



U.S. ARMY

CSAT INTEGRATION WITH EHYDRO IN NAVPORTAL COASTAL NAVIGATION PORTFOLIO MANAGEMENT

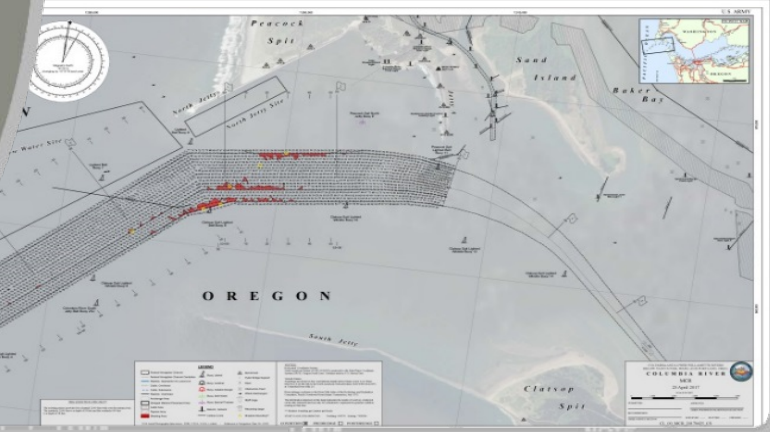
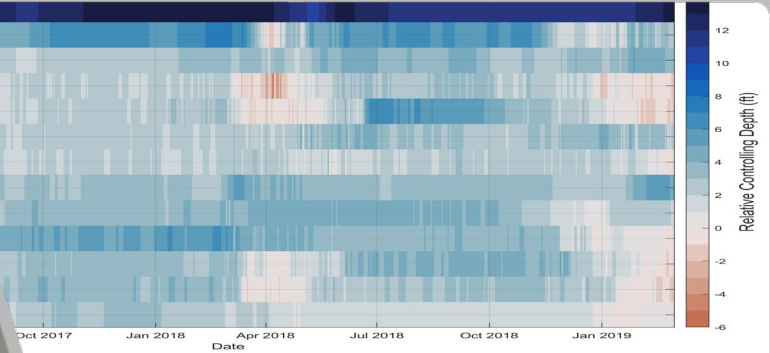
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COASTAL INLETS RESEARCH PROGRAM FY20 IN PROGRESS REVIEW

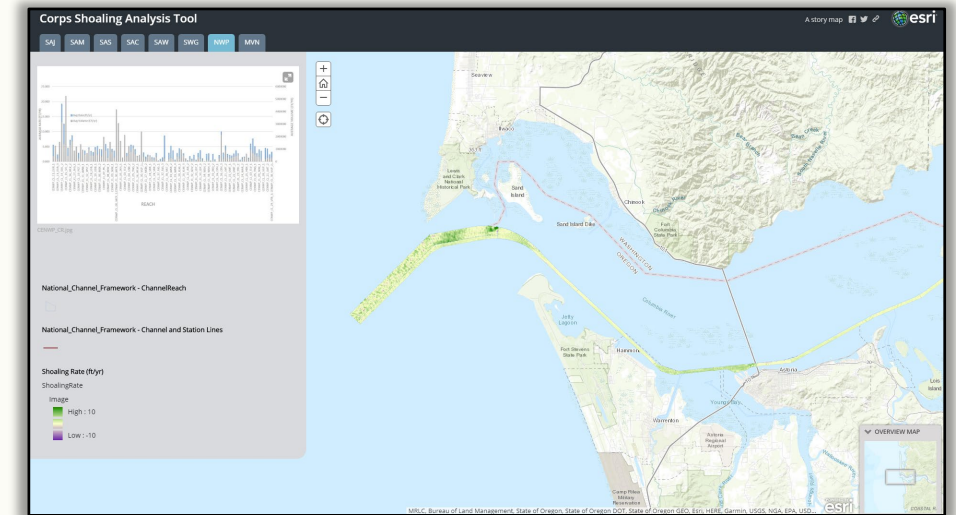
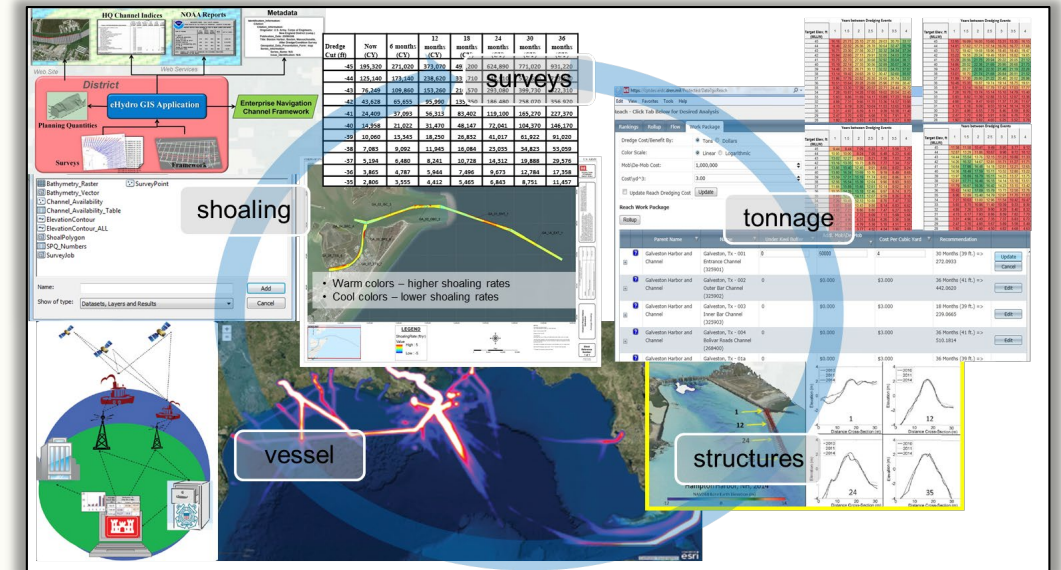
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Problem

