Standard Missile-3 Block IIA Destroys Target in First Intercept from Land

PACIFIC MISSILE RANGE FACILITY, Hawaii – The Missile Defense Agency completed the third successful intercept of a ballistic missile target by a Raytheon Co. Standard Missile-3 (SM-3) Block IIA missile, the next-generation variant that defeats missile threats outside the earth's atmosphere, the company announced Dec. 11.

The test evaluated the system's overall performance and achieved three milestones for the IIA variant:

■ The first successful intercept from a land-based launch.

■ The first intercept of an intermediate-range ballistic missile target.

■ The first intercept using tracking data from remote sensors, known as "engage on remote."

Raytheon's missile defense solutions continue to expand the defended area by protecting against increasingly sophisticated threats with the use of remote sensors. In this test, Raytheon's AN/TPY-2 radar served as a remote sensor, tracking and providing the missile with data on the incoming threat, instead of using the phased-array connected to the Aegis Ashore system.

"This is a versatile and sophisticated missile," said Dr. Taylor W. Lawrence, Raytheon Missile Systems president. "Our partnership with the Missile Defense Agency and Japanese industry made these results possible."

The IIA variant has larger rocket motors and a bigger kinetic warhead, raising its effectiveness against evolving threats.

The advanced missile obliterated a medium-range ballistic missile target at sea in October. SM-3 is the only ballistic missile interceptor that can be launched at sea and on land, and has achieved over 30 intercepts in space.

Navy Announces Findings on Sinking of World War I Cruiser USS San Diego

WASHINGTON – The Navy announced its findings Dec. 11 after a two-year study into what sank the World War I cruiser USS San Diego (ACR 6).

Alexis Catsambis, Ph.D., of the Naval History and Heritage Command's Underwater Archeology Branch, based at the Washington Navy Yard, led the project and chaired a panel discussion for media at the American Geophysical Union's (AGU) Fall Meeting. Although the original court of inquiry believed the explosion that sank the 500-foot armored cruiser was caused by a mine, later speculation raised the theory that it might have been a torpedo.

After examining new survey data, additional archival research, computer impact and flooding models, the area of the ocean floor in which the wreck rests, and other elements related to the ship's loss, Catsambis announced that research team believed the explosion's cause was a mine. In fact, they believe it was one of two types of mines laid by German submarine U-156.

"The legacy of the incident is that six men lost their lives on July 18, 1918," Catsambis said. "With this project we had

an opportunity to set the story straight and by doing so, honor their memory and also validate the fact that the men onboard did everything right in the lead up to the attack as well as in the response. The fact that we lost six men out of upwards of 1,100 is a testament to how well they responded to the attack."

In addition to Catsambis, the panel participants included Ken Nahshon, Ph.D., of the Naval Surface Warfare Center Carderock Division in Bethesda, Maryland, and Arthur Trembanis, Ph.D., from the University of Delaware in Newark, Delaware.

The 15,000-ton armored cruiser San Diego sank off Long Island, New York, losing six sailors from a crew of 1,100. German submarines had mined the coast, implicating a mine. But the ship's captain was perplexed that the explosion occurred aft of the ship's widest point, which gave rise to the notion the explosion might have been caused by a torpedo even though no submarine or torpedo trail had been spotted.

Later theories suggested a coal bunker explosion or sabotage, but the source of the explosion remained a mystery.

During the presentation, the scientists detailed how each of their teams used historical analysis, archaeological research, site investigation, and impact and flood modeling to eliminate other possibilities that might have caused San Diego's sinking such as sabotage, accident or enemy torpedo.

Trembanis explained how the use of underwater robotics and remotely deployed instruments including an autonomous underwater vehicle allowed researchers to collect high-resolution 3D images of the site to support their conclusion.

"The format of the 3D modeling data makes analysis readily comparable," said Nahshon. "Before we started this, I wasn't familiar with the ability to do this underwater; above the water we do it all the time, but below water collecting 3D data is a challenge. I've learned that the sheer amount of

expertise that’s needed to interpret it is a credit to the advances of technology in sea floor mapping.”

Before taking questions, Catsambis shared why this research is important for the U.S. Navy and how learning from the past will help to prepare for the future.

