

2017 Arctic Energy summit



Community Ice Cellar and Environmental Initiatives on Alaska's North Slope

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North Slope and Point Thomson background

- Point Thomson Project is located on the North Slope of Alaska, approximately 60 miles west of Kaktovik
- One of ExxonMobil's core values is Protect Tomorrow. Today. and we also support and foster productive relationships between local communities, regulatory agencies and the oil and gas industry



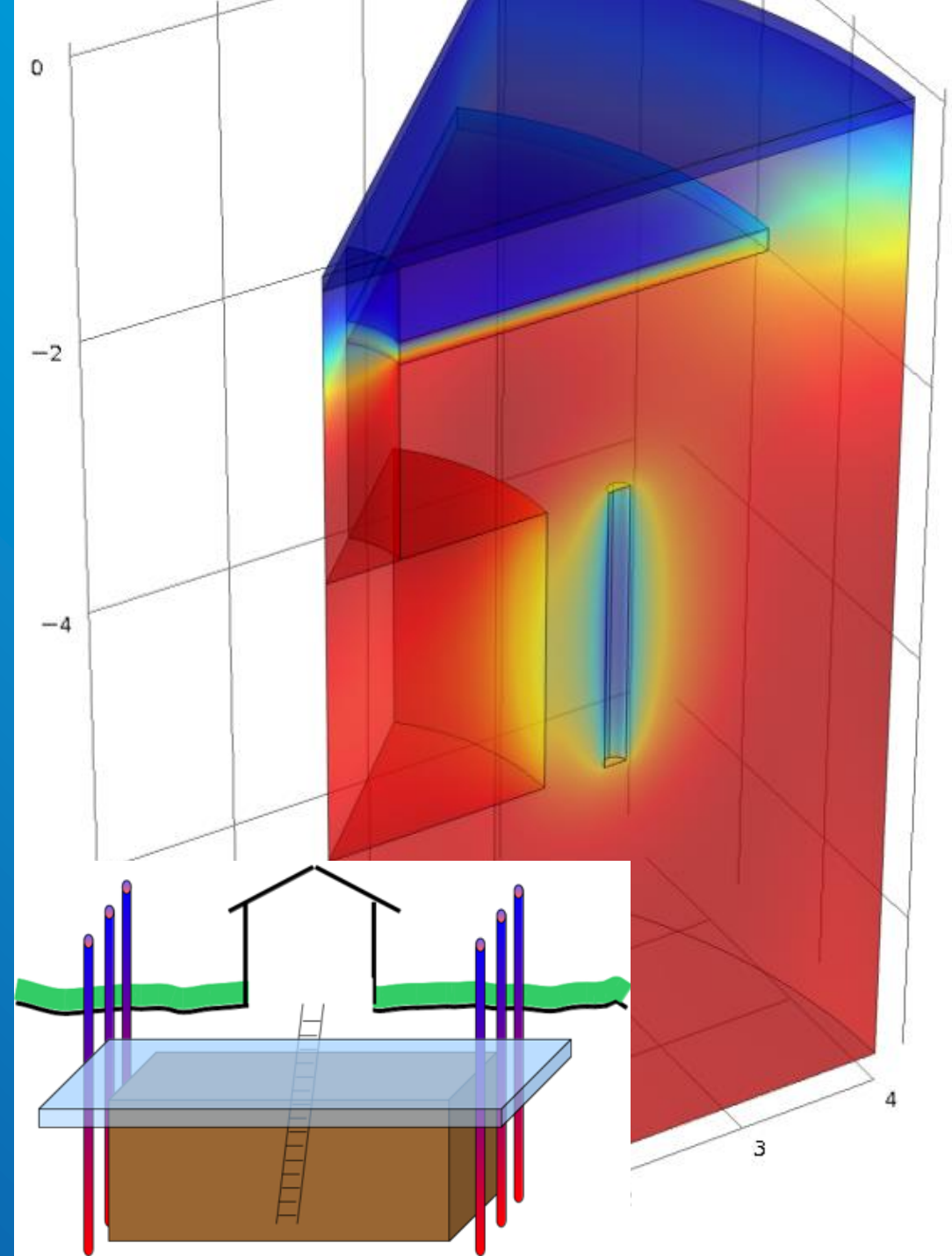
Point Thomson – Winter and Summer

- Remote



Ice Cellar Modeling

- Preservation of Traditional Ice Cellars
- Thermal modeling study
- Zero power, low maintenance
- Engineering solutions



