



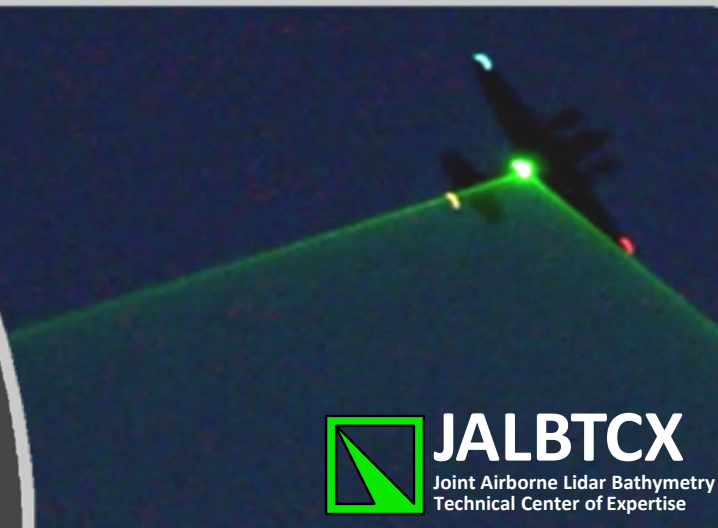
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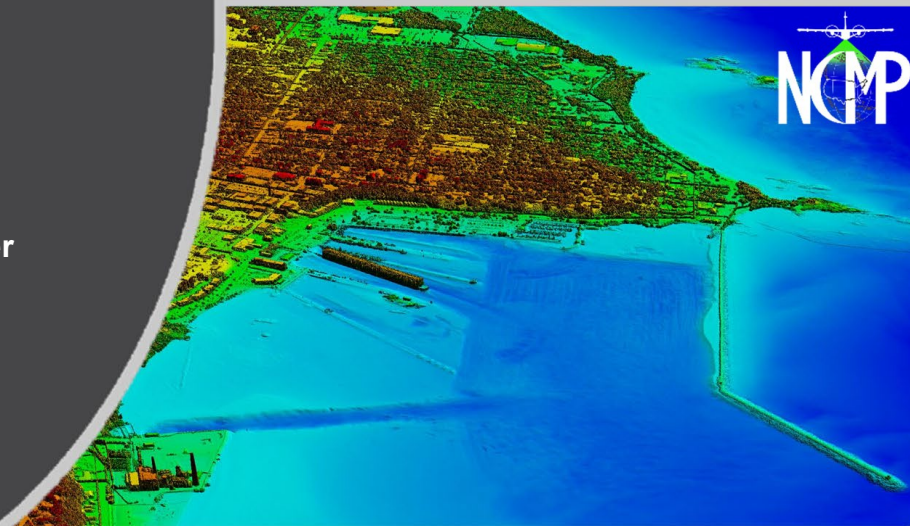
Jennifer M. Wozencraft

- Joint Airborne Lidar Bathymetry Technical Center of Expertise Director
- US Army Corps of Engineers National Coastal Mapping Program Manager
- Coastal and Hydraulics Laboratory, US Army Engineer Research and Development Center

