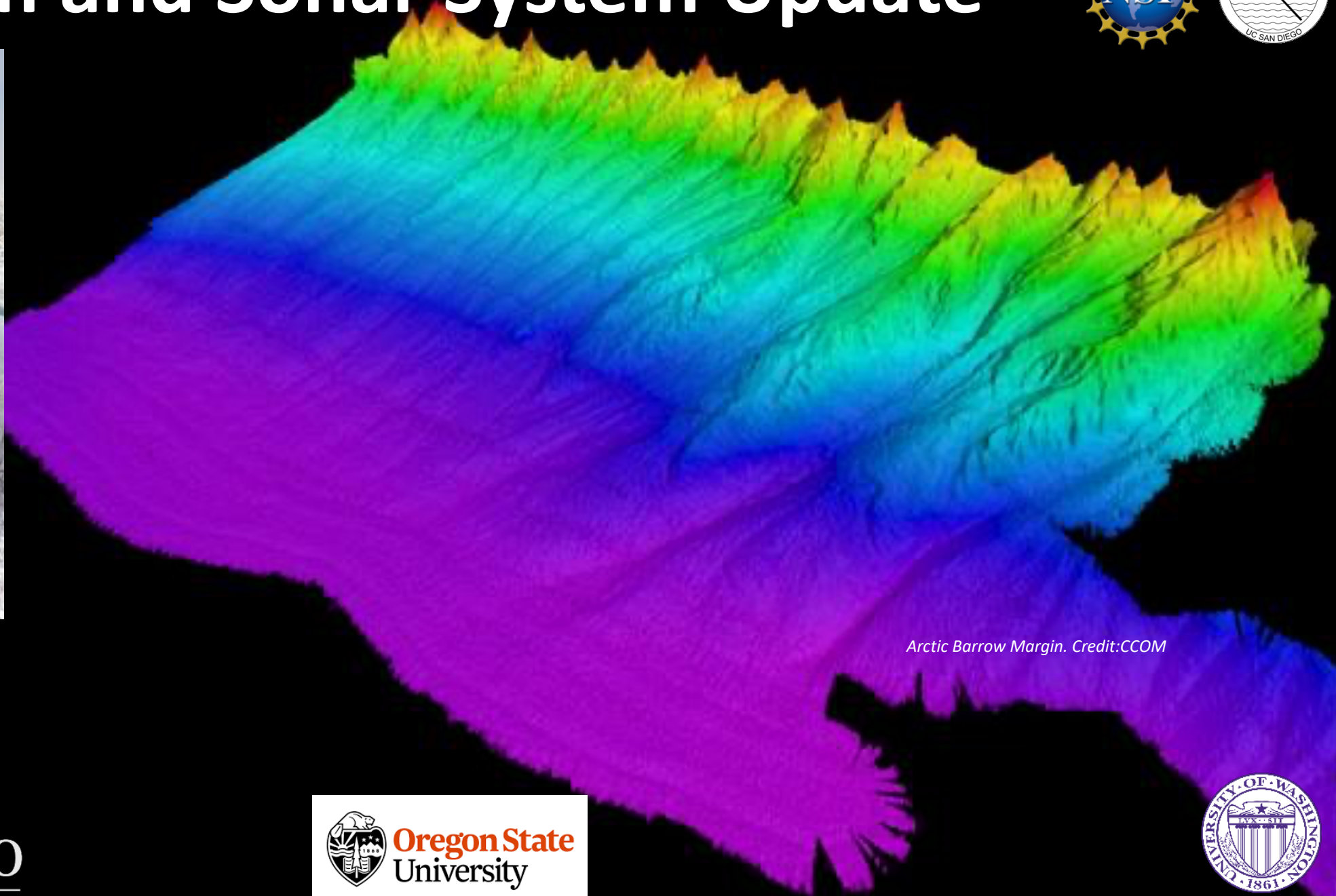


Multibeam and Sonar System Update



USCGC Healy. Credit: Mayer et al., 2016



Arctic Barrow Margin. Credit:CCOM

What kind of multibeam?

