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--The Armed Forces as an organisation is highly oriented towards action and achieving results. This means working in complement with one’s collaboration partners and capitalising on the present possibilities. We maintain our focus in the project through working in teams to keep the ultimate goal uppermost in our thoughts, concludes Størkersen.

The breakthrough bodes well for the further development of the project as the three parties continue to work on new minesweeping methodology. The new minesweeping technology is a textbook example of what Norwegian naval inventiveness can produce when people pull in the same direction. The new technology is a result of hard work, which is now starting to pay off. Kongsberg Defence & Aerospace, the Royal Norwegian Navy’s Commander Norwegian Fleet COMNOFLEET (Kysteskadren) and FFI collaborated for 10 years for this achievement.

The race and the challenges

There is a constant race of technology between mines and minesweeping equipment under water. Today’s sea mines are considerably more intelligent than earlier versions. Modern mines do not explode purely on contact with a vessel, but are laid on the seafloor and are triggered by a given vessel’s signature (specific magnetic and acoustic signals that are characteristic of certain ships). In this way, mines can be employed with great lethality against ships.

--The propeller of a larger ship radiates a powerful low-frequency sound. Modern mines utilise highly sophisticated technology, which can be fine-tuned to identify different kinds of ships from the sound generated by their propellers. Until now the mine-manufacturers have been ahead, says Ole Refsahl at Kongsberg Defence & Aerospace.

Many defence suppliers have tried to reproduce this low frequency sound with

Outwitting modern sea mines

This sensational, new development is the product of a close collaboration between the Royal Norwegian Navy and the Norwegian Defence Research Establishment (FFI).

-This new technology really reduces the lead of modern mines. No other country, neither in NATO nor outside the alliance, has come up with anything like it. We look forward to participating in the exercises Battle Griffin and Loyal Mariner during the winter and spring of 2005 to demonstrate just how good this new equipment really is, says Lieutenant Commander Pål Skorge, commander of the minesweeper KNM Alta.

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The Norwegian minesweeper KNM Alta embarks upon a NATO mission with a revolutionary new minesweeping technology on board.
under water loudspeakers. However, this approach proved unsatisfactory, as the loudspeakers were unable to recreate the frequency distributions and the power of propeller-noise in water:

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The new acoustic technology on our minesweepers is called AGATE (Air Guns and Transducer Equipment). We found the key to AGATE in exploration equipment developed for the oil industry. In underwater seismology, air guns generate underwater bubbles (explosions!) that radiates sound. The reflected sound from the seafloor is then analysed to give an indication whether or not there is any oil there, Refsahl explains.

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The next step in the battle against naval mines could be unmanned, remote controlled minesweeper-drones on the surface. Among the goals NATO aims to achieve by 2015 is the elimination of risks to crewmembers serving on board minesweeping vessels. The parties mentioned in this article have also collaborated on the development of so-called "autonomous underwater vehicle" (AUV) for the purpose of localising sea mines. The Royal Norwegian Navy operates the AUV HUGIN from the mine-hunter ship KNM Karmøy. HUGIN is currently doing service in NATO's standing Mine Countermeasure Force Northern Europe, MCMFORNORTH. Also in this field Norway has taken a leading role, designing and developing equipment that saves lives. In other words, scientists participating in the race against mines have meaningful work ahead of them. Working in conjunction with the Royal Norwegian Navy, FFI scientists are dedicated to maintaining FFI's position as a world leader in clearing mines at sea.

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The Norwegian minesweepers carry a crew of 40 men. The vessels are 55 meters long and 13.5 meters wide. They are constructed as a hovercraft catamaran, which lies only 0.9 meters in the water amidships. With a top speed of 22 knots, the Norwegian vessels are the world’s fastest minesweepers. The new equipment for sweeping modern mines is the icing on the cake for the Norwegian navy, which has gradually worked its way up to become one of the world’s most modern fleets.

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We have run the new minesweeping technology through exhaustive tests in an area outside Bergen planted with mine sensors. The equipment has worked extremely well, and we are very proud to be able to contribute in this way, Lieutenant Commander Pål Skorge says.

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The mission of NATO’s minesweeping force is to “demonstrate naval presence and solidarity in the alliance, and to be a rapid deployment force for the supreme commander in Europe”. The Norwegian command-ship, KNM Vidar and the minesweeper KNM Alta are participating in this force; the KNM Alta joined this fleet from mid January 2005. The crews of the two vessels have also declared themselves willing to participate in international peacekeeping operations. The risks represented by sea mines are more imminent in the new threat scenario of international terrorism. Mines are among the greatest threats to civilian and military shipping.
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Maintaining focus leads to success

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The future. The next step in the battle against sea mines could be unmanned, remote controlled minesweeper-drones on the surface. (Photo: Morten Nakjem, FFI)

«AGATE» against mines. AGATE is the name of the newly developed minesweeping equipment. (Photo: Morten Nakjem, FFI)