AIS Aids to Navigation (AtoNs) and Navigation Notices: Transmitting Information via AIS

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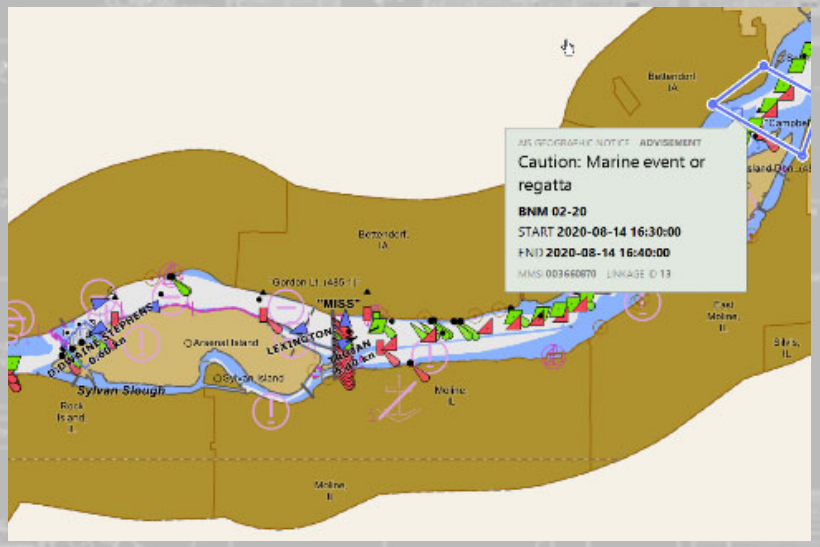
11 May 2021



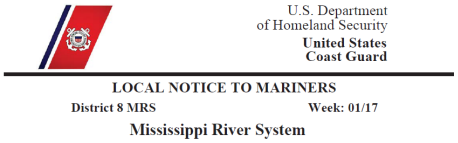
U.S.ARMY

US Army Corps of Engineers®

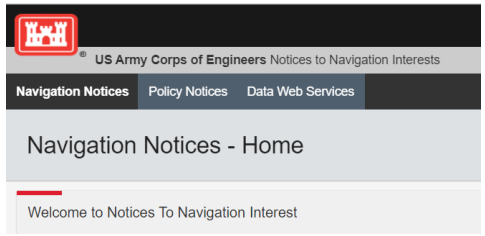
COASTAL AND HYDRAULICS LABORATORY

The situation:

- Navigators rely on charts for baseline information
- However, charts need to be updated
  - ~ every two weeks
- New information in between chart updates is communicated manually: Notices to Mariners, Notices to Navigation Interests, and Broadcast Notices to Mariners
  - Easy to miss; difficult to transfer to nav systems
- Goal is to get new information to mariners/on the chart as quickly as possible
- Secondary use to emphasize information already on the chart


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

LOCAL NOTICE TO MARINERS
District 8 MRS Week: 01/17
Mississippi River System



SAFETY/NC - CHERRY POINT OPERATING AREA (CPOA) - HAZOPS - FIREX WEEK OF 10 - 16 MAY 21, CHANGE TWO/HAZ OPS/CCGD5 BNM 268-21

1. REQUEST THAT THIS NOTICE BE BROADCAST DAILY DURING THE SUBJECT WEEK.
2. FIRING EXERCISES HAZARDOUS TO SURFACE VESSELS WILL BE CONDUCTED DURING THE FOLLOWING TIMES AND LOCATIONS IN THE CPOA DURING THE SUBJECT WEEK:

DATE	TIME (L)	SURFACE GRIDS	AREA BOUND BY
15 MAY	1730-2100	W-122(06,13-14,21,23)	32-39N7 076-50W8
16 MAY	1730-2130		32-12N8 076-50W8
			32-12N8 076-49W6
			33-55N6 074-24W7
			34-15N3 074-47W2
			33-55N6 075-14W7
			34-01N8 075-19W2
			33-00N6 076-42W9
			32-39N7 076-42W9

3. FOR SECTOR NORTH CROLINA, BROADCAST UNTIL CANCELLED.
4. CANCEL AT TIME //170430Z MAY 21//

AIS is a 2-way system

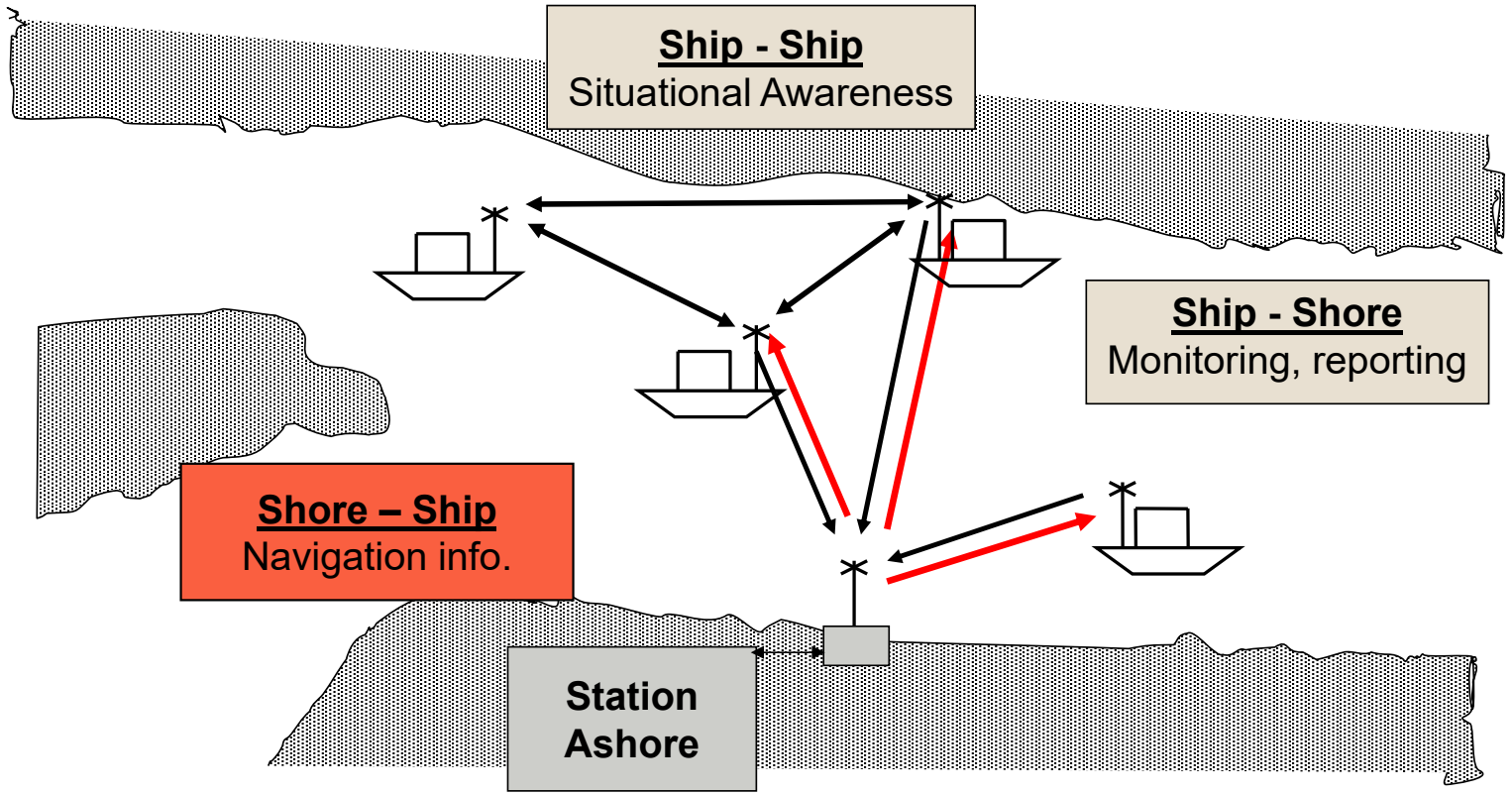


TABLE 46

Message ID	Name	Description	Priority	Access scheme	Communi-cation state	M/B
1	Position report	Scheduled position report; (Class A shipborne mobile equipment)	1	SOTDMA, RATDMA, ITDMA[1]	SOTDMA	M
2	Position report	Assigned scheduled position report; (Class A shipborne mobile equipment)	1	SOTDMA[9]	SOTDMA	M
3	Position report	Special position report, response to interrogation; (Class A shipborne mobile equipment)	1	RATDMA[1]	ITDMA	M
4	Base station report	Position, UTC, date and current slot number of base station	1	FATDMA[3], [7], RATDMA[2]	SOTDMA	B
5	Static and voyage related data	Scheduled static and voyage related vessel data report; (Class A shipborne mobile equipment)	4[5]	RATDMA, ITDMA[11]	N/A	M
6	Binary addressed message	Binary data for addressed communication	4	RATDMA[10], FATDMA, ITDMA[2]	N/A	M/B
7	Binary acknowledge-ment	Acknowledgement of received addressed binary data	1	RATDMA, FATDMA, ITDMA[2]	N/A	M/B
8	Binary broadcast message	Binary data for broadcast communication	4	RATDMA[10], FATDMA, ITDMA[2]	N/A	M/B
9	Standard SAR aircraft position report	Position report for airborne stations involved in SAR operations, only	1	SOTDMA, RATDMA, ITDMA[1]	SOTDMA ITDMA	M
10	UTC/date inquiry	Request UTC and date	3	RATDMA, FATDMA, ITDMA[2]	N/A	M/B
11	UTC/date response	Current UTC and date if available	3	RATDMA, ITDMA[2]	SOTDMA	M
12	Addressed safety related message	Safety related data for addressed communication	2	RATDMA[10], FATDMA, ITDMA[2]	N/A	M/B
13	Safety related acknowledge-ment	Acknowledgement of received addressed safety related message	1	RATDMA, FATDMA, ITDMA[2]	N/A	M/B
14	Safety related broadcast message	Safety related data for broadcast communication	2	RATDMA[10], FATDMA, ITDMA[2]	N/A	M/B
15	Interrogation	Request for a specific message type (can result in multiple responses from one or several stations)[4]	3	RATDMA, FATDMA, ITDMA[2]	N/A	M/B
16	Assignment mode command	Assignment of a specific report behaviour by competent authority using a Base station	1	RATDMA, FATDMA[2]	N/A	B

ASM

Safety Text

TABLE 46 (*end*)

