# UNOLS RVTEC MEETING

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Ship-based Science Technical Support in the Arctic

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# Ship-based Science Technical Support in the Arctic

Acknowledgements

Underway Cruise Support

2023 Drydock Updates

2025 Sonar Updates

Cooperative Agreement


STARC, USCG, NSF SAS

# Acknowledgements

National Science Foundation (NSF)

Office of Naval Research (ONR)

United States Coast Guard (USCG)

Arctic Icebreaker Coordinating Committee (AICC)

Multibeam Advisory Committee (MAC)

WHOI Potential Fields Pool Equipment (PFPE)

National Geospatial Agency (NGA)

Shipboard Automated Meteorological and Oceanographic Systems (SAMOS)

Rolling Deck to Repository (R2R)

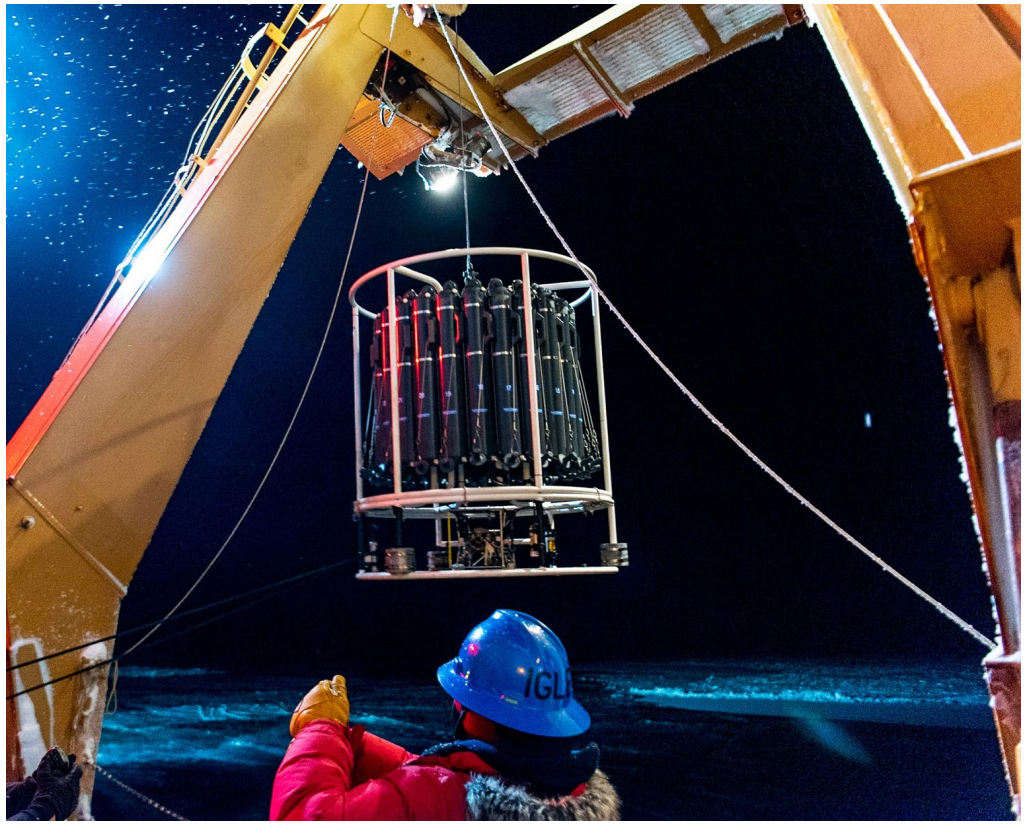
UNOLS West Coast Winch Pool

Partner Universities:
- Scripps Institution of Oceanography
- Oregon State University
- University of Washington

UNOLS Tech Pool

# HLY2201: Arctic Mobile Observing System (AMOS) Chief Scientist Jason Gobat

- 4 Mooring recoveries
- 7 Mooring deployments,
- 1 Very Low Frequency mooring deployment
- 1 Ice Gateway Buoy-Heavy deployment
- 1 Remus deployment/docking
- 3 Glider deployments
- 11 CTD casts



CTD cast

# HLY2202: Synoptic Arctic Survey (SAS) Chief Scientist Carin Ashjian

51 science stations (short and long)

