



U.S. ARMY

UNDERKEEL CLEARANCE IN NAVIGATION CHANNELS

COASTAL NAVIGATION PORTFOLIO MANAGEMENT

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COASTAL INLETS RESEARCH PROGRAM

FY20 IN PROGRESS REVIEW

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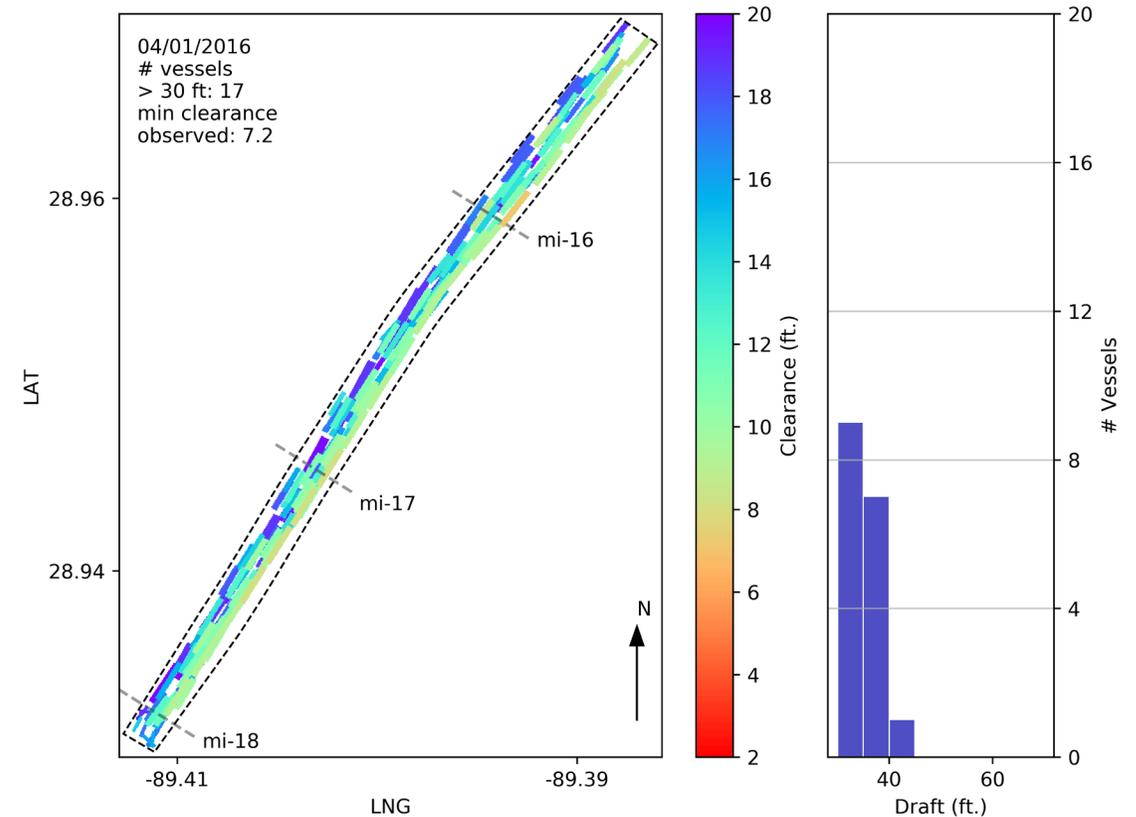
US Army Corps of Engineers



ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

Problem Statement

- Existing performance metrics for coastal navigation channels allocate appx. \$1B annually for dredging but incompletely describe channel performance.
- Vessel clearance can be estimated for nearly all transits made by commercial vessels in USACE managed waterways and will more adequately describe performance.
 - This research uses existing business processes & federal agency data to generate 4-d vessel clearance measurements that inform management of all channels in the USACE portfolio.