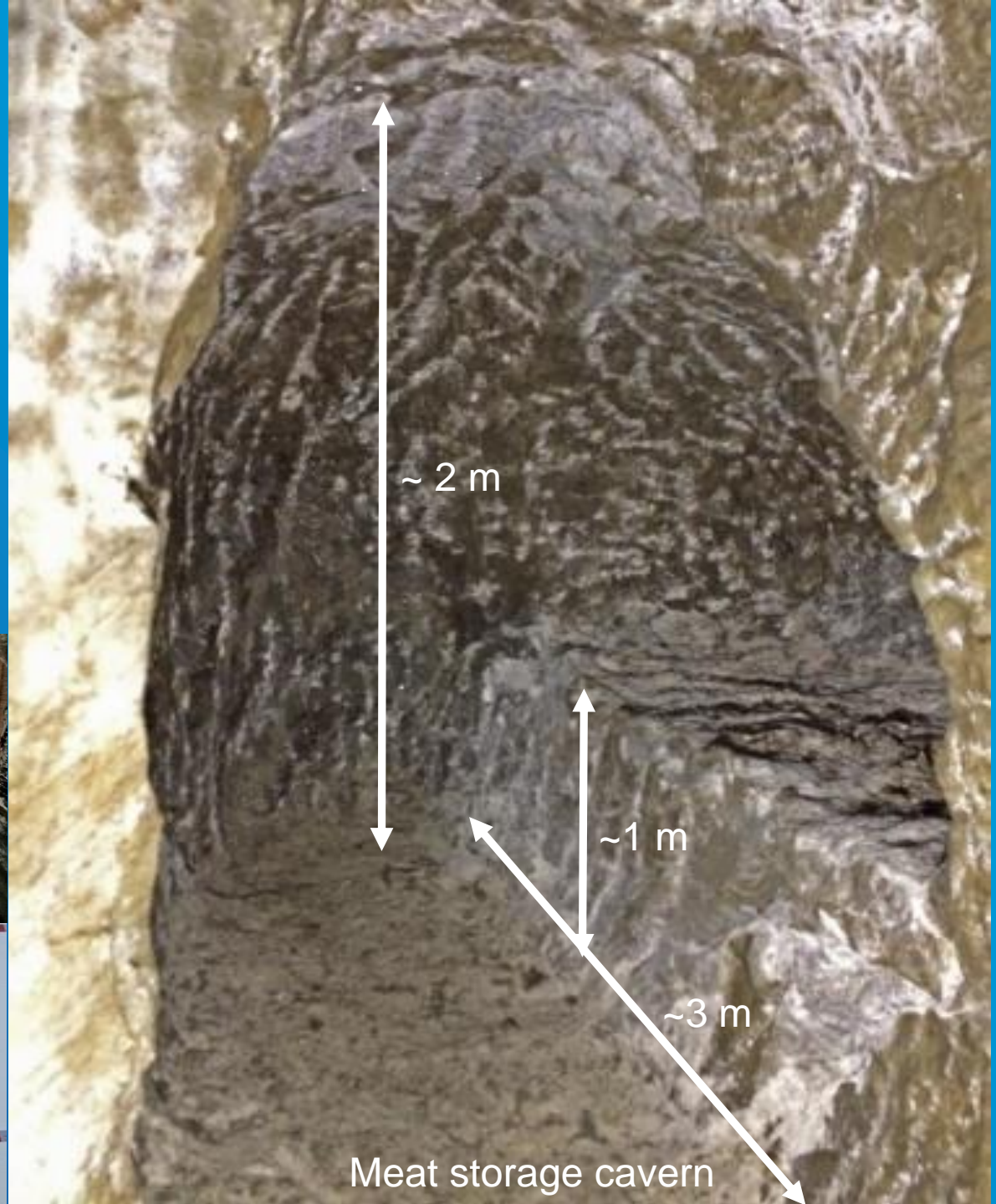
Engineered Community Ice Cellar

- Text and photos courtesy of Kaktovik Community Foundation
 - Founded 2013
 - Tri-lateral Board of Directors
- Ice Cellar Principles
 - Shared storage
 - Off-grid
 - Inupiaq tradition / technology
 - Adaptation and monitoring
 - Shared learnings



