



THIS IS NOT AN ORDER

REQUEST FOR

WSEFVHRIWROORZQLHPVHDVWKEPLW RK
ELDQGHDLQRQHFRSIRURKILOHVLEWUHVHUUHMFHSHU
UHMFDQ\SDUVRI RK ELG< RK TKWRQ ZOO EH LHQ
FRQVLHUDRQLIUHFHLHGQRQOORRPRQRUEHIRUH

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

MUVRGMDHUPVRIVDOHEWUPVDUHH QDVQHVV
FVHUPVZOODSSOSHUVVVLVLSLODZ
WVHUPV ZOOQBHXHOVDEDVLVIRDUQJ
FRQWDFWZHUUQLHUV LPOODFFHSDVEVFRQWZHQUHQUHG

SP &
FREHU
MUEHUORG

FRDQQRWKWRQWHPQFJ
QUANTITY

Table with 4 columns: Description, Unit Price, Total Net Price, and additional notes. Description includes 'BID 25-09 Surface ASV' and 'RFx # 3160006895'.

Shipment can be made in ... days from receipt of order. DA
Return quotation to Procurement Services at above address.

Signature Required \_\_\_\_\_

**THE UNIVERSITY OF SOUTHERN MISSISSIPPI  
PROCUREMENT SERVICES  
118 COLLEGE DRIVE  
#5003  
HATTIESBURG, MS 39406-0001**

**GENERAL TERMS, CONDITIONS AND INSTRUCTIONS FOR BIDS/PROPOSALS**

- 1.) Failure to examine any drawings, specifications, and instructions will be at bidder's risk.
- 2.) Samples of items when called for must be furnished free of expense and if not destroyed in testing, will, upon request, be returned at the bidder's expense. Request for the return of samples must be made within ten (10) days following opening bids. Each individual sample must be labeled with bidder's name and manufacturer's brand name and number.
- 3.) Bids must be signed and sealed with bidder's name and address on the outside of the envelope, and the time and date of the bid opening and the bid file number shown in the lower-left corner of the packages; envelopes, express mailing labels, boxes, etc.
- 4.) At least one (1) signed original and one (1) signed copy of the bid **MUST** be provided. The University **requires** a portable electronic virus/malware free copy (thumb drive) of the bid response from the responding Vendor to be included in the bid response package. If an electronic copy is not included, the University reserves the right to request an electronic copy of the **exact** bid response prior to review of the bid.
- 5.) For your bid to be considered, it must be received, and time stamped in our office by 2:00 P.M. of the bid opening date. It is the responsibility of the vendor to ensure their bid is received within the appointed time. If your bid package is not received in Bond Hall, Room 214, by 2:00 P.M. of the bid opening date, it will not be considered.
  - a. If you are delivering your bid, you need to hand carry the bid package to: The University of Southern Mississippi  
Procurement Services  
Bond Hall, Room 214  
Hattiesburg, Mississippi
  - b. If you are mailing your bid package via U.S. Postal Service, mail to: The University of Southern Mississippi  
Procurement Services  
118 College Drive #5003  
Hattiesburg, MS 39406-0001
  - c. If you are express mailing your bid package via Federal Express or UPS, or any other delivery service which requires the use of a physical address, deliver to:

The University of Southern Mississippi  
Receiving Department  
2609 West 4<sup>th</sup> Street  
Hattiesburg, MS 39401

- 6.) Bids or proposals shall not be modified, corrected, altered, or amended after the specified closing time and the opening of such bids, unless otherwise noted in the request for bids or proposals.
- 7.) The University of Southern Mississippi reserves the right to reject any and all bids, to waive any informality in bids, and unless otherwise specified by the bidders, to accept any items on the bid. If the bidder fails to state the time within which bids must be accepted, it is understood and agreed that The University of Southern Mississippi shall have 90 days to accept. The University of Southern Mississippi reserves the right to make an award to this bid on an all or none basis, or on a line-by-line basis, whichever serves the best interest of The University of Southern Mississippi.
- 8.) Contracts and purchases will be made or entered into with the lowest, responsible bidder meeting specifications.
- 9.) A written purchase order or contract award mailed or otherwise furnished to the successful bidder within the time of acceptance specified in the Invitation for Bid results in a binding contract without further action by either party. The contract shall not be assignable by the vendor in whole or in part without the written consent of The University of Southern Mississippi.
- 10.) Unless written exception is provided in the bid response, the winning Vendor agrees to be bound by the USM Terms and Conditions, which are incorporated herein, and may be found at <https://www.usm.edu/procurement-contract-services/usm-terms-and-conditions>.

