Update to HEALY Multibeam Replacement Discussion

After receiving the AICC input STARC engaged in more detail with the USCG on multibeam replacement options. Due to FY22 budget constraints and a lengthy approval process the USCG is not able to support the replacement of the EM122 to an EM304 during Drydock 2022. They could however support the installation of an EM304 in drydock 2025 given the approval process was initiated in early 2021. Based on this feedback from the USCG we have developed costs and a sequence of several options for consideration by NSF and the community.

STARC is in discussions with USCG-SFLC-LREPL regarding shipyard package development for future sonar options. STARC took into consideration the community preference for not only an EM124 or EM304 but also a shallow water multibeam system, EK80 fisheries sonars, and high-resolution sub bottom profiler capabilities. The feedback from the USCG is that any plans for installing sonar systems that involve significant modifications to the vessel, a change in configuration, or additional capabilities should be put forth now for USCG approval processes to move forward in a timely manner.

HEALY Multibeam Sonar Options for Community Consideration

AICC recommended that either a EM124 or EM304 would be acceptable options but added that there would be interest in ways to add shallow water multibeam capabilities to the vessel. Since the EM124 cannot be replaced with an EM304 in 2022 what options are preferred by the AICC community? Listed below are options for each system paired with a shallow water multibeam

1. Upgrade the EM122 to an EM124 ice protected system paired with an EM712 system.
    a. Upgrade to EM124 1 x 2 system in DD2022.
    b. Add capability of a EM712 2 x 2 degree system (retractable hull unit) in DD2025.

2. Upgrade to an EM304 system paired with a EM2040 in 2025 and provide input on EM122 RX replacement as a bridge to ensure quality multibeam data until 2025
    a. Replace the existing EM122 receive array in DD2022
    b. Add capability of EM304 .5 x 1 degree ice protected system in DD2025
    c. Add capability of EM2040 .5 x .25 degree system (retractable hull unit) DD2025

There are other systems that should be considered for refurbishment and upgrade on HEALY. In parallel to evaluating engineering options for multibeam sonar systems on HEALY STARC has been coordinating with the USCG on their planning requirements. The recommendation from USCG is that through STARC the community should lay out all potential sonar modifications desired through 2025.

It was clear in the AICC recommendations that EK80 fisheries sonar capabilities are desirable. We have also listed out several technologies that would augment or replace existing capabilities. In the next several years several aging systems on HEALY could be upgraded or replaced and a sequence is proposed for consideration.

Fisheries Sonar
It is possible to install EK80 18kHz and 38kHz fisheries sonar transducers on HEALY. Higher frequency transducers would not provide the required performance behind ice protection windows.

Acoustic Mooring Release System
HEALY currently has an Edgetech mooring release transducer and deck box. This system currently has limited utility as it is restricted to Edgetech products. In 2019 the 12kHz transducer was replaced. This existing transducer should be paired with a Teledyne product that is capable of communicating with most acoustic release systems.

Reference Hydrophone System
A reference hydrophone was installed in a spare transducer well on HEALY. This hydrophone would need to be removed for the installation of fisheries sonar. A reference hydrophone is still desired, therefore a new reference hydrophone (an EA440 hydrophone system or similar) should be included as part of the 2025 shallow water multibeam refit effort.

SBP 29 Sub Bottom Profiler
Based on the existing commercially-available systems we propose that a Kongsberg SBP 29 be selected to replace the current Knudsen subbottom profiler. The SBP 29 system is becoming available in the ARF and consists of a transmitter array that pairs with the receive array of an EM124 or EM304. This is a narrow-beam subbottom profiler system with roll and pitch stabilization that would improve geophysical survey capabilities.

The sequence listed below is how STARC proposes to plan for these additional sonar and sonar-related systems.

1. Install EK80 18kHz and 38kHz and Sea Technology Services calibration system 2022
    a. Removal of the Edgetech mooring transducer would be required
        i. This capability could be replaced by a Teledyne UTS9000 series deck box
    b. Remove reference Hydrophone
        i. This capability would not be restored until 2025 installation of reference hydrophone system
2. Install Teledyne UTS9000 Universal Acoustic Release System (2022)
    a. replaces Edgetech mooring release system
3. Refurbish existing 75kHz and 150kHz ADCP systems in 2022
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 Seabeam transmit array casing is in the ideal hull location, and could be adapted to admit the SBP 29 array.
5. EA440 reference hydrophone system installation 2025