

# The future of shipping?



The *Falco* is a 53.8m-long double-ended car ferry, which entered service in 1993. It is equipped with twin azimuth thrusters from Rolls-Royce.

**AUTONOMOUS VESSELS** The past few months have seen various concepts and projects come to life in the fields of autonomous and remotely controlled vessel operation. The major players Wärtsilä, ABB and Rolls-Royce have demonstrated what is already possible with the deployment of intelligent sensors and automated systems.

“We are entering a new era in shipping. The era of shipping intelligence.” These words from Rolls-Royce’s Oskar Levander, who is a veteran when it comes to forward-looking technologies in the maritime sector, formulate very accurately what many companies these days see high on their

agenda: the development of smart and connected components and systems.

### First autonomous voyage

At the beginning of December, Finferries and Rolls-Royce presented what they called the first fully autonomous car ferry in the Finnish archipelago south of the city of Turku. Witnessed

by 80 guests, the 1993-built vessel *Falco* used a combination of Rolls-Royce Ship Intelligence technologies to navigate autonomously during its voyage between Parainen and Nauvo. No changes to the diesel-mechanical propulsion system were necessary.

The return journey was conducted under remote con-

trol. During the demonstration, the *Falco* undertook the voyage under fully autonomous control. The vessel detected objects utilising sensor fusion and artificial intelligence and conducted collision avoidance. It also demonstrated automatic berthing with a recently developed autonomous navigation system. All this was achieved

without any human intervention from the crew.

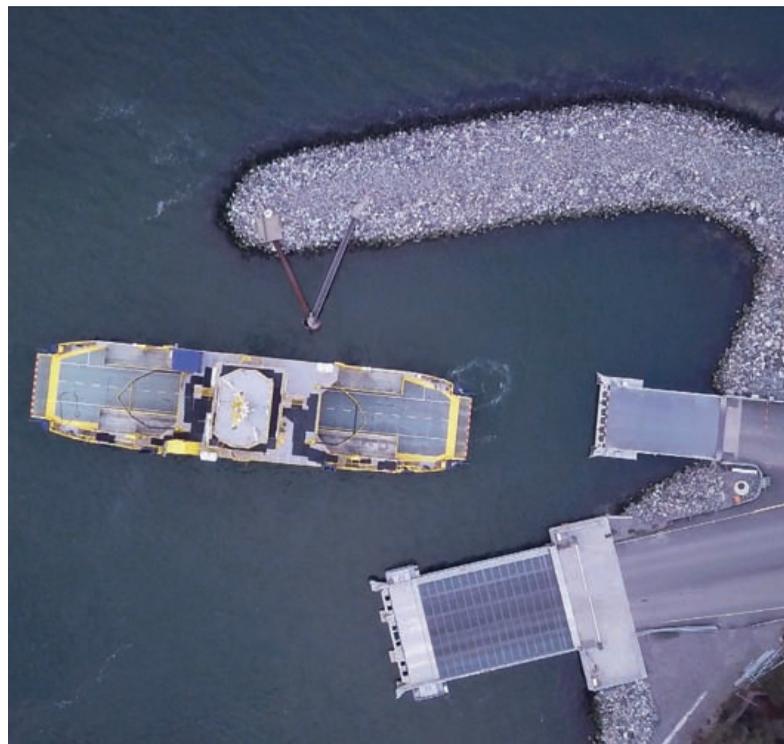
The *Falco* is equipped with a range of advanced sensors which allows it to build a detailed picture of its surroundings, in real time and with a level of accuracy beyond that of the human eye. The situational awareness picture is created by fusing sensor data that is then relayed to Finferries' remote operating centre on land, some 50km away in Turku city centre.

Tuumas Mikkola is the captain in the remote control centre. He monitors the autonomous operations and can take control of the vessel if necessary. While he enjoys the possibilities of the new technologies and having more regular working hours than on board a ship, he says he misses the senses of really being at sea when

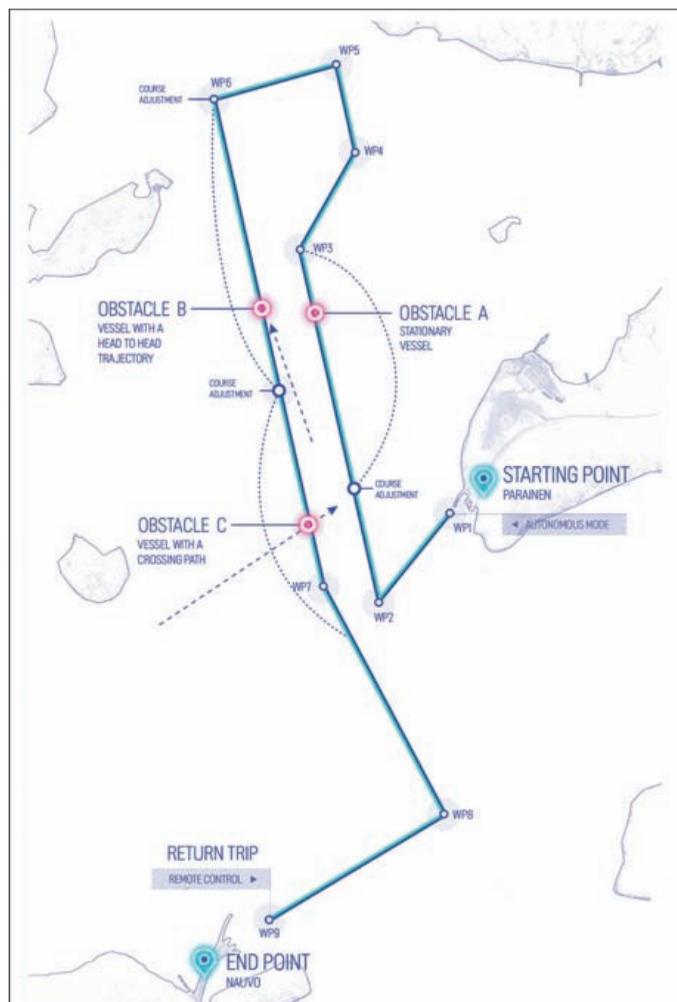
navigating the ferry remotely as there is no sensation of wind, weather and currents.

