



**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:** June 15, 2025

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

**BID No. 25-56**

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

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

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

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

July 2, 2025

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.

**Buyer:** Amber Floyd

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
		<b>BID 25-56 GNSS-IMU Intertial Positioning System</b>  <b>RFx # 3160007436</b>		
		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.		

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.



THE UNIVERSITY OF  
**SOUTHERN**  
**MISSISSIPPI®**

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**SYSTEM DESIGN SPECIFICATIONS FOR A GNSS-IMU INERTIAL POSITIONING  
SYSTEM**

**The University of Southern Mississippi**

*Prepared by Steve Stanic and Landry Bernard*

*May 20 /2025*

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# SYSTEM DESIGN SPECIFICATIONS FOR A GNSS-IMU INERTIAL POSITIONING SYSTEM

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## I. Background

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 novel sonar sensor designs, and on-board processing to create advanced maps of acoustic sensor data over a broad range of environmental and platform noise conditions.

The University of Southern Mississippi (USM) has received funding to purchase a high-resolution GNSS-IMU aided inertial positioning system optimized for marine applications. This system will be integrated into USM's SeaTrac Multibeam sonar system which will be used to 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 systems required for testing and performance evaluations of these high-resolution SAS systems.

This document contains the minimum requirements for a high-resolution GNSS- aided inertial positioning system optimized for marine applications. This GNSS-IMU system will be integrated with USM's Multibeam system for high resolution target detection, classification, and localization (DCL) of low/medium/high target strength targets over a broad range of environmental and platform noise conditions. This GNSS-IMU system will map the location of proud and partially buried targets deployed in USM's CUBEnet test range.

## III. General Requirements

1. The system shall provide six-degree positions and orientation data.
2. The system shall provide accurate altitude, heading, heave, pitch and roll, position, and velocity data.
3. The system shall use a high-resolution inertial unit (IMU), use a global navigation satellite system (GNSS), and a small form factor PCS.
4. The system shall have ethernet input and output ports.
5. Time, system status, position, altitude, velocity, track, speed, raw IMU and GNSS data shall be available at this port.
6. The system shall have a display port, UDP protocol.
7. The system shall have a TCP/IP control port..
8. The system shall have ports that provide data logging to an external device.
9. The system shall have user assignable serial RS 232 input/output ports.
10. The system shall have a NMEA ASCII output that provides system output parameters at a 50 Hz maximum rate and shall be user selectable on each port.
11. The system also shall have a high-speed attitude output (attitude, heading, speed).
12. Output and rates shall be configurable for each port.

13. The system shall have auxiliary GNSS 1 Hz NMEA Standard ASCII inputs.
14. GNSS correction inputs shall accept RTCM V2., V3., CMR, CMR+, and CMR+.
15. These input rates shall be at least 1Hz.
16. The system shall accept digital I/O at no less than 1 PPS.
17. The delivery arrangements and transportation costs shall be the vendor's responsibility.
18. The GNSS-IMU inertial positioning systems shall be delivered to USM's Marine Research Center, 1030 30th Ave Gulfport, MS 39501.

**IV.** The following table outlines the minimum physical and system performance specifications that the GNSS-IMU shall meet to perform the tasks necessary to satisfy USM's project objectives.

<b>Table 1 General GNSS-IMU Physical Specifications</b>	
<b>Small form factor PCS</b>	<b>Description/Value</b>
Weight	Shall be less than 3 kg
Size	Length < 200 mm, Weight < 200 mm, Height < 70mm
Operating temperature range	-20°C to 50°C
Power	10 to 35 V
<b>Inertial measurement unit</b>	
Weight	< 3 kg
Operating temperature Range	-30°C to 50°C
IP Rating	IP65
<b>Global Navigation Satellite Antenna</b>	
Weight	< 1 kg
Operating temperature Range	-50°C to 60°C

**V.** The following table outlines the minimum position specifications that the total system shall meet.

<b>Table 2 General GNSS-IMU Performance Specifications</b>	
<b>System position resolutions</b>	Horizontal: less than 4 cm, Vertical: less than 7 cm
Pitch and Roll resolutions	Less than 0.03°
Heading	Less than 0.02° with 4 m baseline, less than 0.03° with 2 m baseline
True Heave	5 cm or 5% over 20 second periods, 2 cm or 3% for 35 sec periods

The vendor shall also provide both pre-and post-processing algorithms to enhance the position, altitude, velocity, track, speed, heave, pitch and roll resolutions specifications listed in table 2.

## **VI. Options**

The Vendor shall also provide the costs of the following options

<b>Table 3 System Option</b>	
<b>Rack mounted PCS</b>	
Weight	< 4kg
Operating temperature range	-20°C to 50°C

## **VI. Software**

The vendor shall provide all ICD documentation for the GNSS-IMU system.

## **VII. Training**

The vendor shall provide training on the operation, software, maintenance and troubleshooting integration of the GNSS-IMU. This training shall take place at the USM facility located in Gulfport MS.

