

Space and Missile Defense Command saves Army money with low-cost 'Zombie' targets

U.S. Army

REDSTONE ARSENAL, Ala. -- The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command has found a way to save the Army money while still providing capabilities by using low-cost targets during missile defense testing.

Members of the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, or USASMDC/ARSTRAT, Technical Center, in support of the Program Executive Office Missiles and Space's Lower Tier Program Office, or LTPO, is providing a realistic threat ballistic target called "Zombie" for use in testing the PATRIOT Advanced Capability-3 Missile Segment Enhancement, or PAC-3 (MSE), advanced missile defense systems.

With the Army and testers of missile defense programs looking to save money on ballistic missile targets, SMDC has developed low-cost targets that cut expenses from the approximate \$30 million each for high-end targets, to approximately \$4 million for SMDC's low-cost Zombie targets. These savings will allow program managers to stretch their testing budgets and apply funding to where it is needed while reducing the program's overall testing budget.

Zombie uses government-owned material components that have reached the end of their useful life and are subject to consideration of demilitarization. The re-purposing of this government hardware instead of demilitarization ultimately saves the taxpayers' money.

"This is what the Technical Center does and this is kind of what Redstone Arsenal does," said Col. Morris L. Bodrick, former SMDC Technical Center deputy. "Whenever we are able to leverage the government expertise in our labs and our research centers with our industry partners, we can produce a lot of quality work like this project."

To save the government money, SMDC members are using components from legacy systems and reconfiguring them to fly, in modified configurations, as ballistic targets.

"Some of the legacy components we are pulling from are from systems that some employees refer to as 'dead components' or components that are not part of the active program's future developments," said Bryon K. Manley, Technical Center Flight Test Services chief. "And then someone like us comes and asks the legacy programs if we can utilize components to fly two new targets in 2013."

"The 'rebirth' of the dead components is where the term Zombie came from,"

Manley explained. "People who have worked this program love this name because of recent pop culture popularity, and even the PATRIOT interceptor program operators have used the name 'Zombie Killers' in their documentation. It is a name that people can get behind and get motivated."

The Zombie missile recently underwent validation as a threat-representative target to meet second quarter testing needs and will fill a target niche in the future. Zombie is an alternative to the high-performance Juno missile targets that remains an important target for LTPO, and its capabilities are still required to meet specific test requirements.

Zombie is an alternative to the high-cost, high-performance, high-fidelity tactical ballistic missile targets historically used in PATRIOT PAC-3 testing, such as the Juno. Although it is natural to compare Zombie to Juno, Zombie is not a replacement for Juno, as Juno is still needed for the occasion when its specific, required performance capabilities are required.

"As the former product manager of the PAC-3 product office, I really understand the value of having these kinds of options," Bodrick said. "Having a target that is able to meet requirements and is able to fly the kind of envelope it is needed to fly, allows us to not only purchase more targets, it also lets us conduct more testing, which is what we haven't been able to do in the past because of the cost of targets and the amount of time it takes to build a target.

"With some of our high-end targets, in the \$30 million range, you don't just go out and build five and six of them," he added. "So this option allows us to save greatly and gives the Army a lot of options from a missile defense testing perspective. It really allows us some flexibility in meeting our test objectives and checking the performance of our design more frequently."

Bodrick said the genesis of this project was the cost and schedule of threat representative tactical ballistic missile targets for target options typically used to satisfy these types of target requirements.

"The LTPO uses a selection of targets to trade off the required target characteristics with the target cost," Bodrick said. "LTPO generally uses the high-fidelity, very high-performance, high-cost Juno target or the low-fidelity, medium-performance, very low-cost Patriot-as-a-target, or PAAT, depending on flight test objectives."

This initiative allows a tester to aggressively pursue other options, and in this case, very low-cost options, to be able to meet the same requirements that we need to get the defense missile system past its milestone decisions. The process is designed to save the government, in the long run, a lot of money. Having this option and allowing SMDC to meet the requirements that are needed, is a big deal.

Since its inception, the Zombie took 13 months to build the first two and launch them.

"In these times of budget constraints, the Zombie target allows us more flexibility in testing and can possibly free up more funding elsewhere for the Army," Bodrick said. "Our main goal is to make our customer, PEO MS successful. We want to speed the process of getting the capability to the field. That is what having these low-cost, short lead time production targets allows us to do in meeting the operational needs of the warfighters."

The Zombie idea is one of several low-cost ballistic targets that have been developed and are developing. Each version and individual development has its own unique performance parameters intent on meeting the full threat representative trade space. The Economical Target-1 was the first in a suite of targets that was developed and launched on its maiden voyage in February 2012. Two other developments currently ongoing, however, add more flexibility and performance at longer ranges.

"When the developments are complete, SMDC will be able to make these low-cost target options at lower-than-traditional target costs," Manley said. "The goal is to build huge capabilities at low cost. We built our two Zombie targets for \$7.5 million. Our first target, launched on April 7th, was a risk-reduction flight that confirmed our ability to produce future low-cost targets, confirm our performance and allow the system under test to get a 'first look' at the target."

"Lance is another in our low-cost target suite," he continued. "The Missile Defense Agency abandoned the Lance missiles and my division went and picked them up because there are systems that need cheap targets. For less than \$500,000 apiece, we are providing eight telemetry configured Lance missiles to get real tactical ballistic missile test articles to exercise a defense system at a fraction of what other targets are normally available in the integrated missile defense community.