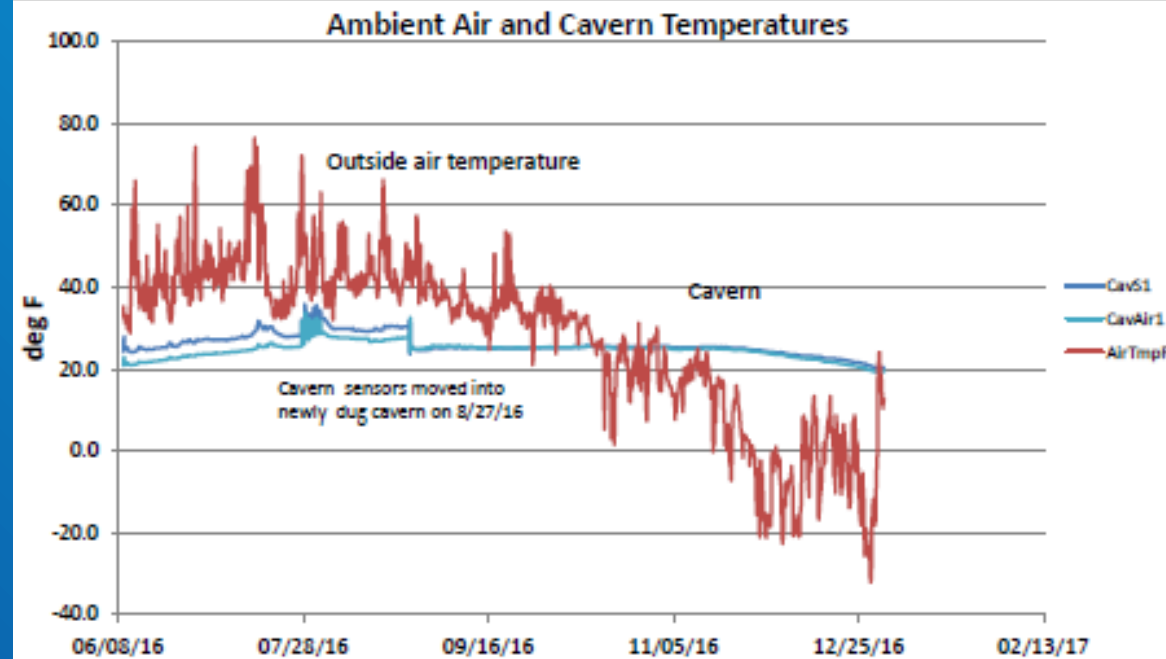
Construction Sequence

- 2013 - Project Planning and Design
- 2014 - Above-ground features
- 2015 - Excavation of entry shaft
- 2016 - Excavation of storage cavern



Monitoring

- Temperature
 - Outdoor air
 - Housing air
 - Soil/Tundra (outside intervals)
 - Cavern (with humidity)
- Battery voltage