Earlier in 2018, Rolls-Royce and Finferries began collaborating on a new research project called SVAN (Safer Vessel with Autonomous Navigation), to continue implementing the findings from the earlier Advanced Autonomous Waterborne Applications (AAWA) research project, funded by Business Finland.

On the occasion of the demonstration, Mikael Mäkinen, Rolls-Royce president Commercial Marine, said: "Today marks a huge step forward in the journey towards autonomous shipping and reaffirms exactly what we have been saying for several years, that autonomous shipping will happen. The SVAN project has



Autodocking of the *Falco*



Route that the ferry took

been a successful collaboration between Rolls-Royce and Finferries and an ideal opportunity to showcase to the world how ship intelligence technology can bring great benefits in the safe and efficient operation of ships."

If or when an autonomous car ferry in the region will ever enter normal service is, as yet, unclear. At the time of the demonstration, the *Falco* had conducted 360 validation hours and 90 autodockings. When asked for a possible time frame, however, spokespeople both from Finferries and Rolls-Royce agreed that it was more likely to be five than 15 years.

### Passenger ferry completes remote navigation trial

Shortly after the demonstration on board the *Falco*, and also in Finland, ABB and Helsinki City Transport completed the successful trial of remote navigation, controlling the ice-class passenger ferry *Suomenlinna II* through a test area near Helsinki harbour. The project demonstrated that the latest technologies allow the human oversight

of vessels from anywhere, ABB said in a statement. The ferry was retrofitted with ABB's new dynamic positioning system, ABB Ability™ Marine Pilot Control, with remote navigation undertaken from a control centre in Helsinki.

The trial was completed while the vessel was not in normal service, with no passengers on board, in a restricted area with no other vessels. Although the ferry now has the new dynamic positioning system, it will continue to operate using conventional controls, with further R&D initiatives undertaken in the future.

Peter Terwiesch, president of ABB's Industrial Automation division, said: "We are excited about the potential impact of this test on the future of the maritime industry. Advanced automation solutions from ABB are making the previously impossible possible for a wide range of sectors, including shipping, which is actively searching for technologies that can rapidly deliver more efficiency and better safety."



The ferry *Suomenlinna II* was remotely driven and controlled

### First autodocking system

Earlier in 2018, the world's first autodocking system, developed by Wärtsilä, was successfully tested on board the *Folgefonn*, an 83m-long hybrid-powered coastal ferry owned by Norwegian operator Norled. The tests began in January and were completed in April with actual harbour docking trials. At no time during the tests did the captain

need to take manual control, Wärtsilä said in a statement.

The automated docking procedure begins about 2,000m from the berth when the ferry's speed is gradually reduced. The system activates the line-up and docking manoeuvre automatically until the ship is safely secured on the berth. The same system is used for the ferry's departure, but in reverse order.

Benefits include improved safety because there is less risk of human error, reduced wear and tear since thruster use is optimised, while a more efficient docking procedure allows more time on the berth.

Manual intervention is possible at any time but the system is designed to enable the ship's officers to focus more on situational awareness outside the wheelhouse.

The *Folgefonn*, equipped with hybrid propulsion and a Wärtsilä wireless charging system, has been made available by its owner for the Finnish automation company to introduce, test and develop its various products in the 'smart' marine sphere.

The technologies installed and tested include an energy optimisation system, hybrid propulsion, wireless inductive battery charging, and energy storage. The ferry can operate with automatic wireless charging, automatic vacuum mooring, and automated docking.

In November, Wärtsilä completed a further round of test procedures of its automated dock-to-dock solution on board

the *Folgefonn*, this time with the autonomous operation being utilised uninterrupted for the entire route, visiting all three ports serviced by the ship.

Once the operator selected the next destination berth, the operation was started by simply selecting "Sail", which authorises the autonomous controller to take control of the vessel. The ferry was able to leave the dock, manoeuvre out of the harbour, sail to the next port of call, manoeuvre through the harbour entrance, and dock alongside the terminal – all without human intervention.

Navigation of the vessel is controlled through the use of a series of tracks and waypoints, which guide the ship to the next destination. The autonomous controller, which is based on Wärtsilä's existing dynamic positioning system, controls the vessel's speed, position on the pre-defined track, and heading. GNSS is used as the primary sensor, while a Wärtsilä Guidance Marine CyScan AS is being tested as a secondary position sensor for the approach to the berth.



Recent autodocking and dock-to-dock tests were carried out on board the *Folgefonn* ferry, owned by Norled