Expression of Interest

TOT of Portable Diver Detection Sonar (PDDS) system

NPOL, Kochi, a premier laboratory under Defence R&D Organisation invites Expressions of Interest (EOI) from original manufacturer(s) having sufficient experience, expertise and willing to undertake production of state-of-the-art portable diver detection system. The firm should be technologically sound to manufacture and supply the system with requisite quality standards.

PDDS is a portable sonar system capable of detecting potential underwater threats like, divers and diver delivery vehicles in shallow waters. The system alerts the operator to confirm the type of threat so that effective countermeasures can be initiated in time. The system can be deployed either outboard a ship or at any location in a harbor, typically beside a wall, pier or at the sea bottom. As an auto-alert system, PDDS performs detection, tracking and classification of divers or diver-like targets automatically and alerts the operator accordingly. The target information provided by the system includes (i) target position (range and bearing) and (ii) target dynamics (speed and course). Technical Specifications of the system are enclosed at Annexure 'A'

Interested parties may respond along with their company profile, financial & technical capabilities etc. as per the following format –

a) Memorandum and Articles of Association (Should be incorporated as per Indian Companies Act, 1956)
b) Certificates of registration as a manufacturing unit, if any.
c) Balance Sheet for the preceding three years.
d) Income Tax returns for the preceding three year period
e) Details of shareholding/ownership pattern especially foreign partners/ shareholders, foreign employees, directors, etc. The company must adhere to the prevailing Govt. of India policies and regulations on Foreign Direct Investment (FDI).
f) Annual budget for R&D during last three years.
g) Numbers and details of IPR or patents etc. held by the company.

h) Number of technically or professionally qualified personnel.
i) Record of past performance (e.g. Supply orders executed against of Ministry of Defence orders, public sectors and paramilitary forces, if any.
j) Availability of adequate infrastructure (List of machines and their production capacities) and technical expertise.
k) List of Testing and Support equipment.
l) ISO/ ISI certification or any other certification
m) Relevant clearances form the authorities/ ministries (if any)
n) Capacity and capability to undertake developmental work and to accept attendant financial and commercial risks.
o) Capacity/Capability to market the product through the marketing network, sales and service network, reliability to maintain confidentiality.

Eligible parties will have to sign Confidentiality & Non-Disclosure Agreement (CNDA) with DRDO for technical discussion including specifications, following which they shall be considered for giving Transfer of Technology (TOT) on non-exclusive basis. TOT to industry will be given based on their manufacturing capability, assurance on quality and capacity of production apart from other terms and conditions.

Interested Industries may contact/ write to Director, NPOL, Kochi or Director DI^2TM on the following addresses –

Director, NPOL
DRDO, Min. of Defence,
Thrikkakara P.O.
Kochi-682021
Contact No - 0484 2424878
Email: director@npol.drdo.in

Director, DI^2TM
Room No 446 DRDO Bhawan
DRDO HQrs Ministry of Defence
Rajaji Marg New Delhi – 110011
Contact No - (011) 23016216 / 23007446

Portable Diver Detection Sonar system (PDDS)

1. Product overview

PDDS is a portable sonar system capable of detecting potential underwater threats like divers and diver delivery vehicles in shallow waters. The system alerts the operator to confirm the type of threat so that effective countermeasures can be initiated in time. The system can be deployed either outboard a ship or at any location in a harbour, typically beside a wall, pier or at the sea bottom.

The system consists of units under water and on shore, interconnected by water blocked cable carrying data and power supply lines. The wet-end unit is a sonar head consisting of transducer arrays, transmitter and front-end receiver electronics hardware. The shore units consist of an interface unit, a processing and display units and power supply. As an auto-alert system, PDDS performs detection, tracking and classification of divers or diver-like targets automatically and alerts the operator accordingly. The target information provided by the system includes (i) target position (range and bearing) and (ii) target dynamics (speed and course).

