



NWP, North Head Argus Station Engineering Products for Improved Regional Sediment Management

BLUF: Provide automated data products to exploit Argus coastal imaging data (CID) for engineering information (EI) and support managing the Mouth of Columbia River (MCR)

Challenge

Existing Argus and coastal imaging analysis algorithms often require a narrow expertise to convert data into useful EI. Districts need more applicable tools to better + more quickly exploit data.

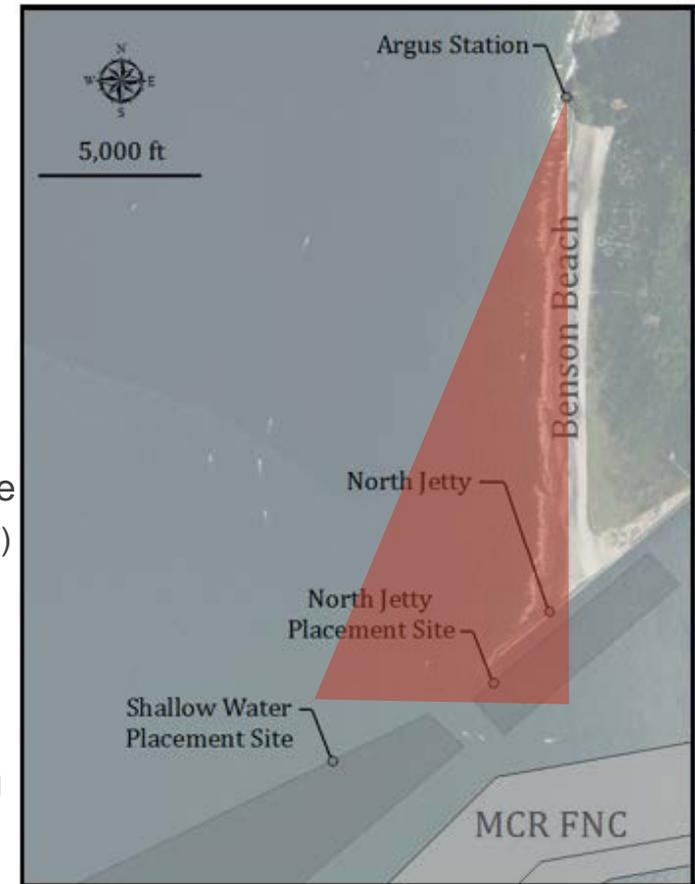
Objectives

To establish a data integration framework for NWP + North Head Argus Station where :

- EI from CID is automatically generated in real time
- CID + EI is easily accessible/visualized via web-tools in real time
- CID + EI can be exploited without licensed software (i.e. MATLAB)

Approach

ERDC will leverage the data integration framework developed under the Coastal Ocean Data System (CODS) program to store CID in an Azure cloud/THREDDS based environment along with interactive web-tools to access and visualize CID+EI in real time with Jupyter Notebooks.



FY18 RSM IPR

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District/Other USACE PDT Members

NWP Team

Rod Moritz, CENWP-EC-HR, Hydraulic Engineer

Austin Hudson, CENWP-EC-HR, Hydraulic Engineer

Jarod Norton, CENWP-OD-NW, Project Manager, RSM/MCR

ERDC Team

Katherine Brodie, CEERD-HFA, Research Oceanographer

Brittany Bruder, CEERD-HFA, Research Engineer

Tyler Hesser, CEERD-HFA, Research Hydraulic Engineer

Leveraging/Collaborative Opportunities

- OSU Coastal Imaging Laboratory (CIL)
- ERDC CW & military research (e.g. mini-Argus towers, UAS collection)
- Coastal Imaging Research Network (CIRN) including the Naval Research Lab, USGS and academia

Stakeholders

ERDC, NWP, NRL, Columbia River Bar Pilots, Port of Ilwaco, Port of Chinook, Port of Astoria, MCR FNC users