- 51 CTD casts
- 37 Optic casts
- 2 Ring Net deployments
- 31 Bongo Net deployments
- 16 Multinet casts
- 18 HAPS Corer
- 53 Van Veen grabs
- 20 Multicore casts
- 34 Video Plankton Recorder
- 24 XCTD
- 121 XBT
- 3 Moorings recovered
- 3 Moorings deployed
- 15 McLane Pumps


Photo courtesy of Leonard Sussman

## Transducer Well Deck Preservation

- 100% deck and 3” up bulkheads
- Transducer well exteriors and lids
- New ice windows for auxiliary wells

## Transducer Maintenance:

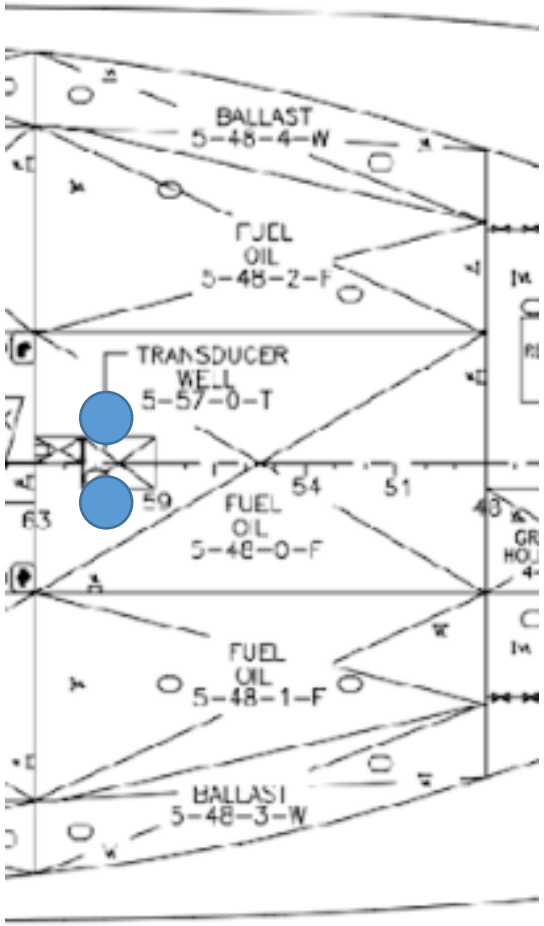
- Single beam transducers will be removed
- Clean and preserve transducer well interiors
- Replace OS75 and OS150 ADCP transducers
- Install EK80 18kHz and 38kHz fishery sonars

## Multibeam:

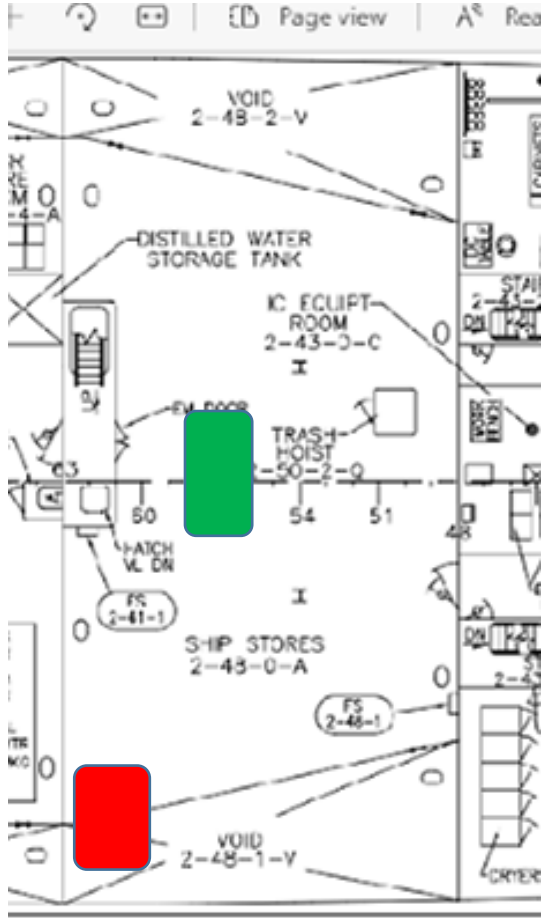
- EM122 RX array replacement (NAVO)
- Modify RX frame to install baffle kit
- Update ship survey