- **USACE collects a wide range of data to support its Navigation Mission Area**
 - eHydro, DQM, AISAP, CPT
 - Allows new types of analysis previously unavailable (e.g. CSAT)
- **Big Data leads to Big Challenges:**
 - Increased storage/computational requirements
 - Discoverability and integration with current and future Navigation research tools
- **SoNs:**
 - Machine Learning / Artificial Intelligence capabilities related to connecting, integrating and analyzing data and model output to produce navigation decision support information.
 - 2017-N-52 Further Development of CPT and AIS software products

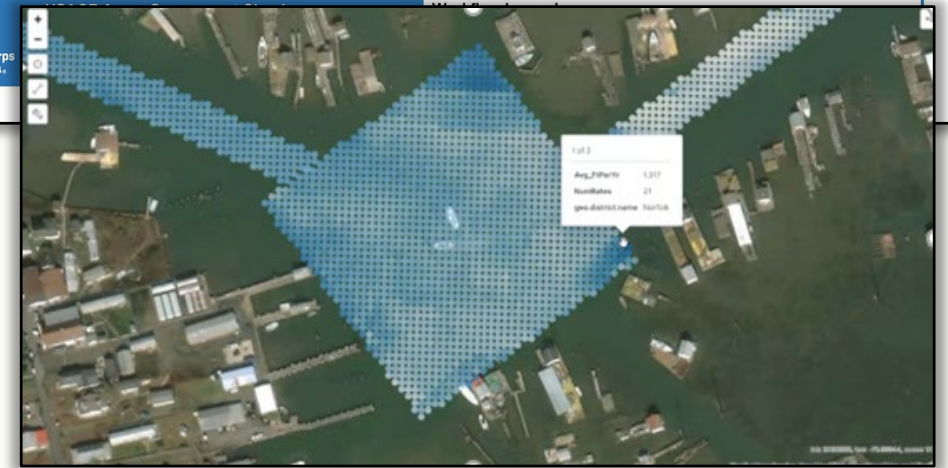
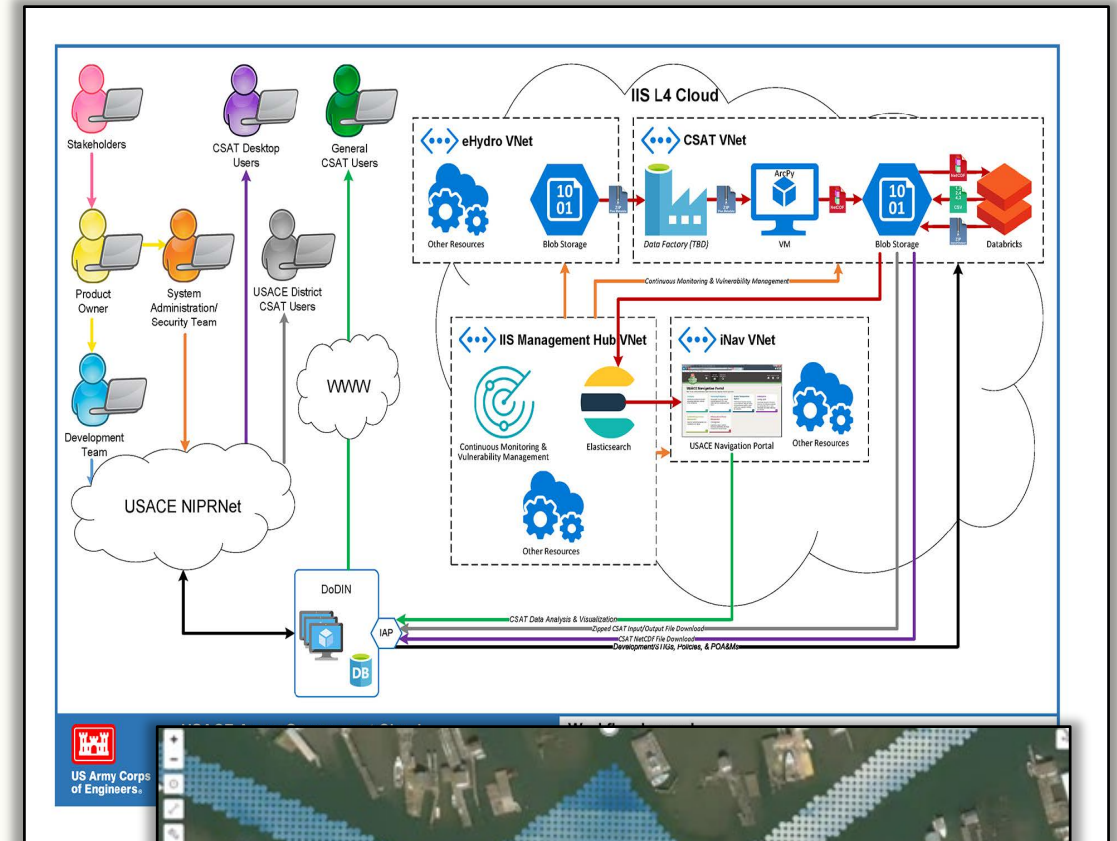


Capability and Strategic Impact Statement

The coupling of CSAT and other navigation related tools/datasets provide enterprise level capability to support research efforts aimed at understanding and quantifying navigation channel conditions. The utilization of cloud computing resources can provide the scalability required to address much larger problems than currently possible with only using local computing resources.

Approach

- Existing codebase and workflow must be adapted to work in the cloud environment
 - Plenty of learning along the way
- Working with the data in the same environment where it is stored reduces file transfer burden
 - CSAT input/output data stored in Azure Blob Storage
 - Microsoft Azure Databricks and Data Factory for actual computing
- The NavPortal team is working on providing performant interfaces for users to explore data and drive additional analyses
 - ElasticSearch for rapid querying and on-the-fly viz
 - ▶ Currently requires CSAT data



Summary

FY20 Major Advances in Capability

- CSAT Input Generation Updates
 - ▶ Streamlined workflow from legacy code
 - ▶ Python 2.7 to Python 3
- Storage of CSAT Inputs/Outputs in Cloud
- Shoaling rates incorporated into working example of ElasticSearch

FY20 Major Products & Collaborations

- CSAT inputs/outputs have been leveraged to support:
 - ▶ District customer needs
 - ▶ Other CNPM tools
 - ▶ DIG research efforts (Dredge Optimization)
 - ▶ ADCIRC model development at the University of Notre Dame.

FY21 Products/Advances

- Automatic processing by CSAT of incoming eHydro data on the USACE Azure L4 Government Cloud
 - ▶ Support for overall enterprise level inquiries + localized analysis needs
- Direct integration of CSAT output with NavPortal visualizations and other CIRP tools