



STIC Note



Electric Outboard Evaluation

BACKGROUND/PROBLEM

In remote Alaska areas there are few piers or docks and boat crews often have to come ashore on unimproved beaches for equipment or personnel transfer. In these remote areas along the North Slope of Alaska, there have been numerous documented examples of cutters needing to execute shore transfer of personnel or light materials. This effort evaluated a potential option that could be implemented to improve the ability of cutter boat crews conducting shore transfers in remote areas.

In September of 2022 the crew of the USCGC STRATTON reached out to the RDC to inquire about using electric outboards for skiff propulsion in lieu of a gasoline outboard. They had recently completed a deployment using an inflatable skiff and were interested in the theoretical benefits an electric outboard could provide.

METHODS

The STIC conducted market research on the state of electric propulsion and determined improved electric propulsion options were commercially available that could be used in lieu of gasoline outboards. The STIC conferred with the Office of Boat and Cutter Forces and identified a National Security Cutter to evaluate the electric propulsion during the summer of 2023. The STIC acquired an Elco 20 Horsepower outboard and 48 Volt 96 Amp-Hour Dakota Lithium batteries for the evaluation.

The Office of Boat Forces arranged for an inflatable skiff to be made available for the testing and shipped it to the R&D Center. STIC staff conducted extensive trials with the electric outboard installed on the skiff to ensure that there would be no major issues before sending the skiff and outboard to be picked up by the USCGC BERTHOLF in Dutch Harbor, AK. Preliminary testing included speed, range, and water exposure testing. The electric outboard with one battery provided a maximum speed of 9.5 kts and run time of 34 minutes.



Figure 1. Elco 20 HP electric outboard during trials at the R&D Center (Source: U.S. Coast Guard).

EVALUATION

The STIC developed a Test Plan that provided background information, identified the goals of the effort, provided safety and operations guidance, and contained all the manuals for the skiff, electric outboard, and batteries. During their deployment, the USCGC BERTHOLF had the opportunity to evaluate best practices to launch

and recover the electric outboard for beaching operations on Adak Island.

CONCLUSIONS

The USCGC BERTHOLF determined the best practice for deployment on a National Security Cutter was to inflate and assemble the craft on the flight deck and use a stern crane to launch and recover from the stern notch. Under full throttle conditions a single battery lasted less than 30 minutes. The maximum speed was dependent on the number of crew aboard, but never exceeded 10kts. While the electric outboard did not require gasoline, the large lithium batteries still required special hazardous material handling and storage considerations. The USCGC BERTHOLF concluded that an inflatable skiff increased their capabilities to come ashore in remote areas, but the electric outboard was limited when compared to a larger gasoline powered outboard.



Figure 2. Recovery from the stern notch on USCGC BERTHOLF (Source: U.S. Coast Guard).



Figure 3. USCGC BERTHOLF crew coming ashore on Adak Island, AK (Source: U.S. Coast Guard).

FUTURE WORK

Alternative energy propulsion methods are continually improving and the STIC continues to monitor technological advancements in this field. Further work will address battery storage considerations, charging, and fire response issues that need to be developed for lithium batteries. The Office of Boat Forces has expressed an interest in evaluating electric outboards for disaster response applications as part of the flood response kit.

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