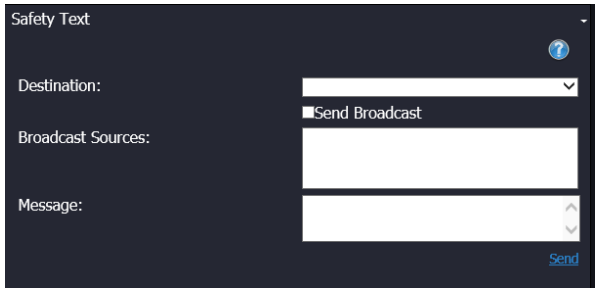
Message ID	Name	Description	Priority	Access scheme	Communi-cation state	M/B
17	DGNSS broadcast binary message	DGNSS corrections provided by a base station	2	FATDMA[3], RATDMA[2]	N/A	B
18	Standard Class B equipment position report	Standard position report for Class B shipborne mobile equipment to be used instead of Messages 1, 2, 3[8]	1	SOTDMA, ITDMA[1], CSTDMA	SOTDMA, ITDMA	M
19	Extended Class B equipment position report	No longer required; Extended position report for Class B shipborne mobile equipment; contains additional static information[8]	1	ITDMA	N/A	M
20	Data link management message	Reserve slots for Base station(s)	1	FATDMA[3], RATDMA	N/A	B
21	Aids-to-navigation report	Position and status report for aids-to-navigation	1	FATDMA[3], RATDMA[2]	N/A	M/B
22	Channel management[6]	Management of channels and transceiver modes by a Base station	1	FATDMA[3], RATDMA[2]	N/A	B
23	Group assignment command	Assignment of a specific report behaviour by competent authority using a Base station to a specific group of mobiles	1	FATDMA, RATDMA	N/A	B
24	Static data report	Additional data assigned to an MMSI Part A: Name Part B: Static Data	4	RATDMA, ITDMA, CSTDMA, FATDMA	N/A	M/B
25	Single slot binary message	Short unscheduled binary data transmission (Broadcast or addressed)	4	RATDMA, ITDMA, CSTDMA, FATDMA	N/A	M/B
26	Multiple slot binary message with Communi-cations State	Scheduled binary data transmission (Broadcast or addressed)	4	SOTDMA, RATDMA, ITDMA FATDMA	SOTDMA, ITDMA	M/B
27	Position report for long-range applications	Class A and Class B "SO" shipborne mobile equipment outside base station coverage	1	MSSA	N/A	M

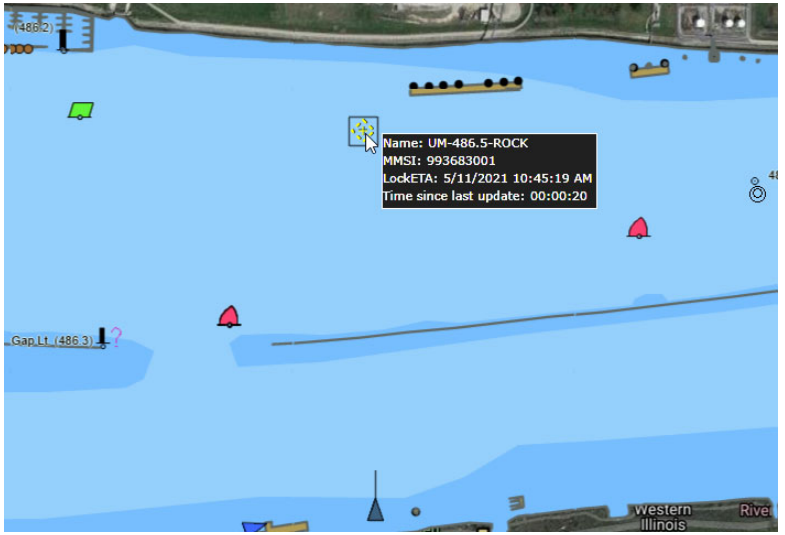
AtoN

ASM

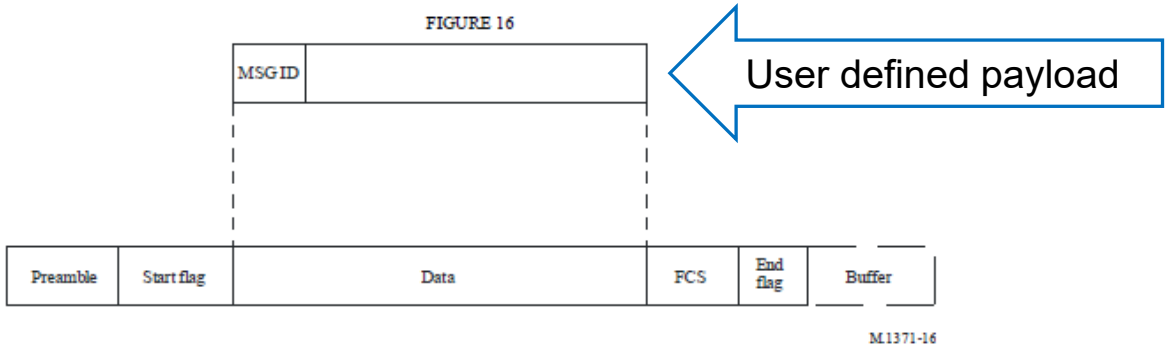
Two general capabilities

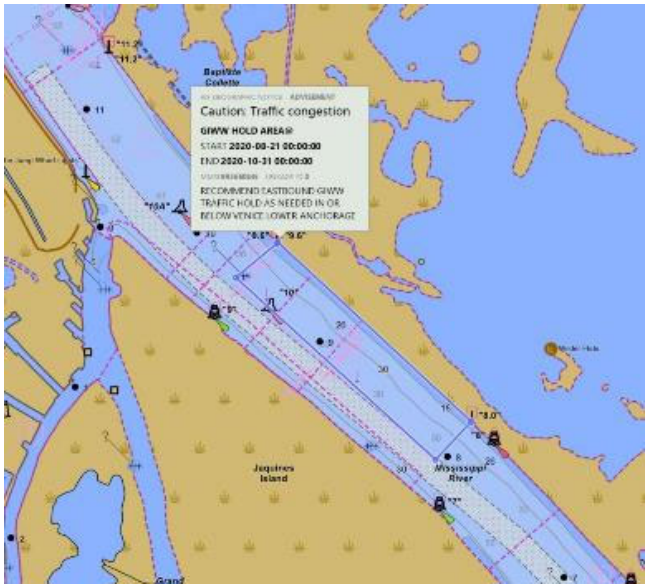
- Out of the box:
  - AIS AtoNs
  - Text messages



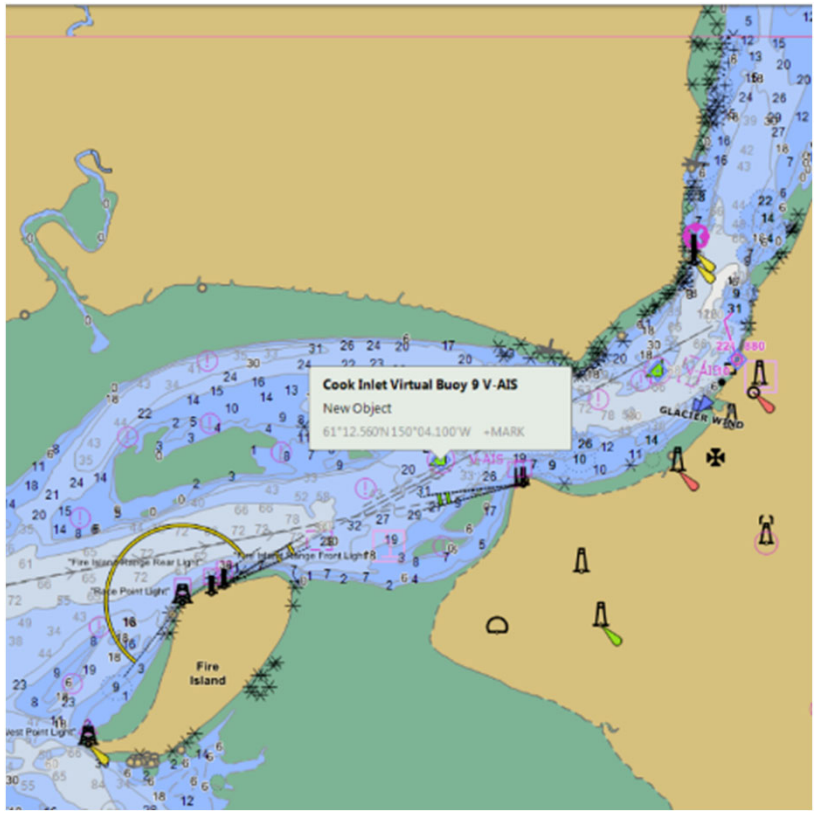


- Some assembly required:
  - Application-specific messages (ASM)

