

# SUCCESS STORY

**TOPIC NUMBER:**  
**N98-114**

**SBIR INVESTMENT:**  
**\$958,798**

**PHASE III FUNDING:**  
**\$6,671,893**



## TORPEDO WARNING SYSTEM (TWS) FLEET, ENGINEERING, AND LOGISTICS SUPPORT

*3E Technologies International, Inc., now Ultra, delivers the Torpedo Warning System (TWS) to the Navy, enhancing the surface fleet's defense against incoming torpedo threats.*

**3E Technologies  
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## THE CHALLENGE

Adversarial submarines pose a silent threat to both commercial and military surface ships. The use of torpedoes in the maritime battlespace underscores the need for anti-submarine warfare (ASW) capabilities to detect and counter these threats. Without the Torpedo Warning System (TWS), surface vessels have little recourse, relying on manually deploying acoustic countermeasures and performing evasive maneuvers. TWS introduces a layered torpedo defense system, significantly increasing a ship's chances of surviving an incoming threat torpedo attack.

## THE TECHNOLOGY

TWS uses both active and passive technologies to detect, classify, and localize threat torpedoes at long ranges. Using advanced algorithms, it fuses data from active and passive sensors to enhance the detection range and probability. These algorithms employ both kinematic projections and traditional threat classification methods to develop an operational picture, providing operators with actionable intelligence for neutralizing the incoming threat. TWS enables the deployment of hard kill countermeasures, or anti-torpedo torpedoes, to neutralize the incoming threat. This approach is part of a layered torpedo defense strategy which combines soft kill countermeasures, both launched and towed, with hard kill countermeasures to engage the threat torpedoes at multiple points throughout the engagement.

## THE TRANSITION

Leveraging SBIR funds, 3E Technologies International, Inc. (now Ultra) developed the TWS to provide the Navy with a rapidly deployable torpedo defense systems for surface combatants. The system enhanced traditional torpedo detection algorithms with passive and active kinematic processing enabling the use of a hard kill countermeasure. This addition significantly increased the number of threats a torpedo defense system could address.

With an aggressive 18-month development timeline, Ultra was tasked with developing, demonstrating, testing, and delivering the capability to address a potential gap in the Navy's defenses. The successful demonstration of the capability showcased the system's potential to improve survivability outcomes. Under this Phase III, Ultra continued supporting the system aboard aircraft carriers, analyzing system data and ensuring enhanced torpedo threat detection. This resulted in the Navy's only automated ship defense against incoming torpedoes.

## THE NAVAL BENEFIT

TWS represents a major advancement in Naval defense, equipping surface ships with the ability to detect incoming threats at extended ranges, allowing for timely responses. Ships with TWS gain critical decision-making windows, whether deploying hard kill countermeasures or performing evasive maneuvers. This increased reaction time significantly enhances survivability. TWS is currently operational on multiple aircraft carriers, bolstering the Navy's defense against torpedo threats.

## THE FUTURE

Ultra and NAVSEA's Undersea Defense Warfare Systems Program Office (PMS 415) continue to work together to rapidly equip the Navy with the latest in torpedo defense technology. Future developments will integrate TWS into a broader system of systems for torpedo defense, a concept championed by Ultra known as layered torpedo defense. This approach ensures multiple defense systems work in unison to counter incoming torpedoes, strengthening the Navy's protective capabilities even more.