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3DSS-DX-AUV Mapping / 3D Imaging Sonar

- **Wide swath bathymetry**
- **Enhanced 2D Sidescan**
- **True 3D Sidescan**
- **Full water-colum imaging**
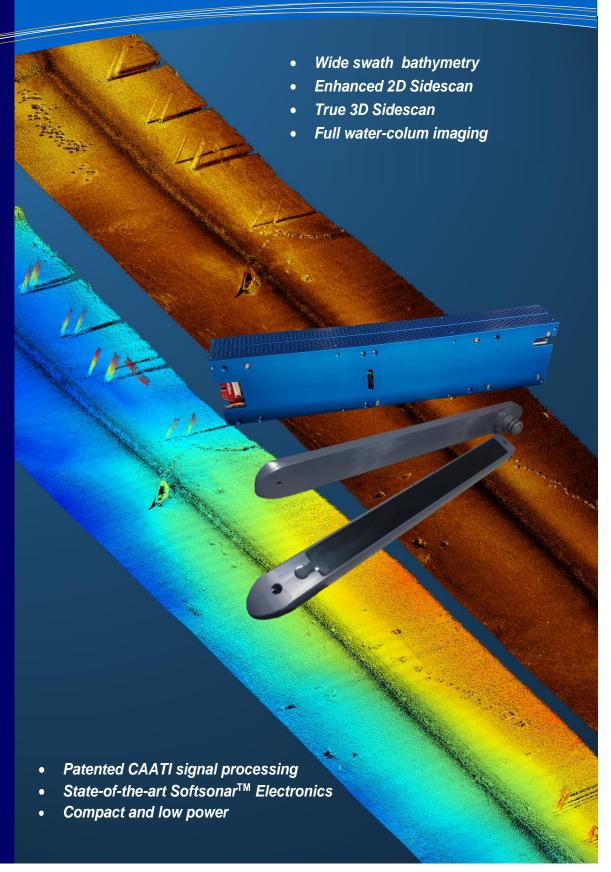
BRINGING ANGLE-OF-ARRIVAL PROCESSING TO UNMANNED AND AUTONOMOUS VEHICLES

State-of-the-art transducer design and manufacturing methods, combined with *SoftSonar*[TM] electronics and patented CAATI signal processing provides fine scale imagery and bathymetry to unmanned vehicles. Superior swath bathymetry performance and dense 3D point cloud imagery over ultra-wide swath sectors implemented in a compact and low power form factor perfect for portable, low logistics AUV platforms.

REAL-TIME 3D IMAGERY

Geometrically correct, co-located 3D Sidescan imagery augments wide swath bathymetry and extends 2D sidescan resolution into three dimensions. 3DSS real-time software displays, capture and allow measurement of detailed 3D images of seabed texture, structures and wrecks, pipes, cables, geological features pilings, biological habitats / vegetation, and other seabed and water-column features not evident in bathymetry alone.

- **Patented CAATI signal processing**
- **State-of-the-art Softsonar**[TM] **Electronics**
- **Compact and low power**

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PATENTED ARRAY SIGNAL PROCESSING TECHNOLOGY

3DSS sonar incorporates patented signal processing (CAATI) that extends the single angle-of-arrival principle used in interferometric systems to accommodate multiple simultaneous backscatter arrivals (e.g. from the seabed, sea surface, water-column, and multipath). The result is superior wide swath bathymetry and true 3D sidescan imaging and from a compact, easy-to-use sonar.

SOFTSONAR™ TECHNOLOGY

At the heart of the *3DSS* sonar is Ping DSP's *SoftSonar™* electronics technology that integrates low noise, wide dynamic range sonar receivers with compact steerable transmitters, a versatile Gigabit Ethernet interface, modular high speed digital signal processing architecture, straightforward AUV systems integration, and easy-to-use software.

BROAD APPLICATION LIST

- Hydrographic Survey
- Subsea Structure Surveying
- Search and Localization
- Marine Archaeology
- Pipe and Junction Surveying
- Benthic habitat mapping
- 3D Water-column imaging
- Terrain based guidance
- Mine counter measures

Specifications[1]

Sonar Model	3DSS-DX-AUV
Sonar Specifications	
Operating Frequency	450 kHz
Transmit Waveforms	CW, Broadband
Pulse Lengths	10 – 200 cycles
Horizontal Beamwidth (2 way)	0.4°
Vertical Beamwidth (selectable)	19° - 125°
Mech. Transducer Tilt (fixed)	20°
Electronic Transmit Tilt	-45° to 45°
Max. Ping Rep. Rate	~45 Hz
2D Sidescan (2D Imagery) Specifications	
Data Output	Range and Amplitude
2D Imaging Swath Width	10 to 20 times sonar altitude depending on sound profile and bottom type
Max Range	200 m per side
Max Range Resolution	1.67 cm
3D Sidescan (3D Imagery) Specifications	
Data Output	Range, Angle, and Amplitude
3D Imaging Swath Width	8 to 14 times sonar altitude, varies with sound velocity profile and bottom type
Max 3D Imaging Range per Side	100m per side
Max Resolution	1.67 cm
Bathymetry Specifications	
Data Output	Range, Angle, and Amplitude
Bathymetry Swath Width	8 to 16 times sonar altitude, varies with sound velocity profile and bottom type
Max Bathymetry Range	100m per side
Min. Sounding Depth	0.7m
Max. Sounding Depth	75m (reduced swath width)
Sounding Accuracy	Exceeds IHO Special Order
Multibeam Mode Settings	Beamwidth (0.25°-5°), Sector (90°-220°), Beams (3-1024), Mode (Equidistant, Equiangle, Hybrid)
Binning Mode Settings	Bin Count (3-1440), Bin Width (5cm – 200cm)
Integrated MRU Specifications	
Pitch Range, Res., Rep., Acc.	±90°, < 0.05°, < 0.2°, 0.5° @ 25□C
Roll Range, Res., Rep., Acc.	±180°, < 0.05°, < 0.2°, 0.5° @ 25□C
Heading Range, Res.,Rep., Acc.	±180°, < 0.05°, < 0.5°, 2° @ 25C
Motion Sensor Output Rate	100 Hz
Interface Specifications	
Control Input / Data Output	Gigabit Ethernet, sonar software provides control GUI and TCP data server
Time Reference	Automatically time aligned to GNSS or vehicle time
Additional Communication Ports	RS-232 or Ethernet, for external MRU, GNSS or INS,
Additional Inputs	PPS, Ext. Trigger, TSS (Motion), NMEA (Position, time)
Onboard Computer Req.	PC (Quad Core, 8GB, MS Windows 10 (64 bit)
3rd Party Software Support	Hypack, SonarWiz, QINSy, PDS2000, Caris HIPS/SIPS
Physical Specifications	
Voltage Requirements	10.5-35 VDC
Power Consumption	17 W idle, 22W typical (current: 0.7A idle 0.9A typical average, 3A max for 2sec., 7A peak)
SoftSonar™ Module Dimensions	L: 14.08'' W: 3.10'' H: 1.85''
SoftSonar™ Module Weight (Air)	1.38 kg
Transducer Dimensions	L: 17.00'' W: 1.75'' H: 0.69''
Transducer Weight (Air)	0.8 kg
Depth Rating	Standard: 100 m (3DSS-DX-AUV-100m), Optional: 500m (3DSS-DX-AUV-500m)
Ambient Operating Temp.	-5° C – 45° C

Notes:
[1]   Specifications subject to change without notice.