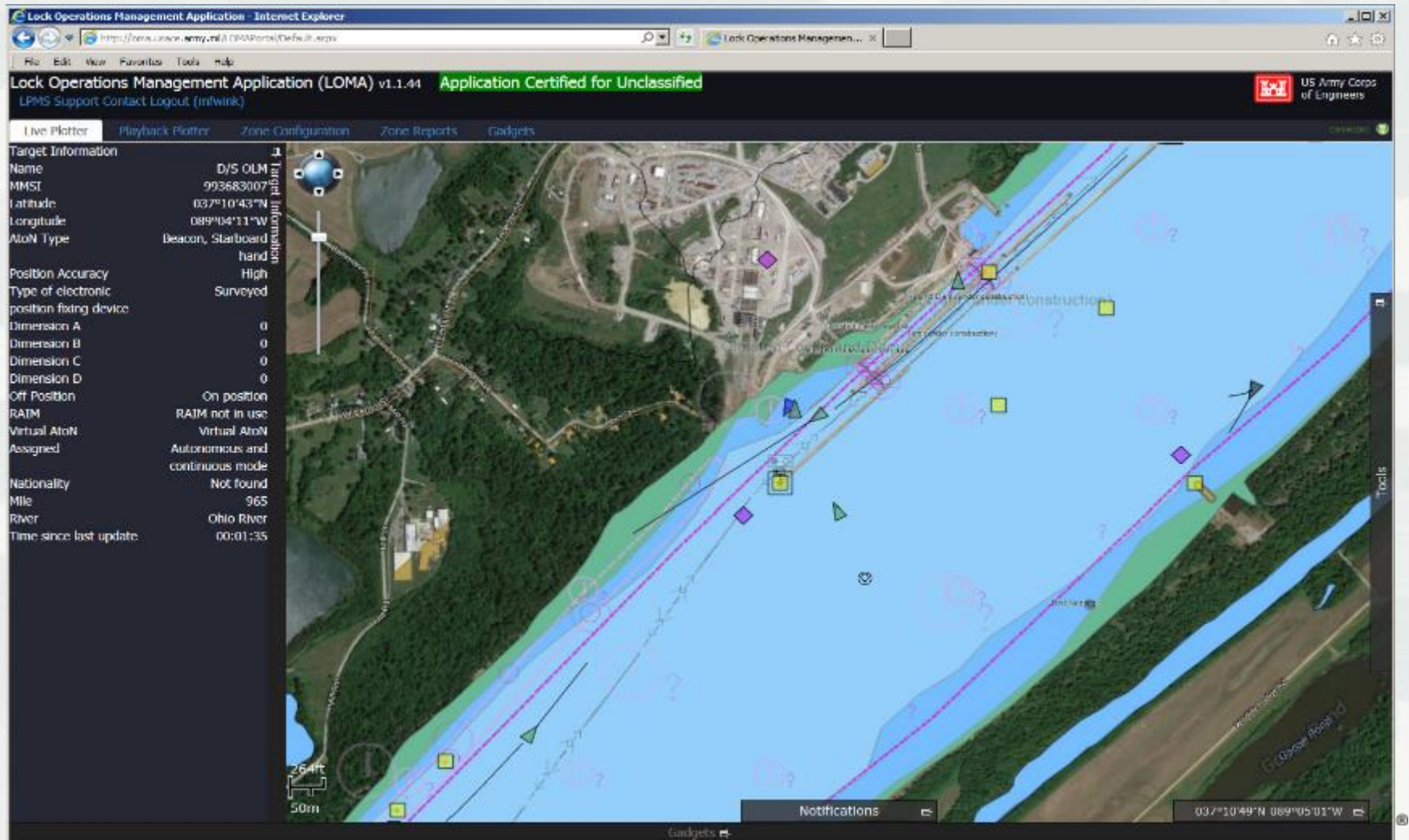
MILE 953.0 - MILE 968.0 - L/D REPAIRS/TOW RESTRICTIONS - UPDATE
Effective June 13, 2016, the Olmsted Project in the vicinity of Mile 964.4, will begin passing all vessel traffic through the riverside lock chamber. Mariners must contact the lockmaster for traffic information when arriving at the approach points at Mile 953.0 and 968.0. The barge configuration restriction is now limited to a 3 by 5, 1,200 feet by 108 feet, including tow, maximum of 15 barges and no more than 2 wide for 54-foot chemical barges until the lane returns to the navigation pass. During this period, a helper boat will be available 24-hours a day. Mariners are reminded that this area is no passing, meeting overtaking or waiting/hovering zone that extends from Mile 962.0 to Mile 966.0. Mariners MUST proceed at their slowest safe speed to minimize their wake.
LNM: 24-16



Synthetic Buoys – Olmsted



Synthetic Buoys – Olmsted



Synthetic Buoys – Olmsted



For more information



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