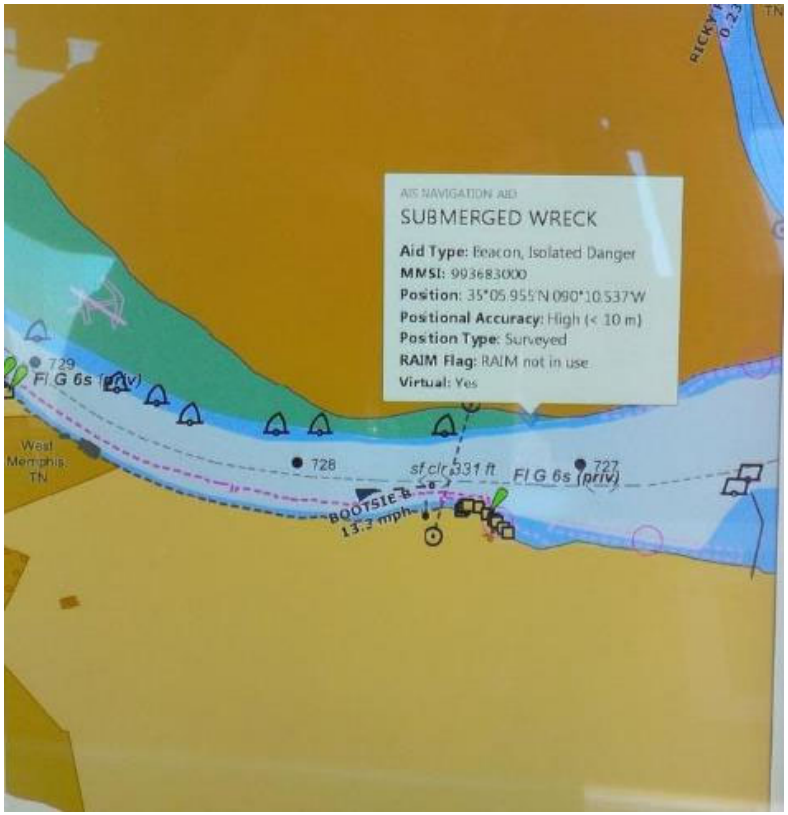




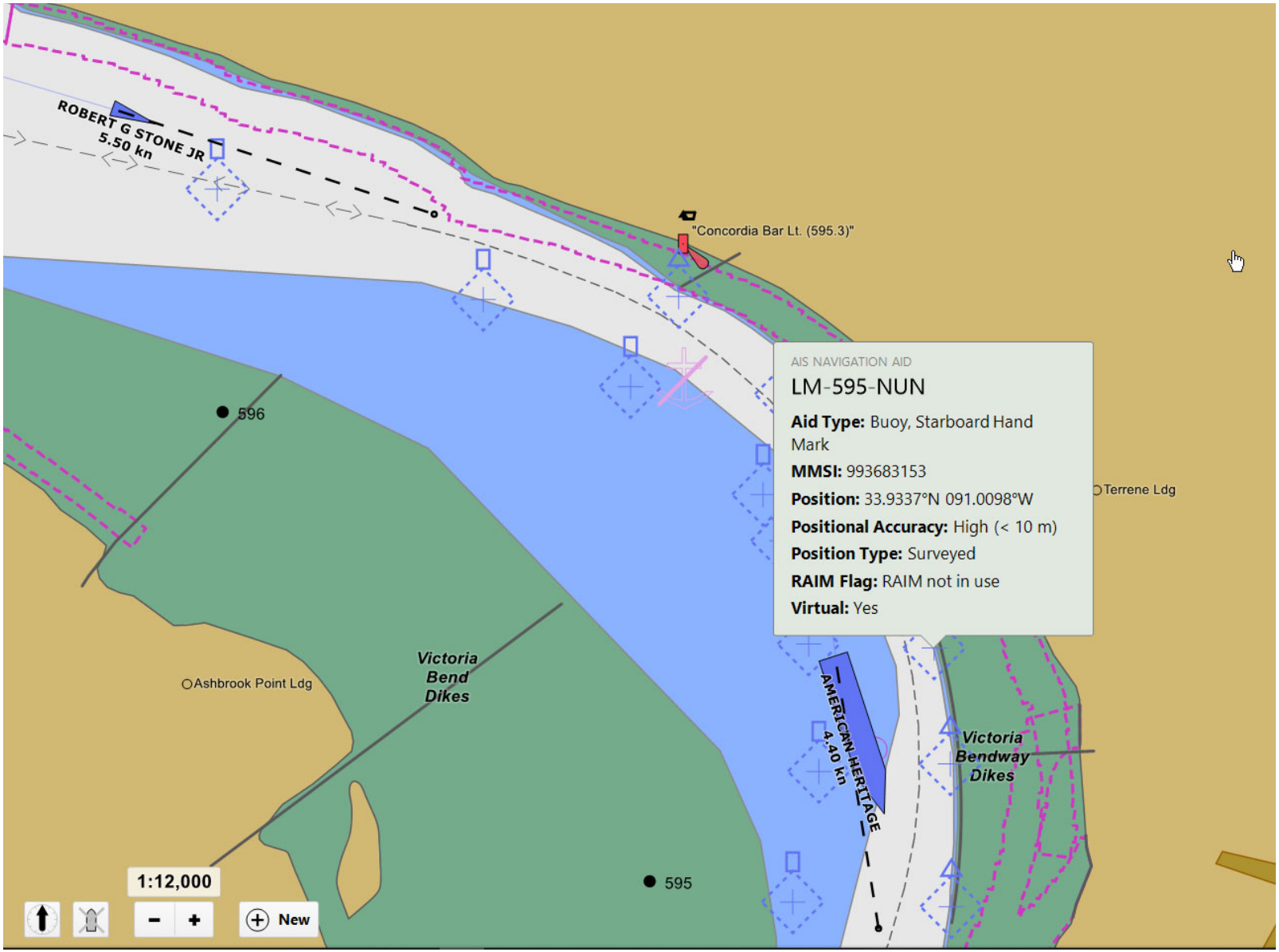
Virtual AtoN

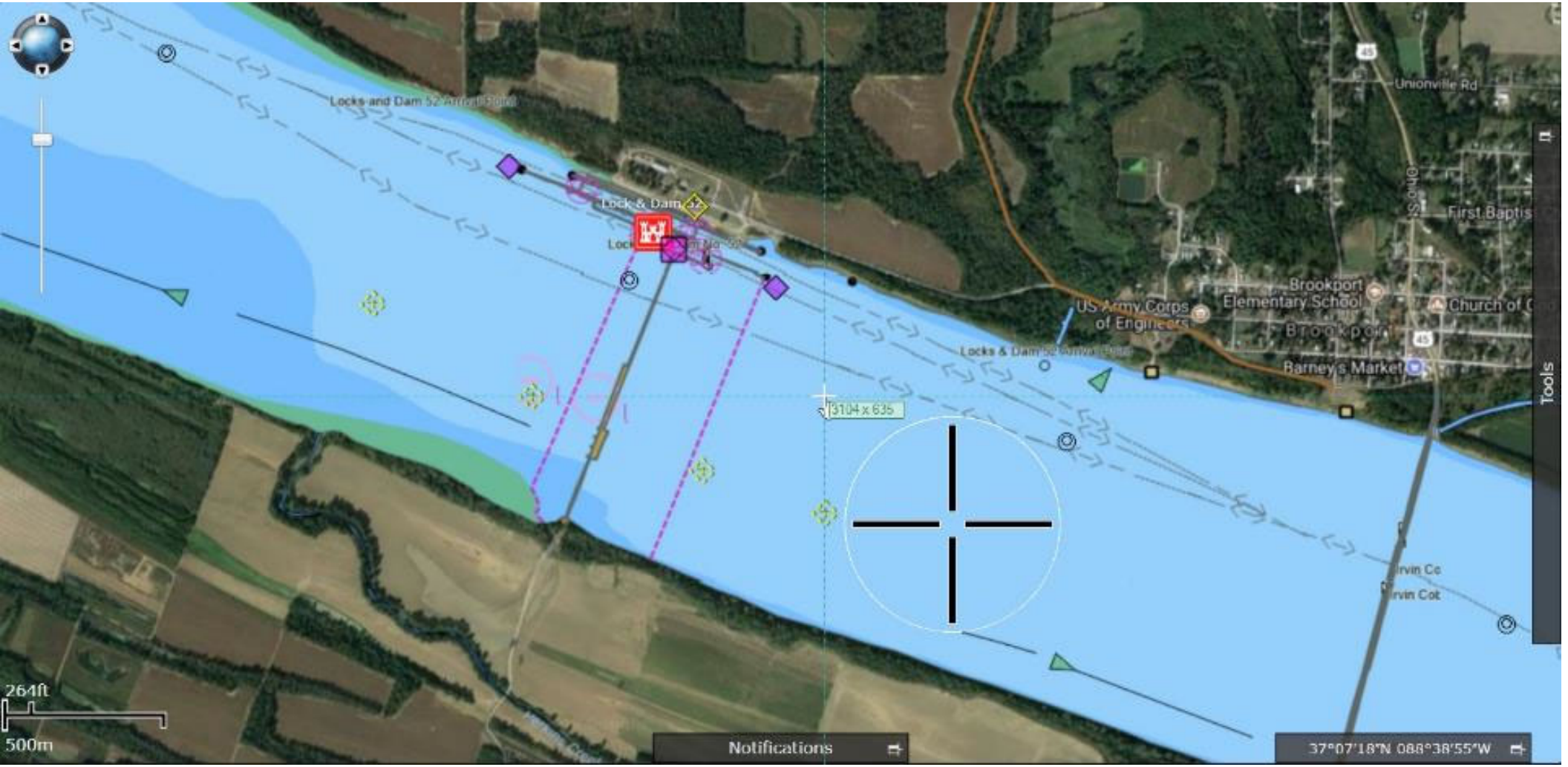


AIS AtoN in area where ice and tidal range prohibit physical AtoN

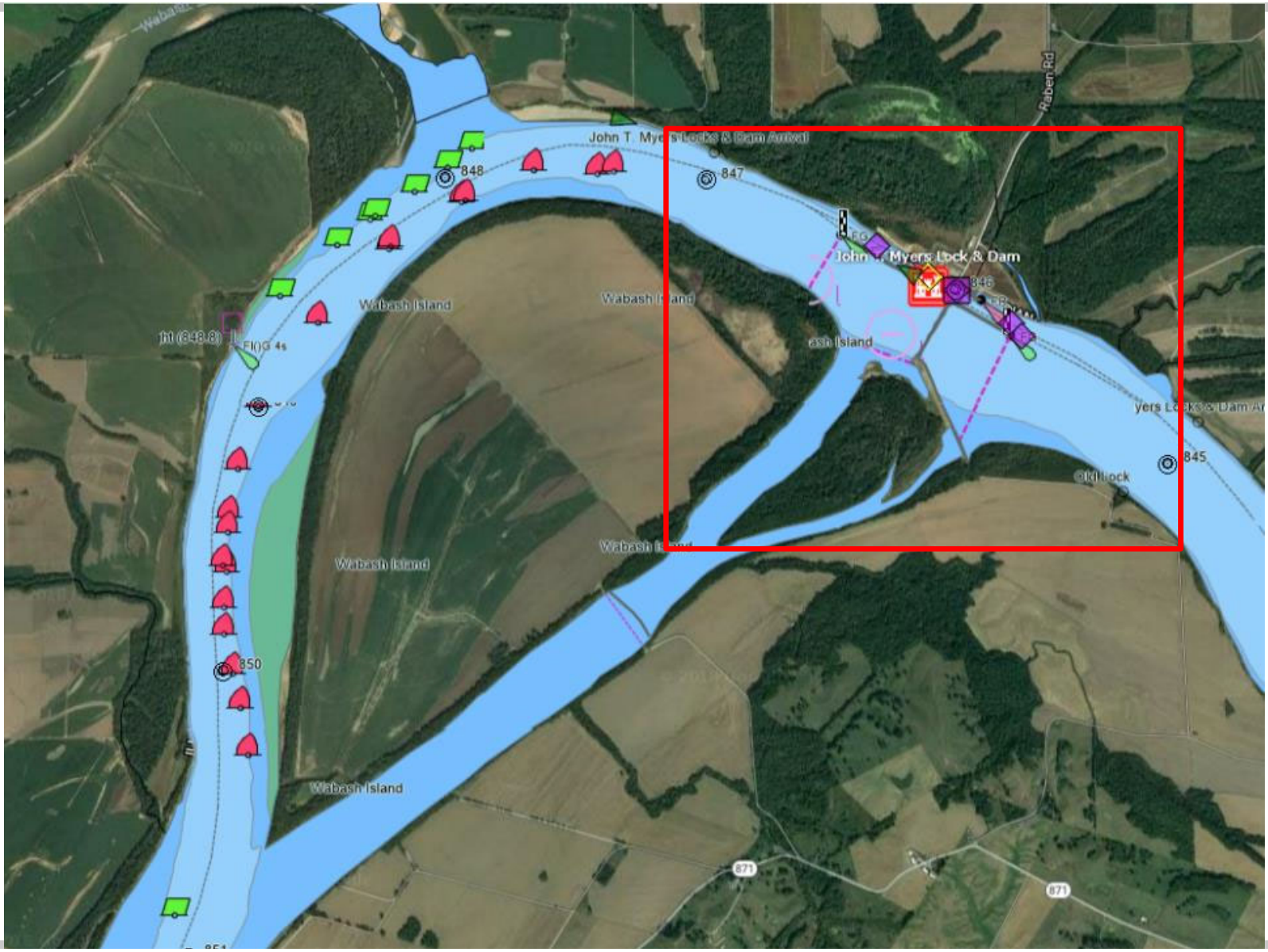


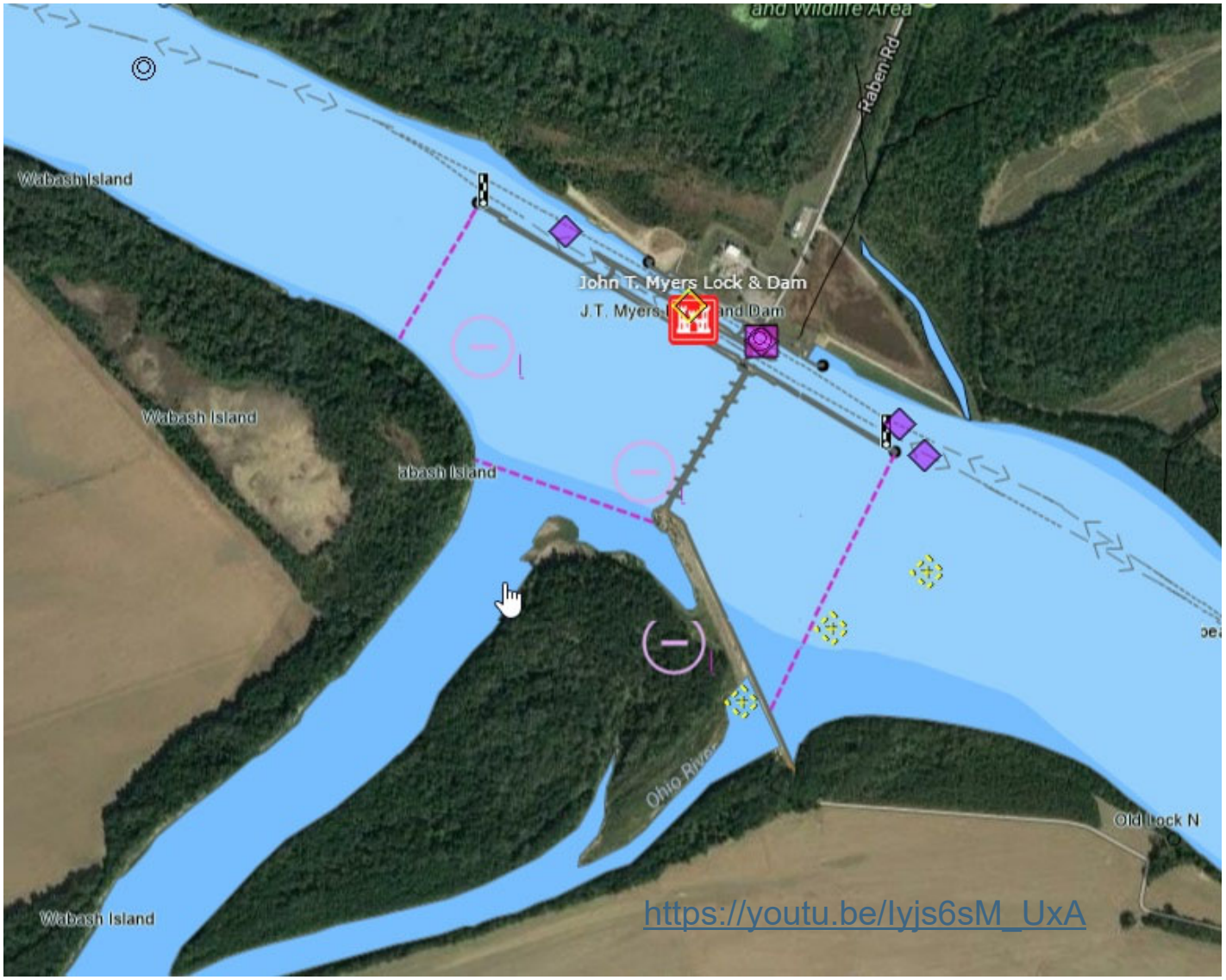
AIS AtoN marking submerged wreck in swift river waters


ROBERT G STONE JR
5.50 kn
"Concordia Bar Lt. (595.3)"
AIS NAVIGATION AID
LM-595-NUN
Aid Type: Buoy, Starboard Hand Mark
MMSI: 993683153
Position: 33.9337°N 091.0098°W
Positional Accuracy: High (< 10 m)
Position Type: Surveyed
RAIM Flag: RAIM not in use
Virtual: Yes
596
Terrene Ldg
Victoria Bend Dikes
Ashbrook Point Ldg
AMERICAN HERITAGE
4.40 kn
Victoria Bendway Dikes
595
1:12,000
New

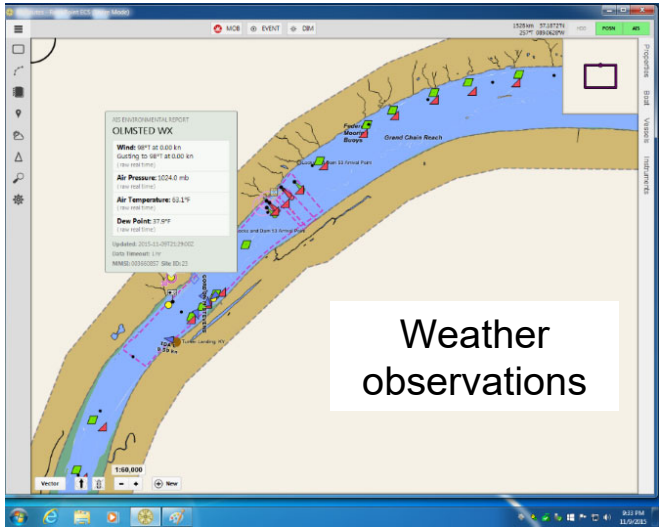

Locks and Dam 52
Lock & Dam 52
Unionville Rd
