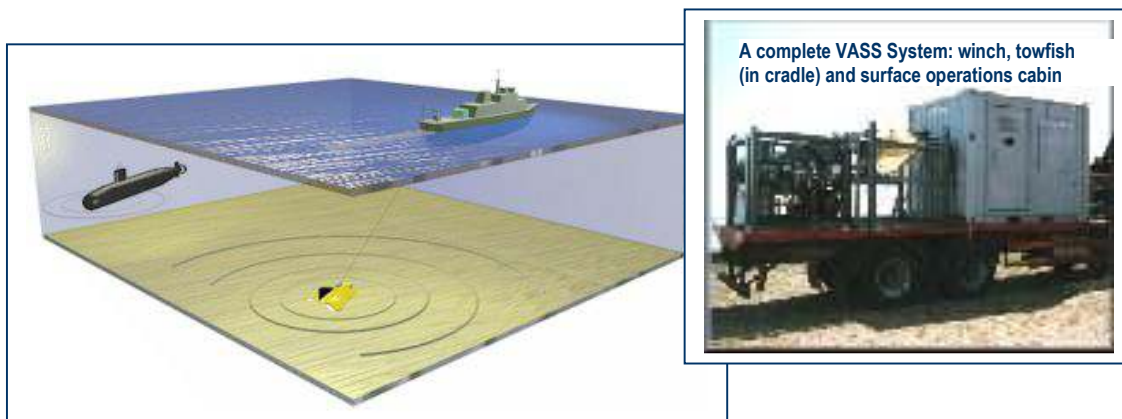




# VERSATILE ACOUSTIC SOURCE SYSTEM (VASS)

The Versatile Acoustic Source System (VASS) has been designed and developed by Chelsea Technologies Group to evaluate the performance of a wide range of active and passive sonar. It produces complex, calibrated transmissions in addition to echo repeating, transponding and acting as a calibrated receiver.



## OVERVIEW

VASS provides a highly versatile and flexible sonar test system, which is configured by simple mouse or keyboard selections. In addition to instant configuration changes, via its Windows XP interface, VASS allows desktop set-up of complete trials programs in advance, hence avoiding costly errors in signal definition during calibration trials.

VASS can be deployed from relatively small vessels with few facilities other than power and a crane or A frame. The transducers are contained within a compact and robust tow fish that is connected to a lightweight tow cable. On the surface are a winch and a Surface Operations Cabin. This Cabin is a self contained, environmentally controlled, half size ISO container which contains the Computer, Power Amplifier and control electronics for operating the system. All transmissions can be monitored on the system's digital analyzer or via a set of headphones outputs.

## FEATURES

- Broadband operation
- Operator control via computer
- Self contained and transportable
- Easily deployed from a range of ocean going vessels
- Advanced, acoustics source and echo repeat functions

## OPERATING MODES

- Complex Signal Source
- Sequence
- Echo Repeater
- Transponder
- Received Signal Monitor
- Slant Range Measurement

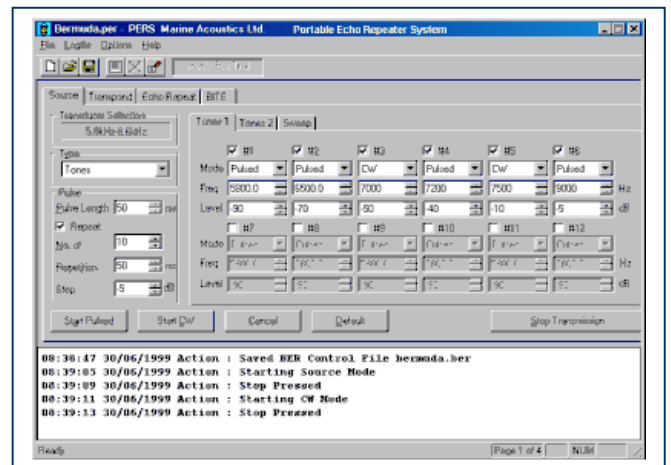
## APPLICATIONS

- Sonar test and calibration
- Underwater target detection
- Sonar operator training
- Surveillance
- Noise signature simulation
- At sea, acceptance trials

