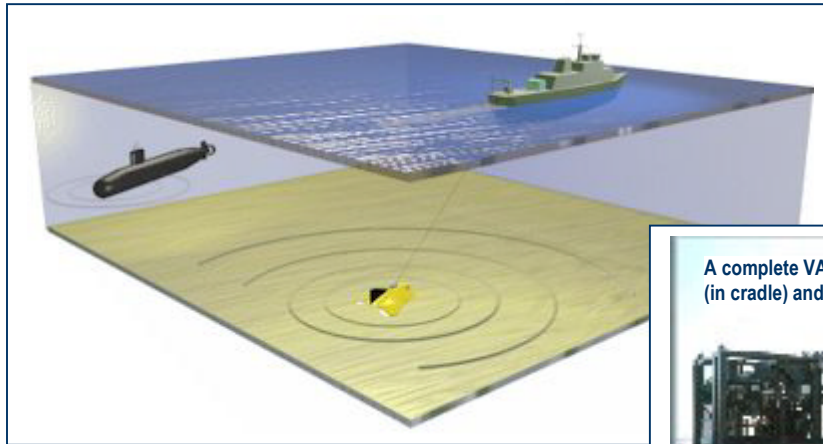


VERSATILE ACOUSTIC SOURCE SYSTEM (VASS)

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 can produce 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 Microsoft Windows 98™ 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 required 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. The Surface Operations Cabin is a self contained, environmentally controlled, half size ISO container which contains the Computer, Power Amplifier, and DSP electronics for operating the system. Within this cabin, all transmissions can be monitored on the system's digital analyser or headphone outputs.

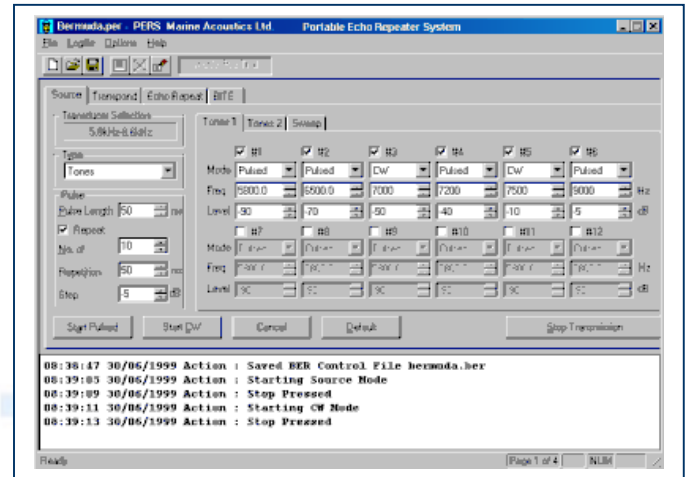
FEATURES

- 30Hz to 200kHz broadband operation
- Total operator control via computer
- Self contained
- Transportable
- Simple Deployment

VASS – Versatile Acoustic Source System

Source & Sequence Mode

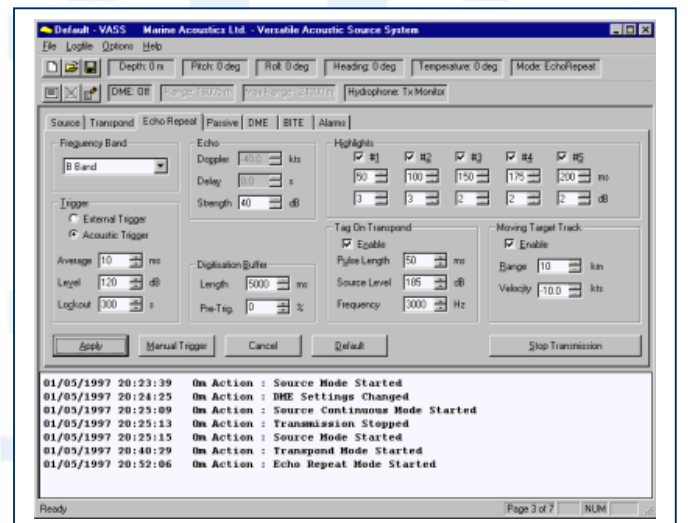
As a calibrated acoustic test signal transmitter (source mode) VASS can generate complex acoustic test signals between 30Hz and 200kHz at source levels of up to 185 dB re 1µPa@1m. It is capable of concurrently generating up to 24 tones. The system can also generate simultaneous wide band noise (selectable 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