First Baptis
Brookport Elementary School
US Army Corps of Engineers
Brookport
Barney's Market
Locks & Dam 52
3104 x 635
Irvin Co
Irvin Cot
Tools
264ft
500m
Notifications
37°07'18"N 088°38'55"W

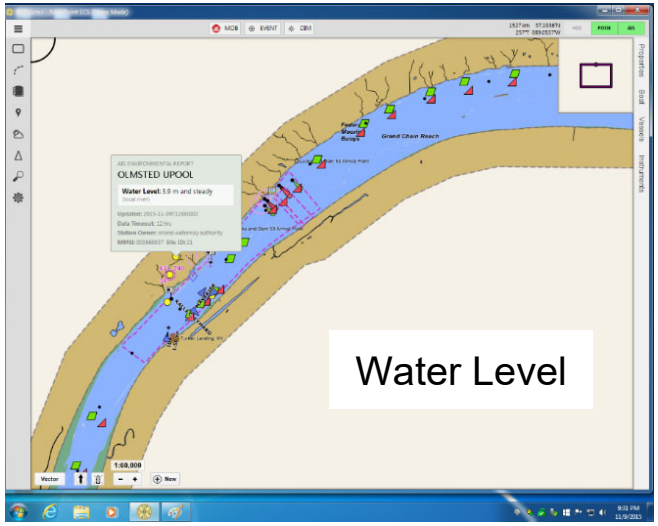

Lord's Church of Prayer
Newburgh Locks & Dam River
Newburgh Lock & Dam
County Rd 70 S
Tools
264ft
500m
Notifications
37°55'51"N 087°22'38"W

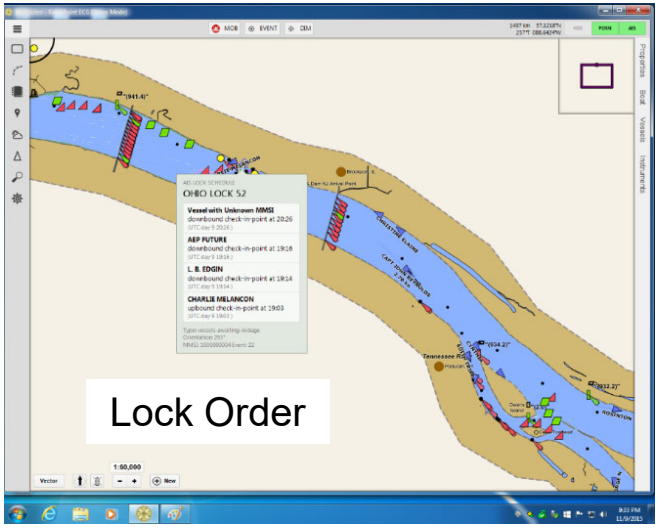

John T. Myers Locks & Dam Arrival
847
848
John T. Myers Lock & Dam
846
Wabash Island
Wabash Island
Wabash Island
Wabash Island
Wabash Island
Fl(3)G 4s
Raben Rd
845
850
871
871


Wabash Island
John T. Myers Lock & Dam
Raben Rd
Wabash Island
Wabash Island
Ohio River
Old lock N
Wabash Island
https://youtu.be/lyjs6sM_UxA

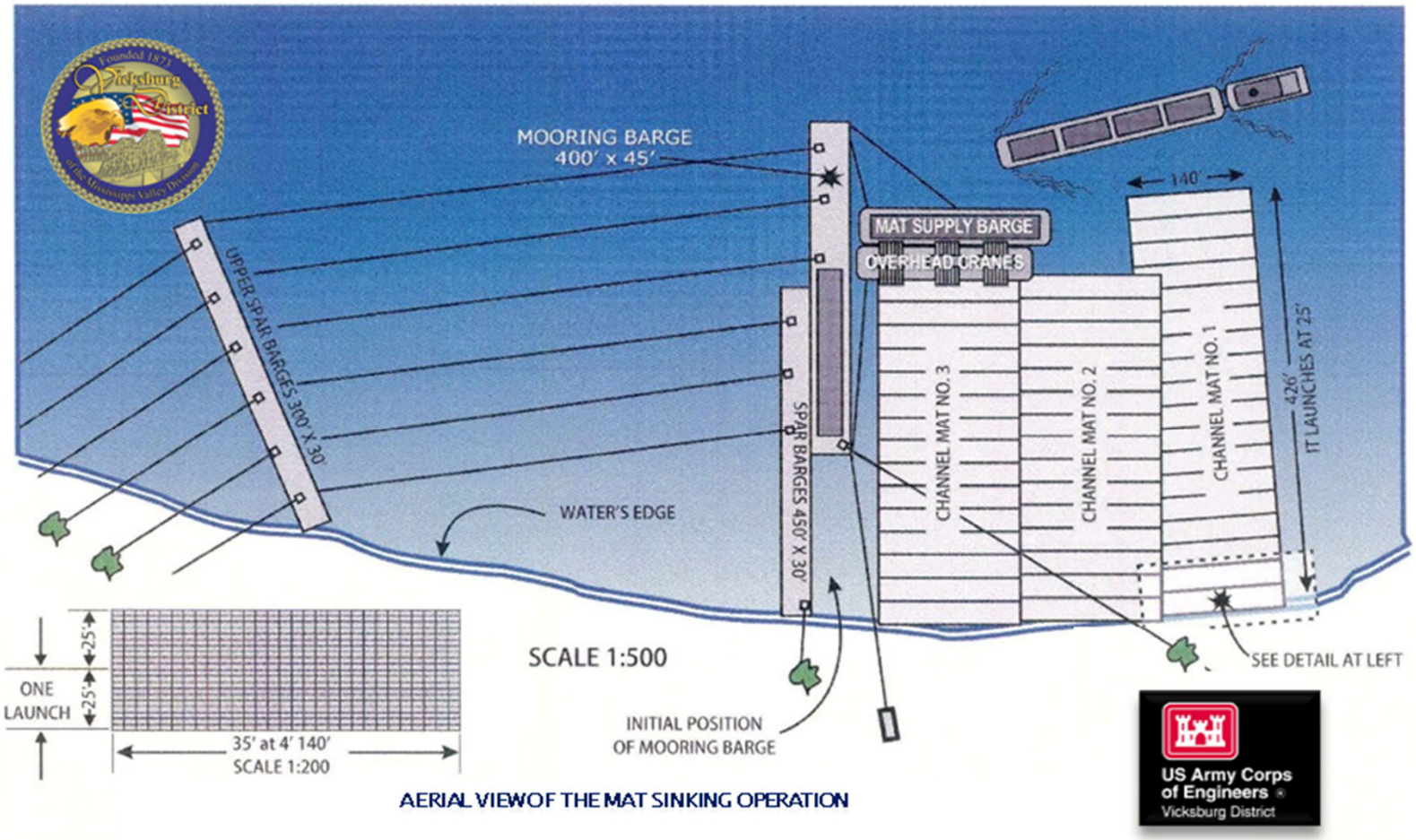
Information delivered to vessels via AIS







