An extensive area of the Trondheimsfjord in Northern Norway was designated as an official test bed for autonomous shipping by the Norwegian Coastal Authority (NCA), during a special event in Trondheim, Norway on Friday 30th September 2016. As one of the first coastal areas in the world officially dedicated to the development of technology for autonomous ships, the test bed is a vital facility for the future of shipping.

Norwegian maritime technology company KONGSBERG was integral to the opening of the test bed and is a user in order to continue its development of sensors, software and systems that enable more autonomy for ships.

Announced in March as a follow-up to the Norwegian government’s new National Transport Plan, the fjord offshore Trondheim is an ideal location for the development of technology that will make autonomous shipping a reality. The area experiences light vessel traffic, making it a safe place to conduct autonomous vehicle trials. It is also home to high levels of maritime competence through an extensive maritime technology cluster and several major academic and research organisations, including the Ocean Space Centre, the Norwegian University of Science and Technology’s (NTNU) Center for Autonomous Operations and Services (AMOS), and the Norwegian Marine Technology Research Institute (MARINTEK).
“As far as we know, there are no such test sites of this kind in the world so the Norwegian Coastal Authorities are taking the lead in a changing maritime world,” said Gard Ueland, President, Kongsberg Seatex. “We are seeing how autonomy is coming into vehicles on land. I believe we will see some massive changes in the future leading to smart ships that will make maritime transport safer and more efficient. We will also see technology that has the potential to enable fully autonomous cargo vessels. Much of this will come from Trondheim, thanks to the unmatched maritime expertise here and our autonomous vehicles test bed.”

KONGSBERG has played an important role in the Trondheimsfjord test bed, having already demonstrated the suitability of the area for autonomous technology trials. The company’s Trondheim-based subsidiary Kongsberg Seatex tested various new autonomous technology solutions in Trondheimsfjord this June, together with the NTNU and the Norwegian Defense Research Establishment.

Why Trondheimsfjorden?

- Trondheimsfjorden is a fjord with few archipelagos and relatively limited ship traffic.
- Trondheim has focus on Ocean Space Centre and the ocean based industry, and a close cooperation between university, research institute and industry. Cooperation has existed for many years within e.g. ship concepts, aquaculture, mineral recovery, robotics, autonomous ships etc.
- NTNU and MARINTEK are central research actors within maritime research, together they represent the world’s largest marine technology research centre.
- There is already ongoing severe research activity in the fjord related to autonomy.
- NTNU owns and operates the research vessel Gunnerus, which is being used all year for full scale tests.
- AMOS (Autonomous Marine Operations and Systems) is a Center of Excellence with focus on autonomy, and with substantial activity in the area.
- Several companies situated in Trondheim has engaged in the development of autonomous systems (Kongsberg Maritime, Kongsberg Seatex, Maritime Robotics, FosenYards, Kystrederiene, Trondheim Harbour etc.)
- The test area in Trondheimsfjorden will provide positive spin-off effects for industry and research, and provide valuable experiences that can be applied to new establishments of test areas in Norway.
- The test area in Trondheimsfjorden demonstrates the Norwegian interests and strategy for autonomous shipping.
SOME OF THE ONGOING PROJECTS

The AUTOSEA project with focus on improved situational awareness and uses Trondheimsfjord as test site when utilising sensor fusion to reduce the risk of collisions between ships and vehicles - when increased level of autonomy is introduced. In order to improve detection capabilities also on small objects and improved coverage of the close-range sector, the AUTOSEA project will, in addition to conventional maritime radar, include sensor types not normally used for such purposes in the maritime sector, such as cameras, infrared and LIDAR.

Eelume is a disruptive technology for subsea inspection, maintenance and repair (IMR). Eelume vehicles are basically self-propelled robotic arms whose slender and flexible body can transit over long distances and carry out IMR in confined spaces not accessible by conventional underwater vehicles.

ReVolt
Short sea shipping testing in the Trondheimsfjord. A collaboration between DNV-GL and NTNU.

NORWEGIAN GOVERNMENT PLAYS ALONG

“Building and testing autonomous vessels and transport systems in national waters now will make it easier to bring about changes in international regulations later. But the most important factor for the authorities is safety”, says Olav Akselsen, Director General of Shipping and Navigation.

“If you can steer a ship from an onshore position, this means that hackers could also take control of the ship. We have to make data security a priority”, Olav Akselsen told Teknisk Ukeblad at the inauguration of the Norwegian Forum for Autonomous Ships.
ABOUT THE TEST SITE

The initiative for the designated area in the Trondheimsfjord was undertaken by Kongsberg Seatex, Kongsberg Maritime, MARINTEK, NTNU and Maritime Robotics in cooperation with Trondheim Harbour, the Norwegian Maritime Authority and the Norwegian Coastal Administration.

On the 30th of September 2016 an agreement was signed, where the partners signed up for a common intention of facilitating tests of new concepts and full scale programs related to autonomous vessels in Trondheimsfjord, and the surrounding coastal areas. The partners will share knowledge and experiences and contribute to the development of the test area.

The use of the test area presume the operation to be within in force legislation, and that necessary communication and surveillance infrastructure is established.

AREA OVERVIEW

Trondheimsfjord with surroundings