

L-3 Nautronix

HAIL

HYDRO ACOUSTIC INFORMATION LINK

PRODUCT DESCRIPTION

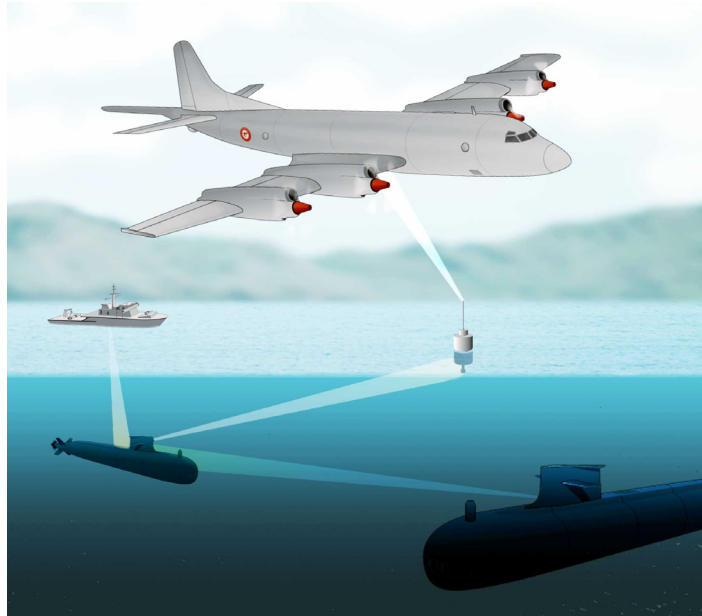
HydroAcoustic Information Link (HAIL) has been developed by L-3 Nautronix to provide reliable Through-Water Communication (TWC) and Ranging for undersea platforms operating at speed and depth.

Underwater Email or Short Message Service (SMS) are capabilities that HAIL makes a reality today.

The priority of HAIL has been to achieve communication reliability, doppler tolerance and ability to operate below the background noise. Hence signal bandwidth is used to provide receiver processing gain rather than high data rates.

HAIL is based on an adaptation of a Direct Sequence Spread Spectrum (DSSS) signalling technique which provides a number of advantages over traditional modulation techniques:

- **Low Spectral Density** Able to operate discretely and reliably below the ambient noise.
- **Resistance to Jamming** Wide bandwidth signal resistant to interference from discrete noise sources.
- **Code Diversity** Enables selective addressing of multiple systems.
- **Message Privacy** Unique spreading codes allocated to specific user groups.
- **DSSS Signal Processing** Reduces the impact of adverse underwater channel effects such as time varying multi-path interference and frequency selective fading on signal integrity.
- **Continuous Doppler Tracking** Able to operate reliably between platforms with high and changing relative motions.
- **Platform Ranging** HAIL signals can also be used to calculate range between platforms, using code synchronisation and subsequent high precision one way time of flight measurements.



KEY FEATURES

- Reliable Through-Water Communications at speed and depth
- Optimised for Short Message Service and data packet telemetry
- Advanced Spread Spectrum Signalling
- Doppler tolerant
- Programmable signal carrier frequency and bandwidth
- One way Time Of Flight ranging
- Resistant to adverse underwater channel effects
- Choice of PC or DSP based systems to suit application



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HAIL SYSTEM DESCRIPTION

HAIL has been successfully utilised for TWC and distance measurement between submarines and from submarines to other platforms including surface vessels, underwater ranges facilities, aircraft via sonobuoys, swimmer delivery vehicles, unmanned underwater vehicles and divers.

Exercises with various Navies have demonstrated that HAIL can make a significant contribution to Network Centric Warfare concepts and requirements in the underwater battle space.

HAIL is currently being fitted to all the RAN Collins Class Submarines where it will form an integral part of an advanced TWC system. HAIL has also been successfully fitted and operated in both the British Royal Navy and the United States Navy.

HAIL technology is based on re-usable software and hardware modules with industry standard interfaces that can be configured and rapidly integrated with new host applications and systems.

Two main HAIL product ranges are available:

HAIL-PXI

HAIL-PXI is based on the PXI architecture of a Personal Computer (PC) running the Microsoft® Windows® XP operating system.

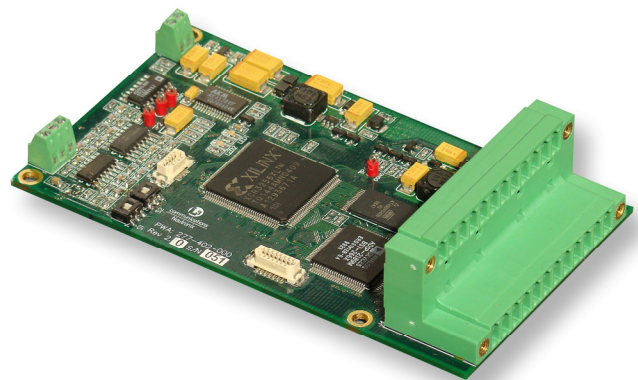
The PC architecture has been optimised for HAIL applications with requirements for flexibility and expandability such as in manned submarines and surface platforms; and where power and size constraints are not a limiting factor.

HAIL-GPM

The HAIL General Purpose Modem (GPM) is based on a Digital Signal Processing (DSP) architecture which is aimed at embedded HAIL applications with well defined telemetry requirements such as in Autonomous Underwater Vehicles; and where power and size are major constraints.

OPTIONS

- Optimised transducer solutions
- Operator terminal programs
- Range of power amplifiers and front end conditioners
- Custom interfaces to host sonars and underwater telephones
- Spectral analysis tools



HAIL Acoustic Communication Module (ACM)

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