## Winches:

- Inspection of oceanographic winches and wires




3rd Deck




2nd Deck

**EM304 Multibeam**

- More appropriate for the Arctic Basin depth range, however technical advancements in transducer design still allow for mapping in full ocean depths
- Higher resolution than EM124 (.5x1 vs 1x2), similar array dimensions but requires new hull casings
- Matches USCG Polar Security Cutter configuration

**SBP29 Sub-Bottom Profiler**

- Replacement of single beam Knudsen Chirp 4kHz sub-bottom profiler (12 kHz to remain)
- System consists of a transmitter array (TX) that will be paired with the receive array (RX) of the EM304 multibeam
- Narrow-beam sub-bottom profiler system with roll/pitch stabilization, beam steering and slope correcting capabilities allow for highly accurate high-resolution data in varied terrain
- Will greatly improve US sub bottom profiling capabilities in the Arctic

**EM712 Multibeam (?)**

- Addition of shallow water, high resolution mapping is desirable for scientific and federal agencies
- Installation feasibility is being explored as it requires a gate valve and extendable ram
- Successful implementation on Canadian Icebreakers

# SBP29: R/V Sally Ride

- Higher resolvability than single beam Knudsen Chirp 3.5 kHz sub-bottom profiler
- System consists of a transmitter array (TX) that will be paired with the receive array (RX) of the EM304 multibeam
- Narrow-beam sub-bottom profiler system with roll/pitch stabilization, beam steering and slope correcting capabilities allow for highly accurate high-resolution data in varied terrain
- Will greatly improve US sub bottom profiling capabilities in the Arctic, collecting data sets that are challenged by sea ice coverage

