Satellite Imagery for Coastal Mapping

2018 IWG-OCM Alaska Coastal Mapping Summit
Lighting Talk
February 9, 2018

Drew Hopwood
GeoNorth Information Systems (GNIS)

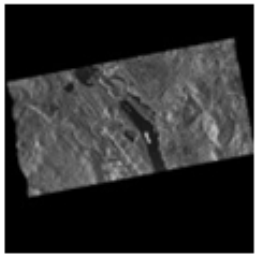
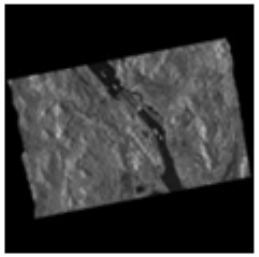
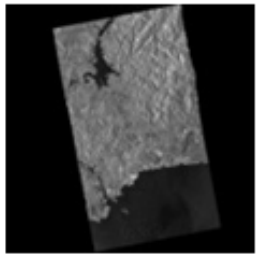
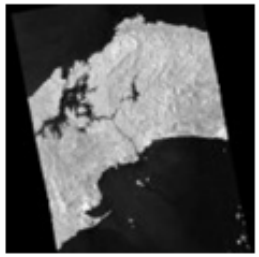
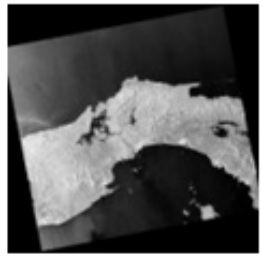
Why Use Satellite Imagery for Coastal Mapping?

- Easy access remote locations
- Regular monitoring and repeat collections
- Year round data collection
- Weather independent
- Broad area collections
- Rapid response (emergencies, storms, etc.)

Synthetic Aperture Radar (SAR)

- Multiple acquisition modes (resolution and coverage)
- All-weather, day/night data acquisition
- Predictable collection scheduling
  - Increased revisits in high latitudes
- Precise & accurate geolocation and measurement
  - TerraSAR-X up to 1m @ CE90

TerraSAR-X Collection Modes

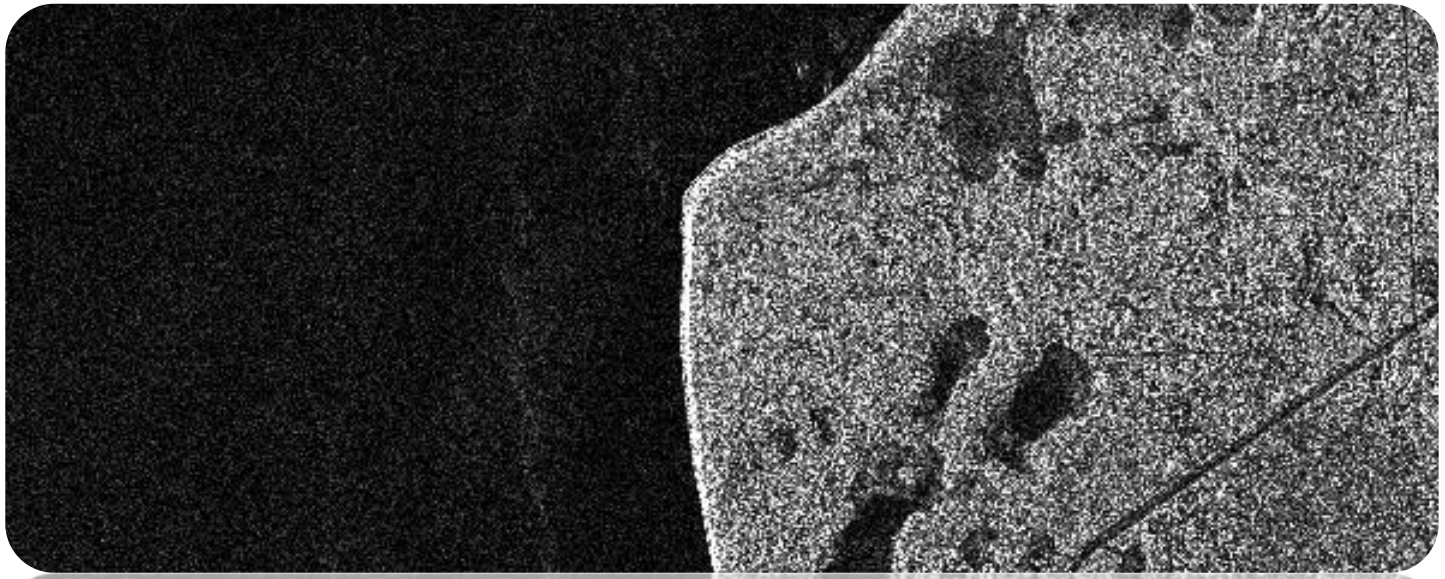
Staring SpotLight	High Resolution SpotLight	StripMap	ScanSAR	Wide ScanSAR
				