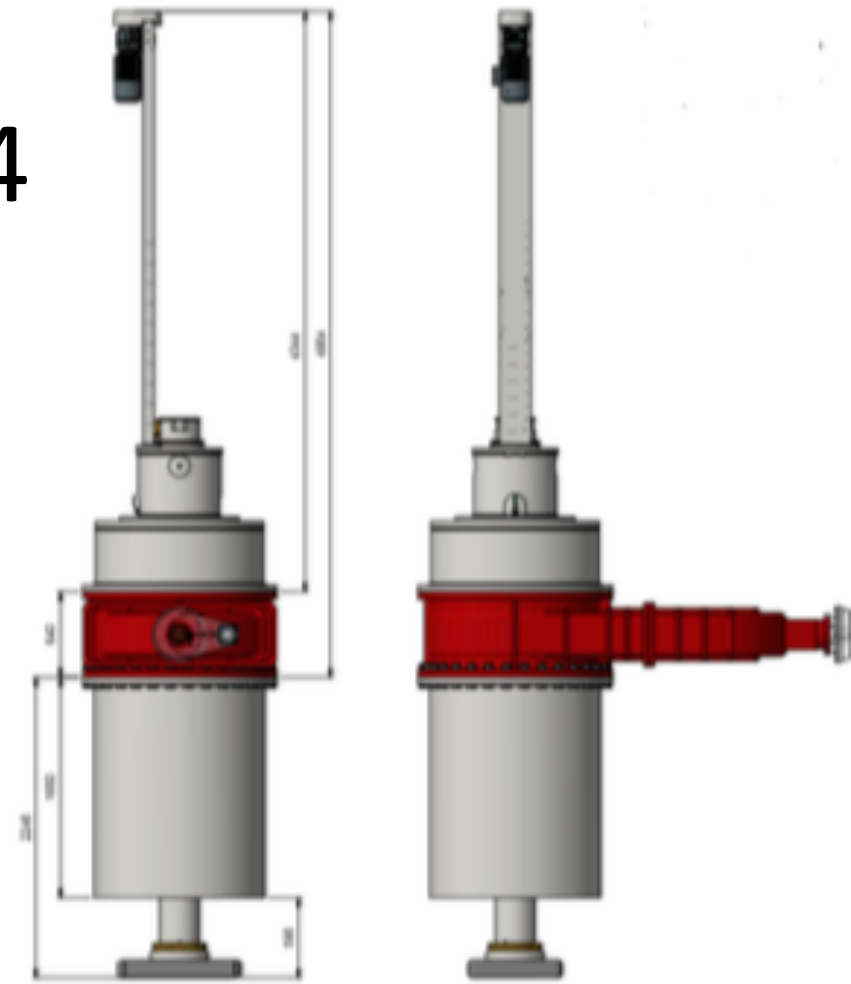
Summary of AICC Input

- There was support for either the Kongsberg EM124 or EM304
- Addition of shallow water, high resolution mapping is desirable
- Addition of EK80 Fisheries Sonar capability is desirable

High Resolution Multibeam Option 1

Option 1: Kongsberg EM712

- Should be paired with an EM124
- 40kHz to 100kHz system
- Requires a retractable hull unit and gate valve
- 2 X 2 degree system
- Maximum swath width: 3250m
- Maximum depth: 3000m