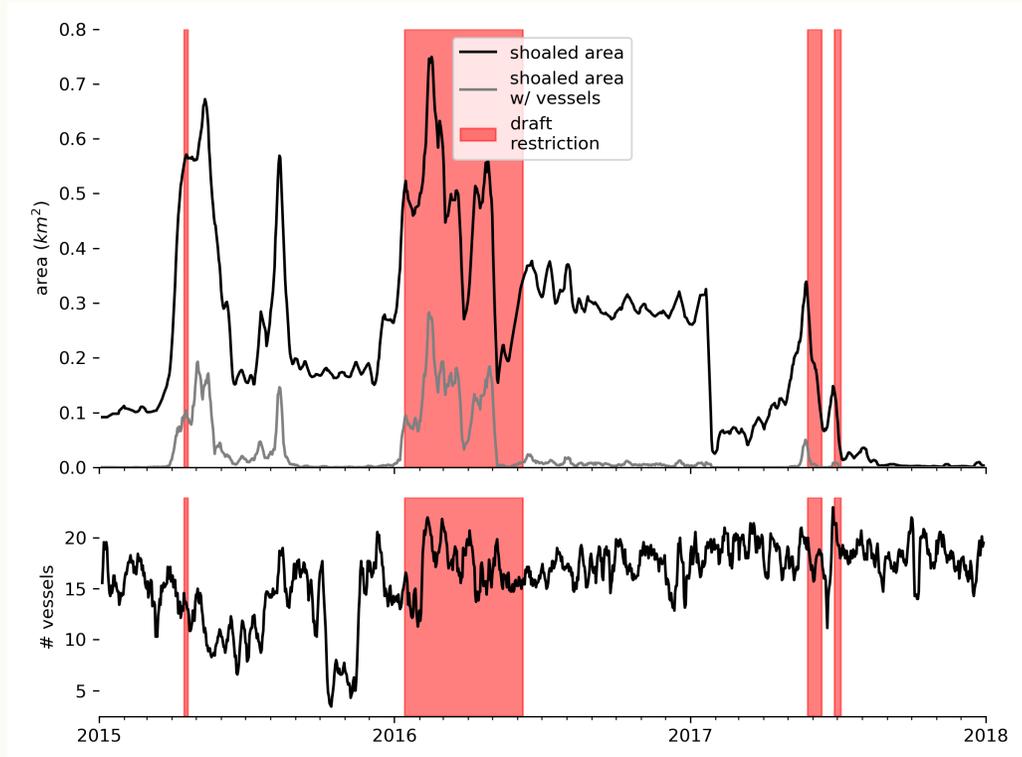


Underkeel clearance of vessels transiting through a dredged reach in the Southwest Pass of the Mississippi River.

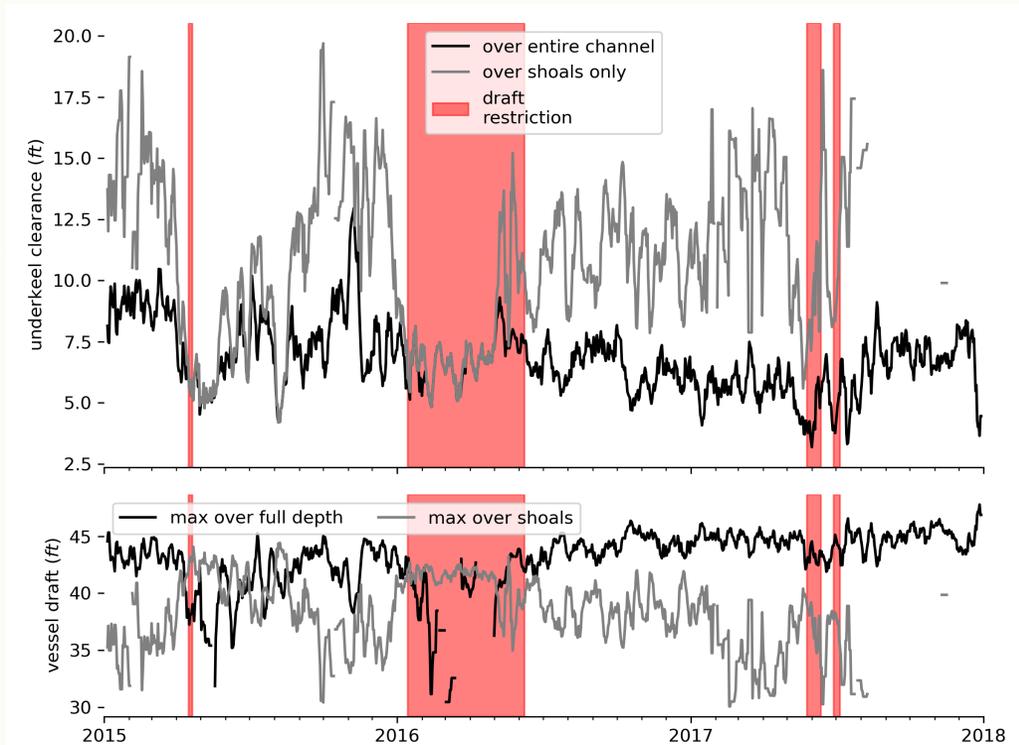
- Strategic R&D advances Machine Learning / Artificial Intelligence capabilities related to connecting, integrating and analyzing data and model output to produce navigation decision support information.
- 2019-N-1332 – Waterway transit times from AIS Data
- 2017-N-52 Further Development of CPT and AIS software products

Capability and Strategic Impact Statement

Vessel clearance provides a more complete picture of how channels are performing compared to vessel draft/cargo tonnage combined with channel controlling depth.