Up to 25cm resolution	Up to 1m resolution	Up to 3m resolution	Up to 18.5m resolution	Up to 40m resolution
Scene size depending on incidence angle, for example ~ 4km (width) x 3.7km (length) at 60°	Scene size 5 to 10km (width) x 5km (length)	Scene size 30km (width) x 50km (length*)	Scene size 100km (width) x 150km (length*)	Scene size up to 270km (width) x 200km (length**)
Identification of objects	Recognition of objects (airplanes, hangars, vessels)	Detection & classification and monitoring of vessels and infrastructure Large scale mapping	Detailed maritime monitoring & detection Small scale mapping	Large area maritime monitoring of ship traffic, oil spills, sea ice

*StripMap and ScanSAR: acquisition length extendable to 1,650 km

**Wide ScanSAR: acquisition length extendable to 1,500 km

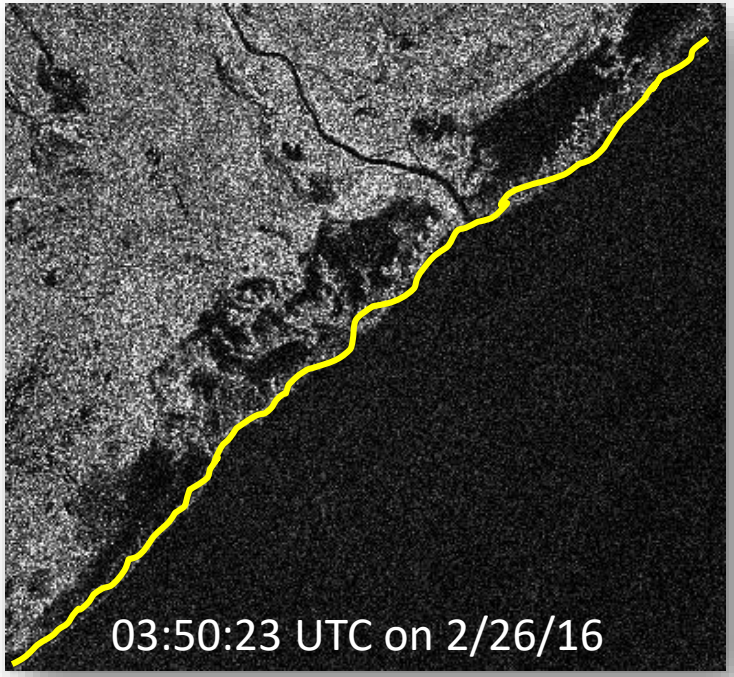
Using SAR for Coastal Mapping

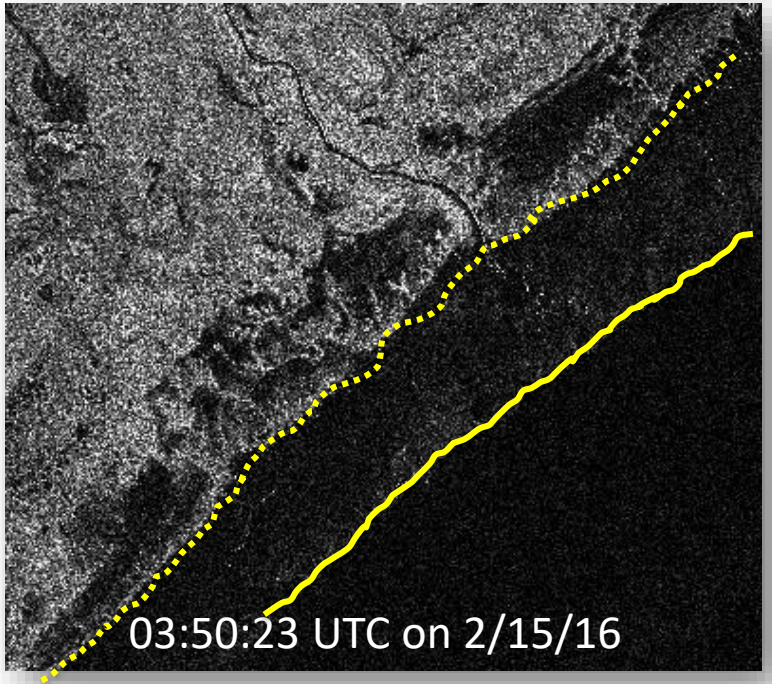
- Land/Water boundary identifiable
  - Automation is possible
- Precise & accurate geolocation and measurement
  - TerraSAR-X up to 1m (w/o GCPs)
- All season monitoring, emergency/event response



Using SAR for Coastal Mapping

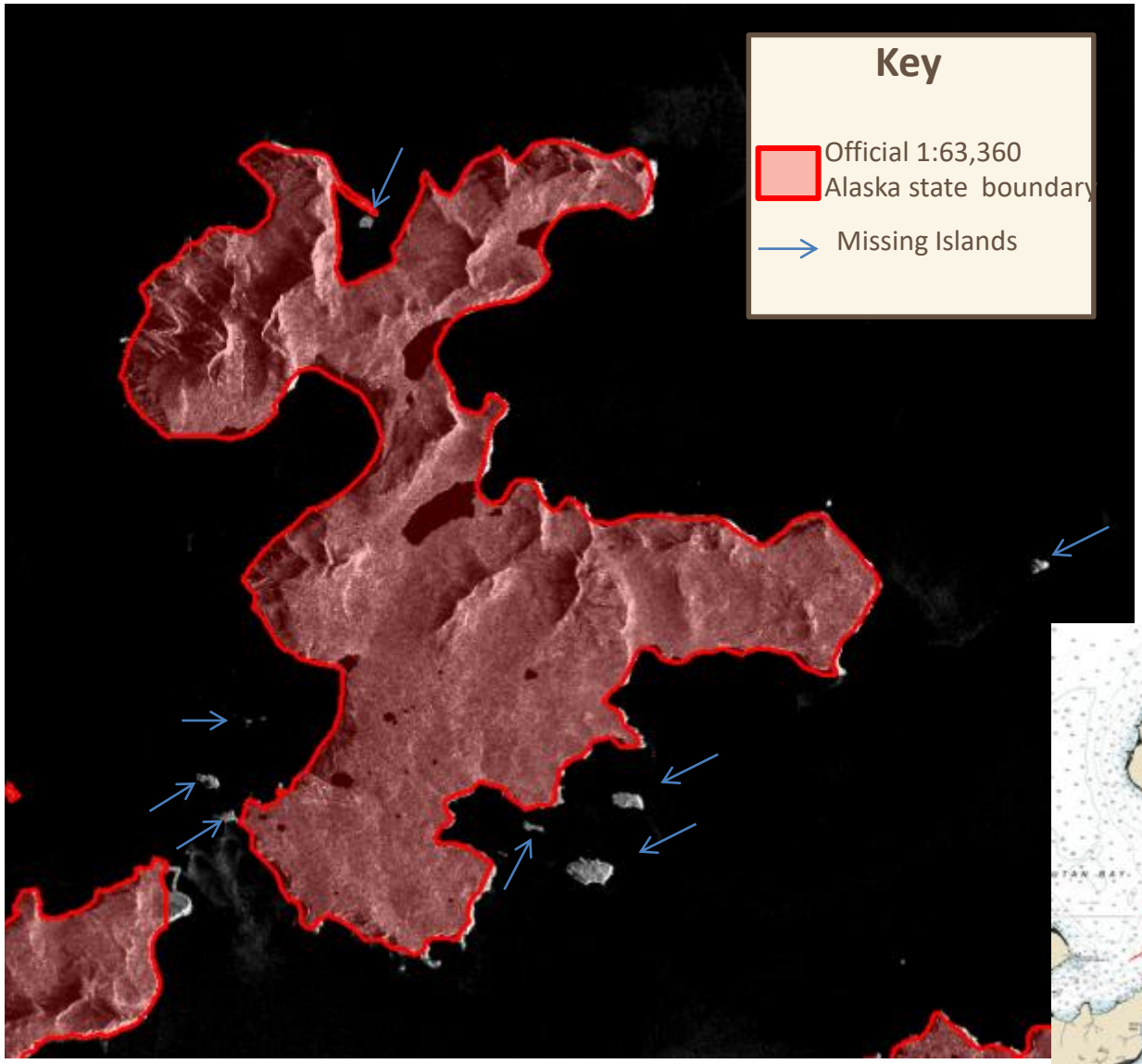
- Weather independence allows collection scheduling
  - Enabling tide coordinated collections
  - Aiding field work coordination
  - Guaranteed collections to meet project timelines