“The collection of archeological and hydrographic data establishes a baseline informing site formation processes and management of USS San Diego,” said Catsambis. “Lessons learned here are applicable to other U.S. Navy sunken military craft. This endeavor also provided real-world training opportunities for U.S. Navy divers, archaeologists, historians, modelers, naval engineers and graduate students.”

To commemorate the 100th anniversary of the loss of San Diego, the only major U.S. warship sunk in World War I, a multipartner investigative campaign dubbed the USS San Diego Project was launched in 2017; mapping the wreck, assessing the wreck’s state of preservation, modeling its sinking, and uncovering the weapon that likely sank it.

Dive training at the site occurred in August 2016 and June 2017, with the site investigation commencing September 2017, followed by the commemoration and diver survey July 2018. A major goal of the project is to raise awareness of the importance of preserving the wreck site into the future.

Coast Guard Continues Search for Possible Survivors of

Capsized Migrant Boat

SAN JUAN, Puerto Rico – Coast Guard rescue crews continue searching Dec. 7 for possible survivors of a capsized migrant boat in waters just off Isla Saona, Dominican Republic.

So far, 21 people have been rescued, while seven others are reportedly still missing.

Coast Guard watchstanders in Sector San Juan overheard a VHF Channel 16 radio transmission at approximately 2 p.m. Dec. 6 from the commercial tanker Sea Board Ranger requesting assistance to find for persons in the water, approximately six nautical miles east of Isla Saona, Dominican Republic. The Sea Board Ranger crew further relayed that they located a capsized vessel at and safely recovered 20 migrants from the water.

Survivors reported that there were 28 people aboard the makeshift vessel. Shortly thereafter, Coast Guard Sector San Juan received a request for assistance from Dominican Republic authorities.

Coast Guard watchstanders diverted the Coast Guard Cutter Joseph Tezanos and launched an MH-65 Dolphin helicopter and an HC-144 Ocean Sentry aircraft to search for possible survivors.

The cutter Tezanos arrived on scene located and rescued a woman from the water on the afternoon of Dec. 6, while the crew of the Coast Guard helicopter also located the capsized vessel.

Coast Guard rescue crews participating in the search are the Cutters Joseph Tezanos and Winslow Griesser, MH-65 Dolphin helicopters from Air Station Borinquen, HC-144 Ocean Sentry from Air Station Miami and HH-C-130 Hercules from Air Station Clearwater, Florida.

ODU, LAVLE USA Announce New Marine Electric Propulsion Laboratory for Newport News

NORFOLK, Va. – Old Dominion University (ODU) is collaborating with LAVLE USA Inc. to establish a new Marine Electric Propulsion Simulation (MEPS) Laboratory, the university announced in a Dec. 8 release. The $12 million, 22,000-square-foot lab will be built on 1.33 acres in the heart of downtown Newport News, Virginia.

The lab will house state-of-the-art equipment to develop marine electric propulsion, advanced energy storage, autonomous systems and associated technologies to advance marine vessels for military and commercial applications. It will also focus on training the current and next-generation workforce supporting the shipbuilding and ship repair industry.

ODU President John R. Broderick sees the partnership in Newport News as an ideal opportunity for hands-on learning, particularly in one of the region's key industries.

"The university is excited about this project, which has grown from of our digital shipbuilding initiative and aligns with our partners' collective vision for America Builds and Repairs Great Ships," Broderick said. "It is exactly the sort of collaborative research with which ODU wants to be affiliated – it is cutting edge, makes a significant economic impact to the region, supports the region's military, maritime and industrial bases, and provides hands-on training and education for students, industry and naval personnel."

The lab is expected to create at least 25 high-paying jobs including designers, engineers, programmers, and analysts.

LAVLE will design the lab's engineering and building plans for city approval in the first half of 2019. Construction is expected to begin in the summer with occupancy anticipated in summer 2020.

"The advantages of workforce development in Newport News cannot be overstated. In addition to the technical advantages of partnership with ODU and the MEPS Lab, LAVLE USA is extremely excited about the workforce development opportunity where our business will become even more heavily invested. Vessel electrification and hybridization within the region is a critical future market," said Jason Nye, LAVLE CEO.

