

'Self-driving' tech heads out to sea

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A boat with Buffalo Automation's marine autopilot technology goes for a test run on Lake LaSalle at the University at Buffalo. DOUGLAS LEVERE, UNIVERSITY AT BUFFALO



An artist's rendering of an autonomous ship developed by Rolls-Royce. The company hopes to have a remote-operated tug or ferry on the water by 2020. ROLLS-ROYCE

Shipping industry sees automation as inevitable next step in evolution

Stacey Zable, Special to USA TODAY

As with other forms of transportation, technology is enabling the development of ships that can get from point A to point B all on their own. The maritime industry, both in the private sector and government, is working to set standards for autonomous ships and understand what the evolution of shipping means. ■

"'Self-driving' ships effectively already exist," says Richard Balzano, deputy administrator of the Department of Transportation's Maritime Administration. "Every commercial and most pleasure yachts already have autopilots, which is a form of automation. The next step is to input the entire route of a voyage into the system, relying on GPS, and let the ship navigate with only human oversight."

The International Maritime Organization (IMO), which regulates international shipping, has identified four degrees of autonomy for ships:

- Ships with some automated operations and a crew on board.
- Ships that are remotely controlled from another location with a crew on board.
- Ships that are remotely controlled without any crew aboard.
- Fully autonomous ships that operate completely independent of human crew.

The IMO is conducting a scoping exercise, to be completed by 2020, that looks at the safety, security and environmental soundness of autonomous ships, says Natasha Brown, a spokeswoman for the organization.

Though the IMO is a few years away from any findings coming out of the exercise, Brown did note that self-driving ships can lead to environmental benefits. "A ship without people at all on

board would likely have very low levels of waste such as sewage or garbage to deal with," she says. "An autonomous ship designed to use low-carbon or zero-carbon fuel is going to benefit the environment in terms of lower emissions."

As far as the negatives of autonomous ships, Brown says: "I think a number of issues need to be looked at, including how an incident at sea or breakdown could be handled, as well as liability and compensation issues."

Balzano notes that reports indicate the majority of maritime accidents are rooted in human error. "Self-driving and more automated ships will greatly reduce the hazards of the working environment in the maritime industry," he says. "Increased efficiency will save operating cost and enable the system to be more productive and competitive."

Buffalo Automation, based in Buffalo, N.Y., is creating technology to assist ship crews similar to aircraft autopilots. It has



Thiru Vikram of Buffalo Automation says self-driving ships could bring many benefits, including improved safety through better monitoring of hazards and threats, and fuel savings from more efficient routes. DOUGLAS LEVERE, UNIVERSITY AT BUFFALO

a product called AutoMate that “enables ships to chart and navigate a path from one port to another. [It] detects threats along the chosen route through onboard sensors, cameras and wireless communications,” says Buffalo Automation CEO Thiru Vikram. AutoMate currently cannot be used for unmanned vessels; crewmembers are still needed for such things as engine maintenance and emergency firefighting, Vikram says.

In addition to improving the safety of commercial shipping and recreational boating, AutoMate is able to save fuel by calculating more efficient routes, Vikram says. The company is testing its technology on freighters in the Great Lakes and speedboats in Buffalo.

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manned ships become a possibility, America’s ports and waterways will have a renaissance,” Vikram says. “Vessels can become smaller as ship operators will not have to bear increased crew costs

associated now with larger fleets. Smaller vessels can reach more parts of the country even in shallow waterways, becoming a viable alternative to trains and trucks.”

Of course, if ships are sailing without crews, that means lost jobs in the industry. Brown of the IMO responds that “new technology sometimes creates jobs as well as disrupts jobs.”

Balzano says the new technology will “improve the quality of life of the men and women working in the industry,” although “the shift will require a change in skill sets.” He adds: “It is important that the industry adapt to the changes and update maritime workforce training to ensure no one is left behind and that workforce disruptions are minimized.”

Research and development continues. “Big ships operating in fully autonomous mode could be some years away, perhaps decades,” Brown says. “For now, fully autonomous ships are small, while most predictions are that autonomous or semi-autonomous operation would be limited to short voyages, for example from one specific port to another, across a short distance.”

Rolls-Royce demonstrated its first public remote-controlled vessel in November 2017 at its Remote Operations Centre in Copenhagen, Denmark. The company’s Research & Development Centre for Autonomous Ships opened in Turku, Finland, in January. It expects to have its first remote autonomous ship in the water before 2020, according to Oskar Levander, senior vice president for concepts and innovation at Rolls-Royce’s Marine division, based in Turku. “That will be something small like a tug or a ferry,” he says.

Boston-based Sea Machines Robotics was expecting to bring its Sea Machines 300 system to market in the third quarter of 2018. The system “provides autonomous and remote-vessel command for all types of commercial craft 6 to 35 meters in length, including rugged workboats and utility craft, persistent survey and surveillance vessels, and high-speed response craft,” says Michael G. Johnson, the company’s founder and CEO. The system is already on the water aboard Tuco boats in Denmark and other craft involved in pilot programs.

Johnson says technology “will enable maritime industries to take cargo back from the crowded roads, increase transit speeds to compete with air travel, and open the doors to vast ocean farms of food and energy.”

He adds that his systems are “helping to shape a new era of maritime. For centuries leading up to the 20th century, the maritime industries and those that created it were at the forefront of human technology in each of their respective ages. We aim to bring that spirit of ingenuity, innovation, and technological investment and exploration back to the seas.”