

With a bang, Navy begins tests on electromagnetic railgun prototype launcher

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This photo illustration shows the 32-megajoule prototype demonstrator, built by BAE Systems, top, which arrived at Naval Surface Warfare Center Dahlgren Division on Jan. 30, 2012, and is the first of two industry-built launchers to be delivered to the Navy. General Atomics is building the second launcher, bottom, scheduled for delivery in April 2012. ONR previously relied upon laboratory-built systems to advance the technology. Credit: US Navy Illustration

Engineers have fired the Navy's first industry-built electromagnetic railgun (EM Railgun) prototype launcher at a test facility, commencing an evaluation that is an important intermediate step toward a future tactical weapon for ships, officials announced Feb. 28.

The firing at Naval Surface Warfare Center Dahlgren Division (NSWCDD) kicks off a two- month-long test series by the [Office of Naval Research](#) (ONR) to evaluate the first of two industry-built launchers. The tests will bring the Navy closer to a new naval gun system capable of extended ranges against surface, air and ground targets.

"We are starting our full-energy tests to evaluate the barrel life and structural integrity of the [prototype system](#)," said Roger Ellis, program manager of the EM Railgun, part of ONR's Naval Air Warfare and Weapons Department. "It's the next step toward a future tactical system."

The EM Railgun launcher is a long-range weapon that fires projectiles using electricity instead of chemical propellants. Magnetic fields created by high electrical currents accelerate a sliding metal conductor, or armature, between two rails to launch projectiles at 4,500 mph to 5,600 mph.



A high-speed camera captured the first full-energy shots from the Office of Naval Research-funded electromagnetic railgun prototype launcher that was recently installed at a test facility in Dahlgren, Va. The test shots begin a month-long series of full-energy tests to evaluate the first of two industry-built launchers that will help bring the Navy a step closer to producing a next-generation, long-range weapon for surface ships. The new launcher brings advanced material and high-power technologies in a system that now resembles a large-caliber gun. Credit: US Navy photo by John F. Williams/Released

The 32-megajoule prototype demonstrator, built by BAE Systems,

arrived at NSWCDD on Jan. 30. One [megajoule](#) of energy is equivalent to a 1-ton car being thrust at 100 mph. The prototype—which now looks more like a naval weapon compared to previous lab-style launchers—is the first of two industry-built launchers to be delivered to the Navy. General Atomics is building the second launcher, scheduled for delivery in April. ONR previously relied upon laboratory-built systems to advance the technology.

After installing the BAE Systems launcher and outfitting it with a comprehensive suite of sensors, high-speed cameras and measuring devices, engineers fired successful low-energy test shots to prepare it for the evaluation. The team will conduct tests at 20 megajoules and 32 megajoules, shooting test projectiles similar to what was previously fired through NSWCDD's laboratory launcher.

"The test series will characterize the gun's performance by shooting several rounds through the barrel at various energy levels to fully exercise the capabilities of the prototype," said Ellis.

When fully developed, the EM Railgun will give Sailors a dramatically increased multimission capability. Its increased velocity and extended range over traditional shipboard weapons will allow them to conduct precise, long-range naval surface fire support for land strikes; ship self-defense against cruise and ballistic missiles; and surface warfare to deter enemy vessels. The Navy's near-term goal is a 20- to 32-megajoule weapon that shoots a distance of 50 to 100 nautical miles.



Gary Bass, left, and Jim Poyner, from the Naval Surface Warfare Center, Dahlgren Division, take measurements after a successful test firing of the Office of Naval Research-funded electromagnetic railgun prototype launcher that was recently installed at a test facility in Dahlgren, Va. The test shots begin a month-long series of full-energy tests to evaluate the first of two industry-built launchers that will help bring the Navy a step closer to producing a next-generation, long-range weapon for surface ships. The new launcher brings advanced material and high-power technologies in a system that now resembles a large-caliber gun. Credit: US Navy photo by John F. Williams/Released

To achieve this, the Navy is moving ahead with the EM Railgun program's next phase: to develop thermal management systems for both the launcher and pulsed power to facilitate increased firing rates of up to 10 rounds per minute. Toward this end, BAE and General Atomics have been contracted to begin concept design of a next-generation thermally managed launcher.

"The next phase of the development effort is to demonstrate the ability to operate at a firing rate of significant military utility," Ellis said.

Additionally, ONR awarded contracts through Naval Sea Systems Command to General Atomics, BAE Systems and Raytheon Co. to develop a pulsed power system capable of meeting the firing rate goal.

Various new and existing ship platforms are currently being analyzed for future integration.

Provided by Office of Naval Research

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