This approach allows assessment of the extent to which accumulated sediment intersects with vessel swept path.



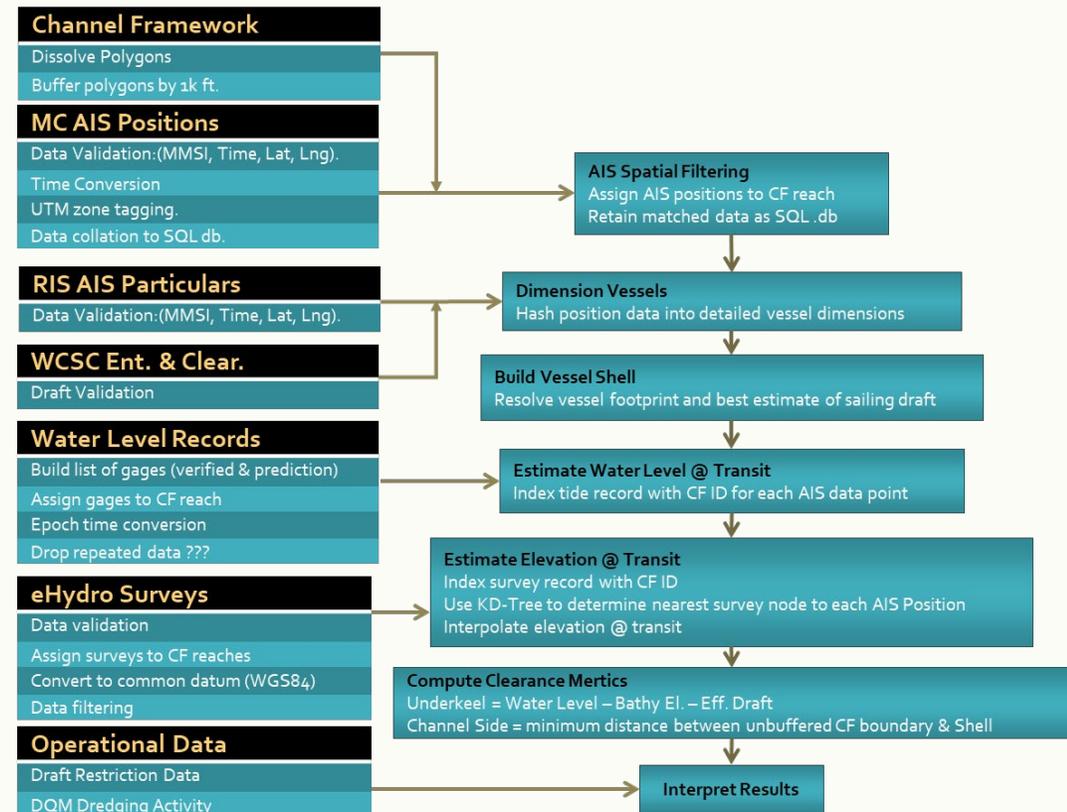
Traffic patterns in clear and shoaled channel regions can be compared to understand performance gains of dredging.

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Fusing Relevant Data

- Archival vessel AIS data provides high resolution (space, time) missing from draft/tonnage and controlling depth.
 - AIS data is available in real time and far exceeds coverage of any other data source in space or time.
 - ▶ Relevant data sources are layered and cross-referenced to improve estimates.
 - ▶ Additional value extracted from existing data products generated by USACE and federal partners.
 - With further development AIS data may demonstrate shoal prediction capability
 - ▶ Potential to modify survey role from exploratory, e.g. “where is the shoal?” to descriptive, e.g. “how big is the shoal?”
 - Operational savings from targeted survey deployment.

HPC Data Modeling Approach



Summary

FY20 Major Advances in Capability

- All major datasets collated
- Analysis algorithms developed
- Analysis demonstrated at SW Pass

FY20 Major Products & Collaborations

- Transformed pre-2019 eHydro surves to WGS '84
- 1 Cirp TD
- Leverages eHydro survey (USACE), foreign entrance clearance (USACE/Customs), TideNet (NOAA), AIS (USCG, BOEM, NOAA) datasets
- Leverages DIG funding for integration with DQM data.

FY21 Products/Advances

- X,Y clearances to be formulated/implemented
- JP Underkeel clearance history of SW Pass by reach.
- JP comparative underkeel clearance of 10 major ports.