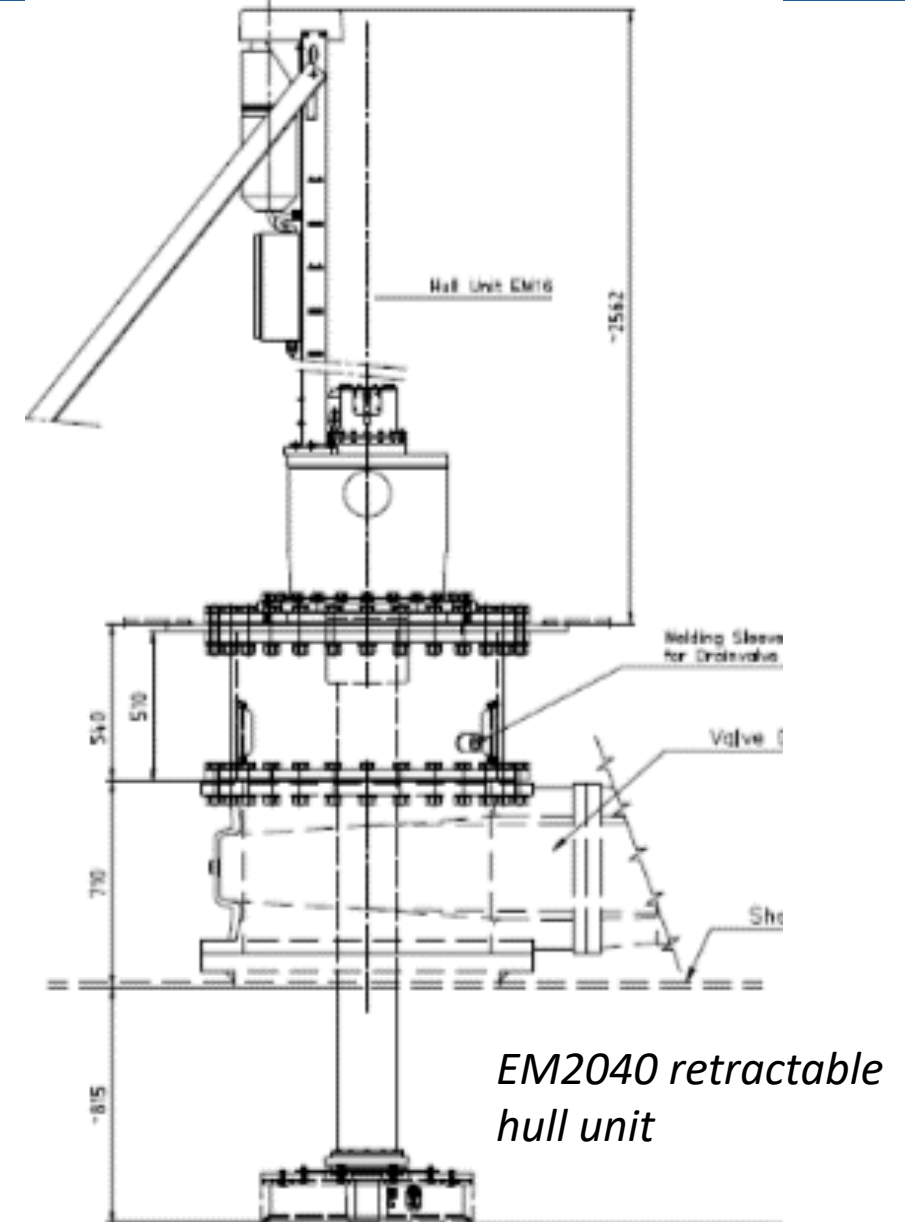


EM712 retractable hull unit

High Resolution Multibeam Option 2

Option 2: Kongsberg EM2040

- Should be paired with EM304
- 200kHz to 700kHz system
- Requires a retractable hull unit and gate valve
- 0.5 X 0.25 degree system
- Maximum swath width: 920m
- Maximum depth: 635m



Decisions Points Multibeam Sonar

1. Upgrade the EM122 to an EM124 ice protected system paired with an EM712 system
 - a. Upgrade to the EM124 1 x 2 system during the 2022 drydock availability
 - b. Add an EM712 2 x 2 degree system, with a retractable hull unit, in 2025 drydock

Decisions Points Multibeam Sonar

2. Upgrade to an EM304 system paired with a EM2040 in 2025 –with EM122 RX replacement as a bridge to ensure quality multibeam data until 2025
 - a. Replace the existing, failing EM122 RX array in 2022 drydock
 - b. Add an EM304 0.5 x 1 degree ice- protected system in 2025 drydock
 - c. Add an EM2040 0.5 x 0.25 degree system (retractable hull unit) in 2025 drydock

