



A report by Patrick Tucker gives a short summary of the Defense Department recently named the Sea Hunter which is a 132-foot robot 'ghost ship' designed to seek out and track diesel-powered submarines across the ocean. The start of the test phase for the program signals a new dawn for autonomous systems at sea, which, Pentagon officials say, will perform an ever-wider variety of jobs and could fundamentally change the way militaries operate on the water.



On-speed waters tests of DARPA's Anti-Submarine Warfare (ASW) Continuous Trail Unmanned Vessel (ACTUV), Feb. 17, 2016 – Source <http://www.defenseone.com/technology/2016/04/us-christens-first-ghost-ship-and-dawn-robotic-navy/127298/>

The Sea Hunter is the first of a new type of ocean drone, called an 'Anti-submarine Warfare Continuous Trail Unmanned Vessel', or ACTUV. The goal of the program: field an autonomous ship with the range and endurance to go anywhere in the world while avoiding collisions with other ships and obeying the rules of navigation. "Current unmanned surface vessel systems and concepts are operated as close-adjuncts to conventional manned ships – they are launched and recovered from manned ships, **tele-operated from** manned ships, and are limited to direct support of **manned** ship missions. The ACTUV system will be **a first of its kind unmanned** naval vessel that is designed and sized for theater or global independent deployment," reads the [program's description](#) from 2014.

Below is footage from some ACTUV trial runs. The vessel can travel 27 knots and was designed to stay at sea for as long as 70 days, but the actual voyage duration depends on fuel burn.



Although the ship is designed to sail unmanned, a human operator will maintain contact and make sure the ship is obeying nautical rules and is on mission. “The human being is not joysticking,” said DARPA program manager Scott Littlefield. Rather the operator stays in the loop via what DARPA calls sparse remote supervisory control. The ship perceives its environment via F- and X-band radar, the ship automatic identification system (required on ships of greater than 300 tons), and a camera. DARPA is working with the Office of Naval Research on a stereoscopic camera and software that can do advanced image recognition of other ships that it encounters. If a second vessel meets ACTUV on the open sea and needs to make bridge-to-bridge contact, the remote human operator will do the talking.

ACTUV is designed to track the new, quieter generation of diesel-powered submarines, **a rising concern for the Pentagon**, and with a price tag **between \$200 million and \$300 million** they are proliferating. Iran currently has 17 diesel attack submarines; China, 53. “Some observers **raised questions about the Navy’s ability to counter** Chinese submarines,” according to the Congressional Research Service, or CRS. Cases in point: in 2006, a Chinese Song sub surfaced five miles from the aircraft carrier USS *Kitty Hawk*. And last October a Chinese attack submarine trailed and simulated a missile attack on the carrier USS *Ronald Reagan* off the southern tip of Japan.

These sorts of incidents are where ACTUV could help close a critical gap. And there are other 'sea monsters' out there, including mines.

Responding to a variety of threats will require different modules and sensor payloads on the ACTUV, which DARPA is exploring with the ONR. Just days before the christening, Matt Klunder, a retired rear admiral and former ONR chief, was at the Pentagon **discussing work that the company Harris, where he now serves as vice president for Defense Department strategy**, is doing in new sensor payloads and what they mean for future autonomous vessels.

“Now we’ve also got these incredibly small micro-payloads that we can put on these autonomous platforms that make them unbelievably effective in terms of a multitude of missions for the Navy, Marine Corps, Army, Air Force, pick one. It’s really given us an ability to now scale these autonomous platforms into many, many multi-function missions,” Klunder told *Defense One*.

Klunder spearheaded autonomy research at ONR. During that time ONR developed the 'Control Architecture for Robotic Agent Command and Sensing', or CARACaS, a small cube **not much bigger than a paperweight** that with a few other



modifications can turn **any** boat into an autonomous vessel. That led to a key demonstration of next-generation multi-vessel 'swarming' capability on the James River in 2014. Some 13 small, rigid-hulled inflatable, or RHIB, boats were outfitted with CARACaS and **showed** the ability to conduct **coordinated** maneuvers in defense of a ship. For more information see <http://www.defenseone.com/technology/2016/04/us-christens-first-ghost-ship-and-dawn-robotic-navy/127298/>

EUREKA ITEA

As reported in the November 2016 News BAU with support from C4FF and their industrial partners prepared several ITEA3 proposals. BAU asked Professor Ziarati, the Coordinator of MariFuture and a Professor affiliated to BAU to attend the ITEA3 Open Days in Paris, 13-14th September 2016. One of the projects presented by Professor Ziarati was the IntelliMariPal which concerns the integration of maritime data and development of a platform for it. The proposal attracted considerable interest from other ITEA Open Days' participants. The proposal intends to streamline all the data necessary for ships, ports and shipping and maritime bodies and authorities which then expected to substantially improve the effectiveness and efficiency of ship and port operations Europe-wide. The project proposal was prepared and submitted to the ITEA on time. The partners of the project were informed early in December that their proposal has been successful and that they are invited to proceed to second and final stage of the competition.

A delegation led by Professor Ziarati, visited universities of Plymouth, Coventry and Warwick to discuss new proposals. One interest was the discussion on Warwick University's submarine project which could form the basis for ITEA proposal to develop a novel under water drone system for ship under water inspection.