"We are pleased LAVLE and ODU have selected Newport News as the site of the MEPS Lab," said Mayor McKinley L. Price. "The research and development that will be conducted at MEPS will bring new technology to the commercial and military markets and expand Newport News' role as a center of excellence for maritime innovation and construction."

"The city and EDA are excited to host MEPS," said Florence G. Kingston, the city's director of development and secretary/treasurer of the EDA. "We have been impressed by the entrepreneurial approach LAVLE and ODU have displayed during the site-selection process for the lab."

General Dynamics Awarded $346

Million by U.S. Navy for Virginia-Class Submarine Work

GROTON, Conn. – General Dynamics Electric Boat has been awarded a $346.5 million contract modification by the U.S. Navy to provide research and development and lead-yard services for Virginia-class nuclear-powered attack submarines. Electric Boat is a wholly owned subsidiary of General Dynamics.

Under the contract modification, Electric Boat will undertake development studies and other work related to Virginia-class submarine design improvements. Additionally, Electric Boat will perform research and development work required to evaluate new technologies to be inserted in newly built Virginia-class ships, including the Virginia Payload Module.

Initially awarded in 2016, the contract has a potential value of $1.3 billion through September 2019.

ONR-Sponsored Researcher Wins Nobel Prize

ARLINGTON, Va. – The Office of Naval Research (ONR) has a long record of placing winning bets on up-and-coming scientists. In fact, it was 30 years ago that the ONR Young Investigator Program sponsored Dr. Frances H. Arnold, a professor from the California Institute of Technology, who has been awarded the 2018 Nobel Prize in Chemistry.

Arnold – who still serves as a professor of chemical

engineering at Caltech – was in Stockholm, Sweden, for the Nobel Prize Award Ceremonies, where she became only the fifth woman – and the first American woman – to take home science's most recognized award.

"Dr. Arnold is the latest in a long line of Nobel Prize winners to have been sponsored through ONR basic research programs," said Dr. E. Anne Sandel, ONR executive director. "Like the others, her research has led to discoveries and breakthroughs with important implications for both the Navy and society at large."

ONR sponsored Arnold with a series of grants between 1988 and 2002.

"I received an ONR Young Investigator Award in the late 1980s, which introduced me to problems of interest to the Navy, but also problems of good intellectual content that overlapped with some of my interests in metal recognition and protein engineering," said Arnold.

It was during this period that Arnold pioneered a process known as directed evolution of enzymes, which steers enzymes – proteins that accelerate chemical reactions – toward specific functions, such as manufacturing pharmaceuticals and biofuels.

"During those years, I developed methods for creating proteins that could be useful for naval applications, but that also pushed the boundaries of protein engineering," said Arnold. "We were doing things that no one knew how to do.

"The methods we devised to make new proteins became useful to many other laboratories. That's the reason I won the Nobel Prize," she continued, "not just for what I have done with directed evolution, but for the impact that others have made with the technology we developed in those early days."

Subsequent to Arnold's original research, Dr. Laura Kienker, a program officer in ONR's Warfighter Performance Department,

saw the promise in Arnold’s work and provided a grant from 2011 to 2014, which led to the creation of a whole new class of enzymes that is important to sustainable production of chemicals and fuels from renewable sources.

Arnold’s research and teaching has also benefitted a new generation of scientists, several of whom ONR currently sponsors through basic research grants. According to Arnold, it’s important to take interest in and support this new generation of researchers, just like ONR did in her 30 years ago.

“It’s really important to fund people at an early stage, when they are just starting to formulate their ideas, because problems we learn about early in our careers stay with us,” said Arnold. “I

can’t thank ONR enough for that critical early support and also for introducing me to a community of brilliant scientists who were breaking new ground in biological engineering.”

Since 1952, more than 60 Nobel laureates have been sponsored by ONR for their work in everything from laser technology to graphene.