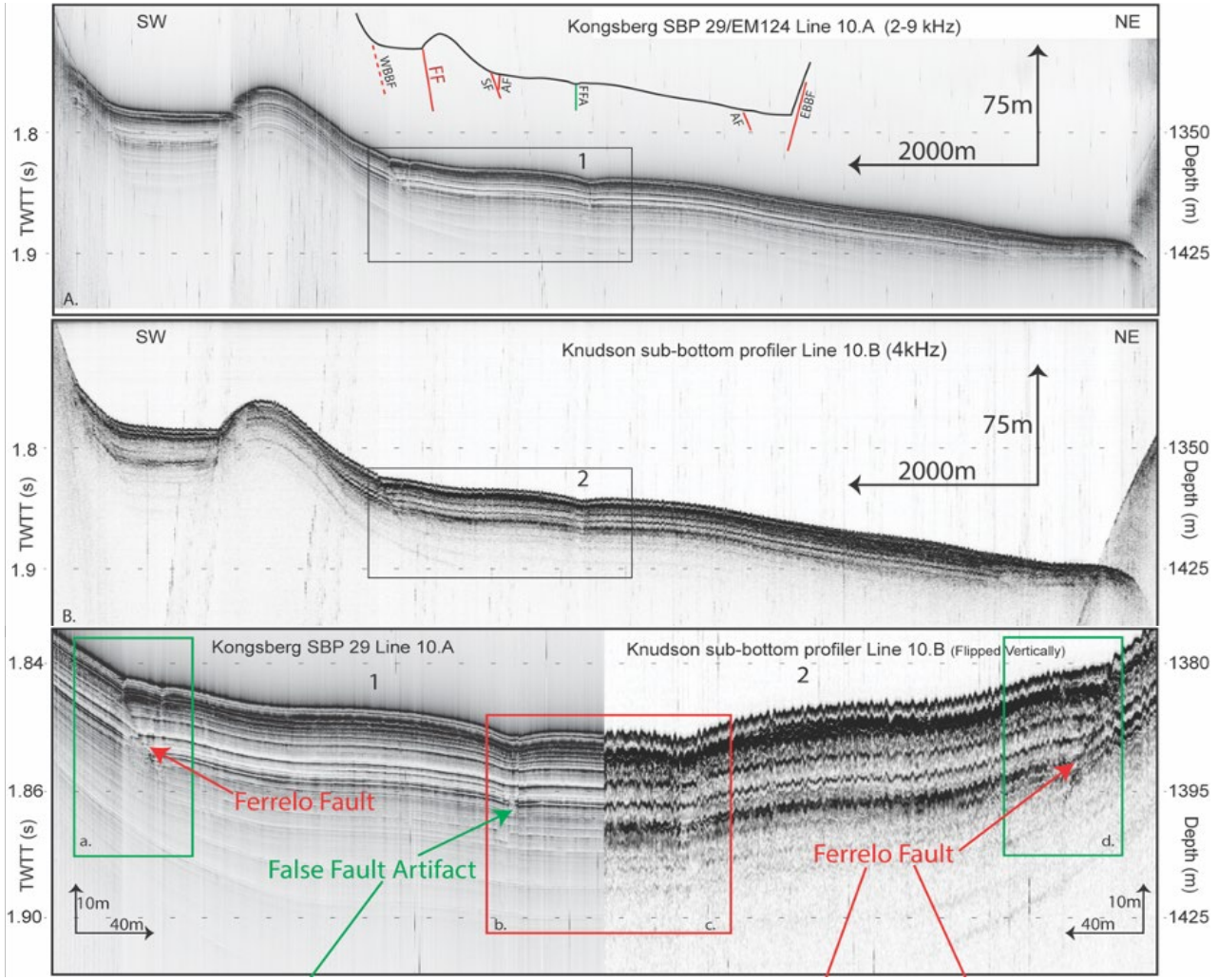



Figure courtesy of Boe Derosier

# SBP29: R/V Sally Ride

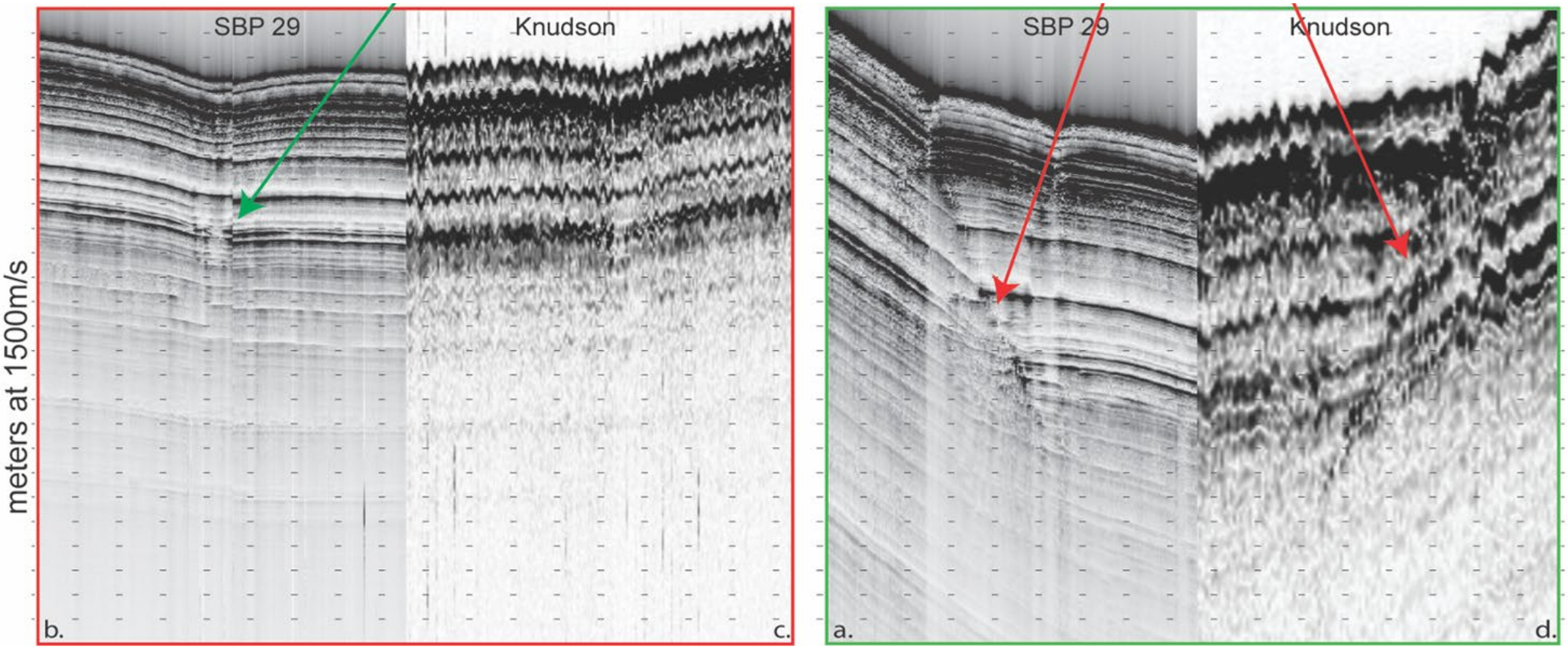



