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AN ORDER**

REQUEST FOR BIDS/PROPOSALS COVERSHEET
THE UNIVERSITY OF SOUTHERN MISSISSIPPI
Procurement and Contract Services
118 College Drive #5003, Hattiesburg, Mississippi 39406-0001

Date: September 20, 2023

BID No. 24-08

THE UNIVERSITY OF SOUTHERN MISSISSIPPI is considering the purchase of the following item(s). We ask that you submit your bid and retain one copy for your files. Right is reserved to accept or reject any part of your bid. Your quotation will be given consideration if received in Bond Hall, Room 214 on or before:

2:00 p.m. CT

October 05, 2023

Buyer: Amber Floyd

Name: _____

Company: _____

Address: _____

City/State/Zip: _____

TERMS - Bidder should state terms of sale. Our terms are 2% ten days, net 45 days.

These terms will apply per Mississippi law.

AWARDING CONTRACT - Cash terms will not be used as a basis for awarding contracts; however, the University will accept cash discounts when earned.

NOTE: If you cannot quote on the exact material shown, please indicate any exception giving brand name and complete specifications of any alternate. If additional space is required, use a separate sheet or letter of transmittal.

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL NET PRICE
		BID 24-08 Side Scan Sonar System		
		RFx # 3160006175		
		<small>PROPOSAL MUST BE RETURNED TO THE UNIVERSITY IN ACCORDANCE WITH THE SPECIFICATIONS. RFP NUMBER AND DATE OF BID OPENING MUST BE SHOWN ON THE OUTSIDE OF THE ENVELOPE IF USING THAT METHOD.</small>		

We quote you as above - F.O.B. The University of Southern Mississippi.
Shipment can be made in _____ days from receipt of order. DATE _____
Return quotation to Procurement Services at above address.

Signature Required _____



THE UNIVERSITY OF
SOUTHERN
MISSISSIPPI

**SYSTEM DESIGN SPECIFICATIONS FOR HIGH RESOLUTION
SIDE SCAN SONAR SYSTEMS WITH INTEGRATED MAGNETOMETER**

The University of Southern Mississippi

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SPECIFICATIONS FOR A PAIR OF HIGH-RESOLUTION SIDE SCAN SONAR SYSTEMS WITH INTEGRATED MAGNETOMETER

I. Background

The U.S. Navy requires the ability to detect targets using recently developed low cost, low power consumption, high sensitivity solid state magnetic sensors integrated into unmanned underwater vehicles (UUVs). These magnetic sensors have the potential to provide the Navy with enhanced capabilities to detect low magnetic signature buried and proud targets particularly in the littoral zone. These sensors will also have the added capability to detect intrusions into secure coastal facilities.

The University of Southern Mississippi's Roger F. Wicker Center for Ocean Enterprise, located at the Port of Gulfport, MS has been researching and testing advanced uncrewed systems using sonar and magnetic sensor designs, and on-board processing to create advanced maps of acoustic and magnetic sensor data over a broad range of environmental and platform noise conditions.

The University of Southern Mississippi (USM) has received funding to purchase several high resolution side scan sonar systems which will be integrated into a combined sonar/magnetometer tandem towed system. These systems will map the location of specific targets inside USM's CUBEnet test range environment.

II. Purpose

The University of Southern Mississippi (USM) has developed the environmental measurement framework, data processing, visualization products, and ocean measurement system required for testing and performance evaluations of these new and emerging solid state magnetic sensors.

This document contains the minimum requirements for two advanced side scan sonar systems. This will include conventional and ultra-high resolution sonar systems and an integrated magnetometer. These systems will be integrated and tested to determine the ideal sensor configurations for detection, classification, and localization (DCL) of low/medium/high metallic strength targets over a broad range of environmental and platform noise conditions. The sonar systems will map the placement and types of proud and partially buried targets deployed in USM's CUBEnet test range.

III. General Requirements

1. Each side scan sonar towfish should be able to fully integrated to the magnetometer system to facilitate tandem and towing and data acquisition.
2. An automatic target recognition and display software shall also be provided which uses the native sonar file format and utilizes the full resolution raw sonar data for convolutional neural network (CNN) analysis.
3. Each towbody shall have an AMSTEEL™ safety cable.

4. Splashproof topside processing units shall be included for each system.
5. Each of these systems shall be controlled by a rugged topside laptop.
6. A depressor wing shall be included for each system.
7. Each of the systems shall have a dedicated altimeter transducer for optimized bottom tracking.
8. The systems shall provide a method to minimize shallow water surface reflections.
9. Each of the systems shall come with its own transportation crates.
10. The vendor shall provide a list and cost of all optional onboard spares.
11. The vendor shall also provide a list of optional tow and deck cables.
12. To meet program requirements the side scan sonar systems, winches, and all supporting equipment shall be delivered to USM within 90 days after contract award.
13. The delivery arrangements and transportation costs shall be the vendor's responsibility.
14. The side can sonar systems, towbody, and winch shall be delivered to USM's Marine Research Center, 1030 30th Ave Gulfport, MS 39501.