## **VIII. Proof of Performance**

The vendor shall provide a proven record of the GNSS-IMU system. 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.

## **IX. 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.

## **XI. 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.

**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 to comply with all applicable local, State and Federal laws, codes, ordinances, and regulations in the provision of the materials required.
- 12.) Respondents must comply with Personally Identifiable Information (PII) data protection regarding State, Federal, and University regulations and policies.
- 13.) Mandatory Legal Provisions
  - a. Any provisions disclaiming implied warranties shall be null and void. See Mississippi Code Annotated Sections 11-7-18 and 75-2-719(4). The Vendor shall not disclaim the implied warranties of merchantability and fitness for a particular purpose.
  - b. The Vendor shall have no limitation on liability for claims related to the following items:
    - i. Infringement issues;
    - ii. Bodily injury;
    - iii. Death;
    - iv. Physical damage to tangible personal and/or real property; and/or

- 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 should be directed to the Buyer listed on the solicitation at:

The University of Southern Mississippi  
118 College Drive #5003  
Hattiesburg, MS 39406-0001  
Phone: (601) 266-4131  
[Bids@usm.edu](mailto:Bids@usm.edu)

- 23.) All items must equal or exceed the specifications listed. The absence of detailed specifications or the omission of detailed description shall be recognized as meaning that only the best commercial practices are to prevail, and that only first quality materials and workmanship are to be used.
- 24.) It is the intent of the specifications to obtain a product that will adequately meet the needs of the user while promoting the greatest extent of competition that is practicable. It is the responsibility of the prospective bidder to review the entire Invitation to Bid packet and to notify The University of Southern Mississippi if the Specifications, Instructions, General, or Special Conditions are formulated in a manner which would unnecessarily restrict competition.
- 25.) It shall be incumbent upon the bidders to understand the specifications. Any requests for clarifications shall be in writing and shall be submitted to our Procurement Services office at least seven (7) business days prior to the time and date set for the bid opening, unless otherwise noted in the bid or proposal specifications.
- 26.) The minimum specifications are used to set a standard and in no case are used with the intention of discriminating against any manufacturer. Bidders should note the name and the manufacturer and model number of the product they propose to furnish and submit descriptive literature.
- 27.) Trade names, brand names, and/or manufacturer's information used in these specifications are for the purpose of establishing quality, unless otherwise noted. Bids on products of other qualified manufacturers are acceptable, provided they are demonstrated as equal to those specified in construction, design and suitability. Each bidder shall submit with his bid a complete brochure with pictures on each item and shall point out specifically any deviations from the specified items. Failure to do so may disqualify any bid. Please bid as specified or an approved equal.
- 28.) A copy of the manufacturer's standard guarantee/warranty shall accompany and become a part of this bid.
- 29.) There are no federal or state laws that prohibit bidders from submitting a bid lower than a price or bid given to the U.S. Government. Bidders may bid lower than U.S. Government contract price without any liability as The University of

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 price to The University of Southern Mississippi must automatically be given to the U.S. Government.

- 30.) All invoices, unless noted otherwise, are to be billed to:

The University of Southern Mississippi  
IT Invoices  
118 College Drive #5181  
Hattiesburg, MS 39406-0001  
[ITInvoices@usm.edu](mailto:ITInvoices@usm.edu)

- 31.) All equipment bids shall be of current production and of the latest design and construction.
- 32.) Where all, or part(s), of the bid is requested on a unit price basis, both the unit prices and the extension of the unit prices constitute a basis of determining the lowest responsible and responsive bidder. In cases of error in the extension of price, the unit price will govern.
- 33.) Should the University of Southern Mississippi close due to inclement weather conditions, or any other unforeseen events on the bid opening date, sealed bids will open the following business day at the same time and location.
- 34.) As an alternative to traditional sealed bids in envelopes, the University of Southern Mississippi is capable of receiving electronic bid responses. While this option is available, it is not required, and we ask that all potential respondents keep in mind that with any electronic system there could be delays or glitches with the submission process; therefore, the University highly encourages traditional sealed bids which are either mailed or submitted in person. Should a vendor choose to submit their response electronically, please follow the instructions below using the following website:  
[https://www.ms.gov/dfa/contract\\_bid\\_search/Home/Sell](https://www.ms.gov/dfa/contract_bid_search/Home/Sell). On this site you will find helpful links to procurement opportunities, as well as a link to supplier registration. If not already registered in this system, potential bidders will first need to click on 'Supplier Registration' and follow the steps outlined (a one-time process). Once registered, they can return to the original website and click on 'Procurement Opportunities' where they can either search by keyword for the bid they desire to respond to or leave the search box blank and click 'Search' for a listing of all current bids and proposals for the various State of Mississippi offices.

Regarding construction bids, there is one additional step required during the bid submission process. Along with the bid response and other attachments, contractors will also need to attach their Certificate of Responsibility (COR), or a statement that the bid enclosed does not exceed Fifty Thousand Dollars (\$ 50,000.00). If their COR or such statement is not attached, the bid will be invalid and not considered.

**AA/EOE/ADA**