11.) Respondents are required to1 eM nsy th may M e b.  
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- c. The intentional and willful misconduct or negligent acts of the Vendor and/or Vendor's employees or subcontractors.
  - d. All requirements that the University pay interest are deleted, except for those in conjunction with USM's standard payment terms of Net 45 days. Payments made beyond 45 days are subject to late fees and interest.
  - e. Should any of the terms and conditions in the purchase contract conflict with the laws of the State of Mississippi, the laws of the State of Mississippi shall supersede and govern. A revision of the terms and conditions will be required to ensure compliance with Mississippi state law.
  - f. The University shall not pay any attorney's fees, prejudgment interest or costs associated with any legal action to or for the Vendor, except that which are ordered by a court of competent jurisdiction.
- 14.) Bid files may be examined during normal working hours by bid participants. Non- participants will be prohibited from obtaining any information relative to the bid until the official award has been made.
- 15.) If purchase orders or contracts are canceled because of the awarded vendor's failure to perform or request for price increase, that vendor shall be removed from our bidders'list for a period of 24 months.
- 16.) No addendum will be issued within a period of two (2) working days prior to the time and date set for the bid opening. Should it become necessary to issue an addendum within the two-day period prior to the bid opening, the bid date will be reset giving bidders ample time to answer the addendum.
- 17.) Alternate bids, unless specifically requested or allowed, will not be considered.
- 18.) Bid openings will be conducted open to the public. However, they will serve only to open the bids. No discussion will be held with any vendor as to the quality or provisions of the specifications, and no award will be made either stated or implied at the bid opening. After the close of the bid opening meeting, the bids will be considered to be in the evaluation process and will not be available for review by bidders. Proposal openings are not required to be open to the public; however, the resulting award is open for public inspection.
- 19.) Prices quoted shall be firm for the term of the contract or for the stated time of acceptance.
- 20.) The bidder understands that The University of Southern Mississippi is an equal opportunity employer and, therefore, maintains a policy which prohibits unlawful discrimination based on race, color, creed, sex, age, national origin, physical handicap, disability, or any other such discrimination; and the bidder, by signing this bid, agrees during the term of agreement that the bidder will strictly adhere to this policy in its employment practices and provision of products or services.
- 21.) Bidders must upon request of The University of Southern Mississippi furnish satisfactory evidence of their ability to furnish products or services in accordance with the terms and conditions of these specifications. The University of Southern

Mississippi reserves the right to make the final determination as to the bidder's ability.

22.) Questions or problems arising from bid procedures shoul

Southern Mississippi is exempt from the provisions of the Robinson-Patman Act and other related laws. In addition, the U.S. Government has no provisions in any of its purchasing arrangements with bidders whereby a lower

**AA/EOE/ADA**



THE UNIVERSITY  
**OF SOUTHERN  
MISSISSIPPI**

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**SYSTEM DESIGN SPECIFICATIONS FOR AN AUTONOMOUS  
FACE VEHICLE**

**The University of Southern Mississippi**

*Prepared by Steve Stanic and Landry Bernard*

*SEPT 8/2024*

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# **SPECIFICATIONS FOR AN AUTONOMOUS SURFACE VEHICLE (ASV)**

## **I. Background**

The University of Southern Mississippi (USM) currently has several USVs that provide data to enhance the development of USM's msbCOAWST model and to collect data to calculate Gulf of Mexico hypoxia distributions. These systems have also provided surface and subsurface data for several acoustic and magnetic target detection, localization, and classification experiments.

The University of Southern Mississippi (USM) has received funding to supplement its fleet of unmanned autonomous instrumented surface vehicles (ASV). This system shall be used as an all-purpose system configured with cameras, LIDAR, water temperature, depth, surface speed sensors, and iridium SBD data connections. This system shall also have the capability to be configured with additional USM defined sensor systems

## **II. Purpose**

This document contains the minimum technical specification required for an unmanned surface vehicle and its advanced measurement and communication systems.

## **III. General USV Requirements**

1. The ASV shall be capable of running prolonged preprogrammed missions.
2. Mission parameters shall be changeable on the fly.
3. The ASV shall have an internal MEMS IMU
4. The vendor shall supply a windows-based capability for command and control ?