IV. Specific Sonar System Specifications

The following minimum specifications shall ensure that the side scan sonar systems perform the tasks necessary to satisfy USM's project's objectives.

A. Towbodies for integrated sonar systems (1) and (2)

1. The following table outlines the minimum specifications that two Towbodies shall meet.

General Towbody Specifications	
Towbody	Description/Value
Construction	Electro-polished marine grade 316 Stainless Steel
Length	No greater than 1.5 m
Outer Diameter	No greater than 10 cm
Weight in air	no greater than 75 lbs
Operating temperatures	-1 ⁰ to 37 ⁰ C
Storage temperature	-20 ⁰ to 60 ⁰ C
The operating voltage	12 VDC or 110/120 VAC
Output data format	SDF and XTF
Depth/ pressure sensors	300 m / 450 psi
Water temperature sensor	0-35 ⁰ C
Built in Altimeter	360 kHz 0 to 100 m range
Other sensors	Built-In Heading, Pitch and Roll Sensors

B. Integrated Sidescan Sonar System (1)

2. The following table outlines the minimum system specifications that the Integrated Side Scan Sonar System (1) shall meet.

General Sonar Specifications	
Integrated Sonar System	Description/Value
Transducers	Simultaneously dual mode single beam transducers
Frequency range	300 kHz and 600 kHz
Signal type	FM Chirp
The horizontal beamwidth at 300 kHz	Equal or less than 0.6 ⁰
The horizontal beamwidth at 600 kHz	Equal or less than 0.40
The vertical beam width	No greater than 50 ⁰
The vertical beam center	At least 14 ⁰ down from the horizontal at both frequencies
The maximum transmission range at 300 kHz	At least 225 m
The maximum transmission range at 600 kHz	At least 100 m
The operational tow speeds and scan ranges to maintain 1m object detection	100 m at 4 knots, 7 m at 4.5 knots, 50 m at 7 knots
Across track resolution at 300 kHz	At least 2.6 cm
Across track resolution at 600 kHz	At least 2.5 cm
Maximum operating depth	At least 1500 m
Motion tolerant transducer design	Transducer array designed to mitigate motion.

C. Integrated Ultra-high Resolution Sidescan Sonar system (2)

3. The following table outlines the minimum system specifications that the integrated Ultra-high Resolution Side Scan Sonar System shall meet.

General Sonar Specifications	
Integrated Ultra-high resolution Sonar System (2)	Description/Value
Transducers	Simultaneous dual mode single beam focused transducers
Frequency range	600 kHz and 900 kHz
Signal type	FM Chirp
The horizontal beamwidth at 600 kHz	Equal or less than 0.24 ⁰
The horizontal beamwidth at 900 kHz	Equal or less than 0.24 ⁰
The vertical beam width	No greater than 50 ⁰
The vertical beam center	At least 14 ⁰ down from the horizontal at both frequencies

The maximum transmission range at 600 kHz	At least 100 m
The maximum transmission range at 900 kHz	At least 35m
The operational tow speeds and scan ranges for object detection	40 m at 4.9 knots (0.5 m object), 30 m at 3.9 knots (0.3 m object), 50 m at 7.8 knots (1 m object)
Cross track resolution at 600 kHz	At least 2.5 cm
Cross track resolution at 900 kHz	At least 1.3 cm
Along track resolution at 600 kHz at 50 m	At least 20 cm
Along track resolution at 900 kHz	At least 9 cm
Maximum operating depth	At least 250 m
Motion tolerant transducer design	Transducer array designed to mitigate motion.

D. Portable Electric Winch

4. The following table outlines the minimum specifications that the portable electric tow winch shall meet.

General Winch Specifications	
Property	Description/Value
Type	5HP 220VAC 33A Portable electric winch
Approximate size	61" L x 40" W x 39" H
Weight	Less than 1000 lbs.
Motor	5 HP Aluminum Motor 184TC 1800RPM 230 VAC
Construction	2in x 2in x 1/8in frame tubing with lift strap base tubes. 3.5" 4-Bolt Flange (standard painted cast iron) drum bearings Drum anti-rotation pin lock. Clutch Outboard Bearings. Manual dog-clutch with locking pin for free wheeling Removable back-up handle with sprocket-assisted manual backup drive for easier manual recovery
Controller electronics	CE verified, 2- Beacons Setup (Green, and Red) to indicate the status of the winch. Winch Dynamic Braking Modules for 5HP Motor
Drive controller	Motor controller with variable speed, reverse and power controls, IP65 rated with 3 m (10 f) long power cable
Drum size	Non-Grooved Drum Size, Bolted Drum Design, 28" diameter flanges, 16" diameter core, 20" face width.
Drum Capacity	1000 m (3281ft) of 0.402" (10.2mm) Armored Rochester cable with 1.1" free flange
Winch operation interface	Winch Stop Switch mounted on the Winch Enclosure
	Wired remote Joystick Control for Vector or DC Drive System with Emergency Stop Switch. Local joystick mounted on winch controller with Local/Remote selector switch for dual-control setup. 3m (10 ft) remote cable length
Gear Train	Right Angle Aluminum Gearbox 40:1 Corrosion-Resistant #60 Steel chain with sprocket ratio 64:25 Total gear reduction of 102:1
Mechanical Level wind System	Standard enclosed winch 1.75" screw (20" drum width) (2:1 Levelwind Gearbox) Stainless Steel Direct-drive diamond-pattern automatic reversing