The deadline for submission of final proposal is 14th February 2017 and the project team is working tirelessly to conclude the proposal and submit it on time.

ACTS Plus

The first partner meeting for this newly approved project took place on 17-19 November 2016 in Istanbul. The next meeting is planned for 30-31 March 2017 in Croatia. The details of these meetings will be published in March 2017.

The new ACTS project, ACTS Plus is based on the Pareto analysis carried out as a part of the recently concluded ACTs project. The Pareto analysis showed that some of the COLREGS rules are more complicated than others and that there are situations where a number of rules apply. The paper argues the importance of continuing the ACTs project both according to the plans for its post-funding period and also by preparing a new proposal for EU funding (ACTS Plus). It is worth



pointing out that as a result of the new paper a proposal was prepared by some the partners and submitted to the UK national agency.

This new ACTS project is led by Southampton Solent University (SSU) and coordinated by C4FF. The project started officially on 1st October 2016.



MariEMS

The partners of the MariEMS (Maritime Energy Management Training Strategic Partnership) project are planning to meet in Slovenia in February (8-12th) to monitor



progress to date and discuss how to continue the project with a view to make sure the proposal as proposed is implemented successfully and on time.

The last meeting of partners of the MariEMS project took place during 7-9 September, 2016 in Rauma, Finland. The partners discussed the latest developments and reviewed the job specification and the specification for the training of ship energy officers developed so far and attended the project's workshop organised by the Finnish partners, Rauma Port and Satakanta University. The project meetings and the seminar were a great success. On behalf of the Project Manager and partners, Professor Dr Reza Ziarati, gave a key note speech, presenting the importance of the project in reducing energy consumption at sea and in ports. He stated that this project is expected to help reduce energy use on board ships and in port contributing to a significant reduction of marine pollutions and engine emissions. This project proposes the development of an energy management job and training specification, as well as an e-learning delivery system for the new role of the Energy Manager which has been created specifically for the shipping industry. The intention of MariEMS is also to encourage shipping companies to seek compliance with the IMO and relevant ISO requirements.

It is noted that Southampton Solent University is expected to run the first multiplier workshops seeking the view of maritime academics and industrialist on the training programme specification. The workshop is being prepared and is expected to be held later in November 2016.

The project was disseminated at the 55th International Boat Show exhibition in Barcelona by UPC team from the Faculty of Nautical Studies, 12-16 October 2016.

MariLANG Project

The third partner meeting took place 16-17th January 2017 at Antwerp Maritime Academy, Belgium. The minutes of the meetings are expected later this month.

The MariLANG project intends to develop a Maritime English training programme based on the EU funded SeaTALK learning materials and the EU funded MarTEL assessments, both of which are compliant with the IMO Maritime English Model (3.17). It is worth mentioning that partners from both SeaTALK and MarTEL were involved in the 2015 revision of the IMO Maritime English Model Course through the International Maritime Lecturers Association (IMLA). The funding of MariLANG is very good news as it will complete the process started with MarTEL establishing a Maritime English assessment system, followed by SeaTALK seeking material for it, in conclusion MariLANG will develop an actual training programme for Maritime English which will include the three new categories defined in the revised model



course: Electro-Technical Officers, GMDSS radio operators, and Personnel providing direct service to passengers in passenger spaces on passenger ships.

MariePRO Project

The partners are awaiting the outcome of the Finnish National Agency/EC evaluation.

MariePRO project funding period came to an end on 31 August 2016. The project was to review maritime education and training programmes, searching for good practices and developing an ECVET compliant Maritime Environment Awareness course incorporating the existing IMO Model Course and the and any new developments introduced by the IMO since the inspection of the their Model course 1.38. More details about the project can be found in the Project page of MariFuture or at <http://www.utu.fi/en/units/cms/projects/mariepro/Pages/home.aspx>. The partners held their final meeting and conference in Turku at the same time as the European Maritime Day (EMD), 16-20th May 2016. The final conference was very successful and over 50 delegates attended the event on 17th May 2016. Professor Ziarati, the Chairman and current Director of C4FF was invited to chair the panel at the MariePRO conference, titled 'Sustainable Shipping'. The keynote speeches by the President of the European Maritime Safety Agency (EMSA) and Dr Sadan Kaptanoglu, Kaptanoglu Shipping and member of Board of BIMCO outlined the challenges the regulatory bodies and shipping companies are encountering respectively. The most important consideration for the shipping companies was noted to be the survival and solvency against severe and adverse market conditions. The summary of the speech by Dr Kaptanoglu can be found in the MariFuture June 2016 Article.

The main output of the project is a report on Maritime syllabus differences, good practice report on application of ECVET primarily in maritime education and a comprehensive and ECVET compliant Maritime Environment Awareness course which includes the content of the IMO Model Course by the same name but also includes all the recent up-dates which have not been included in the IMO course. The novelty of the MariePRO Maritime Environment Awareness course is that it also includes some of the recommendations by the industry and provides two versions of the course, one for the seafarers already working in the sector (2-day) and one for the Cadets aspiring to become ship officers (5-day). There are plans to prepare several articles and papers on these outputs and publish them in the MariFuture website in the next few months.

A summary of all the projects can be found in www.marifuture.org. For further information about MariFuture please refer to the MariFuture website.



Dr Martin Ziarati