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A missile punch at bullet prices

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By MICHAEL ZITZ

Normally, new weaponry tends to make defense more expensive. But the Navy likes to say its new railgun delivers the punch of a missile at bullet prices.

A demonstration of the futuristic and comparatively inexpensive weapon yesterday at the Naval Surface Warfare Center at Dahlgren had Navy brass smiling.

The weapon, which was successfully tested in October at the King George County base, fires nonexplosive projectiles at incredible speeds, using electricity rather than gun powder.

The technology could increase the striking range of U.S. Navy ships more than tenfold by the year 2020.

"It's pretty amazing capability, and it went off without a hitch," said Capt. Joseph McGettigan, commander of NSWC Dahlgren Division.

"The biggest thing is it's real--not just something on the drawing board," he said.

The railgun works by sending electric current along parallel rails, creating an electromagnetic force so powerful it can fire a projectile at tremendous speed.

Because the gun uses electricity and not gunpowder to fire projectiles, it's safer, eliminating the possibility of explosions on ships and vehicles equipped with it.

Instead, a powerful pulse generator is used.

The prototype fired at Dahlgren is only an 8-megajoule electromagnetic device, but the one to be used on Navy ships will generate a massive 64 megajoules. Current Navy guns generate about 9 megajoules of muzzle energy.

The railgun's 200 to 250 nautical-mile range will allow Navy ships to strike deep in enemy territory while staying out of reach of hostile forces.

Rear Adm. William E. "Bill" Landay, chief of Naval Research, said Navy railgun progress from the drawing board to reality has been rapid.

"A year ago, this was [just] a good idea we all wanted to pursue," he said.

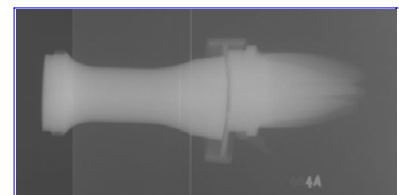
Elizabeth D'Andrea of the Office of Naval Research said a 32-megajoule lab gun will be delivered to Dahlgren in June.

Charles Garnett, project director, called the projectile fired by the railgun "a supersonic bullet," and the weapon itself is "a very simple device."



[Photos courtesy of the Office of Naval Research](#)

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[Flash Xray composite image of the projectile and armature in flight during firing of the large scale Electromagnetic Railgun at the Naval Surface Warfare Center Dahlgren Laboratory. Photo courtesy of U.S. Navy](#)
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He compared the process to charging up a battery on the flash of a digital camera, then pushing the button and "dumping that charge," producing a magnetic field that drives the metal-cased ordnance instead of gun powder.

The projectile fired yesterday weighed only 3.2 kilograms and had no warhead. Future railgun ordnance won't be large and heavy, either, but will deliver the punch of a Tomahawk cruise missile because of the immense speed of the projectile at impact.

Garnett compared that force to hitting a target with a Ford Taurus at 380 mph. "It will take out a building," he said. Warheads aren't needed because of the massive force of impact.

The range for 5-inch guns now on Navy ships is less than 15 nautical miles, Garnett said.

He said the railgun will extend that range to more than 200 nautical miles and strike a target that far away in six minutes. A Tomahawk missile covers that same distance in eight minutes.

The Navy isn't estimating a price tag at this point, with actual use still about 13 years away. But it does know it will be a comparatively cheap weapon to use.

"A Tomahawk is about a million dollars a shot," McGettigan said. "One of these things is pretty inexpensive compared to that."

He said estimates today are that railgun projectiles will cost less than \$1,000 each, "but it's going to depend on the electronics."

Projectiles will probably eventually have fins for GPS control and navigation.

To achieve that kind of control and minimize collateral damage, railgun ordnance will require electronic innards that can survive tremendous stress coming out of the muzzle.

"When this thing leaves, it's [under] hundreds of thousands of g 's, and the electronics of today won't survive that," he said. "We need to develop something that will survive that many g 's."

At the peak of its ballistic trajectory, the projectile will reach an altitude of 500,000 feet, or about 95 miles, actually exiting the Earth's atmosphere.

The railgun will save precious minutes in providing support for U.S. Army and Marine Corps forces on the ground under fire from the enemy.

"The big difference is that with a Tomahawk, planning a mission takes a certain period of time," McGettigan said. "With this, you get GPS coordinates, put that into the system and the response to target is much quicker from call to fire to actual impact."

General Atomics, a San Diego defense contractor, was awarded a \$10 million contract for the project last spring.

The concept was born in the 1970s then promoted when President Ronald Reagan proposed the anti-missile "Star Wars" Strategic Defense Initiative. The SDI railgun was originally intended to use super high-velocity projectiles to shoot down incoming ballistic missiles.

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