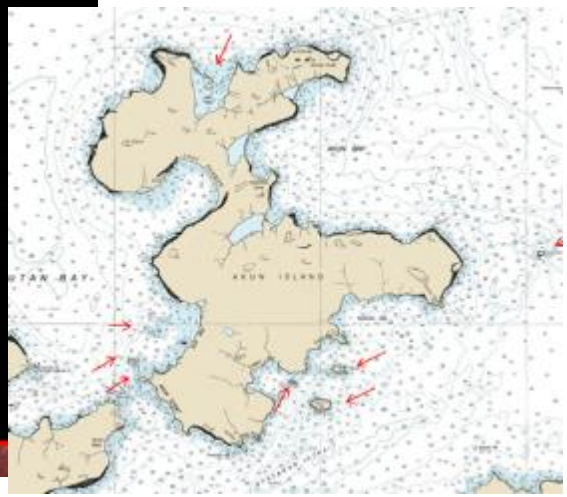
* Shoreline was traced in PPT to illustrate tidal impact on shoreline

Coastline Example



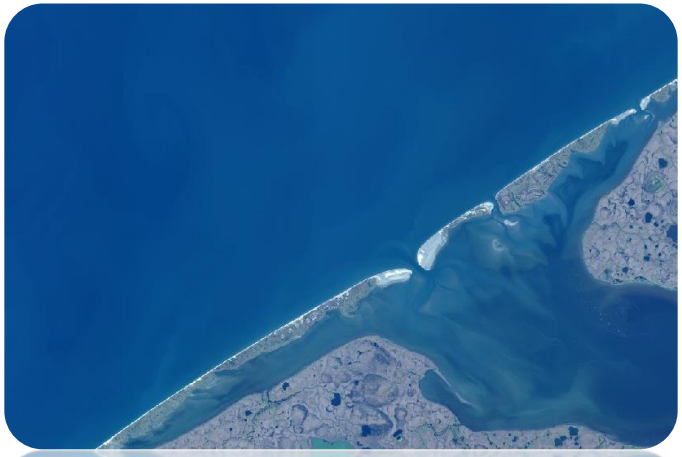
Akun Island

Several islands are missing from the 1:63k state boundary file

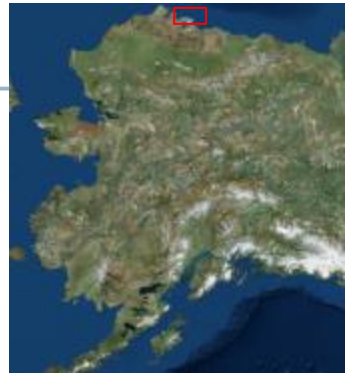


EO Advantages for Coastal Mapping

- Land/Water boundary identifiable using NIR band