U.S. Coast Guard, Royal Canadian Navy Offload More than 5,100 Pounds of Seized

Cocaine

SAN DIEGO – U.S. Coast Guard and Royal Canadian Navy crews offloaded more than 5,100 pounds of seized cocaine on Dec. 7, worth nearly $70 million wholesale, in San Diego following a 49-day counter-drug patrol in the Eastern Pacific aboard Her Majesty's Canadian Ship (HMCS) Edmonton with an embedded U.S. Coast Guard law enforcement detachment, the Coast Guard Pacific Area said in a release of the same date.

The cocaine was seized in international waters off the coast of Central and South America in support of Operation Carribe.

The crew of Edmonton with their embedded U.S. Coast Guard law enforcement detachment stopped two go-fast boats, resulting in the seizure of more than 3,500 pounds of cocaine worth almost $50 million. The crews also recovered an additional 1,600 pounds of cocaine from the Eastern Pacific Ocean during the patrol.

"This 'cycle of justice' disrupts a 'cycle of crime,' which left unchecked, fuels violence and instability that corrodes our hemisphere's social and economic fabric," said Vice Adm. Linda Fagan, U.S. Coast Guard Pacific Area commander. "I stand here today, alongside our Royal Canadian Navy partners, resolved in a shared commitment to protect those threatened by criminals and bring to justice those engaging in these nefarious acts."

The Canadian Armed Forces are an international partner in the fight against transnational crime. Canadian-U.S. crews were responsible for seizing more than 31,000 pounds of cocaine from suspected drug smugglers in the Eastern Pacific since 2015 – taking an estimated $417 million out of the hands of the transnational organized crime networks.

Go-fast boats, traditionally open-hulled boats with multiple outboard engines, are used to outrun military and law

enforcement officials. This offload showcases the variety of tactics and methods of conveyance transnational organized crime groups use to evade military and law enforcement detection.

The multinational effort to combat criminal networks in the region includes more than 19 partner nations operating with Joint Interagency Task Force South (JIATF South) a component of U.S. Southern Command. JIATF South partner nations, including Canadian forces, removed approximately 113 of the 283 tons of cocaine seized or disrupted for fiscal year 2017. JIATF South detects and monitors illicit trafficking in the air and maritime domains to facilitate international and interagency interdiction and apprehension of suspected illicit traffickers.

Operation Caribbe takes place in the Eastern Pacific Ocean and the Caribbean Sea. Under this operation, Canada sends Canadian Armed Forces ships and aircraft to assist Operation Martillo. This U.S.-led effort involves multiple countries cooperating to thwart the flow of drug trafficking.

Marine Corps Officials Look to Micro-Grid to Help Offset Hike in F-35 Energy Costs

SAN DIEGO – The F-35 Lightning II jet will hike Marine Corps Air Station (MCAS) Miramar's utility costs by 150 percent compared to legacy F/A-18 Hornets, an expense driven by greater power requirements to maintain and operate the highly complex, fifth-generation aircraft, a senior official told a group of energy officials.

But an expanding micro-grid and alternative energy projects could take a bite out of that bigger bill when the F-35 comes online by 2020, Col. Charles B. Dockery, the MCAS Miramar commander, said at a briefing Dec 3.

“We know already our F-35 hangars are burning about 150 percent more energy than the standard Hornet or Harrier hangar that I grew up in, so that’s a concern,” he told California Public Utilities Commission and California Energy Commission members who joined state, city and energy firm representatives for a two-day conference at the San Diego base.

Existing, older hangars can’t fully support the modern, multimission joint strike fighter, which requires hangars with upgraded electrical support. The Marine Corps is in the process of retrofitting, building or planning for hangars to support the F-35 at its fixed-wing air stations, including Yuma MCAS, Arizona, and Beaufort MCAS, South Carolina, that house the first F-35 operational and fleet replacement squadrons.

The F-35’s advanced electronics, navigation, avionics, communications and weapons systems are designed to be a leap in technology and combat power, but the jet is a power hog of sorts when grounded. Compared to legacy aircraft, it draws on more power for maintenance checks, repairs and operations when on the apron or inside hangars, so these must have the proper electrical connections, data networks, communications links, and heating, ventilation and air conditioning systems in aircraft bays.

“There’s infrastructure that is required to do some specific maintenance on the lift fan of the aircraft or [that] it requires conditioned air as part of that process,” Dockery said, in response to a question about the F-35’s increased power support requirement.