3rd Alaska Coastal Mapping Summit
09 December 2020



 **JALBTCX**
Joint Airborne Lidar Bathymetry
Technical Center of Expertise



 **NCP**



US Army Corps
of Engineers

 **ERDC**
ENGINEER RESEARCH & DEVELOPMENT CENTER

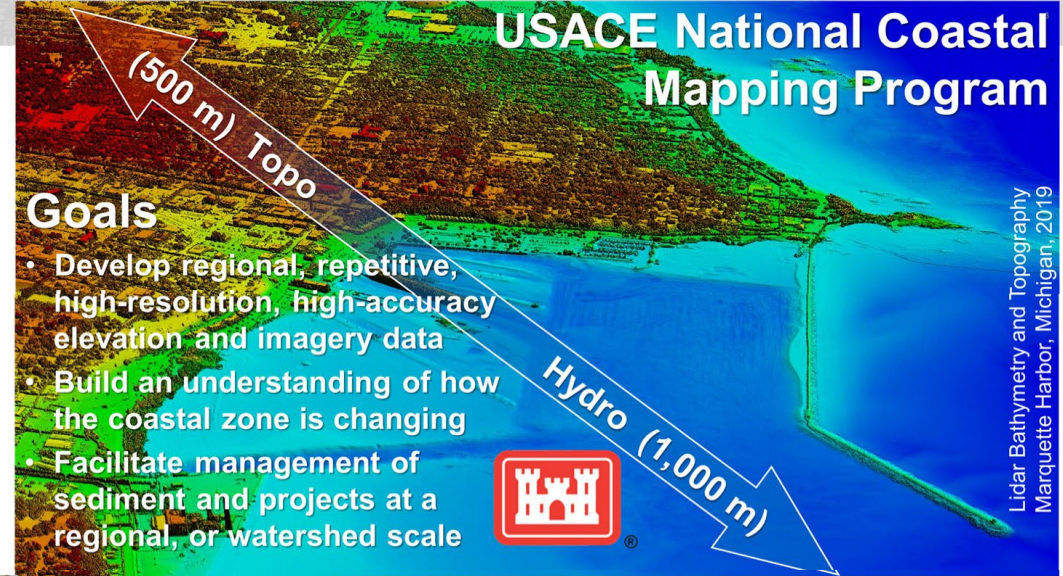
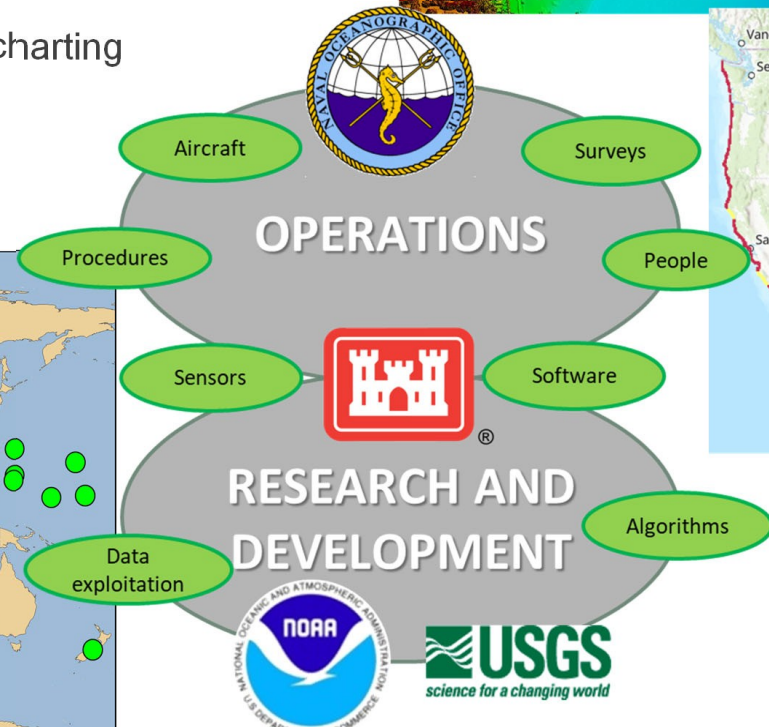


Joint Airborne Lidar Bathymetry Technical Center of Expertise

Mission: Operations and R&D in airborne lidar bathymetry and complementary tech for airborne coastal mapping and charting