- Collection of Stereo imagery
- Sub-surface capability for near shore bathymetric mapping
  - Subject to multiple environmental factors
- Source for land classification



North Slope Coastline



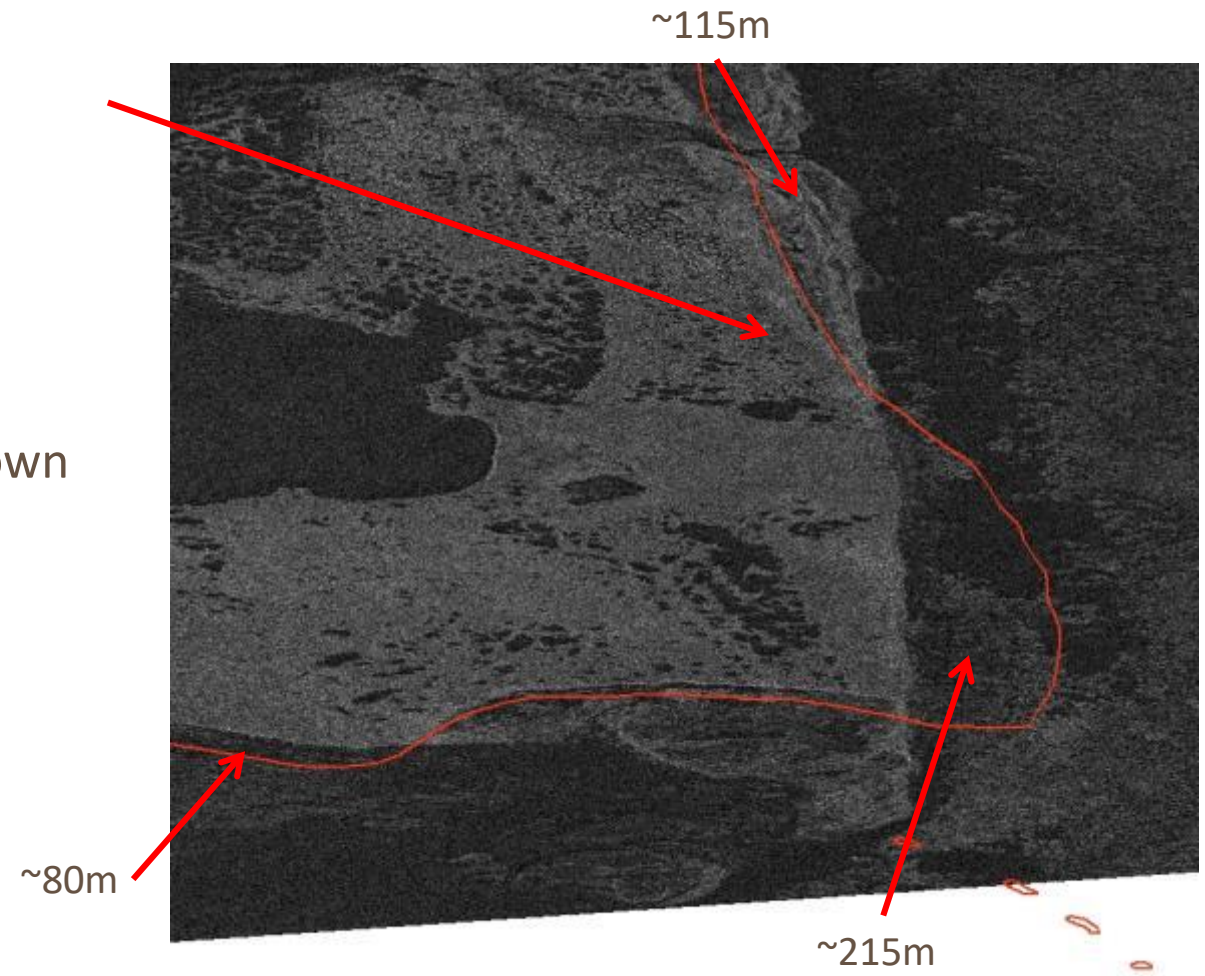
ENC Coastline – Chart US5AK9LM
- Scale – 1:48,767
- Edition 1.0
- Published – February 2012