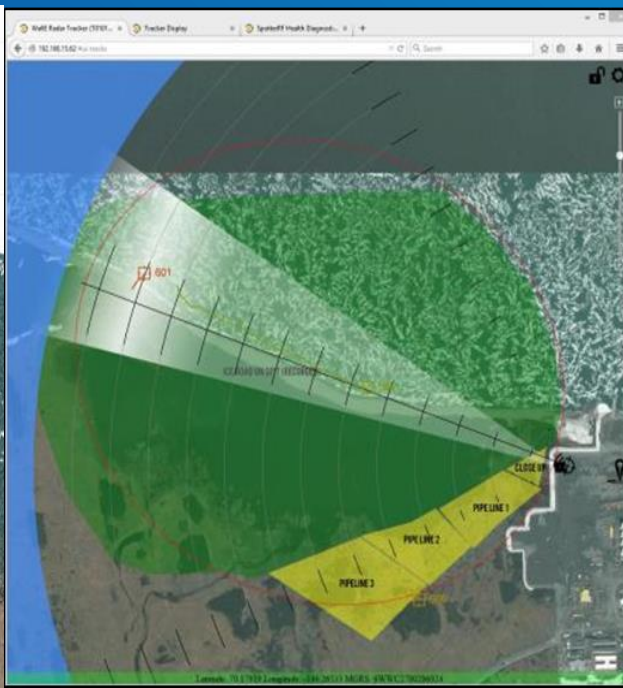
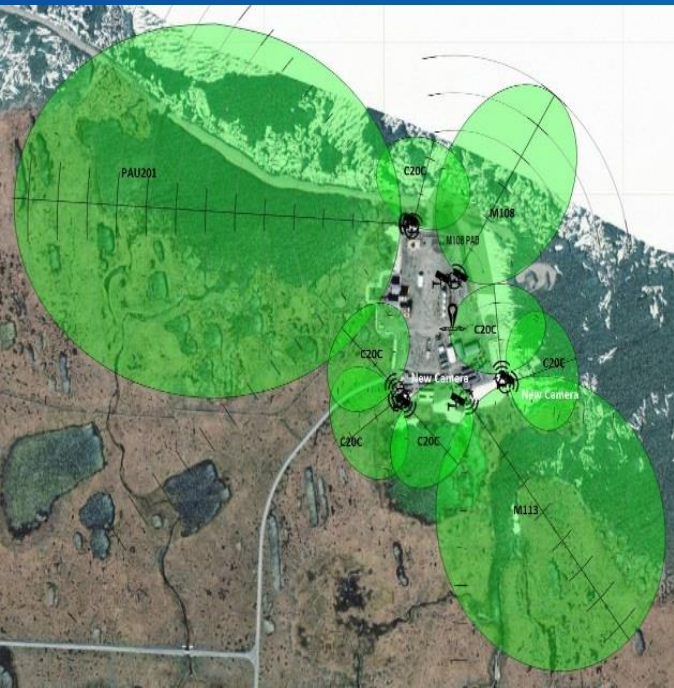
Lessons learned

- Cellar shaft and housing proximity
- Roof slope & Entrance vs. prevailing wind
- Community project vs. captains family
- Water major challenge
- Meat stored off floor
- Public Works personnel and equipment
- Protect tundra
- Site access and elevation
- Rolling beam and hoist
- **Community acceptance**



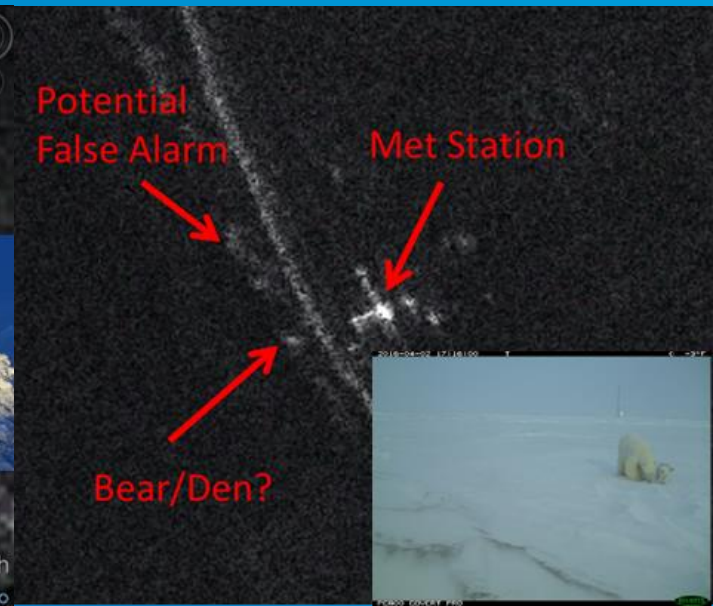
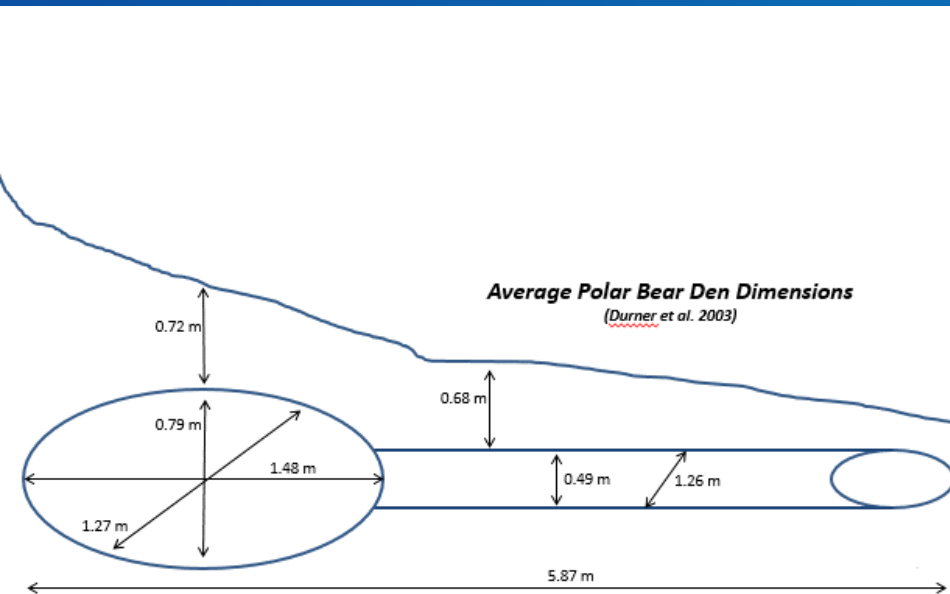
Ground Surveillance Radar