Fisheries Sonar: EK80 18kHz and 38kHz

AICC recommendation: add EK80 fisheries sonar

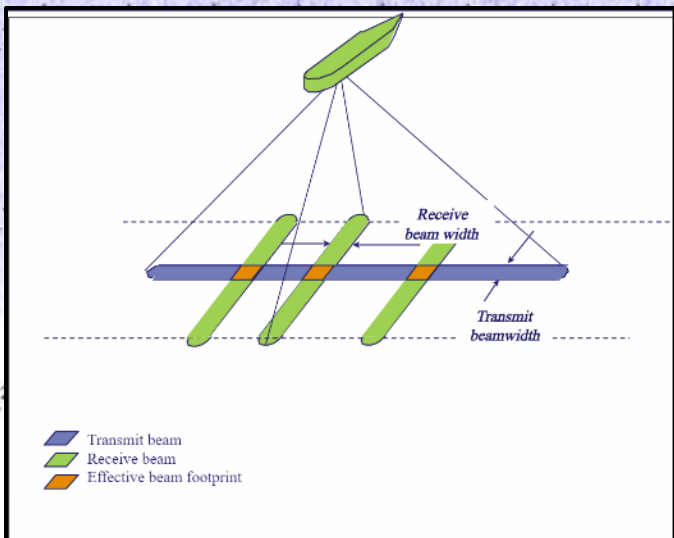
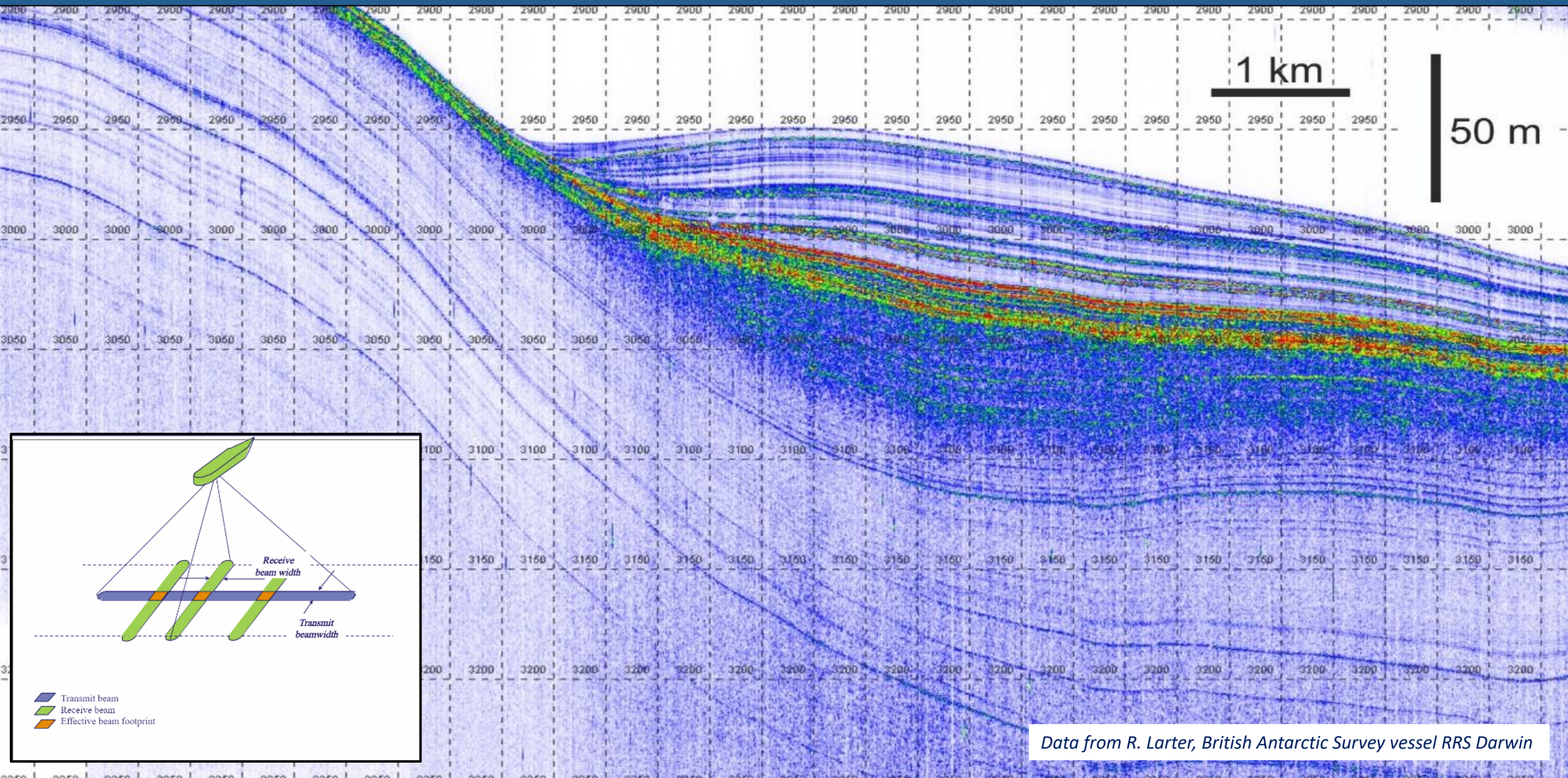
- 18kHz and 38kHz transducers can be installed in existing wells behind ice windows
- Requires the removal of acoustic release system and reference hydrophone
- NB! EK80 requires target strength calibration at least annually