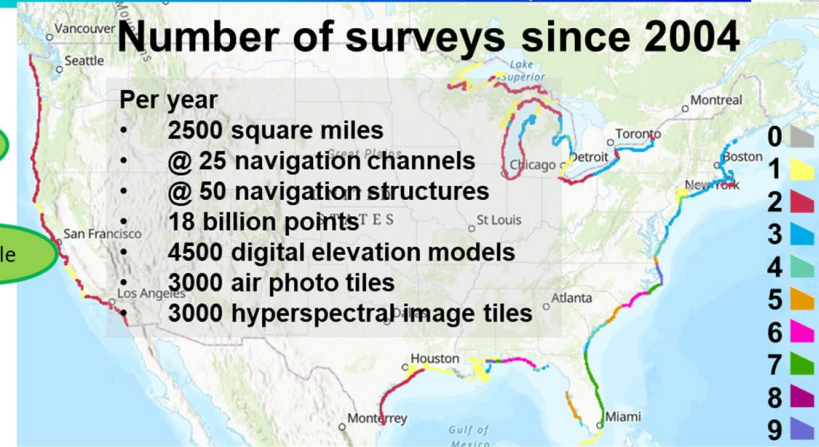
- 22-year collaboration among USACE, Navy, NOAA, & USGS
- Government, industry, and academia partner to advance technology and its application to coastal challenges
- Developed 3 three generations of coastal mapping and charting sensors to meet the needs of the partner agencies
- USACE- and Navy-owned sensors are operated year-round & world-wide

Naval Oceanographic Office (NAVOCEANO) Airborne Coastal Surveys



Goals

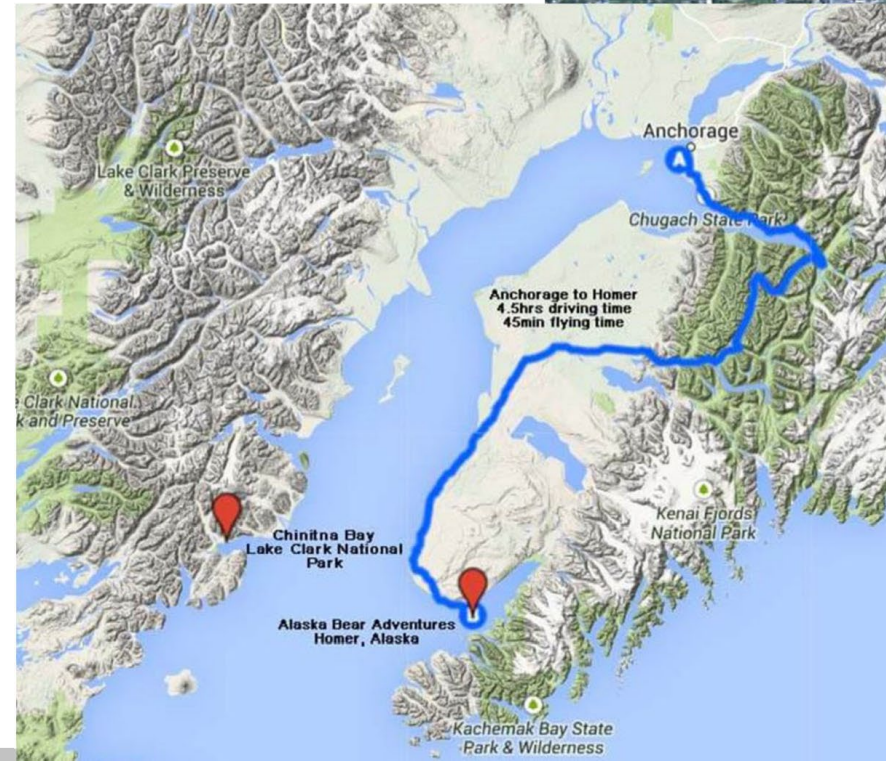
- Develop regional, repetitive, high-resolution, high-accuracy elevation and imagery data
- Build an understanding of how the coastal zone is changing
- Facilitate management of sediment and projects at a regional, or watershed scale





2018 JALBTCX Pilot Project

- Site Selection—Homer Spit, 200 miles south of Anchorage
 - Requirements for the test were developed based on discussions during the Alaska Coastal Mapping Summit
 - Broad interest by a number of federal and state agencies
 - e.g. USACE maintains navigation channels and erosion protection structures for the harbor and 4.5 mi long gravel spit
 - Resource management
 - Data to support harbor expansion
 - “The halibut fishing capital of the world”
 - Alaska’s eco and adventure tourism capital

