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Hydroacoustic telephone's extended power range boosts hopes for divers cast adrift

An advanced high-power, hydro-acoustic telephone for emergency underwater communications will soon become available to the offshore market. The technology is being developed by Stocktronics, a Stockholm-based specialist in underwater communications whose deep-diver communications system is the only one currently able to meet the specifications laid down by Norwegian oil companies Statoil, Norsk Hydro and Saga, according to president Lars Liljeryd.

These are the same three companies which through Norway's FUDT/OMEGA research program, have funded part of the development of the hydroacoustic telephone. This is intended to provide a lifeline in cases where a diving bell has been lost, along with its communications cable.

The key problem to overcome, says Liljeryd, is the immense cavitation noise caused by mother ships and other vessels hovering on the surface in DP mode. Existing hydro-acoustic telephone systems can only achieve communication over limited ranges of 20-30 meters.

Stocktronics' breakthrough has come with the development of a method for connecting the piezo-ceramic rings in the system in an array-shading manner which gives high power, but does not restrict the acoustic radiation pattern, as happens with existing systems.

"We have succeeded in developing a unique shaded high-power, omni-directional transducer array that produces acoustic output levels far beyond those of existing units," says Liljeryd. "Thus we are getting approximately 10-12 dB higher acoustic sound-pressure levels than conventional designs, which means 10-15 times higher output power."

The system has been tested inshore in the presence of Swedish Navy observers at distances of 100, 1,000 and 5,000 meters using an early prototype transducer. The unit provided clear speech communications at all three distances, though some background noise was audible at 5,000 meters.

High power amplifier

The firm is now working on a compact, high-power (2,000W) amplifier. "We are confident that when the new transducer and amplifier are incorporated in the system, we will be able to achieve clear communication up to a distance of 20 km under optimum conditions," he says.

The system will be fully modularized and will include the Stocktronics Frequency-Domain Helium-Speech (FDHS) Unscrambler as an optional extra. A working system would be available by year-end.

In addition to its use in emergency situations, Liljeryd expects the civilian and military submarine market to be interested in the hydro-acoustic telephone for normal operations. In this case, the FDHS unscrambler could be adapted to encrypt speech as a protection against the interception of communications by third parties.

Recently, the Swedish Navy purchased the Stocktronics deep-diver communications system for its submarine and diving support vessel Belos, while Nutec underwater research center in Norway is negotiating the delivery of a second system.

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