## VASS – Versatile Acoustic Source System

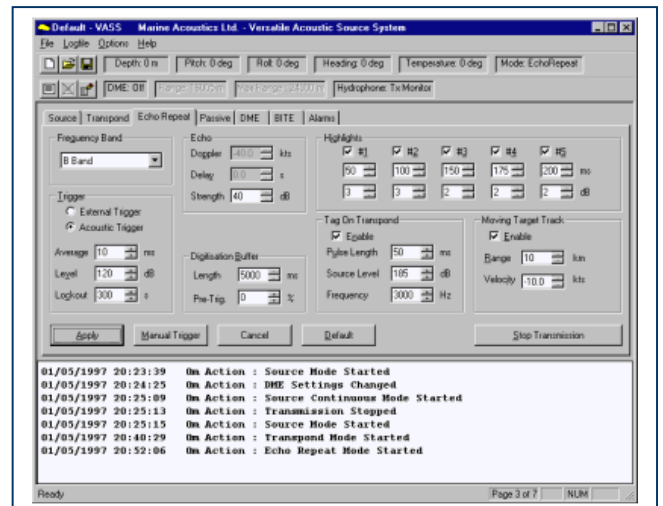
### Source & Sequence Mode

As a calibrated acoustic test signal transmitter (source mode) VASS can generate complex acoustic test signals between 300Hz and 200kHz at source levels of up to 185 dB re 1μPa@1m. It is capable of concurrently generating up to 24 tones. The system can also generate simultaneous wide band noise (selectable bands according to transducer) or five narrow noise bands (selectable from white, pink or pseudo-random noise). The frequency and source level of each tone (and noise band) may be controlled independently - and each selected as CW or pulsed. VASS can also generate LFM or LPM sweeps and complex modulated acoustic transmissions (AM or FM). The sequence mode allows the user to program a series of pulse trains giving up to 12,500s of continuous programmed sequenced transmissions, for example 250 uniquely specified pulse trains each with 1000 50ms pulses can be specified.



### Echo Repeat Mode

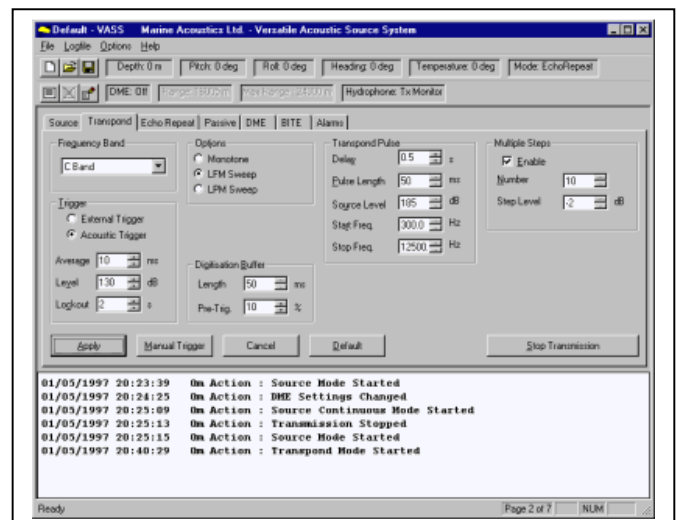
In Echo Repeat mode, VASS can repeat acoustic signals (between 300Hz and 12.5kHz) sampled from the dedicated receiver hydrophone contained in the towed body. It does this in response to a trigger event, based either on the incoming acoustic signal, an external input, or under operator control. The repeated signal can have a highlight structures and Doppler shift imposed upon it to mimic the reflections from a moving or stationary target.



The many configurable parameters are controlled via an easily operated Graphical User Interface, running under Microsoft Windows 98. Within this interface, the user can add Doppler, target strength and signal highlights to the echo repeated acoustic signal. Subsequent echo repeated signals could, in addition to the above, simulate a moving target track.

### Transpond Mode

In Transpond mode, VASS can transmit a user defined acoustic signal in response to a trigger event which can be either acoustic, from an external input or under operator control. The transpond signal can be defined (300Hz to 12.5kHz only) as a single pulse, or a ramp of pulses, of a monotone or LFM or LPM sweeps, with selectable frequency and source level. In addition, any selection within the Source Mode can be transponded allowing signals from 300Hz to 200kHz to be transponded.



