



**THIS IS NOT
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: October 16, 2023

BID No. 24-11

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 31, 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
		<p align="center">BID 24-11 Micro Uncrewed Underwater Vehicles</p> <p align="center">RFx # 3160006225</p> <p>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.</p>		

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 TWO MICRO UNCREWED
UNDERWATER VEHICLES**

The University of Southern Mississippi

Prepared by Steve Stanic and Landry Bernard

OCT 6/2023

SYSTEM DESIGN SPECIFICATIONS FOR TWO MICRO UNCREWED UNDERWATER VEHICLES

I. Background

The U.S. Navy requires the ability to detect targets using low cost, Micro Uncrewed Underwater Vehicles (UUV) that can be launched from small boats.

Using high resolution sensor systems these micro UUV systems have the potential to provide the Navy with enhanced capabilities to covertly detect low signature buried and proud targets particularly in the littoral zone.

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

To address these detection requirements USM has received funding to purchase several small portable micro UUV systems.

II. Purpose

USM has developed the environmental measurement framework, data processing, visualization products, and ocean measurement systems required for the testing and performance evaluations of these new and emerging micro UUV systems.

This document contains the minimum requirements for two portable micro UUVs. One shall have integrated high-resolution high-frequency side scan sonar and DVL systems.

The second shall be equipped with a nose-installed camera and lighting system. These systems will be used to conduct surveys to map the placement of different types of proud and partially buried targets deployed in USM's CUBEnet test range.

III. General Requirements

1. The micro UUVs shall be one- man portable.
2. The systems shall be easily reconfigurable and support the integration and data sync for USM-Magneto hardware. This shall include 3D design files and engineering support.
3. The systems shall come with their own waterproof transportation crates.
4. All systems shall come with the auxiliary equipment required to operate the micro UUVs.
5. The first micro UUV shall come with an integrated high resolution side scan sonar system.

6. The first micro UUVs shall also come with an integrated high-frequency DVL system.
7. Each micro UUV shall come with a neutrally buoyant nose section.
8. The second micro UUV shall come with only a camera and lighting system integrated into its nose.
9. A handheld radio relocating field system shall also be provided.
10. Both micro UUV systems, supporting equipment, and software packages shall be delivered to USM within 10 weeks after the contract award.
11. The delivery arrangements and transportation costs shall be the vendor's responsibility.
12. These micro systems and supporting equipment shall be delivered to USM's Marine Research Center, 1030 30th Ave Gulfport, MS 39501.

IV. Specific Specifications for two micro UUVs. One with integrated high-resolution side scan Sonar, and DVL systems. The second with only a camera and light system integrated into the nose.

The following minimum specifications shall ensure that the micro UUVs, integrated high-resolution side scan sonar, DVL, and camera systems shall perform the tasks necessary to satisfy USM's project's objectives.

1. The following table outlines the minimum system specifications that **EACH** of the micro UUV systems shall meet.

UUV Specifications	
Property	Description/Value
Diameter	Approx. 13 cm
Length	Less than 120 cm
Weight	12 kg
Nose section	Nose section shall be neutrally buoyant
Recharging Time	Less than 10 hours
Run Time	At least 10 hours@3knots
Maximum Depth	300m
Battery	Li-ion with at least 500Wh
Max speed	5 knots
Battery charger	100-240 VAC 60 Hz

2. The following table outlines the minimum payload specifications that the **FIRST** micro UUV payload shall meet.

Payload Specifications	
Properties	Description/Value
Surface Communications	High frequency surface communications system with antenna and status LED
Payload communications	RS 232, 115200 BPS
Navigation	High resolution navigation system with at least +/- 3% of distance travelled
Doppler Velocity Log (DVL)	1 MHz DVL system
External Connections	Vehicle Interface Program for mission planning and post-mission analysis
Ultra-high resolution Sonar System	At least 600 kHz
Safety Features	Ground fault detection, Leak detection, Emergency locator beacon, Health status

3. The following table outlines the minimum system specifications the DVL shall have. Only the **FIRST** micro UUV shall have an integrated DVL.

General DVL Specifications	
DVL System	Description/Value
Max Depth	50 m
Maximum velocity	3 m/sec
Velocity resolution	At least 0.1 mm/sec
Frequency	At least 1 MHz
Beam angle	At least 25 ⁰
Ping Rate	Variable, 5 to 25 Hz

4. The following table outlines the minimum system specifications that the high-resolution integrated Side Scan Sonar System integrated on the **FIRST** micro UUV shall meet.

General Sonar Specifications	
Ultra-high resolution Sonar System	Description/Value
Output file format	DVS and XTF
Frequency	At least 600 kHz
Beam widths	Horizontal beam width, less than 0.6 ⁰ , Vertical beam width 60 ⁰
Swath range	At least 40 m
Additional connector for USM Payload system	Subconn: Circular Micro-series 8pin

5. The following table outlines the minimum payload specifications that the **SECOND** micro UUV payload shall meet.

Payload Specifications	
Properties	Description/Value
Surface Communications	High frequency surface communications system with antenna and status LED
Payload communications	RS 232, 115200 BPS
Navigation	High resolution navigation system with at least +/- 3% of distance travelled
Camera and lighting system	See Table 6
External Connections	Vehicle Interface Program for mission planning and post-mission analysis
Safety Features	Ground fault detection, Leak detection, Emergency locator beacon, Health status

6. The following table outlines the minimum system specifications for an underwater camera and light systems integrated in the nose section of the **SECOND** micro UUV shall meet.

General Camera and light Specifications	
	Description/Value
Camera	GoPro HERO9 or HERO10
Down word looking angle	0 ⁰
Forward looking angle	30 ⁰
Light	
Brightness	At least 1500 Lumens, 5700 Kelvin
Beam angle	At least 130 ⁰

7. The vendor shall provide the cost of the following potential Micro UUV options.

UUV System Options
The vendor shall provide a list and cost of onboard spares
The vendor shall provide the cost of additional battery modules
The vendor shall provide a list and cost of available options
The vendor shall provide the cost of all special tools and suggested spare parts

V. Software

The vendor shall provide Complete Software Package (backup) and product documentation for all systems. The vendor shall provide Vehicle Interface Program for mission programming, post-mission analysis, and vehicle and track monitoring. This includes packages that provide high-resolution acoustic and camera images.

VI. Training

The vendor shall provide training on the operation, software, maintenance and troubleshooting integration of all systems. This shall include mission planning, basic mission data analysis and display, and at sea operations. This training shall take place at the USM facility located in Gulfport MS.

VII. Proof of Performance

The vendor shall provide a proven record of the micro UUV and 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 UUV and sonar system 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.