- Early warning system
- Radar panels & visual & thermal cameras
- Coverage expanded in phases



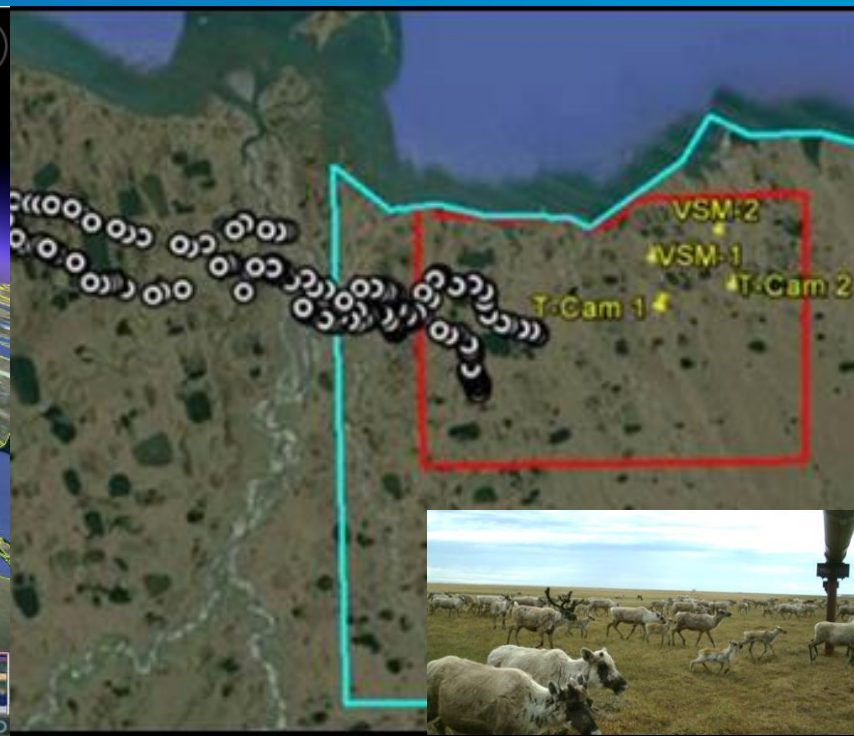
Synthetic Aperture Radar

- Polar bear den detection
- Investigate FLIR alternative
- Less influenced by environmental factors