“This is a story that’s going on across the Navy as we try and

rise to this new global power competition," said John A. Kliem, a retired captain and civil engineer and executive director of the Navy's Resilient Energy Program Office.

Miramar's first F-35 hangar is currently under construction and is slated for completion in late 2019. It's one of nine construction projects planned at the air station to support the F-35.

The Marine Corps is buying the single-seat F-35 Lightning II – the F-35B with short-takeoff-and-landing capability and the F-35C for land and shipboard operations – to replace its fleet of Hornets, AV-8B Harriers and EA-6B Prowler jets. So far, the Marine Corps has two F-35 squadrons based at Yuma MCAS and another squadron at Iwakuni MCAS, Japan.

The first F-35C and F-35B jets are scheduled to arrive at Miramar starting in 2020, with Marine Fighter Attack Squadron 314 transitioning from the F/A-18 Hornet to the F-35C and VMFA-225 from its twin-seat F/A-18D Hornets to the F-35B, according to the 2018 Marine Aviation Plan.

Dockery, a veteran F/A-18 naval flight officer, said energy costs for 2020 "is always in the back of my mind." It's among several energy-related and budgetary challenges the air station faces as it looks to stay capable, relevant and modernized to support operational forces.

Two-thirds of the Marine Corps and Navy's air-to-air and air-to-ground and live-fire training ranges are located within one flight's distance from Miramar, located in northern San Diego. That location makes Miramar critical to support military training and project joint forces across the Indo-Pacific region. "We help 3rd MAW [Marine Aircraft Wing] project their aircraft … so they can maintain their ready and lethal force to deploy," he said.

Just last year, utility costs forced Miramar, headquarters of the 3rd MAW, to shift $1.5 million to cover its utility

budget, Dockery said. “I don’t see that changing through FY19.”

To add to that worry, expected cuts coming in the next Department of Defense’s budget, as well as shrinking Navy capital funding, could lead to more belt-tightening moves in the fiscal 2020 budget. That outlook may worsen in the face of likely higher energy costs, a trend of climbing rates that affect all military installations. This is compounded by aging installation infrastructure.

“We haven’t seen a lot of spending increases on the installation side,” said Dockery. “We are constantly almost doing triage to make sure we are fixing the right things on time.”

But Miramar officials hope that the Navy and Marine Corps’ investments in renewable, “green” energy innovations, along with more efficient fossil-fuel systems, will offset rising costs, including tapping into landfill gases for electricity and beefing up its micro-grid.

“We have some opportunities out there … that’s not only going to keep my costs down but is also going to make me energy resilient,” Dockery said.

A $20 million investment by the Defense Department is helping help shore up that resiliency, officials say.

In recent years, Miramar demonstrated a micro-grid to help find ways for installations to become more energy efficient and build energy resiliency to reduce costs and enable continued operations when the power grid goes down.

“If everything goes dark, I need something I can turn on right now,” Dockery said.

Miramar already buys 3.2 megawatts of electricity – one megawatt is enough to power 750 to 1,000 homes – from San

Diego Gas & Electric, the local utility provider. A backup power plant will provide to up 7 megawatts of power from four diesel and natural-gas generators to power the air station's flightline and more than 100 buildings nearby.

"So when SDG&E goes dark, I'm still launching and recovering airplanes," said Dockery.

This year, Miramar received a $5 million California Energy Commission grant to store up to 3 megawatts of energy in the installation micro-grid with backup batteries.

By next year, Miramar will draw from a mix of energy sources, including electricity and natural gas from the regional power grid; electricity generated by solar and methane gas from the adjacent San Diego landfill and integrated into the air station's micro-grid; and a building-level, $3 million micro-grid project with a large solar array and batteries to power the station's Energy & Water Operations Center building off-grid, or in "island mode." The Marine Corps also is boosting its collection and use of reclaimed water, which reduces the amount of pricier potable water that Miramar purchases, and a water project agreement with the city of San Diego is expected to improve water quality and water resiliency at Miramar, officials said.