Mat Sinking Unit operations



AERIAL VIEW OF THE MAT SINKING OPERATION

Collision between the *Riley Elizabeth* Tow and
US Army Corps of Engineers Barge Plant
Mississippi River near Waterproof, Louisiana
July 18, 2014

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)

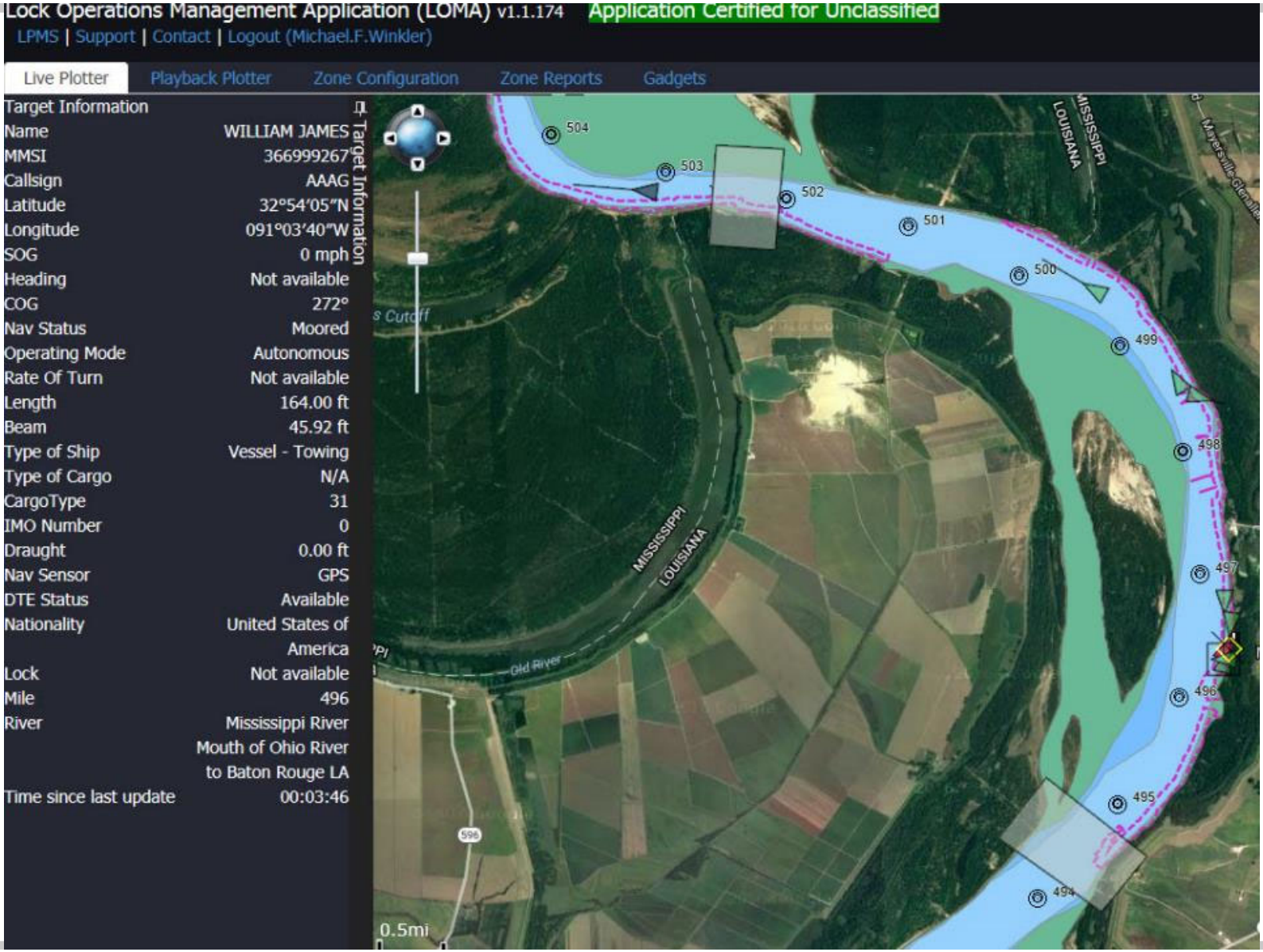
Use automatic identification system aids to navigation or application-specific messages to mark potential hazards to navigation. (M-15-14)

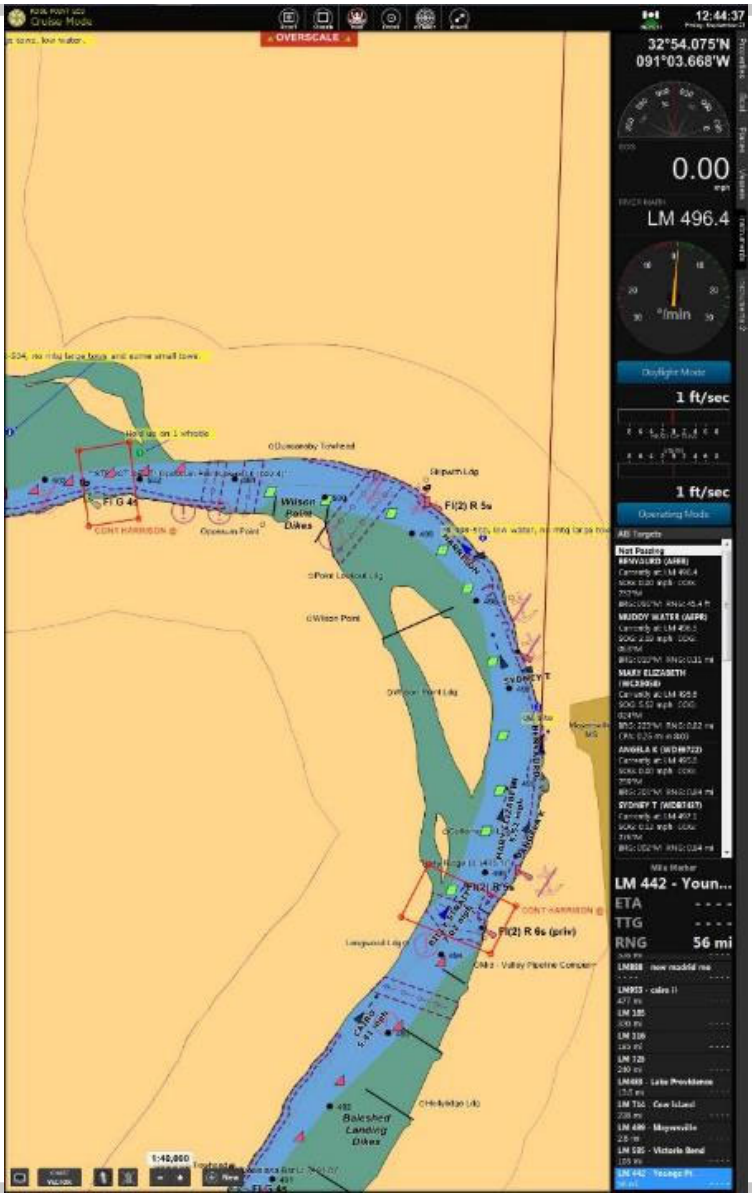
BY THE NATIONAL TRANSPORTATION SAFETY BOARD

CHRISTOPHER A. HART
Chairman

ROBERT L. SUMWALT
Member

Safety Board


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 45.92 ft
Type of Ship Vessel - Towing
Type of Cargo N/A
CargoType 31
IMO Number 0
Draught 0.00 ft
Nav Sensor GPS
DTE Status Available
Nationality United States of America
Lock Not available
Mile 496
River Mississippi River Mouth of Ohio River to Baton Rouge LA
Time since last update 00:03:46
Target Information
504
503
502
501
500
499
498
497
496
495
494
MISSISSIPPI
LOUISIANA
Old River
596
0.5mi


OVERSCALE
12:44:37
32°54.075'N
091°03.668'W
0.00
LM 496.4
1 ft/sec
1 ft/sec
Wilson Point Dikes
Fl(2) R 5s
Fl G 4s
Fl(2) R 6s (priv)
Baileshed Landing Dikes
LM 442 - Youn...
ETA
TTG
RNG
56 mi


12:49:16
32°54.074'N
091°03.669'W
0.00
LM 496.4
1 ft/sec
1 ft/sec
Fl(2) R 5s
Fl(2) R 6s (priv)
LM 442 - Youn...
ETA
TTG
RNG
56 mi

Geographic notices

1 Geographic Notice Message Release Version: 2

Published: 23 March 2015 **Release Version: 2**

DAC: 367 **FI: 22**

Submit any suggested changes to: gwjohnson@alionscience.com

Future variant: NUID instead of message linking ID – at least 18 bits and also include ability to link multiple GN's together for even bigger areas.

Table 11: Notice Description

Value	Description
0	Caution: Marine mammal habitat
1	Caution: Marine mammals in area - reduce speed
2	Caution: Marine mammals in area - stay clear
3	Caution: Marine mammals in area - report sightings
4	Caution: Protected Habitat - reduce speed
5	Caution: Protected habitat - stay clear
6	Caution: Protected habitat - no fishing or anchoring
7	Caution: Derelicts (drifting objects)
8	Caution: Traffic congestion

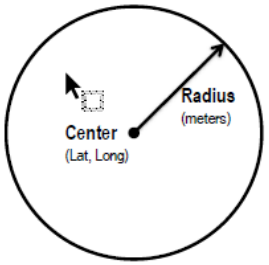


Figure 1: Circle diagram.

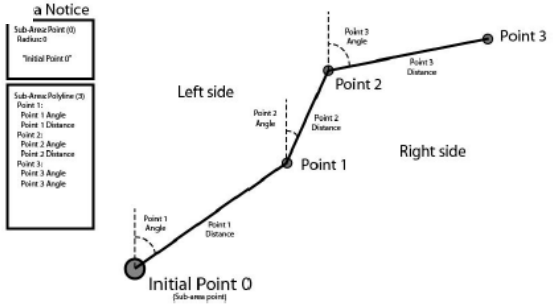


Figure 4 - Graphic description of a waypoint/polyline, showing angle and distance between points. If one side of a polyline is to be a boundary (e.g., edge of ice area), this is defined by the left side of the line in order of sequence from the initial sub-area point (Point 0).