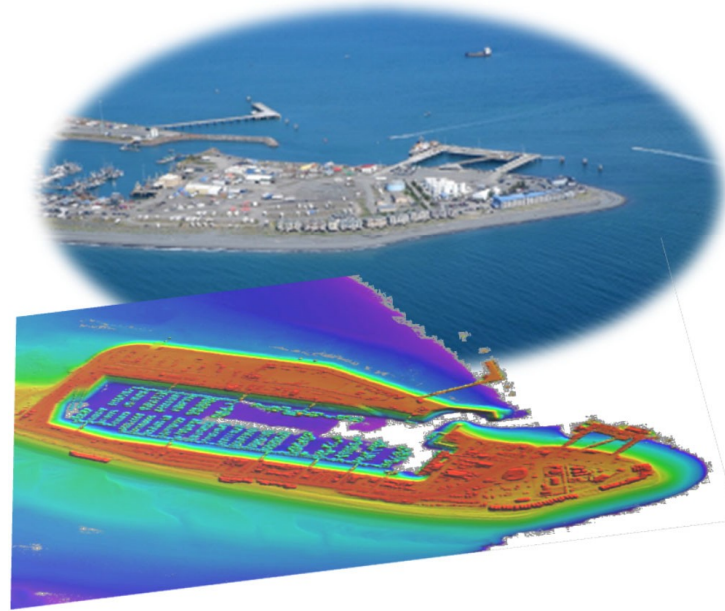




2018 Pilot Project

The flights

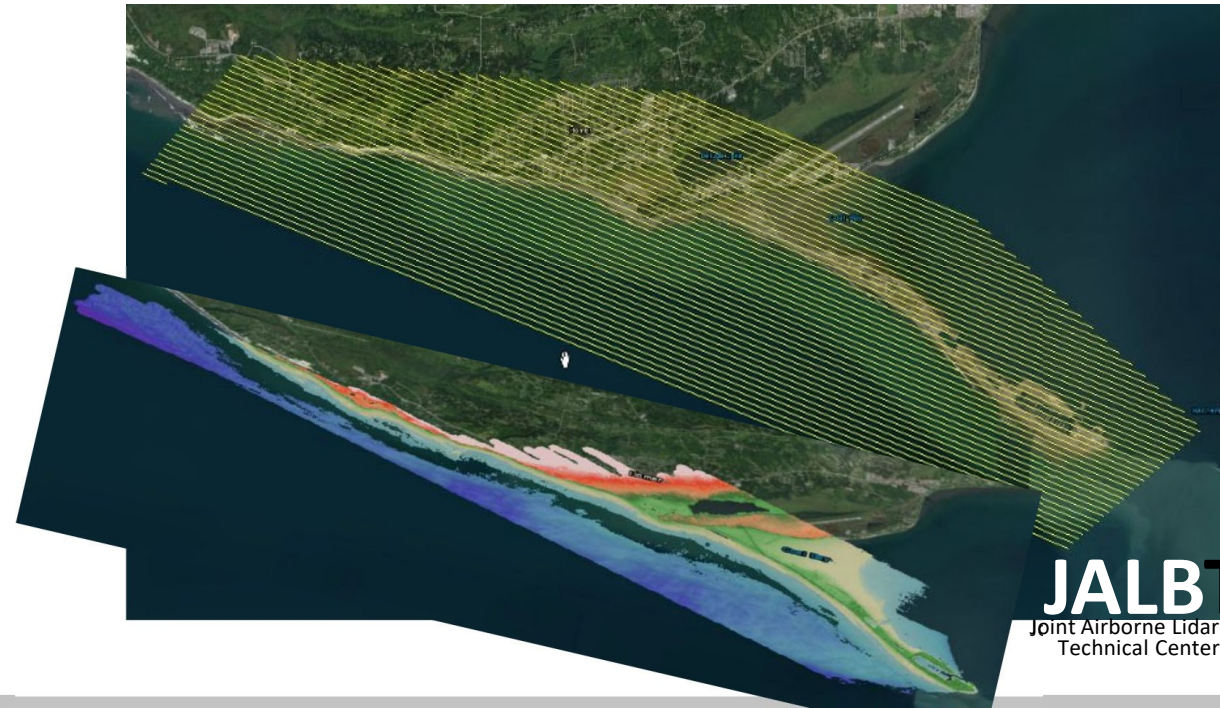
- Data was acquired over three survey days
- 10 –12 June 2018
- 14 Flight Hours
- 47 flight lines
- 53 square kilometers
- Multiple tide windows and wind directions
 - twice at high tide, once at low tide in early morning with low wind
- Depths to ~19 meters
- Submerged aquatic vegetation and sediment layers



