



# STIC Note

## Transducer Puller for Bay Class (140' Icebreaking Tugboat)



### BACKGROUND AND PROBLEM STATEMENT

Icebreaking tugboats operating out of the Great Lakes region (as well as New England) serve an important role for maritime logistics. Like many of the USCG's other aging maritime assets, maintaining these ships sometimes requires new approaches to meet readiness and mission needs.



Figure 1. U.S. Coast Guard Cutter *Thunder Bay* clears a channel for vessels to navigate the frozen Hudson River in New York.

One system required for safe operation of the 140' Icebreaking Tugboats is a working Sonar transducer. The "old" way to service the transducers has been using screwdrivers, chisels, and paint scrapers to break up the adhesive while rocking the transducer back and forth, to break the suction seal. This method can be dangerous and is often very time consuming. Many tools have been broken, and there is always a chance of causing damage to the hull ring, or worse, injury to maintenance technicians.



Figure 2. Transducer well on 140' Bay class Icebreaking Tugboat.

### METHODS

The Science and Technology Innovation Center (STIC) received the original ideation for the shipboard transducer removal tool from Electronics Support Detachment (ESD) in Sault Saint Marie. Subject matter experts at ESD Sault ST Marie developed their initial Transducer puller from scrap pieces of metal in their shop. This first prototype transducer puller was able to greatly assist in removing transducers on this class of ship. When the STIC received the ideation, the design was modeled and run through stress analysis software. A design analysis found that it would be simpler to produce a tool in two different size versions as opposed to a more complex adjustable version. The STIC team produced an industrial service order with updated engineering specifications to Industrial Production Facility at Base Boston for six Transducer pullers, three of each in two different sizes.



Figure 3. Removing transducer with second version of Transducer puller.



Figure 4. Two sizes of third version of Transducer puller.



Figure 5. Same as Figure 4. with different view of third version of Transducer puller.

## EVALUATION

The STIC team sent three sets of the newest version of the transducer (including the engineering drawings against which they were built) to the ideation originator at the ESD in Sault St Marie. Because the transducers are not routinely replaced unless being overhauled for service repair, the puller device will not be used and evaluated until such service is needed. Thus, feedback will be delayed until a triggering event occurs.

## FUTURE WORK

While this solution was designed for the CG 140' Icebreaking Tugboats, it would likely be able to support pulling transducers on other cutters with similar form factor transducer wells. The STIC team will continue to follow up for feedback, and, if indicated, attempt to pursue new processes that will simplify servicing.

The Science and Technology Innovation Center (STIC) is a DHS S&T and USCG collaboration.