



STIC Note

AIS Beacons for Punt Boats



BACKGROUND/PROBLEM

In May of 2021 the LANT Area Chief-of-Staff contacted the Research and Development Center (RDC) with a request for an AIS tracker that could be installed on shallow-water craft and flood punt boats and used to track these assets on CG1View. The request was time sensitive because there was a desire to come up with a solution prior to hurricane season. This was an ideal Science and Technology Innovation Center (STIC) task because there were commercial off-the-shelf (COTS) products available to test and there was a short timeline.

METHODS

The desired characteristics of the system were to be:

- Weather-proof.
- Low cost.
- Self-powered, as the boats have no batteries or generators.
- Quickly mountable on various boats, with no drilling required.
- Enough range to be received by CG Nationwide AIS sites so that they display on CG1View in real-time.

The STIC identified the em-trak BT100 (Figure 1) as a potential solution. The BT100 is a fully waterproof transceiver which has an advertised battery life of 5 days when used continuously. The BT100 is designed to be used for tracking fishing gear, with a cost of about \$400 for the basic system. The basic system does not contain

any chargers, programming docks, or mounting brackets, which allowed the team to separately purchase only what was precisely needed for the evaluation.



Figure 1. BT100 with mounting bracket and charger. Photo Credit: em-trak

After the device was chosen, the team needed to design a way for the transceivers to be easily mounted on a variety of different boats. The solution devised was to repurpose an electric trolling motor transom mount to allow for the easy attachment of the transceiver to the boat, and increase the height of the transceiver (Figure 2). The team then programmed the transceivers with Maritime Mobile Service Identity (MMSI) numbers and gave them easily identifiable names.

EVALUATION

The STIC completed initial testing at the RDC and used the RDC's 29' Research Vessel to verify the mounting system would work on various boats (Figure 2) and that the 29's AIS transponder

could locate the beacons on shore while the boat was underway.



Figure 2. Transceiver on RDC's 29' Research Vessel. Photo Credit: USCG

From this initial testing, it appeared that the AIS transmitters had a range of at least a few miles.

Four of the transceivers and mounts were then shipped to MSST Houston, where they were mounted on their Combat Rubber Raiding Craft (CRRC) (Figure 3).



Figure 3. An MSST Houston CRRC with transceiver mounted. Photo Credit: USCG

MSST Houston then tested the systems on land and determined that a nearby 29 could see the

AIS beacons on its electronic chart system, but the beacons could not be seen on CG1View. The closest CG Nationwide AIS site was about 10 miles from the Sector and the team began to suspect that the transmitter wasn't powerful enough to reach the CG Nationwide AIS sites. Due to a high operational load, which did not require the use of the CRRCs, the MSST was not able to test the beacons on the water.

The decision was then made to ship the transceivers to the D8 Catastrophic Incident Search and Rescue (CISAR) program manager for testing in the New Orleans area. They performed on-the-water testing and determined that:

"On a clear calm day we were able to track the flood response boat out to 2.4 NM when in direct line of sight using a 29' RB-S. The moment it got behind a building or obstruction we lost them at around 1.2 NM."

The D8 CISAR also reported that the Command Center was unable to see the beacon on CG1View, likely due to the distance to the CG Nationwide AIS sites.

CONCLUSIONS

From these tests, it was determined that the transmitter power of one watt was not powerful enough to work in the flooded urban environments where these flood response boats operate. Both MSST Houston and the D8 CISAR liked the ease of use of the system, adequate battery life, and ease of attachment to various boats.

FUTURE WORK

The STIC will continue to monitor advancements in this technology area and work to test systems that may show promise for further evaluation.