Landsat – Date Unknown

SDMI SPOT 5 – Date Unknown

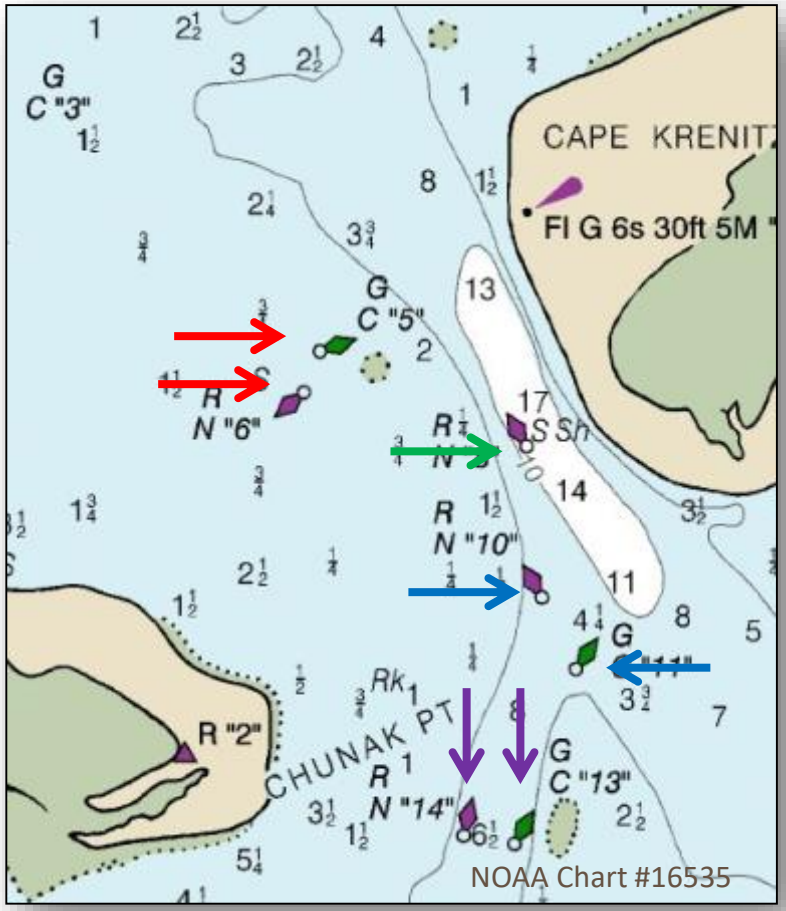
Pleiades – July 2013

TerraSAR-X – June 2014
- High Resolution Mode
- VV Polarization

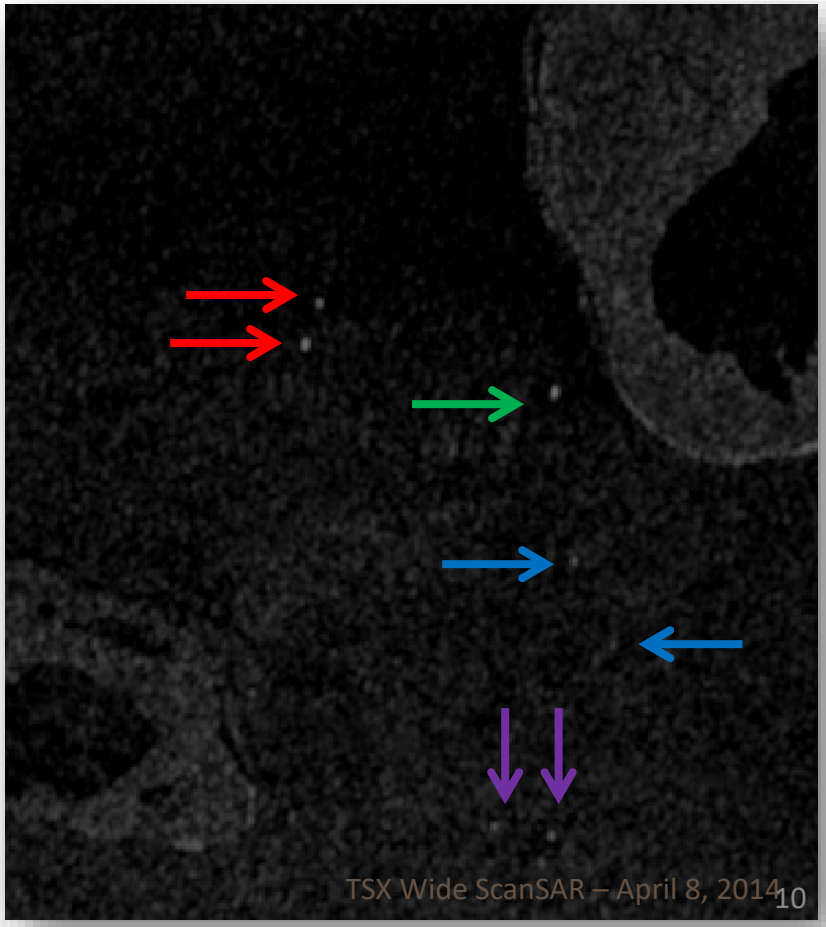


Using SAR for Monitoring Aids to Navigation

Bechevin Bay, Alaska
Locations known within 1 meters



NOAA Chart #16535


TSX Wide ScanSAR – April 8, 2014

Access to GNIS Services

- GNIS prime contract with Army Geospatial Center (AGC) – Imagery Office (IO)
  - Available to any USACE user
  - Includes both SAR & EO products, value-added products, DEMs, etc…
  - Responsive data collection, processing and delivery

Other Government-Wide Acquisition Contracts (GWACs)

- GSA Schedule 70: Schedule# GS-35F-0119Y
  - Term: December 20, 2011- December 19, 2021
- NASA SEWP: Schedule # NNG15SC03B (small) or NNG15SC27B (other than small)
  - *Term: May 1, 2015 - April 30, 2020*

About GNIS

- Founded in 1999
- Alaska Native-Owned Corporation (ANC) and SBA-certified 8(a)
  - A wholly-owned subsidiary of The Tatitlek Corporation
- Headquartered in Anchorage; Offices in Denver and Vienna, VA.
- 18 years IT and Geospatial Solutions
- Top Secret Facility Clearance
- Cleared Staff (TS/SCI, TS, Secret)
- USG Clients: AGC, HHS, NOAA, USGS

Questions?

Drew Hopwood
GeoNorth Information Systems (GNIS)

Tel: (907) 646-4529
Email: dhopwood@geonorthis.com