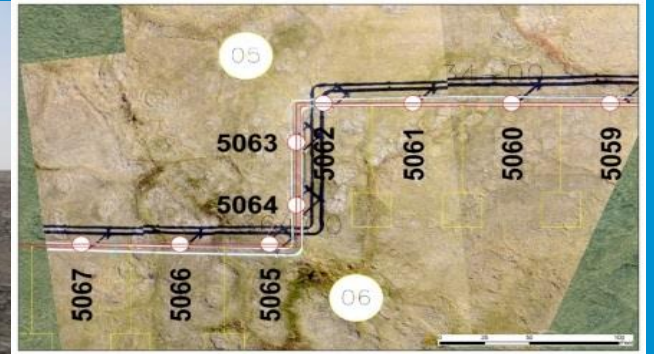
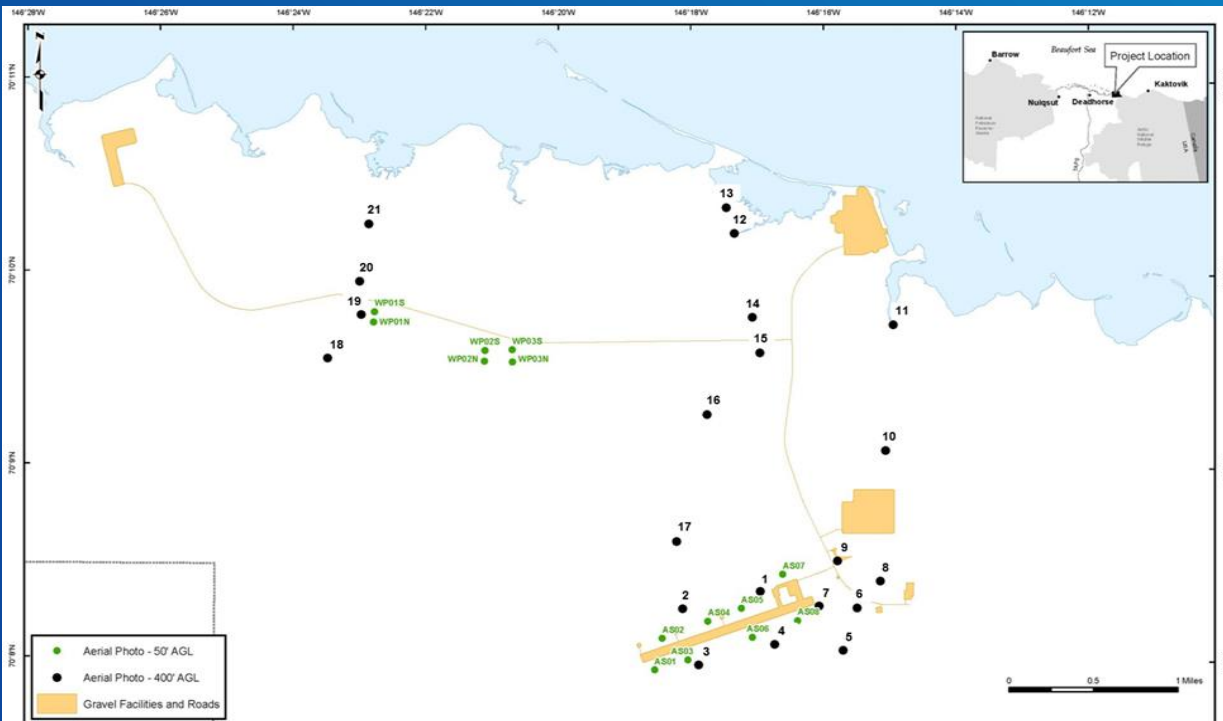
Caribou remote sensing

- Augment aerial surveys
- Multiple platforms assessed
- Collaboration & real-time GPS collar info.



Unmanned Aerial Systems for Environmental Monitoring

- Hydrology and vegetation
- Helicopter alternative
- Also tested pipeline surveillance



Takeaways

- Ground Surveillance Radar (GSR)
 - Synthetic Aperture Radar (SAR)
 - Satellite Remote Sensing (RS)
 - Unmanned Aerial Systems (UAS)
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- Good vehicles for community & agency collaboration & engagement
 - Use pilot study approach
 - Ensure acceptance testing before remote installation
 - Flexibility and adaptability to harsh field
 - Evaluate multiple platforms during pilot phase

Acknowledgements / Thank You / Questions?

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