Standard data products



- Point Data
 - LAS Files – Unclassified (1), Ground (2), Bathy (29), Potential Submerged Vegetation (23)
 - Ellipsoid Referenced (NAD83, NAD83)
 - Orthometric Referenced (NAD83, xGeoid17/18)
- DEMs
 - Digital Surface Models (NAD83, NAVD88)
 - Digital Terrain Models (NAD83, NAVD88)
- RGB Imagery
 - 5cm GSD GeoTiffs (NAD83)
- Hyperspectral
 - 1m GSD and 48 Band
- All tiled using MGRS and metadata in XML format



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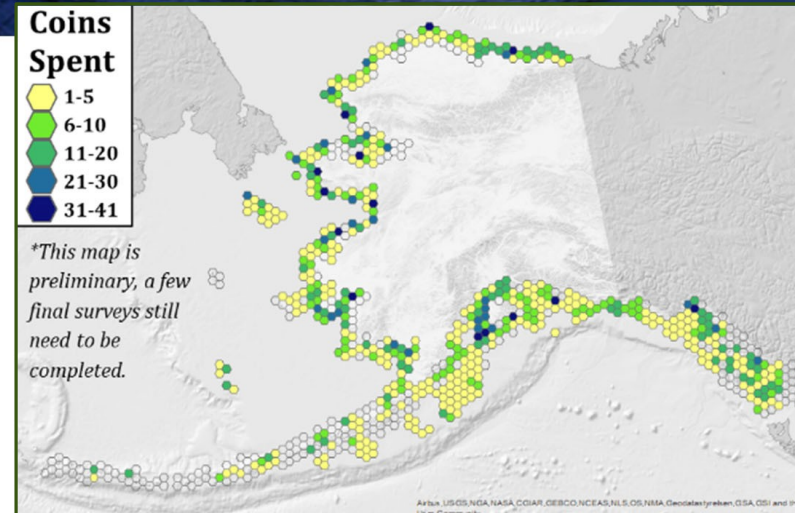