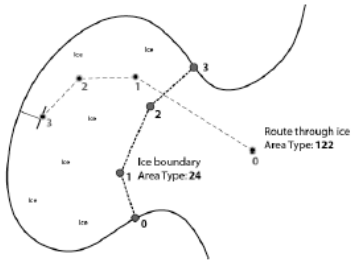


Figure 5 - Graphic depiction of: 1) ice boundary between sea ice and open water, and 2) recommended route through the sea ice area.

34	Restriction: Entry approval required prior to transit
35	Restriction: Entry prohibited
36	Restriction: Active military OPAREA
37	Restriction: Firing - danger area
38	Restriction: Drifting mines
39	Restriction: other (define in associated text field)
40	Anchorage: Anchorage open
41	Anchorage: Anchorage closed
42	Anchorage: Anchoring prohibited
43	Anchorage: Deep draft anchorage
44	Anchorage: Shallow draft anchorage
45	Anchorage: Vessel transfer operations
46	Anchorage: other (define in associated text field)

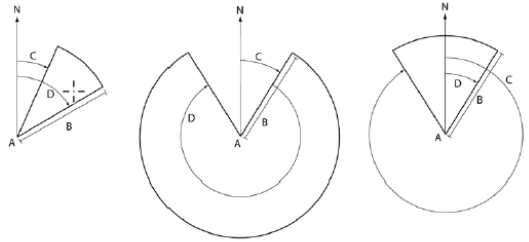


Figure 3- Sector description. a) Center point, b) Sector radius, c) Sector bearings from center point, left boundary, d) Sector bearings from center point, right boundary.

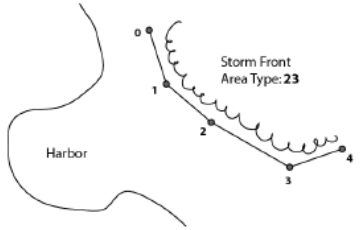
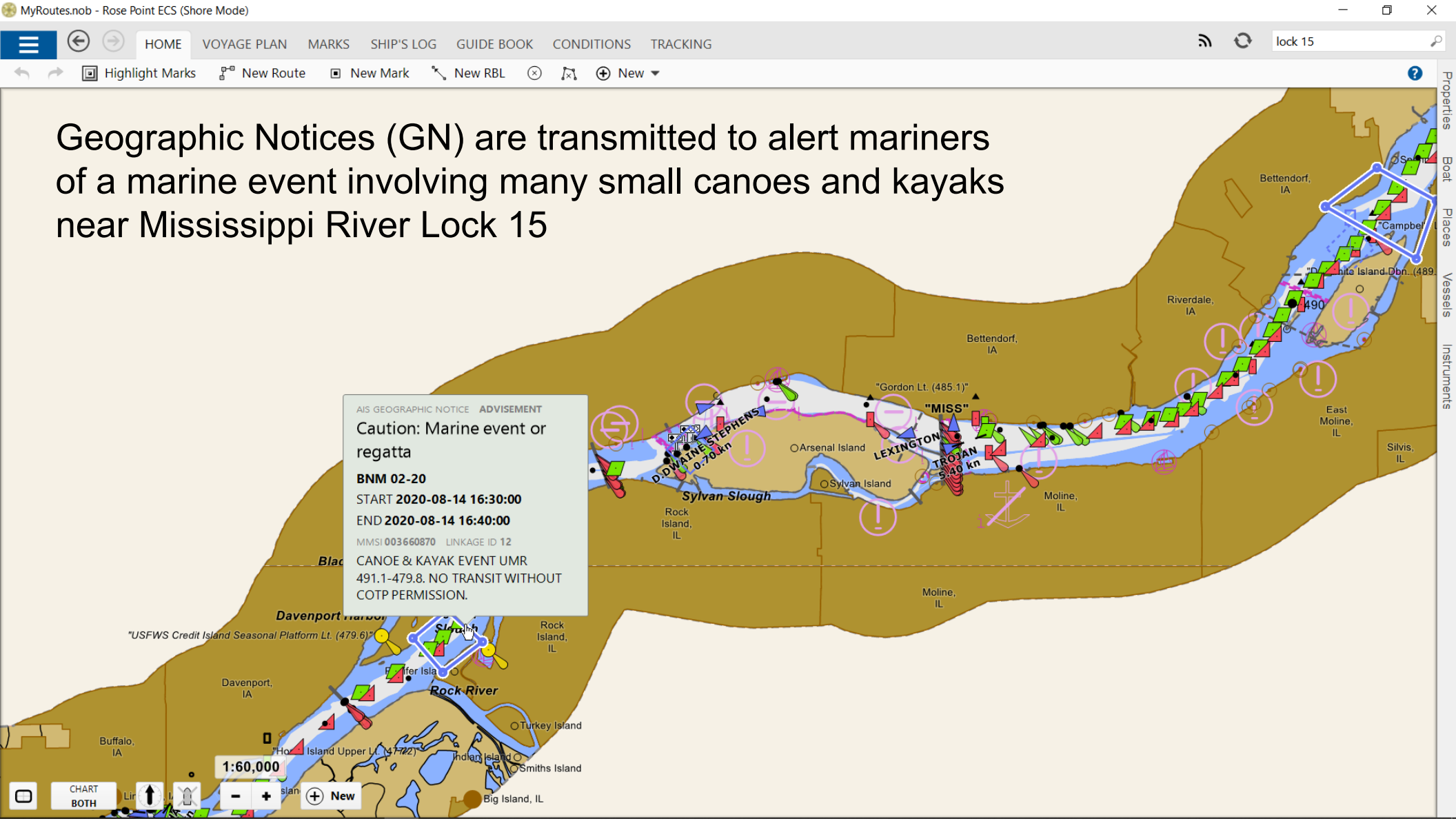
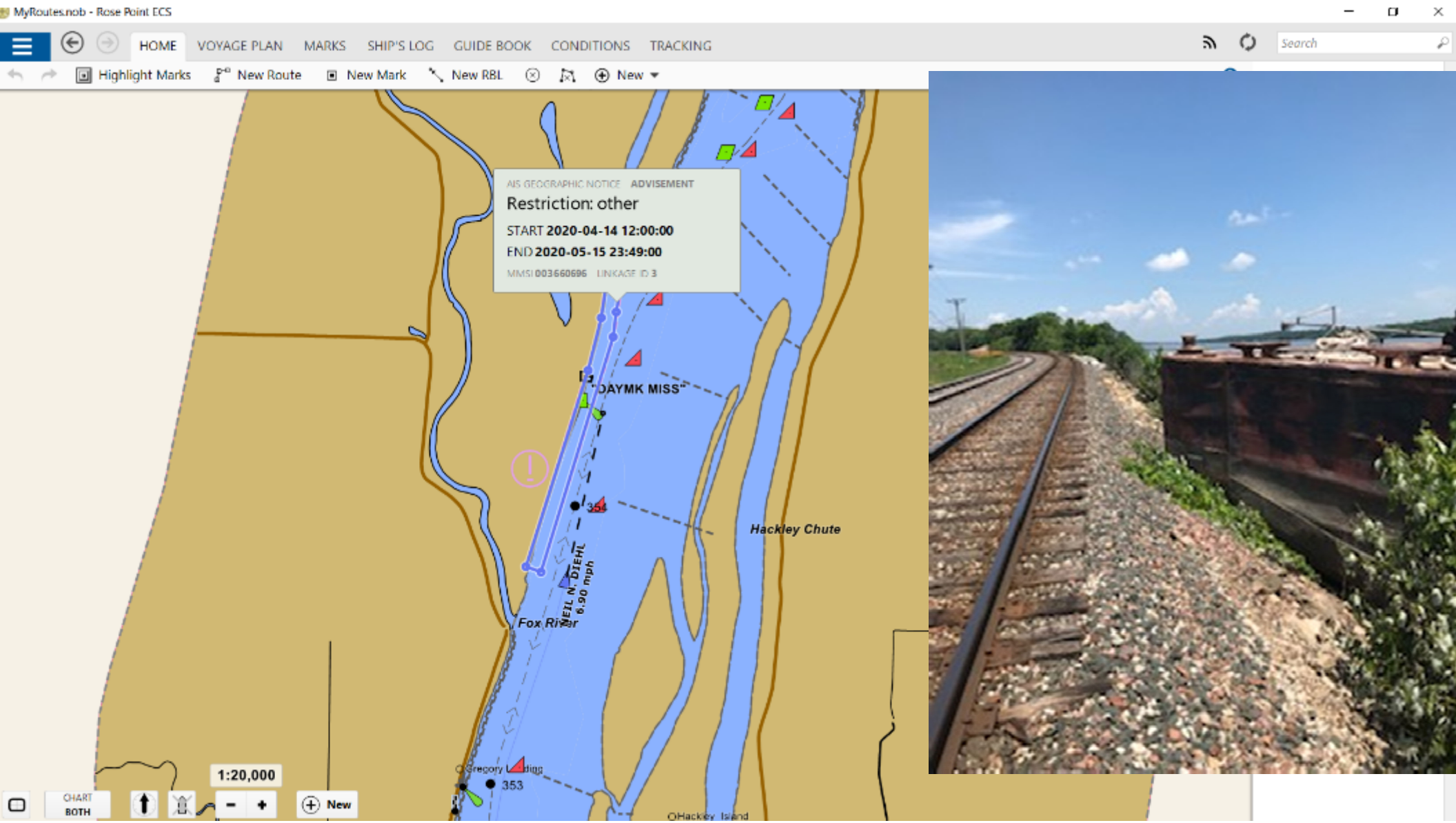


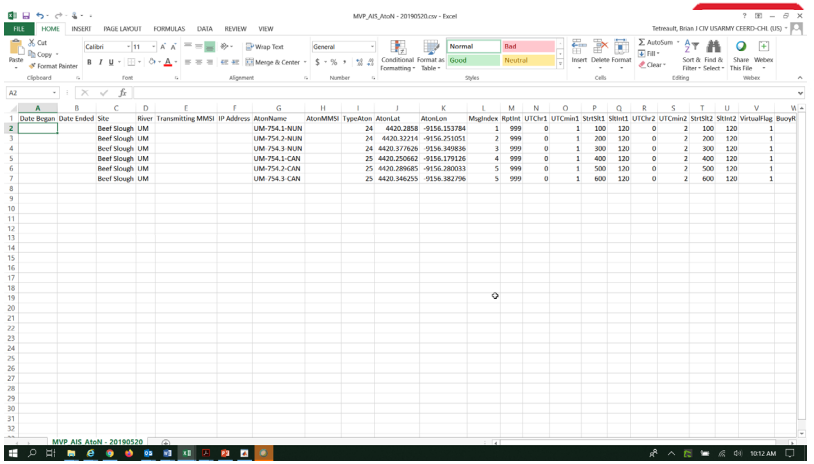
Figure 6 - A graphic depiction of a storm front message.