"We are not replacing the more expensive targets, we are producing a surrogate that is threat-credible and can be used in its place," Manley added. "If you place the two side-by-side, they can simplistically be compared like a 1972 Volkswagen bug, and the other is a Maserati from a maximum performance perspective, and that is why you are paying more. But during these tests, all you are doing is transporting passengers from here to there; you are not racing. At the end of the day, the customer only cares about if they are successful, if it has low costs and we have a target to shoot at that meets their performance requirements."

On June 6, a PAC-3 (MSE), missile successfully engaged, intercepted and destroyed a second Zombie low-cost threat representative target during a flight test at White Sands Missile Range, N.M.

Two PAC-3 (MSE) missiles ripple fired against an advanced Zombie tactical ballistic missile target. The first MSE missile successfully engaged and destroyed the tactical ballistic missile target while the second missile self-destructed as planned.

"Zombie was a great accomplishment from different offices working together to generate a viable alternative target from that of the more costly Juno target," said Lawrence Abrams, LTPO assistant project manager for Strategic Planning, "Although

the community at large recognized that the alternative target would not meet all the target requirements, collectively it was agreed that critical elements were being met and allowed for use of a significantly lower cost target."

Manley said the idea his team started out with, is knowing that existing target inventories that have been used in the past are going away or have already been shot. These 'legacy' target systems are no more and what was left were targets with more capability than what the tester needed.

"So, the idea behind our approach is to develop a whole new suite of targets that utilize old rocket motors that the Army has already invested money in and developed and have no future planned usage," Manley said. "We are taking them and retrofitting and reconfiguring them to fly in a manner for which they were not designed. But at the end of the day, when you are flying ballistic missile targets, the performance requirements can be simplified from much more complicated requirements."

Manley said when he was given the division in 2009, he had two employees, no budget and no programs. One of the first things he did was look at the mission and SMDC's role in the Army. Being in the missile defense arm of the SMDC Tech Center, he took a look at what the PATRIOT Missile System is going to shoot in the next five years as a target. He then asked what his division can do to help out in the test arena and help PATRIOT be successful.

"As we looked around, we had an issue where legacy targets had either been shot up in the execution of tests over the past 15 years, don't exist, or don't meet testing requirements," Manley said. "What we are left with is the high-performance targets with substantially higher costs. There is a better way to approach target development. By focusing on what the missile defense system's needs are, in this case PATRIOT's needs, performance and cost control can be traded to reach the optimum solutions that meet the program needs."

The PATRIOT missile system's PAC-3 (MSE) missile, along with the PAC-3, are two of the world's most advanced, capable and reliable theater air-and-missile defense interceptors. They are designed to defeat advanced tactical ballistic and air breathing threats.

As the most technologically advanced missiles for the PATRIOT air-and-missile defense system, PAC-3 and MSE missiles significantly increase the system's firepower, allowing 16 PAC-3s or 12 MSE missiles to be loaded in place of four Patriot PAC-2 missiles on the launcher. The PAC-3 MSE missile is packaged in a single canister that stacks to provide more flexibility for warfighters in the field.

"From our mission perspective, we are looking for solutions to allow our customers to save money in the target's arena, so they can increase the amount of testing opportunities and ultimately be successful," Manley said. "We are playing a role in getting the PAC-3 MSE to production and ultimately fielded where the latest interceptor will protect our troops in the field."

Boyd said the LTPO is investing in the Zombie target program for the long haul and expects to be using these low-cost targets for many years to come. The LTPO is already experiencing a push for higher performance testing with more limited budgets and Zombie will help fulfill that goal.

"The addition of the Zombie target to the LTPO stable is an important development for the LTPO," said Dennis Boyd, LTPO. "The LTPO testing philosophy is to select the lowest cost target that meets the key target performance requirements. The addition of the Zombie to the PATRIOT target stable enables the LTPO to meet mission requirements at a lower cost where the savings are applied to other lower priority program funding requirements."

Boyd said that past tests of the PAC-3 MSE interceptor have required the high-cost Juno target to meet the test objectives, and in the recent 7-5 flight test conducted on June 6, LTPO was able to meet all of the MSE flight test objectives with the much lower cost Zombie target. He said the result was a savings of 60 percent over previous target costs and future target design-to-cost goal should result in an even higher percentage of savings.

"The LTPO has a very full test schedule that requires very careful coordination of assets," Boyd said. "Scheduling of the first two Zombie targets provided some challenges, though the challenges were similar to that of most target development programs, they were workable and LTPO is ultimately happy with the result."

Boyd mentioned the success of the second Zombie launch. He said that the launch was one more step in making the PAC-3 (MSE) operational.

Everyone involved talked about how the low-cost targets will save money during shrinking budgets and they all agreed the program's ultimate goal is to speed up the deployment of systems designed to protect Soldiers, sailors, airmen and Marines who are defending the nation.

"This is such an innovative approach in this fiscal environment to tackling such a huge problem which is managing target costs within the missile defense community," Bodrick said. "In this fiscal environment, this kind of innovation and forward thinking is going to allow us to not only be able to help the U.S. missile defense capability, but also our allies."

"The SMDC Technical Center is at the forefront of providing the kind of missile defense testing capability to really save the Army a lot of money on its targets," he added. "If we are really able to get this thing rolling, I think it will be a big plus for the command and for the nation."

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