2019 JALBTCX NCMP Topo/Bathy Operations



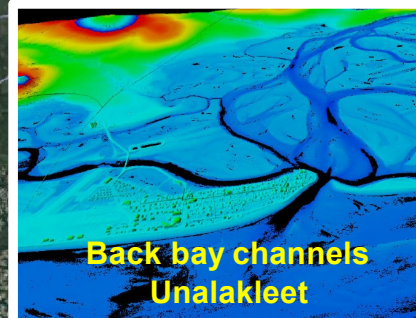
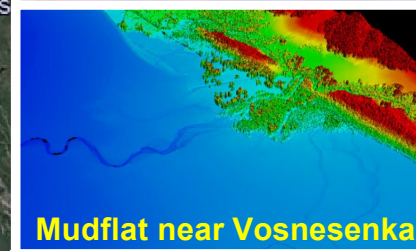
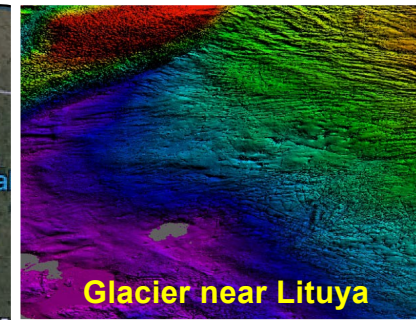
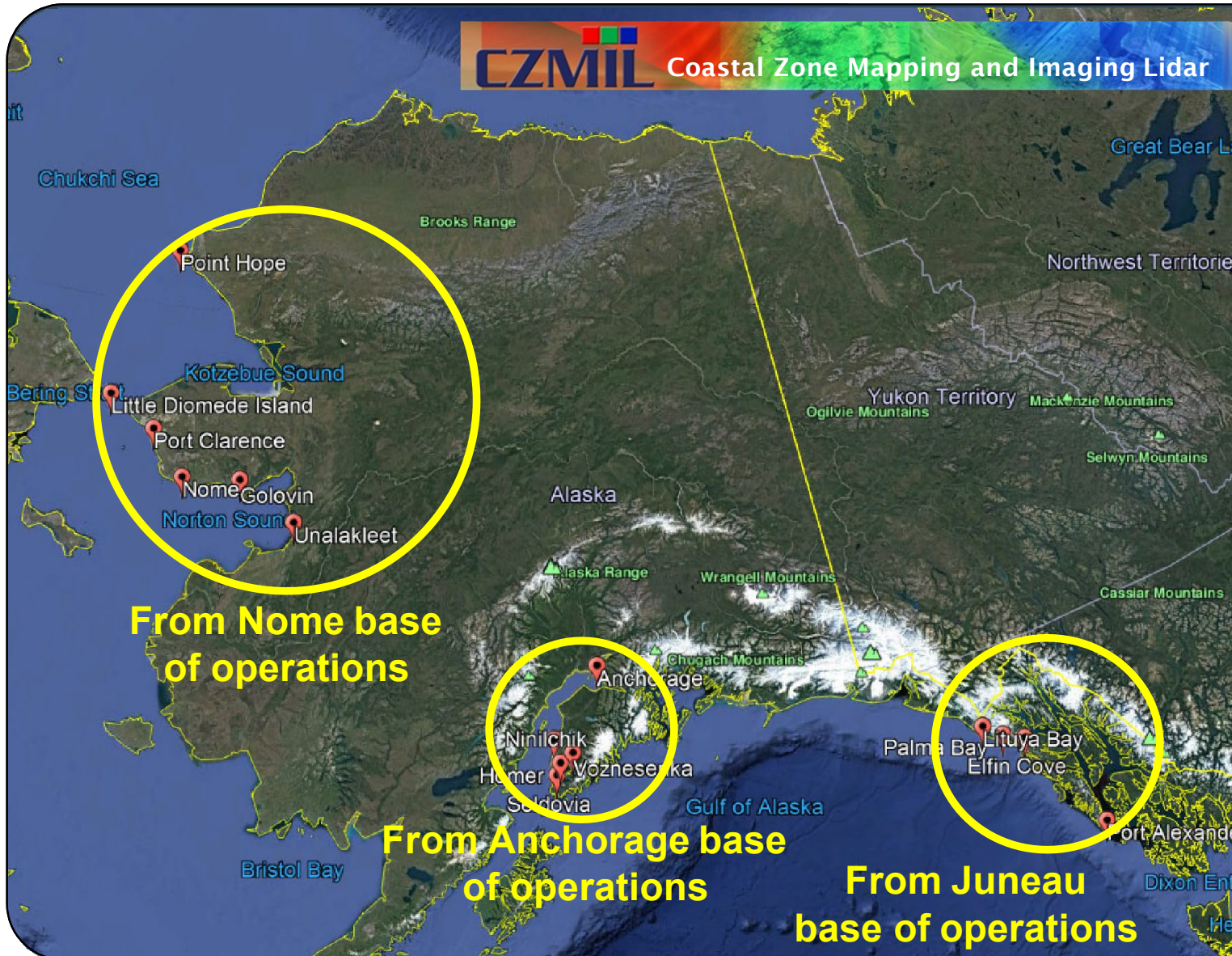
- Areas of interest identified in collaboration with US Army Corps of Engineers Alaska District and AK Coastal Mapping Prioritization
- Applications are numerous
 - Navigation
 - Coastal erosion
 - Coastal storm flood modeling
 - Tsunami modeling
 - Geologic fault
- Target areas identified based on priority and likelihood of success
- To demonstrate
 - Multiple sites provide operational flexibility to accommodate constantly changing weather and water conditions
 - Capability of long-range aircraft to survey geographically separated targets efficiently
 - Capability of high-power, low noise bathy lidar system to collect bathymetry in challenging water conditions
 - Agencies sharing deployed asset for cost savings*