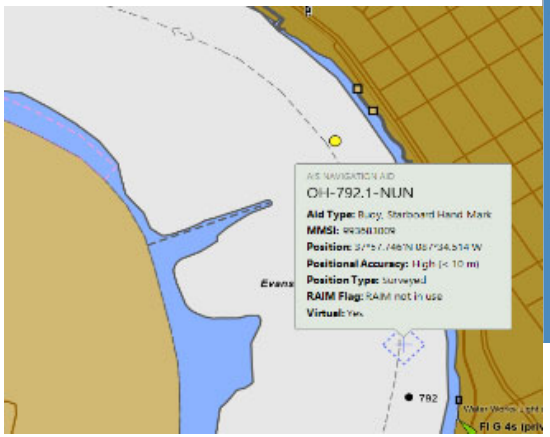

MyRoutes.nob - Rose Point ECS (Shore Mode)
HOME
VOYAGE PLAN
MARKS
SHIP'S LOG
GUIDE BOOK
CONDITIONS
TRACKING
lock 15
Highlight Marks
New Route
New Mark
New RBL
New
Properties
Boat
Places
Vessels
Instruments
Geographic Notices (GN) are transmitted to alert mariners of a marine event involving many small canoes and kayaks near Mississippi River Lock 15
AIS GEOGRAPHIC NOTICE ADVISEMENT
Caution: Marine event or regatta
BNM 02-20
START 2020-08-14 16:30:00
END 2020-08-14 16:40:00
MMSI 003660870 LINKAGE ID 12
CANOE & KAYAK EVENT UMR 491.1-479.8. NO TRANSIT WITHOUT COTP PERMISSION.
Bettendorf, IA
Riverdale, IA
Bettendorf, IA
"Gordon Lt. (485.1)"
"MISS"
LEXINGTON
TROJAN
D.DWAINE STEPHENS
0.70 kn
5.40 kn
Arsenal Island
Sylvan Island
Sylvan Slough
Rock Island, IL
Moline, IL
East Moline, IL
Silvis, IL
Moline, IL
Rock Island, IL
"USFWS Credit Island Seasonal Platform Lt. (479.6)"
Davenport, IA
Rock River
Turkey Island
Buffalo, IA
Indian Island
Smiths Island
Big Island, IL
1:60,000
CHART BOTH
New


MyRoutes.nob - Rose Point ECS
HOME
VOYAGE PLAN
MARKS
SHIP'S LOG
GUIDE BOOK
CONDITIONS
TRACKING
Search
Highlight Marks
New Route
New Mark
New RBL
New
AIS GEOGRAPHIC NOTICE ADVISEMENT
Restriction: other
START 2020-04-14 12:00:00
END 2020-05-15 23:49:00
MMSI 003660696 LINKAGE ID 3
DAYMK MISS"
354
Hackley Chute
NEIL N. DIEHL
6.90 mph
Fox River
Gregory Landing
353
Hackley Island
1:20,000
CHART
BOTH
New

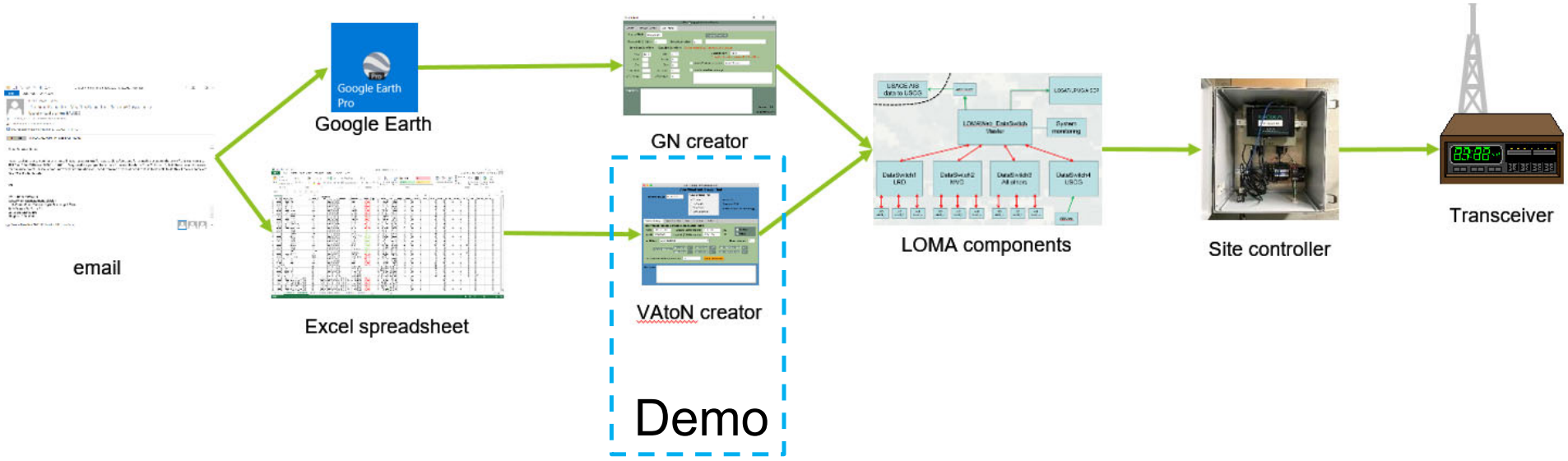
AIS AtoN/GN procedures

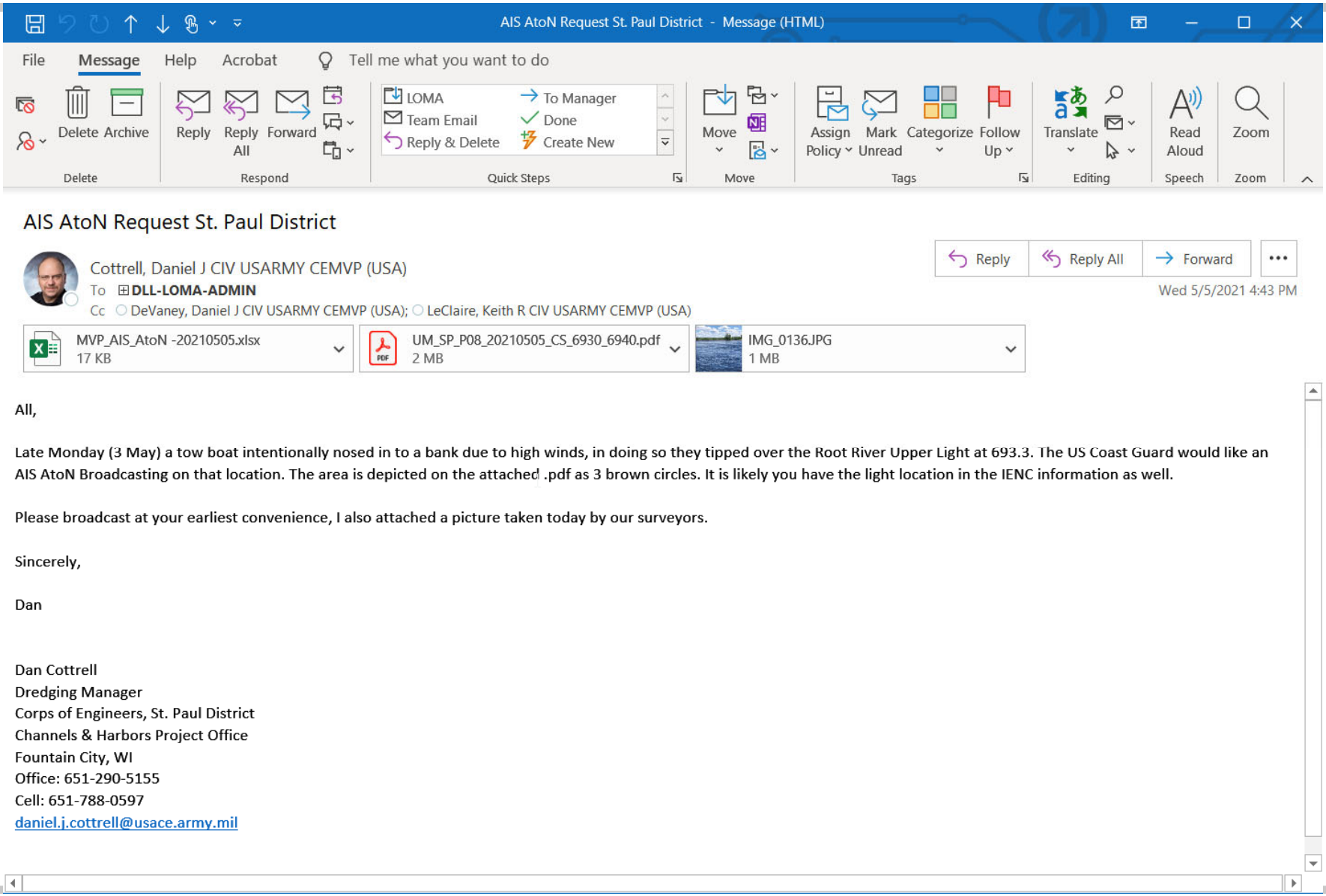
- District identifies need for AIS AtoN/Geographic Notice
  - Permanent or temporary?
  - Added to IENC or not?
  - NTNI/BNM or not?
- Coordinate/consult with USCG
  - Difference if USACE or USCG is establishing AtoN
- Determine location of AtoN/geographic notice
- Provide info to LOMA team – spreadsheet, coordinates, .kml file – lomaadmin@usace.army.mil
- AtoN programmed, starts transmitting
- "AtoN Dashboard development

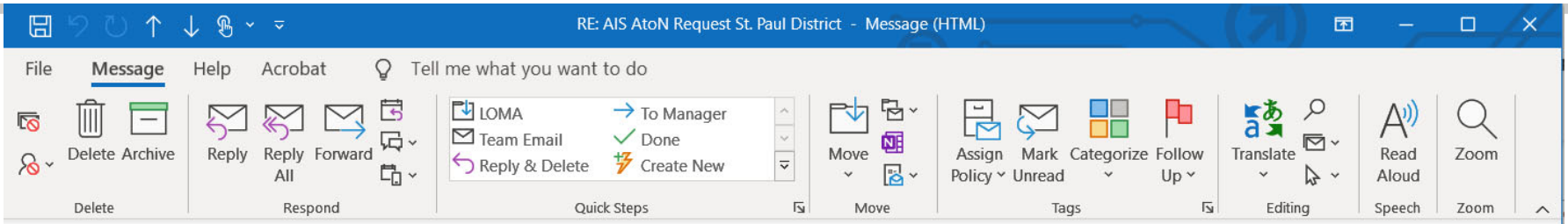




AIS AtoN and GN process




AIS AtoN Request St. Paul District - Message (HTML)
File
Message
Help
Acrobat
Tell me what you want to do
Delete
Archive
Reply
Reply All
Forward
LOMA
Team Email
Reply & Delete
To Manager
Done
Create New
Move
Assign Policy
Mark Unread
Categorize
Follow Up
Translate
Read Aloud
Zoom
Delete
Respond
Quick Steps
Move
Tags
Editing
Speech
Zoom
AIS AtoN Request St. Paul District
Cottrell, Daniel J CIV USARMY CEMVP (USA)
To DLL-LOMA-ADMIN
Cc DeVaney, Daniel J CIV USARMY CEMVP (USA); LeClaire, Keith R CIV USARMY CEMVP (USA)
Reply
Reply All
Forward
Wed 5/5/2021 4:43 PM
MVP_AIS_AtoN -20210505.xlsx
17 KB
UM_SP_P08_20210505_CS_6930_6940.pdf
2 MB
IMG_0136.JPG
1 MB
All,
Late Monday (3 May) a tow boat intentionally nosed in to a bank due to high winds, in doing so they tipped over the Root River Upper Light at 693.3. The US Coast Guard would like an AIS AtoN Broadcasting on that location. The area is depicted on the attached .pdf as 3 brown circles. It is likely you have the light location in the IENC information as well.
Please broadcast at your earliest convenience, I also attached a picture taken today by our surveyors.
Sincerely,
Dan
Dan Cottrell
Dredging Manager
Corps of Engineers, St. Paul District
Channels & Harbors Project Office
Fountain City, WI
Office: 651-290-5155
Cell: 651-788-0597
daniel.j.cottrell@usace.army.mil