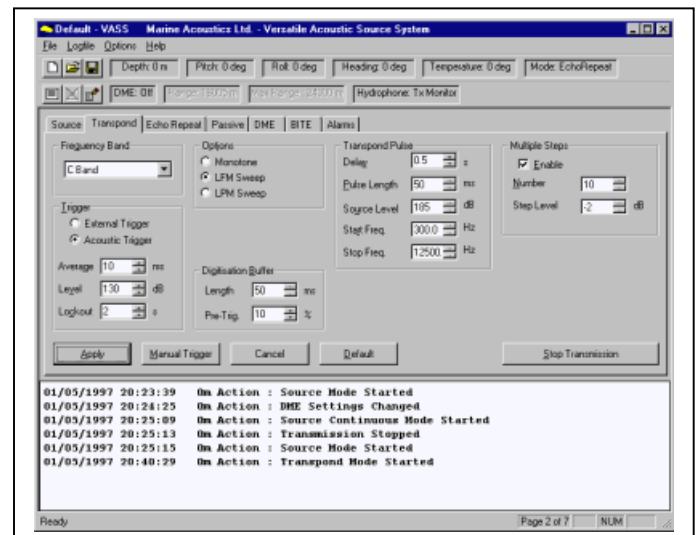
In Echo Repeat mode, VASS can repeat acoustic signals (between 300Hz and 12.5kHz) sampled from the dedicated receiver hydrophone contained in the towed body. It does this in response to a trigger event, based either on the incoming acoustic signal, an external input, or under operator control. The repeated 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 30Hz to 200kHz to be transponded.



VASS – Versatile Acoustic Source System

General Specification

Modes: Source, Echo Repeat, Transpond, Sequence, Receive
Transmit Bandwidth: 30Hz to 200kHz
Transmit Source Level: Up to 185 dB re 1µPa@1m (3kHz 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
Highlight offset: Up to 200ms
Moving track target: Start range up to 90km
Velocity -40 to +40 knots
Tag on Transpond: User configurable

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 - 30 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

Slant Range (DME) System

Type: Synchronised ranging system
Frequencies: Selectable depending on the vessel's sonar
Synchronisation: Via VHF radio to vessel under test
Oscillator: Highly stable oven controlled oscillator

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: Two 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, DME processor card, DME DSP card, 1.2kVA Power amplifier, HF Power Amplifier, Pentium PC, 14" monitor, Keyboard, Printer, VHF Radio, DigitalAnalyser.



Surface Operations Cabin: Interior

VASS – Versatile Acoustic Source System

Tow Fish

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.

Winch

Size: 2m x 1.6m x 1.6m high.

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

Tow Cable

Diameter: 12.7mm

Length: 1000m

Tow Fish Electronics

Telemetry: Pitch, roll, heading, depth and
temperature (all displayed on
the Windows interface in the
Surface Operations Cabin and
recorded in a log file).

Receive Hydrophone: Calibrated for receive and
echo repeat.

Monitor Hydrophone: For monitoring all
transmissions

Transmit Transducers

Number: 4

Frequency bands: 30Hz to 17.5 kHz
17.5 kHz to 50 kHz
50 kHz to 110 kHz
110 kHz to 200 kHz

Source level: Up to 185dB re 1µPa @1m

Horizontal response: Omnidirectional

Remote DME System

PC: Portable mains powered PC with
LCD screen

Cards included in PC: DME processor and DME DSP
card

Software: Remote DME User Interface,
running under Microsoft
Windows 95-98

Printer: Portable inkjet

Interface to sonars: Transmit via (for example)
underwater telephone system or
separate transducer(s).

Receive via a suitable sonar's
bus (with a separate interface
unit) or underwater telephone or
separate transducer(s)

Synchronisation: Interface to vessel's VHF radio
set

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



**Chelsea
Technologies
Group Ltd**

55 Central Avenue
West Molesey
Surrey KT8 2QZ
United Kingdom
Tel: +44 (0)20 8481 9000
Fax: +44 (0)20 8941 9319
sales@chelsea.co.uk
www.chelsea.co.uk