- ⊙ Tsunami modeling
- Coastal storm modeling



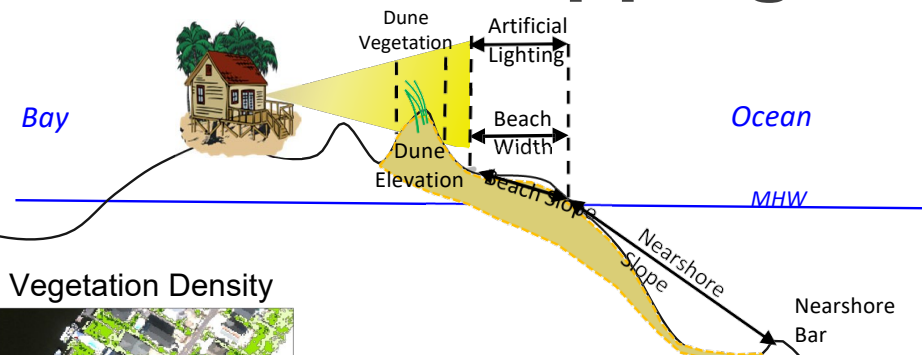
2019 JALBTCX Topo/Bathy Operations



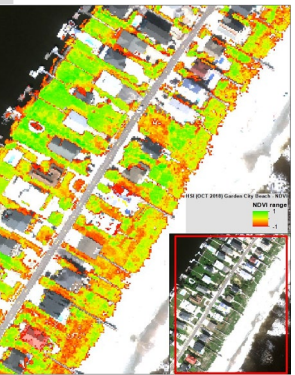
- Utilized NAVO return transit from INDOPACOM
- July 4 – July 29
- 13 Flight days between 9 July and 27 July
- 18 Flights
- 100 Engine Hours
- 54 Survey Hours
- 40 Transit Hours
- ~ 1/3 of days impacted by Weather
- Delivered Data on 17 Dec to USACE, DGGG, and NPS

National Coastal Mapping Program Products and Tools

Coastal Metrics



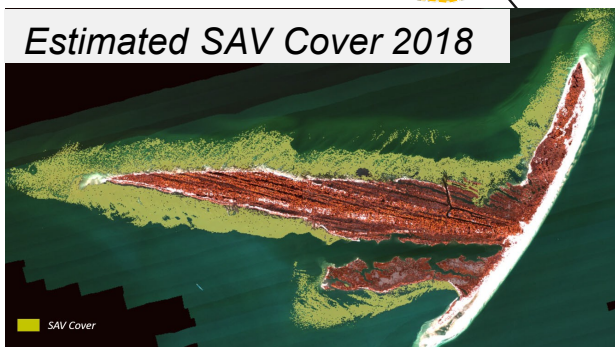
Normalized Difference Vegetation Index



Vegetation Density



Estimated SAV Cover 2018



NCMP data publicly available:

JALBTCX Services REST Endpoint
<https://arcgis.usacegis.com/arcgis/rest/services/JALBTCX>

DIGITAL COAST
<https://coast.noaa.gov/dataviewer/>



<https://griduc.rsgis.erdc.dren.mil/griduc>

How USACE uses NCMP data:

