### **Navigation System Performance R&D**

### W. Jeff Lillycrop

Technical Director Engineer Research and Development Center



Civil Works R&D Steering Committee September 26, 2014



### **CMTS Future of Navigation**

- Purpose: "develop and carry out a work plan for the implementation of the e-Nav Strategic Action Plan."
- Membership:
  - Open to all CMTS agencies
  - Co-chairs:
    - USCG, USACE, NOAA
- Focus areas:
  - Integrating Systems
  - Seamless Data Exchange
  - Decision-Focused Information
  - Human-Focused Interface
  - Improved Connectivity
  - Interagency Coordination





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**Brian Tetreault** 

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### **eHydro Application and Reporting Process**



### **CPT Cargo Through a Channel**

5



**Ned Mitchell** 

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12,000,000

14,000,000

### **Operate Integrated Systems**

eHydro Application and Reporting Process



## Lock Operations Management Application (LOMA)

### Purpose:

Provide end users information needed for decision support
 Goals:

- Increase lock operator situational awareness
- Provide <u>vessel operators</u> better information
- Provide better information to <u>Corps management</u>
- Exchange information with <u>external users</u>

AIS is the central LOMA technology





### **LOMA Current capabilities**

- Lock operator situational display
- AIS vessel information

Name MMSI

SOG

COG

Length

Beam

Lock

Mile

River

- Zone management
- Playback capability

#### Lock Operations Management Application (LOMA) v1.0.340 US Army Corps of Engineers Live Plotter Target Information M/V WALLY ROLLER 367143710 Binford Park Callsign WDD4358 larksv Latitude 038°16'41"N 085°47′44″W Longitude 0.4 kts Not available Heading New Albany EN 100.9° Nav Status Under Way Engine Operating Mode Autonomous Rate Of Turn Not available 164.00 ft McAlpine Lock & Da 65.60 ft Type of Ship Vessel - Fishing Type of Cargo N/A CargoType 30 IMO Number 0 Draught 0.00 ft Nav Sensor GPS Available DTE Status United States of America Nationality 7/2/2013 8:30:56 AM LockETA Louisville McAlpine Lock & Dam W Broadwa 607 Garland Ave PreviousMile 608 Chickasaw 150 Ohio River Time since last update00:00:00

## **Performance Monitoring via AIS**

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







### Selected Preliminary Findings: Ohio River Travel Times, 2013

	travel t	ime (hrs)					
	<b>median</b> 50th percentile	<b>low</b> 25th percentile	Destination / ToUpstream(Ohio River Mile)Direction				
	1	high	Cairo, IL	Paducah, KY	Evansville, IN	Louisville, OH	Cincinnati, OH
		75 <sup>th</sup> percentile	(981)	(934)	(781)	(602)	(470)
	Origin / From (Ohio River Mile)	Cairo, IL (981)		8	38	75	100
				10	46	91	123
				16	63	120	159
		Paducah, KY (934)	6 7		29 36	67 81	92 113
		Evansville, IN	26 33	20 26		37 45	63 77
		(701)	52	39		57	97
		Louisville, OH (602)	51 62 89	45 55 77	25 29 38		<sup>25</sup> 32 <sub>38</sub>
		Cincinnati, OH (470)	68	63	42	18	
)ov )ire	vnstream ection		84 120	77 108	51 69	22 31	

### Lock approach analysis

41.323

41.322

41.321

41.32

41.319

41.318

-88.691

- Analyze vessel approach:
  - Historical vessel tracks (from AIS)
  - Water levels, gate settings, etc.
  - Assess correlation
- Examine problem areas, accidents
- Develop real-time assessment & warning system



-88.711 -88.706

-88.701 -88.696



### **MTS Performance** Measures

**Economic Benefits** 

Producer Price Index for Transportation Industries

Month - Yea



H-H **Economic Benefits to the Nation** ERDC US Army Corps of Engineers® Engineer Researc Ionment Cente **Capacity & Reliability** Navigation Systems Marine Transportation Performance Measures **Research & Development** Safety & Security Marin M. Kress, Kenneth N. Mitchell, Patricia K. DiJoseph, December 2014 J. Scott Rainey, [ awaiting confirmation], [awaiting confirmation1and W. Jeff Lillycrop **Environmental Stewardship** Hydraulics Resilience **Capacity & Reliability** Number of Navigation Lock Closures, Scheduled and Unscheduled Unscheduled Closures (& 2140 - 140 -Calendar Year (CV) **BUILDING STRONG**®

### **Navigation Data Integration Framework**

### **Navigation DIF Components**

- Source Databases
- Hub Catalog
- Tools
- Web Services
- Portals

#### **Navigation Sub-categories**

- Dredging
- River Information Services
- Surveying & Mapping
- Infrastructure & Asset Management
- Engineering With Nature & Regional Sediment Management
- Marine Transportation System





### **Data & Application Access**

- Organizes access to USACE
  Navigation data and applications (users & developers)
- Links USACE data and application assets
- Provides other agency & public access to approved data and tools





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# Questions?



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