Partners

Oregon State University

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Accomplishments

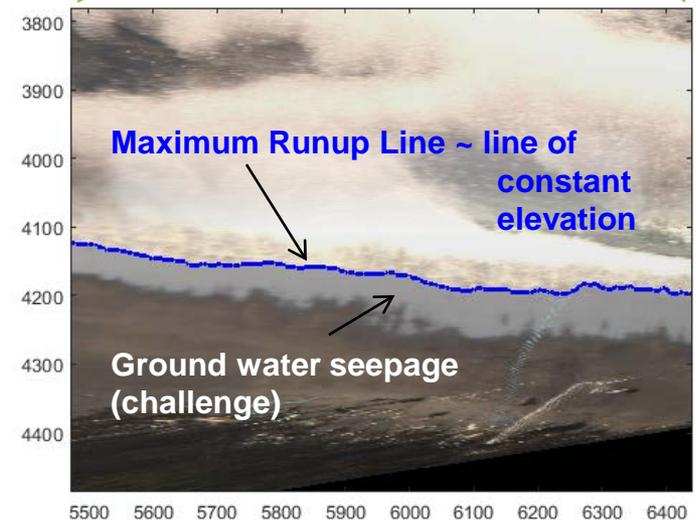
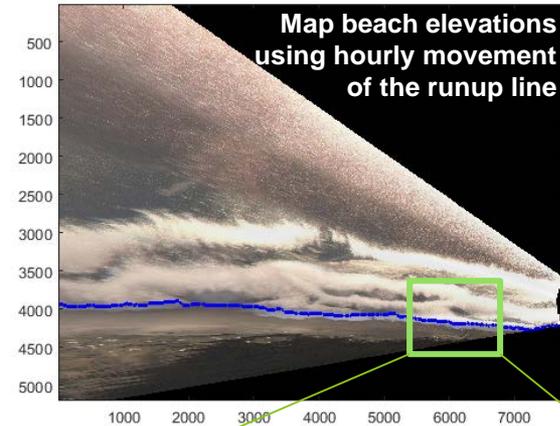
- Identified Cloud Service Provider: Microsoft Azure
 - Storage acquisition via SAM underway
- Implementing framework for OSU→ERDC→Azure dataflow
- Initiated CID data format conversion (.mat →netCDF)
 - ERDC, Argus + CIRN Collaboration
- Identified District desired EI; begun developing automated CID analysis + EI generation algorithms
 - Image quality issues identified and assessed

Expected Deliverables

- CID derived EI for sediment mobility analysis and RSM practices adjacent to the CRM (eg Shoreline Position).
- Web-Based, real-time access to netCDF CID + EI
- Tech Notes: 1) CID derived EI; 2) Web-tool development

Lessons Learned

- Differing weather & shore parallel imagery provides new analysis considerations



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What challenges did you face to get your project to implementation and how did you move past them?

Delayed Project Funds

- Accelerating efforts for second half of FY18

Data Collection Contracting Complications

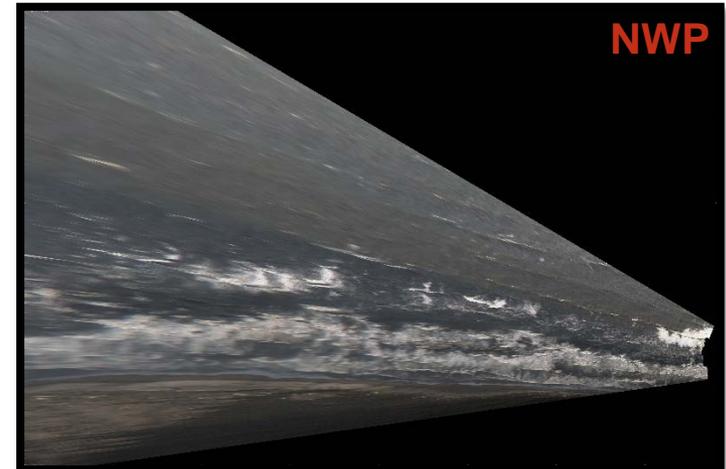
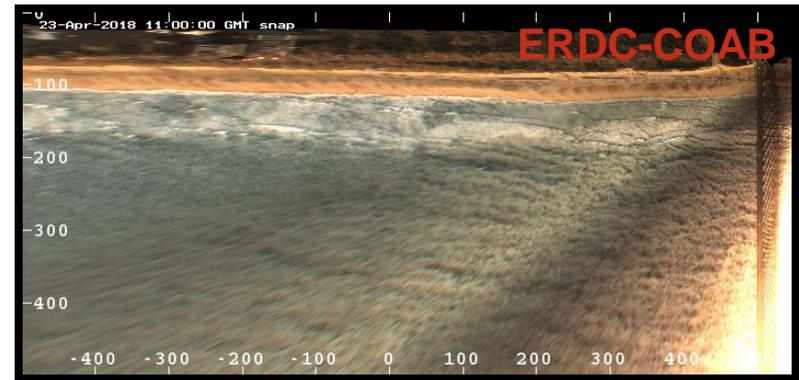
- Traveling to NWP and OSU in July FY18 to identify data quality issues and solutions

CID Quality

- **Weather**
 - Developing automated CID quality assessments (fog, exposure)
- **Field of View**
 - Developing image stabilization techniques
 - Assessing accuracy of original georectification with OSU

CID Accessibility

- Developing documentation to connect to Argus DataBase



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for Improved Regional Sediment Management**



How is this project benefiting the USACE and Nation?

- **Improved understanding of regional sediment dynamics for NWP as well as other districts employing video imagery techniques.**
 - Development of automated tools facilitates access and application of this data, its analysis, and associated implementation
- **Supporting more informed management of MCR dredging placement sites, which require frequent monitoring**
 - Reduces need for in situ surveys (e.g. 20-30K per survey) as well as complicated numerical model runs
 - MCR supports more than \$20B in commerce and requires up to 4 MCY of dredging from federal channel