The Enduring Power of Mark 160: Four Decades of Navy Combat Advantage

By Dorina Watermolen, NSWCDD Corporate Communications, Jan. 8, 2026

DAHLGREN, Va. – The Mark 160 gun computer system is built for quick adaptation and ongoing innovation. Owned and sustained by the government and built at Naval Surface Warfare Center Dahlgren Division, it is a 40-year product line that provides America's fleet with precision.

"Mark 160 is the fire control system for our Navy's main gun weapon systems: The Mark 34 (5-inch), Mark 48 (57mm) and Mark 38 (30mm)," said Rachel Van Buren, the program's deputy manager.

The fire control system is a key component of the Mark 34

gun weapon system used on Aegis-class destroyers and other warships, responsible for calculating ballistic solutions and firing commands based on sensor data and selected ammunition. It interfaces with shipboard sensors, receives target information and generates the precise gun train and elevation orders needed to accurately fire the gun.

Government owned from the start

Unlike many major combat systems developed by contractors, the Mark 160's software is wholly government owned.

"We control the design, upgrades and sustainment," said Van Buren. "There's no dependency on proprietary code or outside timelines."

When the fleet requires a capability or new threats emerge, NSWCDD can make informed decisions and deliver improvements quickly and efficiently.

This ownership also streamlines technical integration. While the hardware for guns and optical sensors comes from various vendors, the NSWCDD Mark 160 team develops the fire control system in-house, calculating complex solutions.

Mark 160 acts as the shipboard brain for gun weapon systems, translating sensor data into precise gunfire.

"It takes all the available sensor input – radar, optical tracking and more – and generates a fire control solution so that, when a threat comes in, our guns engage accurately," said Van Buren.

For each engagement, Mark 160 receives target tracks from combat systems like Aegis, then calibrates for variables such as ship movement, environmental conditions and the ballistic specifics of each type of gun and ammunition, including modern guided projectiles.

The system constantly evolves, incorporating new sensors and

effectors, helping ships adapt to the fast-changing dynamics in hostile regions like the Red Sea, where the gun weapon systems have been effective against threats.

“Our recent work with hypervelocity projectile integration really shows the team’s capability. It took less than six months to move from requirements to ship integration — something that’s possible because the government owns the code and oversees priorities.”

Fast, fleet-focused evolution

The team embraces Agile software development, keeping the Mark 160 relevant.

Waterfall and Agile are two distinct software development methodologies. Waterfall follows a structured, step-by-step process in which each phase — such as planning, design and testing — is completed before moving to the next. Agile, on the other hand, is iterative and flexible. It allows for continuous testing, regular customer feedback and easy adjustments to evolving needs.

“We switched from the Waterfall system to Agile about four years ago,” said Van Buren. “Now, instead of waiting five years for new capabilities, we are doing incremental releases. We push out updates every quarter, test them with real hardware in our labs and, if they are successful, deliver them rapidly to the fleet.”

This iterative approach empowers the Mark 160 team to innovate quickly based on fleet feedback.

“If something’s not working, we adjust,” said Van Buren. “We’re constantly improving both our product and the way we work.”

One of the latest advances focuses on making the operator’s job easier amid the chaos of combat. Previously, each gun

impact was shown individually on displays, which could overwhelm the operator with data.

Because shipboard radars are highly sensitive, the detonation or impact of a 5-inch projectile near a target generates radar clutter. Splash-avoidance processing is designed to minimize clutter's effect on the target's tracking, resulting in more accurate 5-inch gunfire.

Supporting the fleet and partners worldwide

The Mark 160 isn't limited to U.S. Navy ships.

"We're on guided-missile destroyers and cruisers and even Coast Guard platforms, with a substantial number of foreign military sales," said the deputy program manager.

Allies like Australia, South Korea and Japan leverage the Mark 160 for their gun weapon systems and more countries are expressing interest each year.

Through ongoing integration with new weapon systems and munitions, such as guided projectiles, Mark 160 provides the combat edge necessary for modern naval warfare.

"It's our flexibility – being the avenue for new capabilities to reach the fleet, whether it's kinetic or even AI-powered optical tracking – that keeps the Navy at the forefront," said Van Buren. "The fact that we, as the government, own and control the evolution is fundamental to maintaining our strategic advantage."

With its legacy of adaptability, fleet-focused improvement and global reach, the Mark 160 is poised to anchor naval gunfire solutions for decades more – ensuring that the U.S. and its partners remain ready, adaptable and lethal where and when it matters most.