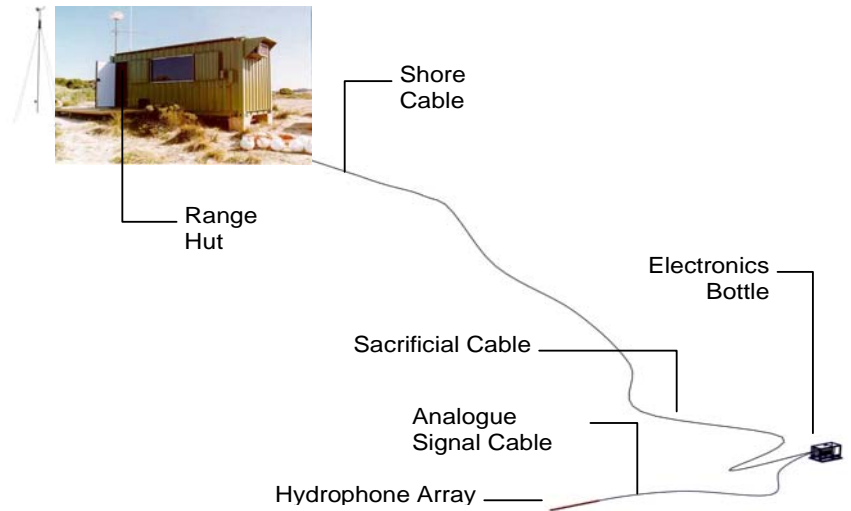


Submarine Acoustic Range**FEATURES**

- Two-man system operation
- Capture acoustic data in the band 2.5 Hz to 45 kHz
- Calibrated to within ± 1 dB within the band 5 Hz to 40 kHz
- Array gain is up to 15 dB
- Tracking using the Submarine Tracking System (STS);
- > 50-hour continuous recording capacity (depending only on disk space).
- Signature results and a ranging summary are calculated in-situ
- Near real time feedback of ranging results.

L-3 Nautronix develops sophisticated solutions to measure and communicate data through water. It specialises in applications involving underwater test and evaluation and through-water communications.

This Capability Statement describes a submarine acoustic signature measurement range (SAR). It is based on an application recently provided to one of our customers.

SAR is an ultra-low noise acoustic measurement range incorporating co-operative tracking and highly automated data analysis and management software. It is a fixed installation comprising:

- a submerged hydrophone array and electronics bottle
- connected via a fixed underwater cable to
- a control centre housed in the range hut on shore.

SAR employs the Submarine Tacking System (STS) developed for other related L-3 Nautronix signature measurement systems. STS provides in water range measurement to provide a highly accurate input to the acoustic sound pressure level (ASPL) calculation. STS also provides information on the platform's current operating state.



OVERVIEW

SAR is one tool used by the customer to provide a tactical assessment of the submarine's acoustic vulnerability to threats, through vulnerability assessments that would assist a platform commander to determine:

- **Long Range Surface Surveillance:** best submarine noise and sensor state to survey a large surveillance area.
- **Target Categorisation and Identification:** best submarine noise and sensor state to perform target categorisation and identification.
- **Torpedo Detection and Avoidance:** best submarine noise and sensor state to achieve torpedo detection and avoidance.
- **Cooperation with Support Aircraft:** best submarine noise and sensor state to minimize interference with cooperating aircraft.
- **Anti-submarine Warfare:** best submarine noise and sensor state to detect, classify, localize and track other submarines.
- **Long Range Detection of Hostile Weapons Indications:** best submarine noise and sensor state to detect and identify long range hostile weapons indications.
- **Long Range Detection of Low Flying Aircraft and Missiles:** best submarine noise and sensor state to acquire searching and shadowing aircraft below the radar or electronic support measures horizon.
- **Collection of Acoustic and Environmental Data:** best submarine noise and sensor state for the collection of acoustic and environmental data. The data could contribute to environmental and acoustic databases which support surveillance and other Command operations.

Secondary customer objectives for acoustic ranging:

- Compare current readings with hull averages.
- Localize the source of abnormal radiated noise, and assist Command to make decisions to adjust the submarine's operating mode accordingly.

CONFIGURATION

A 'typical' SAR installation consists of a single hydrophone array which consists of many ceramic hydrophones (23 typically) spaced with nested sub arrays to enable post-processing by beamforming software in specific directions and frequency ranges.

Installation is preferred in a quiet location to provide best performance and is typically deployed in water depths of around 50m. Vertical and horizontal Array designs can be offered.

The in-water electronics bottle includes Analogue Digital Converters (ADCs) and electronics necessary to transmit multiplexed hydrophone data via fiber-optic elements through the shore cable, which can be greater than 5 km.

The range centre contains the computer equipment required to operate the range and to receive, store and process range data.

The range centre provides a controlled environment for storing and operating the equipment.

The target platform fitted tracking system provides the hydrophone array data to accurately determine the submarine's position.



Example Range Operations and Transport Container (ROTC)

APPLICATION

L-3 Nautronix experience is that each of these systems is unique to the customer's requirement requiring some research, development and evolution to meet the operational need.



communications

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