"Resilience is a solution that involves all of it," Mick Wasco, Miramar's energy program manager, said in a briefing to the group.

"We had the renewables, but we had to bring in conventional power to make it all work," he added. The addition of battery storage also will help provide "power quality" and consistent demand, filling in as needed with fluctuations in available renewable-power generation, he noted.

Lt. Col. Brandon Newell, who heads innovation projects for Marine Corps Installations-West, said the goal is to shore up critical infrastructure when most needed.

“Our vision – our aspiration – for resiliency for installations is that we can go 14 days, no matter what happens external to the base, (and) that energy, water, communications, food and logistics can support the mission that’s required of that base,” Newell said.

The Marine Corps also is boosting its collection and use of reclaimed water, which reduces the amount of pricier potable water that Miramar purchases, and a water project agreement with the city of San Diego is expected to improve water quality and water resiliency at Miramar, officials said.

“This is really a cool thing; the whole Navy is excited,” Kliem told the group, noting Miramar is the first DoD installation to sign an IGSA, or intergovernmental support agreement, with localities – it’s a congressional authority – to help build energy resiliency. “There’s a lot of things that can be done with this once we break the code on how to do this.”

Search Continues for Marines Missing After Air Collision

ARLINGTON, Va. – The search continues for five Marines whose KC-130 Hercules transport/refueling aircraft collided Dec. 6 with a Marine Corps F/A-18D Hornet strike fighter over the Pacific Ocean.

The two Marines in the F/A-18D apparently ejected; one was rescued in fair condition, the other was recovered and declared dead, III Marine Expeditionary Force said in a Dec. 6 release.

“The search-and-rescue operations continue for the remaining five U.S. Marines who were aboard the KC-130 Hercules and F/A-18 Hornet involved in a mishap about 200 miles off the coast of Japan around 2:00 a.m. Dec. 6,” the release said. “The aircraft were conducting routine training and aerial refueling was a part of the training; as to what was taking place when the mishap occurred, that is under investigation.”

Forces from the U.S. Navy and Japan are assisting in the search.

“U.S. 7th Fleet is supporting ongoing search-and-rescue efforts with a Navy P-8A maritime patrol and reconnaissance aircraft flying out of Kadena Air Force Base, along with assistance from the Japan Maritime Self-Defense Force and the Japanese Coast Guard,” the release said.

The Marine Corps has not yet released the names and units of the seven personnel involved. Marine Aircraft Group 11, headquartered at Marine Corps Air Station Iwakuni, Japan, includes one F/A-18D squadron, Marine All-Weather Fighter Attack Squadron 242, and one KC-130J Super Hercules squadron, Marine Aerial Refueler Transport Squadron 152.

The loss of the KC-130J would be the first J-model lost by the Marine Corps. The KC-130J entered service in 2004. More than 50 have been delivered to the Marine Corps.

Coast Guard Cutter Alex Haley Returns After Bering Sea

Patrol

JUNEAU, Alaska – The Coast Guard Cutter Alex Haley returned to homeport in Kodiak, Alaska, Dec. 6, following a 66-day multimission patrol, the 17th Coast Guard District said in a release.

Alex Haley spent the last two months patrolling the Bering Sea and the Aleutian chain. The crew conducted boarding evolutions on the Alaskan crabbing and fishing fleet, and responded to four separate search and rescue cases.

During the Alex Haley's patrol, the cutter's crew conducted 25 fisheries boarding evolutions ensuring the safety of the crews, vessels and the protection of the Bering Sea living-marine resources.

"Following a transfer season that saw a large crew turnover, this patrol provided quality training and operational opportunities across a broad spectrum of Coast Guard missions," said Cmdr. Jon Kreischer, commanding officer of Alex Haley. "We are returning from a highly productive winter season Bering Sea patrol, and I am pleased with the favorable search and rescue case outcomes because they will brighten the holiday season for those families involved."

The Alex Haley is a 282-foot medium-endurance cutter with 100 personnel assigned aboard it. The cutter steamed more than 8,735 miles throughout the last two months, traveling as far west as Adak along the Aleutian chain and as far north as St. Lawrence Island. The crew's time underway was in support of those who make their livelihood on the Bering Sea.