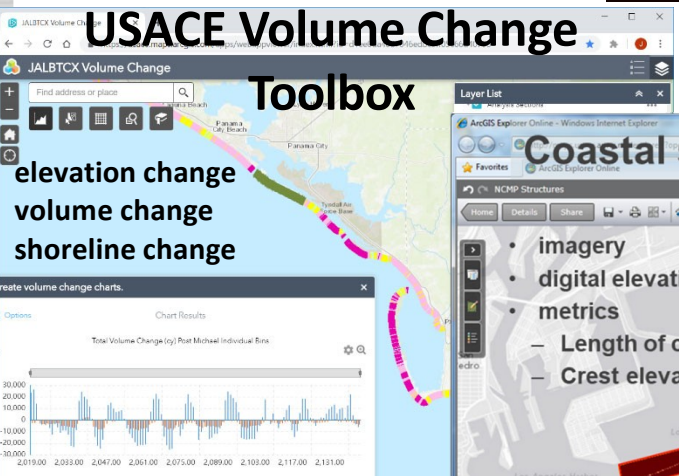
- Regional context for project and sediment management
- Regional sediment budgets
 - Integration with RSM-SBAS (Sediment Budget Analysis System)
- Coastal structure asset management
 - Measure and monitor coastal infrastructure
 - Coastal structure physical condition assessment
 - Data for modeling functional performance
- Quantify capacity of upland dredge placement sites
- Navigation channel impacts to adjacent shorelines
- Physical/environmental baseline for operational changes such as channel deepening
- Channel condition assessment in clear water
- Design and monitoring of beneficial use sites and natural and nature-based features

Habitat data for sensitive species like eelgrass, sea turtles, & wetlands

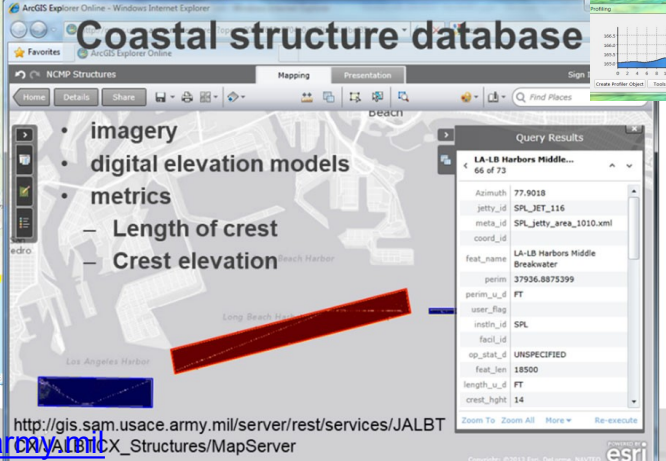
- Emergency response storm impacts
 - Quantify storm impacts to channels and jetties
 - Quantify storm impacts to beaches projects
- Updated bathymetry and topography to drive coastal models

How other agencies use NCMP Data

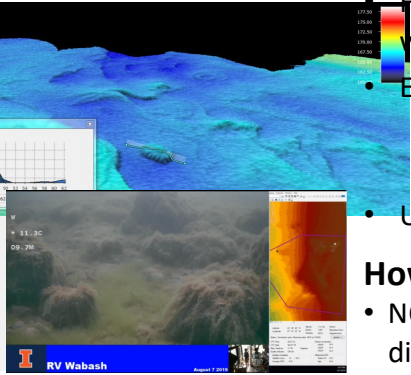
- NOAA—update nautical charts, tsunami modeling, public dissemination (45,000 downloads!)
- USGS—coastal hazard studies, operational storm forecasts, coastal studies, CoNED topo-bathy elevations models
- FEMA—flood hazard mapping, eligibility for public assistance
- NPS—monitor National Parks



<https://usace.maps.arcgis.com/apps/webappviewer/index.html?id=d1ee0da4887046edbc9ff05c66d40708>



Benthic habitat mapping



Questions?

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US Army Corps
of Engineers

Finger Glacier, Glacier Bay National Park, 2019



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