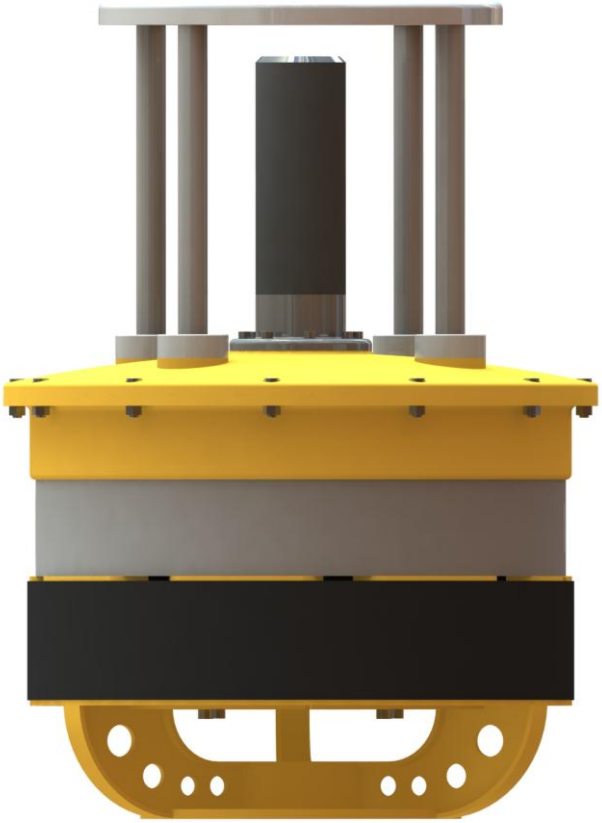

Fig. 1. Wet-end Unit of Portable Diver Detection Sonar

2. Technical Specifications

	Sl. No.	Features	Specification
General Features	1	Targets	Divers, Diver Delivery Vehicles, Midgets
	2	Target strength	> -20 dB
	3	Detection range	Up to 300m
	4	Coverage sector	360° Azimuth, 16° Elevation
	5	Deployment Scheme	Out-board ship /pier / harbour / seabed
	6	Dimensions	Diameter: ~500 mm, Height: ~700 mm
	7	Weight in air	~50 kg
	8	Weight in water	~5 kg
	9	Operating depth	Up to 50 m
Operation	10	Operating frequency	75 kHz
	11	Band width	±5kHz
	12	Tx Beam width	360° Azimuth 6°,12°,24° Elevation(Selectable)
	13	Rx Beam width	3° Azimuth, 16° Elevation
	14	Pulse type	CW,FM
	15	Pulse width	1-40 ms
	16	Range resolution	1m
	17	Bearing resolution	1°
Configuration	18	System components	(a) Wet-end Unit: Sonar Head
			(b) Processor & Display Unit
			(c) Interface Unit
			(d) Deployment structure
	19	Sonar head	Projector and hydrophone arrays integrated with power amplifiers and receiver electronics for transmission and reception, respectively.
	20	Transducer arrays	Independent transmitter & receiver arrays
	21	Array geometry	Cylindrical
	22	Built-in sensors	Temperature, humidity, heading, tilt & depth

3. System Configuration

As shown in Fig. 2, the total system consists of a wet-end unit (sonar head) connected through a water-blocked cable to an interface unit, form where further data is transmitted to a

processing and display unit. A deployment structure is also provided, depending on the type of installation.