Sub-Bottom Profiler: SBP29

STARC recommendation

- Remove obsolescent Knudsen 3260 Chirp 4kHz sub-bottom profiling system
- Replace with Kongsberg SBP29
- Narrow-beam sub-bottom profiler system with roll and pitch stabilization
- System consists of a transmitter array that is paired with the receive array of a EM124 or EM304

Sub-Bottom Profiler: SBP29



Data from R. Larer, British Antarctic Survey vessel RRS Darwin

ADCP Refurbishment

- Plans are in progress to refurbish both 150kHz and 75kHz ADCP system in 2022
- A system may last a decade or more but needs to be refurbished to ensure continued reliable performance

Reference Hydrophone Replacement

- We propose to remove the reference hydrophone capability in 2022 to allow for the EK80 fisheries sonar installation.
- A replacement reference hydrophone would be installed in 2025 in parallel with multibeam and/or SBP29 installation

Acoustic Release Modem: UTS-9400

- We propose to remove the Edgetech acoustic release mooring transducer to allow for the EK80 fisheries sonar installation
- To replace this capability we propose to purchase a Teledyne universal deck box that can be paired with the existing 12kHz transducer (installed in 2019)
- Will be able to communicate with a broad range of instruments

Modification Sequence for Other Sonars

1. Install EK80 18kHz and 38kHz and Sea Technology Services calibration system 2022
 - a. Requires removal of the Edgetech mooring transducer
This capability could be replaced by a Teledyne UTS9000 series deck box
 - b. Requires removal of reference hydrophone
This capability would not be restored until 2025
installation of reference hydrophone system
 - c. We will also procure / install EK80 calibration system
Sea Technology Services Acoustic Calibration Unit

Modification Sequence for Other Sonars

2. Install Teledyne UTS9000 Universal Acoustic Release System (2022)
Replaces Edgetech mooring release system
3. Refurbish existing 75kHz and 150kHz ADCP systems in 2022

Modification Sequence for Other Sonars

4. Install a SBP29-3 or SBP29-6 sub-bottom profiler 2025 as a Knudsen sub bottom profiler replacement
 - a. 3 degree or 6 degree system
 - b. The abandoned, sealed-off Sea Beam transmit array casing is in the ideal hull location for the SBP 29 TX array, and can be modified for this purpose.
5. EA440 or similar reference hydrophone system installation 2025

Multibeam and Sonar System Update



USCGC Healy. Credit: Mayer et al., 2016

Questions?



Oregon State
University

