



Diver Interdiction System

For over 40 years Hydroacoustics, Inc. (HAI) has been a world leader in the design and manufacture of unique high power, broadband, low frequency underwater acoustic sources based on continuous wave and impulsive source technology. Our products include Hydroacoustic Low Frequency (HLF) sources, Diver Interdiction Systems (DIS) and the Proteus® Series underwater Remote Operated Vehicles (ROVs).

The underwater risk created by terrorist divers poses a serious threat to high value maritime assets located in littoral waters, lakes or at ships at anchor. With appropriate levels of detection, identification, and warning HAI's Diver Interdiction System can be brought to bear on a target. The DIS releases broadband low frequency acoustic energy which exerts adverse non-lethal acoustic bio effects on the suspected terrorist diver/s at a substantial distance from the high value asset. This causes the diver to surface making apprehension manageable. The DIS can be fired remotely using encrypted Radio Frequency (RF) signals. We also supply an underwater loudhailer device to provide initial deterrent.

Benefits

- **Protect ships, nuclear power plants, water plants, port facilities, and other high value maritime assets from underwater terrorist attack**
- **Fully portable and sized to deploy from small harbor patrol boat, police boat, or from the dock or pier**
- **Certified non-lethal deterrent using acoustic bio-effects**

HAI's DIS is offered as a portable system and as a stationary network system. These systems may be integrated into diver detection systems or operate as standalone platforms. In a stationary system airguns can be anchored, attached to buoys and or piers. Portable systems may be deployed from RHIBs, harbor patrol boats, piers or from ships. For ships at anchor, the DIS may be deployed off of the side of the vessel.

Key Features

- **Repeatable, scalable response to the underwater terrorist threat under the control of the operator**
- **Safety – no explosives are handled by the operator or on-board the response boat**
- **DOT certified, fiber-wound, high pressure air bottles, rated at 4,500 psi**
- **Powered by self-contained batteries and air supply – no external power source needed to operate the system**
- **Modular design allows operators to select the specific system that is needed and facilitates the installation of the system**

The DIS utilizes a proprietary air gun control system which may be remotely operated at a safe distance from the intruder. A DIS stationary network would consist of an array of guns deployed to protect a specific environment networked into a single control unit. The portable system consists of four components; energy storage unit, controls, umbilical and air gun. Each component is housed in a ruggedized waterproof case.

These systems provide a scalable deterrence that can be achieved by various means including the frequency with which the pulses are transmitted, the creation of tones superimposed on the broadband output, the use of increased air pressure and an increased number of guns that are simultaneously fired maximizing the flexibility of the output.



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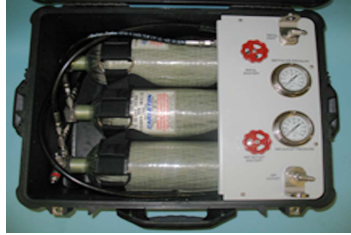
Underwater Diver Deterrent System Comparison

Desirable Attribute Option	Electro-acoustic	Speakers Plasma	Explosives	Watergun	Airgun
Shallow Water Capable	Cavitation concern	X	X	X	X
Scalable Effect, Adjustable Level, Rapid Impact	X	X	Difficult to control delay	X Less low frequency content	X
Multiple Intruders	X	X	Multiple systems required	X	X
Flexible Deployment Configuration	Limited	Limited	Limited	X	X
Highly Reliable/Available	X	Degrades over time		X	X
Low Maintenance		Degrades over time		X	X
System Size	Large size for low frequency			Selectable	Selectable
Low Cost			Inexpensive	X	X
Reusable	X	Degrades over time	Single Use	X	X
Minimum Pollution	X	X		X	X
Control Collateral Effects	X	X		X	X

Mobile System Components



Control Box



Energy Bottles

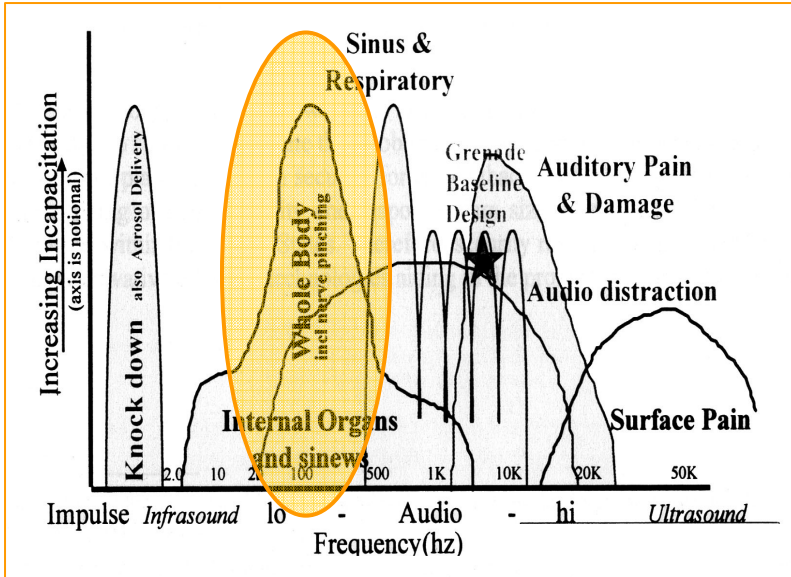


High Pressure Hose



Air Gun Close up

DIS Acoustic Bio-Effects



Component Options Size & Weight

Component Options		Component In Shipping Case	
Control Case	Control Option	L x W x H (cm)	Weight (kg)
PCB-L	Local	40.6x13.3x17.8	6.8
PCB-R	Remote	63.5x48.3x22.9	13.6
Air Gun Case	Chamber Vol.		
AGB 10	10 cu in	96.5x40.6x15.2	24
AGB 20	20 cu in	96.5x40.6x15.2	25.4
AGB 40	40 cu in	114.3x40.6x15.2	28.1
AGB 60	60 cu in	134.6x40.6x15.2	33.1
AGB 100	100 cu in	134.6x40.6x15.2	39.5
Umbilical Case	Umbilical Length		
PUB 20	6.1m	68.6x68.6x63.5	23.6
PUB 50	15.2m	68.6x68.6x63.5	30.4
PUB 100	30.3m	83.8x45.7x45.7	31.7
PUB 200	60.6m	83.8x45.7x45.7	56.7
Bottle Case	Air Capacity @ 4,500 psi		
PBB 150	150 cu ft (855 ci)	63.5x48.3x30.5	22.7
PBB 290	290 cu ft (1650 ci)	71.1x71.1x43.2	31.7
PBB 570	570 cu ft (3248 ci)	114.3x66.0x43.2	68

Estimated Shot Calculator

Total Tank Volume, 2-3 Bottle System, (cu-in)	855	855	1650	855	1650	1650	1650	1650	3248	3248
Tank Charge Pressure, PSI	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Regulated System Operating Pressure, PSI	1000	2000	2000	1000	2000	2500	1000	2000	2000	2500
Air Gun Chamber Size, cu-in	10	10	10	20	20	20	40	40	40	40
Shots Per Tank (w adiabatic losses)	213	76	147	106	73	47	103	36	72	46