# VASS – Versatile Acoustic Source System

## General Specification

Modes: Source, Echo Repeat, Transpond, Sequence, Receive  
Transmit Bandwidth: 300Hz to 200kHz  
Transmit Source Level: Up to 180 dB re 1µPa@1m (4kHz to 200 kHz)  
Horizontal Beam Pattern: Omnidirectional

## Source Mode

Pulse Lengths: 3ms to 10s or CW (below 17.5kHz)  
Number of Pulses: Up to 1000  
Pulse Intervals: Up to 60s  
Variable Step Levels: -10 to +10 dB  
Tones: Up to 24 (each with definable source levels and frequencies, with up to 5 Noise bands - CW or pulsed)  
Sweeps: LFM or LPM  
Noise: Either Broadband or up to 5 user definable bands  
Noise Types: White, Pink or Pseudo-Random  
Modulated Signal: AM or FM (user definable carrier and modulating signal)

## Echo Repeat Mode

Echo Frequency: Broadband (300Hz to 12.5kHz) or 3 narrow bands  
Trigger Types: Acoustic, TTL pulse or manual  
Trigger level and averaging: Fully user definable  
Echo Length: 10ms to 5s  
Added doppler: -40 to +40 knots  
Added echo strength: -30 to +40 dB  
Echo delay: Up to 60s  
Highlights: Up to 5  
Highlight Strength: -30 to +30 dB  
Relative Delay: Up to 200ms  
Moving track target: Velocity -40 to +40 knots  
User configurable  
Tag on Transpond:

## Receive Mode

Frequency Range: 300 Hz to 12.5 kHz or through band pass filter



VASS Tow Fish

## Transpond Mode

Frequency range: Receive - 300 Hz to 12.5 kHz  
Transmit - 300 Hz to 200 kHz  
Trigger types: Acoustic, TTL pulse or manual  
Trigger Level and averaging: Fully user definable  
Transpond types: LFM or LPM sweep, Monotone or as per Source Mode (see above)

## Sequence Mode

Pulse Types: Tones, Noise, LFM or LPM Sweeps, modulated signal or pulse trains  
Pulse Trains: Up to 1000  
Pulse Lengths: Up to 10s each

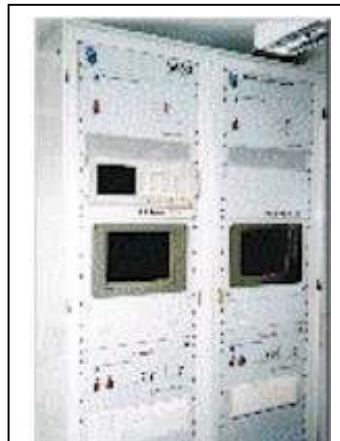
## Surface Operations Cabin

Size: Half size ISO container (3.0m x 2.4m x 2.4m high).

Power input: 3 phase 380V 50Hz, or 415V 50Hz, or 440V 60Hz

Climate control: Air conditioning and heating.

Standard Equipment: 19 inch racks containing a complete set of VASS electronics. and a complete backup set. Each set Includes: DSP card, Band pass filter card, ADC/DAC card, Power amplifier, HF Power Amplifier, PC, monitor, Keyboard, Printer, DigitalAnalyser.



Surface Operations Cabin: Interior.  
Note: shown with optional spare rack

## VASS – Versatile Acoustic Source System

<b>Tow Fish:</b>	
Tow speed:	2 to 8 knots
Size	Wingspan: 1.4m Length: 1.4m Height: 0.6m
Weight:	195kg in air
Within tow fish:	Transmitting transducers, Receive hydrophone, Monitor hydrophone and tow fish electronics.

<b>Tow Fish Electronics</b>	
Telemetry:	Pitch, roll, heading, depth and temperature all displayed on the Windows interface in the Surface Operations Cabin and recorded in a log file).
Received Hydrophone:	Calibrated for receive and echo repeat.
Monitor Hydrophone:	For monitoring all transmissions

<b>Transmit Transducers</b>	
Number:	4
Frequency bands:	300Hz to 17.5 kHz 17.5 kHz to 50 kHz 50 kHz to 110 kHz 111 kHz to 200 kHz
Source level:	Up to 180dB re 1 $\mu$ Pa @ 1m
Horizontal response:	Omnidirectional

<b>Winch</b>	
Size:	2m x 1.6m x 1.6m high
Power input:	3 phase 380V 50Hz, or 415V 50Hz, or 440V 60Hz

<b>Tow Cable</b>	
Diameter:	12.7mm
Length:	1000

**Existing users of the ERAS, VASS & PERS systems include QinetiQ, the UK Director of Submarines, NATO SACLANT Undersea Research Centre, La Spezia, Italy, the Belgian Navy & EDO Corporation, USA.**



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In view of our policy of continual improvement, the designs and specifications of our products may vary from those described. (2271-008-PD-B VASS 0811-0001)

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