NSWCDD Delivers Next-Generation MK 38 Defense System

SOUTH CHINA SEA – Arleigh Burke-class guided-missile destroyer USS Mustin (DDG 89) fires its MK 38 25 mm gun during a live-fire drill in 2015. The weapon has since been upgraded to MK 38 MOD 4, which employes a 30 mm gun and integrates with the Aegis Combat System. (U.S. Navy photo by MCSN David Flewellyn)

By Tierney Kunstmann, NSWCDD Corporate Communications, Feb 6, 2026

DAHLGREN, Va. – For decades, the MK 38 family – a key Navy shipboard weapon system – has delivered reliable close-in defense against small, fast, agile threats at sea.

Since its commissioning in 1977 to protect warships primarily from surface threats, the platform has continually evolved –

extending its reach, improving precision and adapting to counter a full spectrum of modern maritime dangers.

Now, that evolution has taken another significant leap.

As technical design agent, Naval Surface Warfare Center Dahlgren Division has led the development of the system's latest upgrade to the MK 38 family – the Mod 4 – which fully integrates the gun with the Aegis Combat System and strengthens defense against unmanned aerial systems and high-speed, maneuverable unmanned surface vehicles. The Mod 4 also delivers the weapon's first caliber increase in more than 30 years, from 25 mm to 30 mm. With NSWCDD's connection to Aegis, merging the two was a natural progression and allowed for a smoother transition.

"It is going to greatly improve the ship's ability to counter modern threats," said Danny Mudd, technical program lead for MK 38 MOD 4. "With the added caliber, we can reach farther and deliver more damage."

A proven line of defense

By 1977, the Navy's long serving 20 mm MK 16 gun had become difficult to maintain. It was also no longer practical; it didn't use the standard NATO ammunition of the time. It needed an upgrade.

The Chief of Naval Operations directed the development of what became the original MK 38 system, built around the 25 mm MK 242 Bushmaster chain gun – a fully power-operated weapon mounted on the MK 88 support structure. This combination set the standard for modern naval close-in defense, making the MK 38 a more capable, responsive and reliable weapon than previous manually operated or smaller-caliber systems.

Rising tensions in the Persian Gulf in the 1980s accelerated the production and deployment of the MK 38 MOD 1 on various

combatant and auxiliary ships and the weapon saw its first operational use during Operation Desert Shield and Desert Storm in the early 1990s.

While the first mods had addressed a critical gap, the U.S. Navy recognized that there was room for improvement. The MK 38 MOD 2 upgrade transformed the mount into the Typhoon Weapon System, which introduced remote-control operation and mount stabilization and allowed the weapon to maintain aim even as the ship pitched and rolled. It also added a new electro-optical/infrared sensor and a laser rangefinder, giving the system reliable day/night target performance. Beyond sensors, Mod 2 brought improved ammunition handling and enhanced interfaces – resulting in faster and more reliable engagement. Testing showed it delivered two to three times the strike accuracy of its predecessor.

The next upgrade, MK 38 MOD 3 fielded in 2017, advanced the design by introducing an optional 7.62 mm coaxial chain gun with as many as 750 ready rounds, more than four times the capacity of the Mod 2. It also incorporated an improved EO/IR sensor that provides 330-degree surveillance capability and multiple fields of view. This sensor is decoupled from the gun, allowing operators to scan independently of the weapon and reducing the chance of alerting an adversary that they've been detected.

Meeting evolving threats

The newest upgrade, the MK 38 MOD 4, features several improvements. At its core is the Northrop Grumman MK 44 Bushmaster II 30 mm gun – now capable of employing air-burst munitions – integrated with the MK 48 MOD 2 electro-optical sight system and the MK 134 MOD 0 operator console. This setup transforms the MK 38 MOD 4 into a smarter, more powerful and more precise weapon system, capable of handling modern threats that older guns couldn't reliably engage.

An optional 12.7 mm coaxial heavy machine gun further expands engagement options and improves responsiveness against a range of threats. The new sensor is fully stabilized and off mount, enabling better accuracy tracking and clearer imagery in challenging visibility.

A July 2022 test on NSWCDD's Potomac River Test Range successfully identified, tracked and engaged both surface and aerial targets using live ammunition against fixed and moving targets. It also highlighted the enhanced fire-control chain, the 30 mm gun's improved performance and its ability to counter new challenges.

USS Mustin (DDG 89), an Arleigh Burke-class Aegis guided missile destroyer, was the first U.S. Navy warship to receive the upgrade. Dahlgren Division is now finalizing the configuration so the system can be introduced to a wider set of platforms as fleet requirements evolve.

"We're tracking the emergence of new threats, now including airborne ones, and adapting accordingly," Mudd said. "The Mod 4 is designed to deliver greater lethality across a wider range of targets, strengthening overall ship defense and giving us the edge we need."

Editor's note: This story is part of an ongoing series exploring the capabilities and developments of the Aegis Combat System. Read the first installment here.