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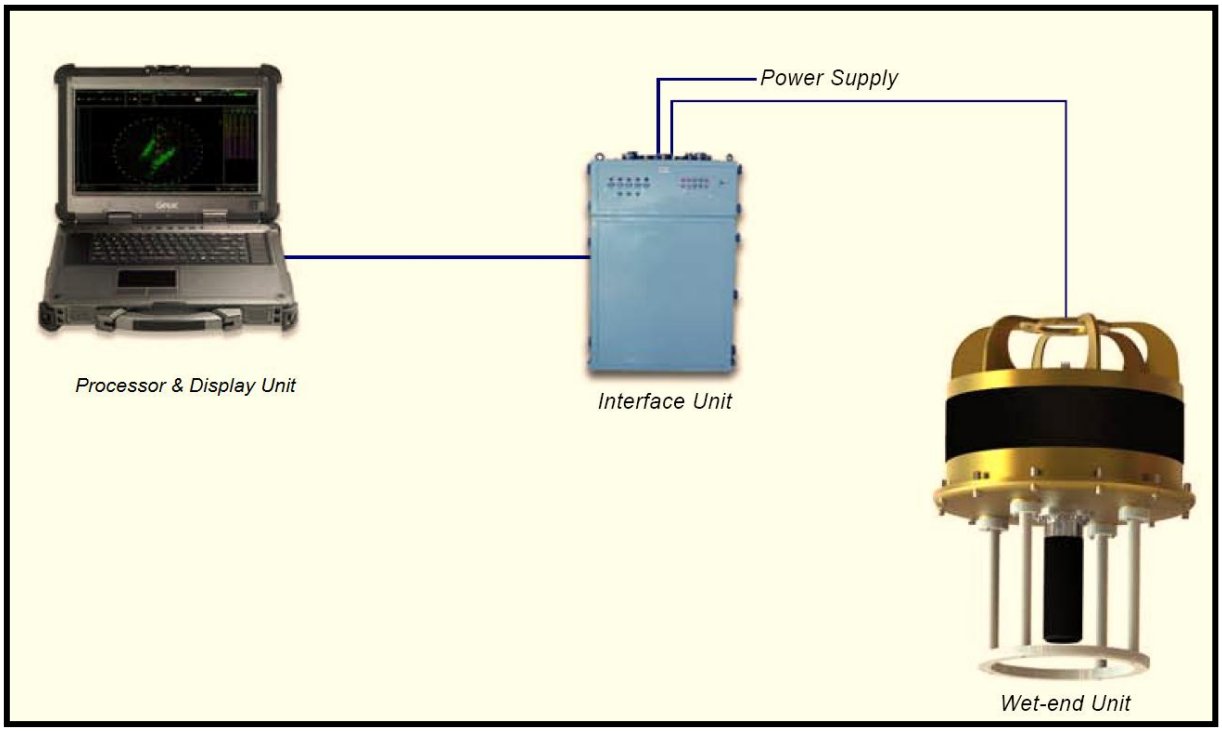

Fig. 2. PDDS - System Configuration

3.1. Wet-end Unit

The wet-end unit of PDDS consists of the transducer arrays and the associated electronics for transmitter and receiver, all housed inside a watertight enclosure. The transmitter consists of a projector array and power amplifiers. The input signal to the power amplifier is generated by the processor and fed through a transmitting controller. The transmitter is designed to generate acoustic signals of specific strength, pulse shape and pulse width that can be controlled according to the water conditions prevailing at the location of operation. The receiver consists of a hydrophone array and front-end electronics. The hydrophone array picks up the incoming acoustic signals and transforms into electrical signals. The signal strength is very low of the order of a few microvolts. Therefore, the hydrophone output is amplified using preamplifiers, and then filtered, digitized and passed on to the signal processor.

3.2. Interface Unit

The data from the wet-end unit is transmitted through a watertight cable to an interface unit, which is installed on shore or on-board ship close to the point where the watertight cable comes out of the water. The data is received in the interface unit and further transmitted across to the processor and display unit. The power supply of 220V is fed to the interface unit, from where it is supplied to the wet-end unit.

3.3. Processor & Display Unit

The Processor & Display Unit is a high performance ruggedized computer (with integrated WLAN). It performs advanced acoustic signal processing algorithms, including, Beam former, Automatic Detection, Automatic Track and Automatic classification. The detector and track output are displayed in the display with map overlay.

4. System Features

- High frequency sonar with extended detection range
- Fully automated solution for underwater security
- Detects and classifies underwater intruders with very low target strength
- Automatic alarm on detection of threat
- Capable of detecting multiple targets around 360° in the azimuthal plane
- Useful for protection of waterside assets & installations with 24x7 surveillance
- Very narrow beams for fine resolution in bearing of small targets
- High probability of detection
- Low probability false alarm
- Very low maintenance requirements
- Enables rapid deployment and movement between sites
- Portable system with compact packaging
- Flexible deployment schemes for fixed-site applications / on board vessels
- Ruggedized system for operation in all-weather and water conditions
- Modular design enables customization for site-specific geography
- User friendly GUI scheme for quick and efficient operation
- Provides sonar picture in desired formats
- Provides tactical GUI with map overlay