21. The delivery arrangements and transportation costs shall be the vendor's responsibility.
22. All systems shall be delivered to USM's Marine Research Center, 1030 30th Ave Gulfport, MS 39501.

**IV. ASV Specific Physical Technical Specifications**

1. The following table provides the minimum specifications the ASV shall meet to ensure that it can perform the tasks necessary to satisfy USM's numerous program objectives.

**V. Sensor Specifications**

1. The following table outlines the minimum specifications that internal ASV sensors shall meet.

<b>Integrated Sensors/Technical Specifications</b>	
<b>Sensor System</b>	<b>Description/Value</b>
Communications	High-bandwidth Iridium SBD modem and connection (e.g Starlink) AIS ID S

Power	9 to 16 volts, Max power consumption shall be: 100W
Protocol Output	NEMA 2000, Shall be blue tooth capable
Weight	Shall be less than 1kg

3. The following table outlines the minimum required specifications that a multi sensor mast mounted weather station shall have.

<b>On Board Weather Station Technical Specifications</b>	
<b>Physical / Electrical</b>	<b>Description/Value</b>
Waterproof Rating	IPX6
Wind Speed	At least a range of 0 to 35 m/s, Resolutions: 0.2 m/s or better, Accuracy: At least 6% at 10 m/s
Wind Direction	Range: 359 <sup>0</sup> , Resolution: 0.1 <sup>0</sup>
Air Temperature	At least an air temperature range of -40 <sup>0</sup> to 75 <sup>0</sup> , Resolution: At least 0.2 <sup>0</sup> C
Relative Humidity	Range: 0 to 100% RH, Resolution: 0.1% RH
Barometric Pressure	Range: At least 300 to 1000 hPa, Resolution: 0.1 hPa
Three Axis Compass	The compass shall be a three-axis solid state unit with dynamic stabilization, Range: 0 to 359 <sup>0</sup> , Resolution: At least 0.15 <sup>0</sup> , Static accuracy at least 1 <sup>0</sup> , Dynamic accuracy 2 <sup>0</sup>
Pitch and Roll Measurements	The measurement unit shall be a three-axis rate gyro unit that measures tilt and rate of turn. The unit shall be a MEMS system with a range of at least 50 <sup>0</sup> , Accuracy: ± 1 <sup>0</sup> over a 30 <sup>0</sup> range. Resolution shall be at least 0.15 <sup>0</sup>
GPS (position and speed over course)	At Least a 10Hz Update Rate, Accuracy: At least 3 m
Operating Temperature	A range the runs from at least -25 <sup>0</sup> C to 50 <sup>0</sup> C
Output	The output shall include both NMEA 1813 and NMEA 2000 formats
Power Requirements	Supply voltage shall range from 9 VDC to 40 VDC Supply current at 12 VDC shall be < 80 mA
Weight	The weight shall be less than 1 lb.

4. The following table outlines the minimum required specifications that a 360<sup>0</sup>, 2D LIDAR system shall have.

<b>LIDAR Technical Specifications</b>	
<b>Physical / Electrical</b>	<b>Description/Value</b>
Weight	Approx. 105 g
Working Temperature Range	At least -5 <sup>0</sup> C to 40 <sup>0</sup> C
Range	White object: 40 m, Black object: 10 m
Blind Range	0.1 m
Sample Rate	At least 9 kHz
Scan Rate	At least 10 Hz
Accuracy	At Least ±5 cm
Angular Resolution	At least 0.391 <sup>0</sup>
Resolution	3 cm
Communication Interface	TTL UART
Communication Rate	At least 250000 bps
Laser wavelength	Typical 905 nm
Laser Power	At least 28 watts
Pulse Length	10
Voltage	4.8 to 5.5 v
Max current	500 A

## **V. Optional**

1. The ASV shall be capable of towing and deploying 4 small buoys with a total weight of 145 lbs.
2. The system shall include AI with at-the-edge detection of vessels and people in onboard camera images.
3. Basic spares kit
4. Sensor integration part kit
5. 20 hour engineering service pack

## **VII. Software**

The vendor shall provide a Complete Software Package and product documentation for all systems. The vendor shall provide vehicle Interface program dashboards for mission programming and post-mission analysis.

## **VIII. Training**

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

## **IX. Proof of Performance**

The vendor shall provide a proven record of the developing USVs, integrated systems, measurements, and operating system performance. The vendor needs to provide references where these systems and their operating system in a 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.

## **X. 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.

## **XII. 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 sensor and software packages.