

Yuma Proving Ground remains on artillery cutting edge

By Mark Schauer

For most of its history, artillery testing has been Yuma Proving Ground's core mission.

As artillery technology evolved over the decades, YPG remained on the cutting edge of testing guided and semi-guided munitions capable of hitting within mere meters of a target many kilometers away.

Today, the Chief of Staff of the Army has identified long-range precision guided munitions as the service's top priority, with aspirations of fielding systems within four years capable of accurately firing at targets 100 kilometers away.

In perspective, a currently fielded 155 mm artillery piece typically fires at targets no more than about 30 kilometers away.

One critical component of the Extended Range Cannon Artillery (ERCA) program currently being tested at the proving ground is the XM1113 projectile, which exceeded 60 kilometers in a test conducted in late May.

"This is a fairly traditional artillery round, but putting a bigger rocket on it allows us to achieve much farther ranges," said Tyler Heagney, test officer. "Precision and long-range are the objectives."

For the test, the projectiles were fired from an Extended Range Cannon developed under the ERCA project. Though capable of substantially longer ranges, the new projectile is remarkably similar to currently fielded 155 mm rounds.

"The prototypes of XM1113 projectiles being manufactured today use tooling that is relatively close to what we would use once the round moves into production," said Ductri Nguyen, ERCA lead. "It would be a relatively easy transition, though there are some optimizations we could do for cost-cutting."

The most significant difference is in the round's much larger rocket, which pushes out more than twice as much thrust as the legacy system. Methodical test Fires of the new round are vitally important, and recovering the fired rounds for careful analysis even more so.

"We look for nozzle degradation or erosion," said Nguyen. "There are insulators

that protect the heat from intruding into the explosive. We certainly don't want to raise the high explosive to critical temperatures. We also want to examine the performance of the rotating band we are using from the legacy system."

Further, the XM1113 is designed to utilize the currently fielded Precision Guidance Kit (PGK), a fuze that turns a conventional artillery round into a semi-guided one.

"It is intended to be compatible with PGK, so we are designing it in collaboration with the PGK team to ensure this round will work with it," said Nguyen. "There may be some required modifications for one or both systems, but I think we can exceed our objective of meeting PGK's current accuracy threshold."

Guided munitions are designed for pinpoint accuracy, yet safely testing them requires an enormous amount of range space. YPG is the fourth largest facility in the Department of Defense in terms of land area.

"In the development of smart muni-

tions, you have very large safety fans because it's not just ballistic anymore," said Kermit Okamura, Munitions and Weapons Division chief. "If I shoot a rifled cannon, it's going to go straight and a little to the right. With guided munitions, anything going wrong, from electrical to mechanical, can make it go way off course."

The Hyper Velocity Projectile, another aspect of ERCA testing by YPG personnel, has already achieved a distance that exceeds YPG's range space.

"As large as Yuma Proving Ground is, we're running out of room," said Okamura. "It isn't just YPG, it's also many other installations in the Department of Defense."

As a temporary solution, YPG personnel have conducted two test Fires at the Barry M. Goldwater Range, a larger facility south of the proving ground that is shared by the Marine Corps and Air Force and primarily used for operational testing of high-performance aircraft. The two test Fires were carried off flawlessly, but posed extraordinary challenges for YPG personnel.

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One critical component of the Extended Range Cannon Artillery program currently being tested at the proving ground is the XM1113 projectile, which exceeded 60 kilometers in a test conducted at U.S. Army Yuma Proving Ground in late May. The most significant difference is in the round's much larger rocket, which pushes out more than twice as much thrust as the legacy system. (Mark Schauer/U.S. Army)

"We had to fire on weekends to avoid a conflict with the Marine and Air Force missions," said Diep Ho, test officer.

Test personnel had to transport and emplace numerous pieces of large, specialized and expensive test-support equipment, then quickly take it down and return it to the proving ground, a multi-day effort. For a variety of reasons, the Goldwater Range will eventually be unable to support the long-range test Fires slated to take place over the next several years. YPG leaders hope to eventually be granted a special use permit for a small number of test Fires from a patch of completely unpopulated Bureau of Land Management-controlled land north

of YPG's boundaries that will effectively meet the long-range munitions' safety fan requirements.

Though much more ERCA-related testing remains in future plans, testers are excited about what has already been achieved.

"That we are effectively at least doubling the range of traditional artillery is pretty exciting," said Heagney. "Once we get this fielded, it will be really cool to put this in the hands of our Soldiers and have them even further out of danger and still hitting targets."

Testers have also been impressed with YPG's flexibility in accommodating rapidly changing test requirements.

"YPG has been absolutely fantastic," said Nguyen. "We've made a lot of changes during testing — sometimes we have to change the test sequence on the fly based on the data we are seeing. YPG's test officers have been very accommodating."

"At many U.S. test ranges, flexibility is limited," added Steve Flores, Artillery and Mine Branch chief. "Here, because of our efficiency in conducting tests, we can schedule tests weeks in advance instead of months in advance."

Mark Schauer is the editor of "The Outpost" and has worked in the public affairs office at U.S. Army Yuma Proving Ground since May 2008.