RE: AIS AtoN Request St. Paul District

Towne, Brady A CIV USARMY CEERD (USA)
To Cottrell, Daniel J CIV USARMY CEMVP (USA); **DLL-LOMA-ADMIN**
Cc DeVaney, Daniel J CIV USARMY CEMVP (USA); LeClaire, Keith R CIV USARMY CEMVP (USA)

Reply | Reply All | Forward

Thu 5/6/2021 9:30 AM

MVP_AIS_AtoN -20210505.xlsx 19 KB
2021_05_06_08_25_11_.jpg 210 KB
2021_05_06_08_26_53_.jpg 314 KB

Dan,

This is now transmitting. Updated spreadsheet and screenshots attached.

Respectfully,

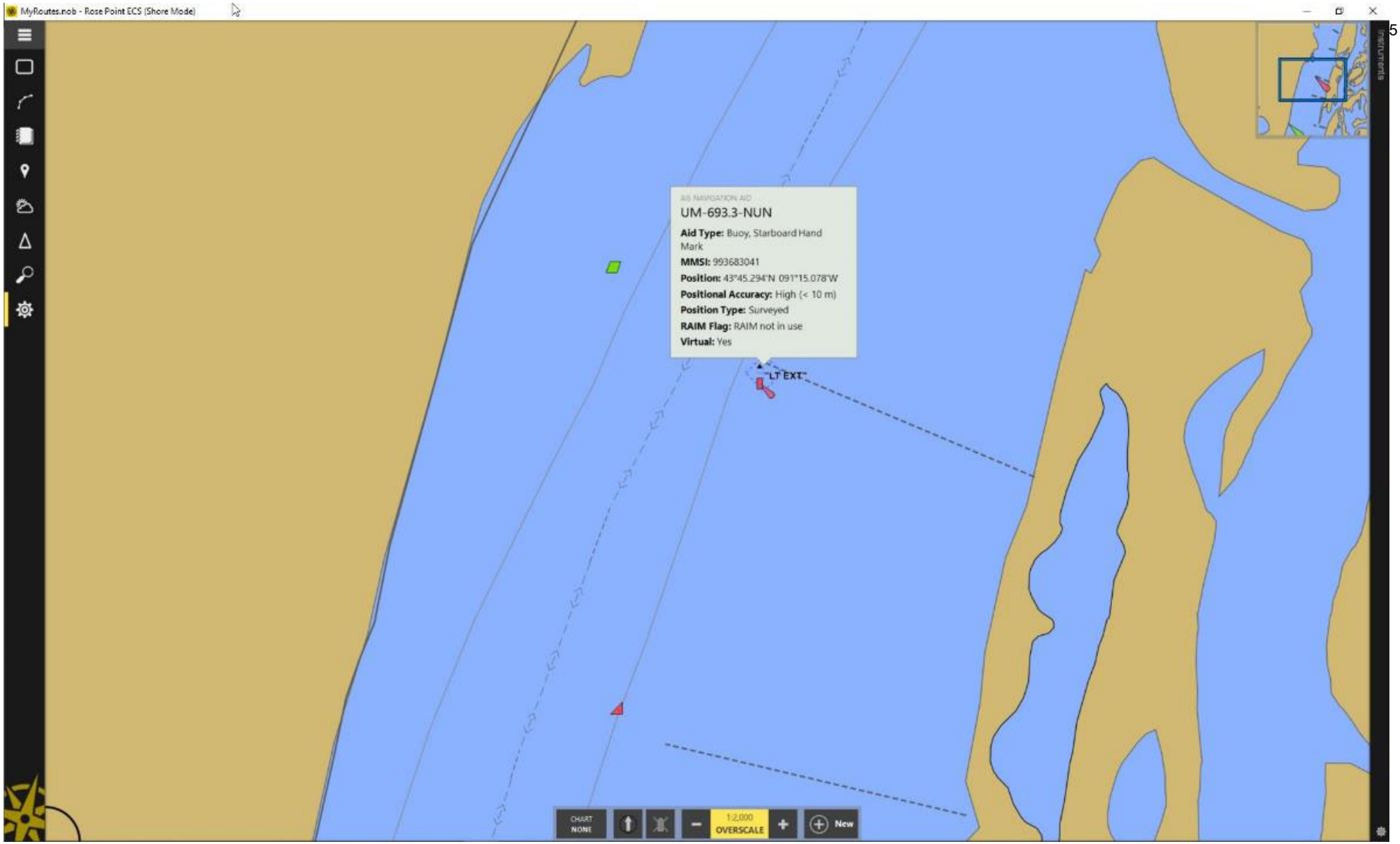
Brady Towne

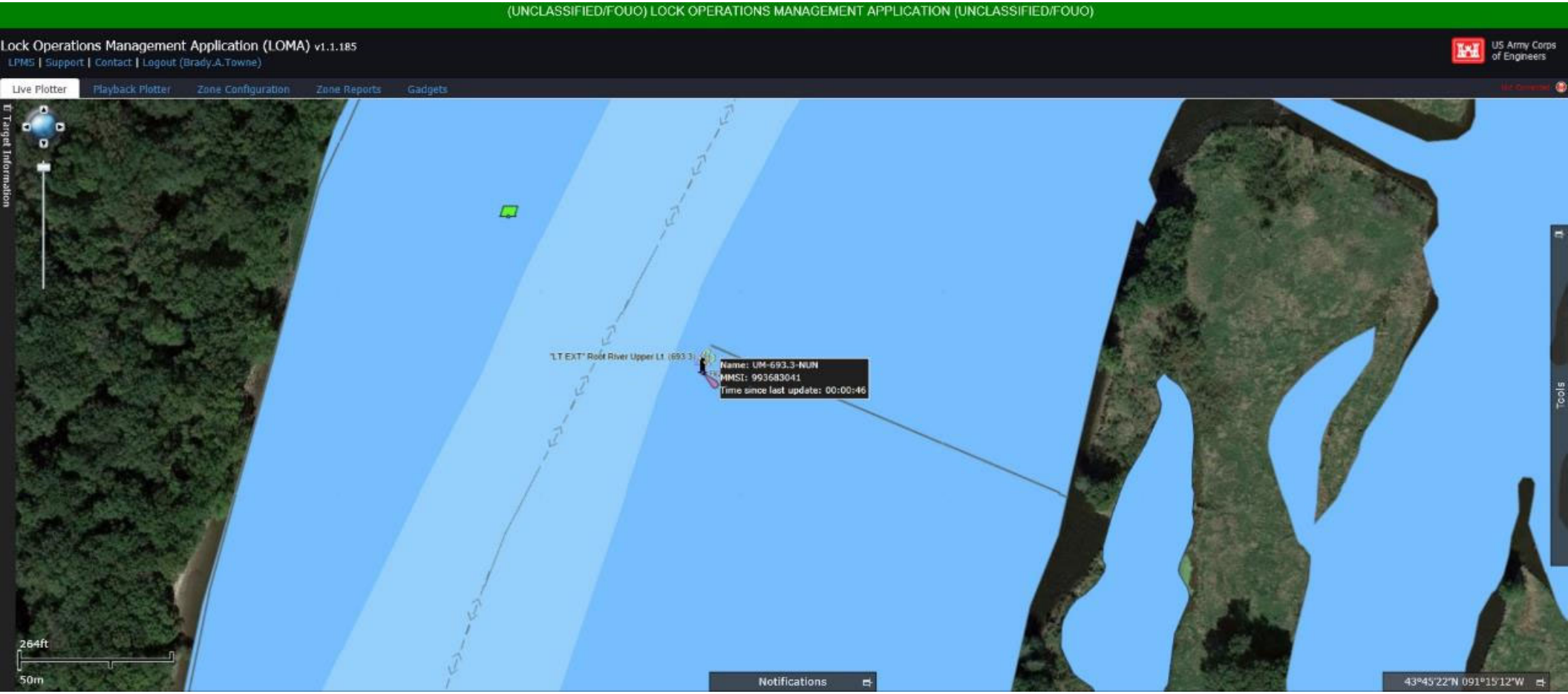
US Army Engineer Research and Development Center
3909 Hall Ferry Road
Vicksburg, MS 39180-6199

Office: 601-634-5195

From: Cottrell, Daniel J CIV USARMY CEMVP (USA) <Daniel.J.Cottrell@usace.army.mil>
Sent: Wednesday, May 5, 2021 3:43 PM
To: DLL-LOMA-ADMIN <lomaadmin@usace.army.mil>
Cc: DeVaney, Daniel J CIV USARMY CEMVP (USA) <Daniel.J.Devaney@usace.army.mil>; LeClaire, Keith R CIV USARMY CEMVP (USA) <keith.r.leclaire@usace.army.mil>
Subject: AIS AtoN Request St. Paul District

All,


MyRoutes.nob - Rose Point ECS (Shore Mode)
AIS NAVIGATION AID
UM-693.3-NUN
Aid Type: Buoy, Starboard Hand Mark
MMSI: 993683041
Position: 43°45.294'N 091°15.078'W
Positional Accuracy: High (< 10 m)
Position Type: Surveyed
RAIM Flag: RAIM not in use
Virtual: Yes
"LT EXT"
CHART NONE
1:2,000 OVERSCALE
New
Instruments


(UNCLASSIFIED/FOUO) LOCK OPERATIONS MANAGEMENT APPLICATION (UNCLASSIFIED/FOUO)
Lock Operations Management Application (LOMA) v1.1.185
LPMS | Support | Contact | Logout (Brady.A.Towne)
US Army Corps of Engineers
Live Plotter
Playback Plotter
Zone Configuration
Zone Reports
Gadgets
Target Information
'LT EXT' Root River Upper Lt (693.3)
Name: UM-693.3-NUN
MMSI: 993683041
Time since last update: 00:00:46
Tools
264ft
50m
Notifications
43°45'22"N 091°15'12"W

Thank you

Brian Tetreault ERDC-CHL

brian.j.tetreault@usace.army.mil