

SOCRATES 2



SOCRATES 2 on deck of HNLMS Van Nes, a RNLN multi purpose fregate

TNO innovation
for life

SOCRATES 2 (for SOnar CalibRation and TESTing) is an even more sophisticated versatile towed acoustic underwater source than its predecessor.

It is designed as a high-tech yet still low cost component for a number of applications such as:

- A convenient and easy-to-handle sound source as a part of an active Anti Submarine Warfare (ASW) sonar system.
- A replacement for submarines in testing, calibration and evaluation of active and passive ASW sonar systems.
- A submarine target simulator in Navy exercises or sonar test trials.
- A target for Navy torpedo launch exercises or a replacement of a torpedo in torpedo defence warning systems.
- A source for long-range underwater communication

From the outside Socrates2 is a copy of Socrates1, but is refitted with a complete new core with two specially designed Free Flooded Ring (FFR) transducers. The two rings are designed by UEMS (Ultra

Electronics Maritime Systems) in Canada. The transducers both have excellent acoustic characteristics.

Its remotely controlled on-board electronics, based on a COTS PC running on Microsoft Windows™, is a generalised WAV-player that allows for the transmission of any predefined or recorded acoustic signal. The user-interface controls the operational modes and monitors the system's hardware and sensors. The different operation modes include: a locator mode with triggering on (GPS) time; a transponder mode with acoustic triggering of predefined signals; as well as an echo-repeater mode, in which recorded signals are retransmitted with simulated Doppler shift and target strength. Besides high power pulses, also transmissions of long-duration signals (noise, signatures or communication signals) at modest power is possible.

The Socrates 2 system consists of a towed body with excellent hydrodynamic properties, a faired tow cable, a deck cable and a PC based operator interface and a power amplifier rack containing amplifiers, power supply interface and transformer. The towed body contains two acoustic sources, a hydrophone, and a watertight inner pressure hull for the transformer and the non-acoustic sensors.

The Socrates sources are successfully used by TNO for the development and testing of low frequency active sonar's for the Royal Netherlands Navy. You can also rent them under attractive conditions for your own sea-trials. Finally, our team at TNO can duplicate Socrates for you to your own specifications.

SOCRATES MODES OF OPERATION: FUNCTIONS:

- echo repeater; acoustically triggered transmission of recorded and processed signal,
- transponder; acoustically triggered transmission of a predefined pulse*
- locator; GPS time triggered transmission of a predefined pulse*
- continuous transmissions; noise, communication signals, ship signatures

* Pulse types: Any WAV file.

ACOUSTICAL SPECIFICATIONS:

Frequency transmitter*:
950-2350 Hz (-3dB)

Maximum transmit level*:
214 dB re 1µPa @ 1 m

Frequency transmitter**:
3500-8500 Hz (-3dB)

Maximum transmit level**:
204 dB re 1µPa @ 1 m

Time Bandwidth Product:
10000

Centre Frequency:
Free within Bandwidth

Doppler:
+/- 40 knots

* Transmitting transducer LF FFR
** Transmitting transducer HF FFR



Socrates2 suspended from the A frame of the HNLMS Mercur during calibration sea trials

MECHANICAL SPECIFICATIONS OF THE TOW BODY

Max operating depth:	700 m
Max tow speeds:	12 knots
Mass in air:	550 kg
Weight in sea water:	350 kg
Mass (filled with seawater):	875 kg
Length:	3.20 m
Width:	0.80 m
Height:	0.60 m

(cable termination not included)

ELECTRICAL SPECIFICATIONS

Max. Voltage to transducer:
2500 V rms

Max. Current to transducer:
25 A rms

Pre-amplifier power supply:
25 V DC

Max. Pre-amplifier signal:
5 V rms

Power supply:
440 V / 60 Hz

NON ACOUSTIC SENSORS

Depth:	0 - 500 m
Pitch:	+/- 45 degree
Roll:	+/- 45 degree
Temperature:	-10 to +40 C

CABLE SPECIFICATIONS:

Tow Cable length:	1000 m
Tow Cable diameter:	25 mm
Breaking Strength:	19 tonnes
Deck Cable length:	60 m
Deck Cable diameter:	19.5 mm

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TNO

TNO is an independent innovation organisation that connects people and knowledge in order to create the innovations that sustainably boost the competitiveness of industry and wellbeing of society.

TNO focuses its efforts on seven themes including Defence, Safety and Security: TNO works on a safe and secure society by creating innovations for people working in defence organisations, the police, emergency services and industry.

CONTACT

Ton (A.C.) van Koersel, MSc
Senior Business Developer

E ton.vankoersel@tno.nl
P +31 888 66 4017
M +31 622 60 9769