Figure courtesy of Boe Derosier

UC San Diego

Oregon State University

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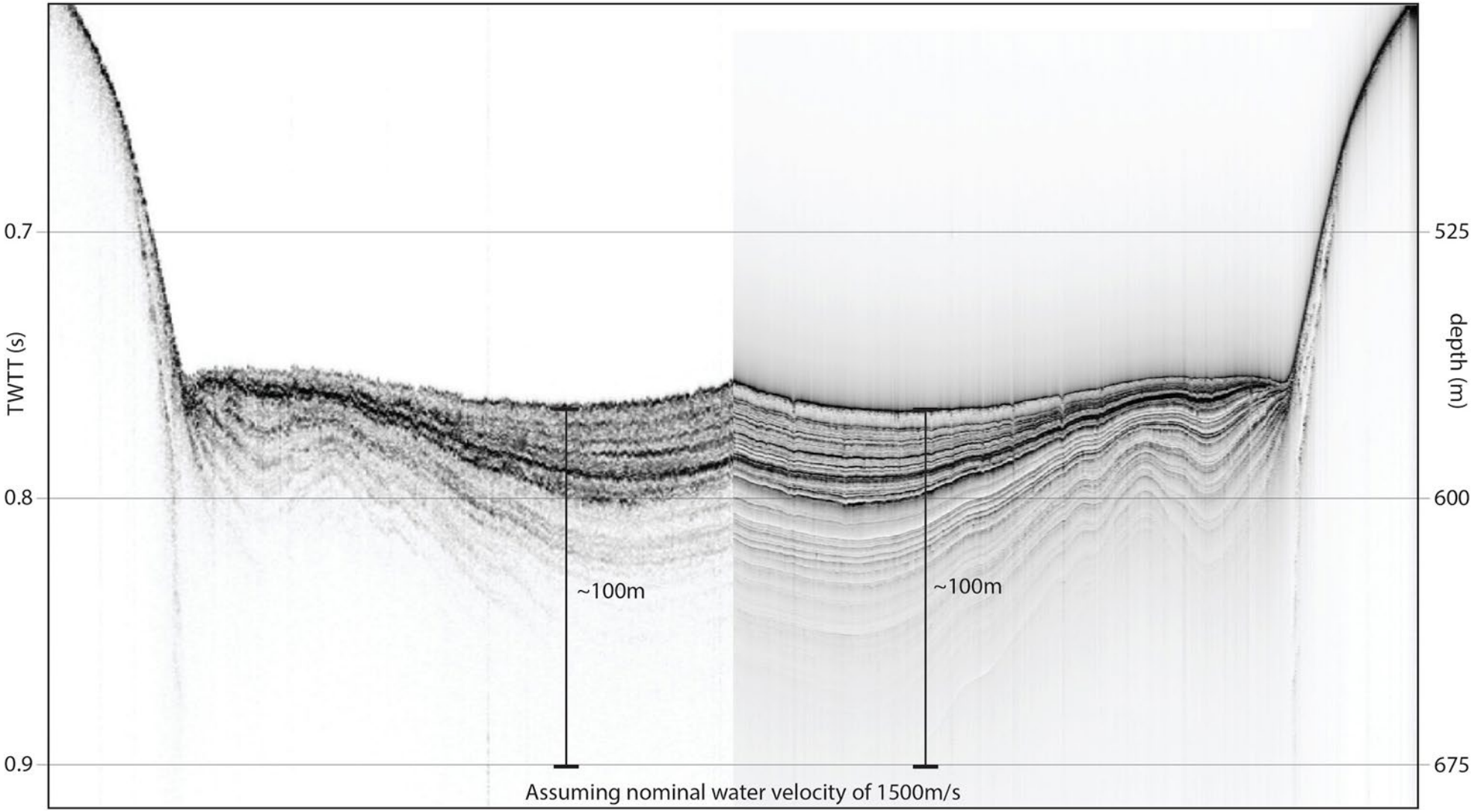


