

# SUCCESS STORY

**TOPIC NUMBER:**  
**N101-018**

**SBIR INVESTMENT:**  
**\$1,345,293**

**PHASE III FUNDING:**  
**\$2,914,894**



## MH-60R SONAR NICAD BATTERY RELIABILITY IMPROVEMENT

*CornerTurn, LLC designed modifications to extend the operational life of the Nickel Cadmium (NiCad) rechargeable battery packs used in the MH-60R fleet's sonar transducers, providing cost savings and greater reliability for the sonar systems.*

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## THE CHALLENGE

The Navy's MH-60R Seahawk fleet experienced unpredictable failures of the transducers in the AN/AQS-22 sonar, resulting in excessive transducer replacement rates. PMA-299 sought solutions to improve reliability and extend the service life of the multi-cell nickel cadmium (NiCad) rechargeable battery packs used in the sonar transducers. The Navy required an improvement of 10% in reliability and longevity of the battery packs to achieve life-cycle cost savings and enhance system availability to support the MH-60R Seahawk's antisubmarine mission.

## THE TECHNOLOGY

CornerTurn, LLC designed a circuit board to integrate into the existing Nickel Cadmium rechargeable battery pack. This dedicated circuitry monitors and protects individual NiCad cells during each charge and discharge cycle and senses when cells are in danger of being overcharged or overdischarged, then isolates the affected cell from the circuitry without impacting the battery pack's voltage or current as it interfaces with the transducer electronics. By managing the stress on individual cells, CornerTurn's modifications prevent premature battery pack failure.

## THE TRANSITION

The Navy awarded CornerTurn a Phase I SBIR contract in 2010, Phase II in 2012 and Phase II.5 in 2014. By the end of the Phase II.5 contract in 2016, CornerTurn had completed its analysis of the battery pack's weaknesses and demonstrated a design that addressed the failure modes which lead to early battery degradation.

In 2013, CornerTurn received their first Phase III; a small contract to perform preliminary integration and acceptance testing. In 2018 the Navy awarded CornerTurn a second Phase III contract to fund prototype development and testing. The MH-60R funded task orders well into 2024 to procure an initial supply of CornerTurn's add-on circuit boards.

## THE NAVAL BENEFIT

Based on results of tests conducted on the prototype products, the Navy expects a 10% improvement in reliability and longevity of the NiCad battery packs. This improvement is projected to deliver cost savings over the operational life of the AN/AQS-22 sonar systems and ensure greater system availability to support antisubmarine missions.

## THE FUTURE

CornerTurn's monitoring circuitry will be installed on replacement battery packs for the AN/AQS-22 sonar transducers at Naval repair facilities. Once the initial supply procured by the MH-60R Seahawk program is exhausted, the Defense Logistics Agency (DLA) will manage ongoing procurement. Both the U.S. Navy and the Australian Royal Navy plan to procure CornerTurn's innovative solution.