	screw level winding system
	Reversing screw, standard painted cast-iron housing bearings, 2:1 intermediate level wind gearbox, chains, idler, follower, and fair-lead rollers
	Powder-coated or anodized marine-grade 6061-T6 or 5052 aluminum Anodized 6061-T6 Aluminum for spool manual disc brake. Steel Drive and Idler Sprocket with Treated Steel Chain 18.8 Stainless Steel Fastener Isolation of dissimilar metals UV-rated engineering thermoplastic
Operational Characteristics	
Property	General Winch Specifications
Line speed at core	0 to ~22.4 m/min (73.4 ft/min)
Line speed at maximum drum	0 to ~35.6 m/min (116.8 ft/min)
Rated line pull at core	1110 lbs. (503 kg)
Rated line pull at full drum:	734 lbs. (333 kg)
Max rated payload capacity:	At least 130 lbs (59kgs)
Rated tow speeds	up to 5 knots.
Towfish Cable lengths	
Cable	Description/Value
Deck cable 1	Length at least 10 m
Deck cable 2	Length at least 10 m
Deck cable 3	Length at least 20 m
Tow cable 1	Length at least 30 m, diameter at least .25 in
Tow cable 2	Length at least 100 m light weight cable, diameter at least .45 in
Tow cable 3	Length at least 1000 m, diameter at least .40 in

E. Manual cable reel management system

5. The following table outlines the minimum specifications that the manual cable reel management system winch shall meet.

Manual Cable Reel Management System	
Property	Description/Value
Cable reel diameter	At least 11 in
Cable reel width	At least 28 cm
	Water proof slip rings
	Environmentally sealed housing
	The winch shall mate with each Towfish and magnetometer systems

F. Integrated Magnetometer

6. The following table outlines the minimum specifications that the Towable Magnetometer System shall meet.

Magnetometer Specifications	
Property	Description/Value
Accuracy	0.1 nT
Sensor Sensitivity	0.01 nT
Counter Sensitivity	0.001 nT
Resolution	0,001 nT
Power Consumption	1 W standby, 3 W maximum, +2 W with altimeter
Range	18,000 nT to 115,00 nT
Gradient Tolerance	Over 9,000 nT/m
Sampling Range	0.1 Hz to 3 Hz
Communications	RS-232, 9600 bps
Power	24 VDC/ 120-240 VAC
Towfish Length	19 cm (47 in), + 10 cm (4 in) altimeter, + 5 cm (2 in) gradiometer
Diameter	7.6 cm (3in)
Weight in Air	12 kg- 12.8 kg with Altimeter
Weight in water	3.5 kg – 4 kg with Altimeter
Magnetometer Tow Cable Specification	
Property	Description/Value
Cable Conductors	Twisted pair
Cable Breaking Strength	2500 kg
Approx Weight in air	125 g/m
Approx Weight in water	44 g/m
Cable length	At least 10 m

V. Software

The vendor shall provide Complete Software Package (backup) and product documentation for all systems. The manufacturer sonar control, data acquisition and viewing software shall be provided together with relevant manuals.

Sonar post-processing software shall provide features such as sonar data management, image waterfalls, target annotation, mapping functionality and full automated target recognition functionality including the ability to build custom ATR models.

The vendor shall also provide the magnetometer control, data acquisition and magnetic signature display software.

VI. Training

The vendor shall provide training on the operation, software (acquisition & ATR processing, maintenance and troubleshooting integration of all systems. This training shall take place at the USM facility located at Stennis Space Center MS.

VII. Proof of Performance

The vendor shall provide a proven record of the Side Scan Sonar measurements and operating system performance. The vendor needs to provide references where these systems and their operating system in a substantially similar configuration as specified above have operated successfully within the last 3 years. The above requested information will assist USM in determining the bidder's capability of meeting these requirements.

VIII. Warranty Services

At a minimum, the Contractor shall provide software/hardware warranty support for one year from acceptance. Longer warranty periods are preferred. The Vendor shall agree to repair, adjust, and/or replace (as determined by the University to be in its best interest) any defective materials at the Vendor and/or manufacturers' sole cost. The University will incur no costs for service or replacement of materials during the warranty period. The Vendor will be the sole point of contact for warranty issues.

IX. Documentation

The Contractor shall provide Operations and Maintenance manuals to USM. Documentation provided shall include, but not be limited to the following:

- A. Theory of operation
- B. Operating procedures
- C. Interfacing instructions with connector pin outs
- D. Troubleshooting and maintenance procedures
- E. IPB (Isometric Parts Breakout) drawings showing how all parts, especially mechanical parts, relate to one another.
- F. Documentation of the various software packages.
- G. All sensor documentation and manuals.