Figure courtesy of Boe Derosier

## Matrix Model: Expired August 2022

- Arctic Coordinator
- Marine technicians from SIO, OSU, and UW
- ARF schedule a significant variable
- CG Objectives often released just prior to season

## Proposed Model: Effective August 2022(?)

- Arctic Coordinator
- Cyberinfrastructure Coordinator
- Systems Integration Engineer
- Lead OSU Sailing Technician
- Lead UW Sailing Technician
- Matrixed technicians from SIO, OSU, and UW
- More robust and flexible for CG scheduling


Photo courtesy of Laurie Juranek

*CG and NSF currently discussing scheduling for 2023 and 2024

# Cooperative Agreement

- The STARC Arctic Cruise Coordinator will serve as a single point of contact for the U.S. Coast Guard and funding agency program managers and will be a primary point of contact for principal investigators and participating scientists for all long lead time planning. This position will be a senior STS technician who will be devoted full-time to lead the effort for planning, coordination, and reporting of research support activities for Arctic cruises. An important function for the STARC Arctic Cruise Coordinator early in the planning process will be to advise and assist NSF and other agency program managers during the planning phase for projects that are being considered. As soon as cruises and projects for an upcoming field season are identified by the funding agencies, the STARC Arctic Cruise Coordinator will consider the objectives of the missions, the equipment and technical personnel required, the research area, and specific logistics required, and make support recommendations based on the schedule being considered by the USCG.

- The STARC Cyberinfrastructure Coordinator will focus on the coordination of the computer systems, display systems, and instrumentation systems supported by the STARC program in a manner that meets obligations and expectations, including maintaining the level of information system security required by the USCG to operate the polar science network (PSN), which must adhere to Department of Defense (DoD) Defense Information Systems Agency (DISA) standards and the DoD Security Technical Implementation Guides (STIGs). STIGs are the configuration standards that must be applied to configure software, implement security protocols, and establish training requirements.

# Cooperative Agreement

- The STARC Systems Integration Engineer will provide technical support to facilitate the integration of project-specific science instrumentation for individual cruises and for the entire sailing season. In addition to integration of instrumentation systems the SIE will support the integration of data acquisition streams for successful data delivery within the shipboard scientific instrumentation environment and will perform recommissioning activities to re-establish the environment at the start of every field season. When onshore and not sailing, this position will provide remote support and practical and review sample data before submitting data to the Rolling Deck-To-Repository (R2R) program. The R2R program provides fleet-wide quality assurance and management of underway data to ensure preservation of, and access to, our national oceanographic research assets.

- The CI Coordinator and the SIE will operate within the SIO Development Operations Group comprised of several Information System Analyst positions that provide high-level systems integration support to department projects, which will benefit the STARC Program by having access to the practices and solutions being implemented on SIO and UNOLS-wide projects.

- Once annual cruise assignments are made by the STARC Arctic Cruise Coordinator, a Lead STARC technician from one of the partner institutions will be designated for each cruise to perform detailed cruise planning from the very beginning through to successful completion of the cruise. At sea this position would serve as a single point of contact to the USCG for STARC onboard the vessel to avoid any confusion in the chain of command with USCG partners.

- The STARC organizational structure employs a modified matrixed approach for providing science support on USCGC Healy, while providing additional specific expertise to address needs related to data and information security, and systems integration of scientific instrumentation and sensors onboard.

# Questions

Underway Cruise Support

2022 Drydock Updates

2025 Drydock Updates

Cooperative Agreement

Hoarfrost

UC San Diego

Oregon State University