

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
EQUIPMENT AND PROCUREMENT DIVISION
BID INVITATION**

Bid Number: M-10-084P

BID OPENING LOCATION:
AHTD Equipment and
Procurement Division
11302 W. Baseline Road
Little Rock, AR 72209

MAIL TO:
AHTD Equipment and
Procurement Division
P.O. Box 2261
Little Rock, AR 72203

DELIVER TO:
AHTD Equipment and
Procurement Division
11302 W. Baseline Road
Little Rock, AR 72209

Bid Opening Date: March 9, 2010 Time: 11:00 a.m.

Sealed bids for furnishing the commodities and/or services described below, subject to the Conditions on Page 2 of this Bid Invitation will be received at the above-noted mail and delivery locations until the above-noted bid opening date and time, and then publicly opened at the above-noted bid opening location. **Bids must be submitted on this form, with attachments when appropriate, or bids will be rejected. Late bids and unsigned bids will not be considered.**

In compliance with this Bid Invitation and subject to all the Conditions thereof, the undersigned offers and agrees to furnish any and all items upon which prices are quoted, at the price set opposite each item.

Company Name: _____

Name (Type or Print): _____

Address: _____

Title: _____

Phone: _____ Fax: _____

City: _____ State: _____ Zip: _____

E-mail Address: _____

Federal Tax ID or Social Security No.: _____

Signature: _____

Signature must be legible, original (not photocopied) and in ink.
Unsigned bids will be rejected.

Item No.	Description	Quantity	Unit	Unit Price	Amount
1.	<p>Global Positioning System (GPS) Survey System consisting of : GPS Continuously Operating Reference Station (CORS) System</p> <p>To meet the requirements of Arkansas State Highway and Transportation Department Specifications attached to and made a part of this bid.</p> <p>FOB: AHTD – Surveys Division 10324 I-30, Little Rock, AR 72209</p> <p>Global Positioning System proposed to furnish: Brand _____ No. _____</p> <p>Bid Bond in the amount of 5% of total bid price required of all bidders at time of bid opening or bid will be rejected. <u>Personal and company checks are not acceptable as Bid Bonds.</u> See Condition 3 on page 2 of Bid Invitation.</p> <p>Performance Bond in the amount of 5% of total bid price will be required of successful bidder prior to providing goods/services. <u>Personal and company checks are not acceptable as Performance Bonds.</u> See Condition 3 on page 2 of Bid Invitation.</p> <p>The successful bidder will be required to complete delivery within 30 days after award.</p> <p>Bids and Specifications are available on-line by going to the AHTD Web Site – www.arkansashighways.com and clicking on “Commodities and Services Bids/Contracts Information”. Tabulations will also be available at this site within 72 hours after bid opening. If you have any questions, call this office at 501-569-2667.</p> <p>(69-3)</p>	3	ea.		
				TOTAL BID	

BID INVITATION

STANDARD CONDITIONS

M-10-084P

1. **ACCEPTANCE AND REJECTION:** The Arkansas State Highway and Transportation Department (AHTD) reserves the right to reject any or all bids, to accept bids in whole or in part (unless otherwise indicated by bidder), to waive any informalities in bids received, to accept bids on materials or equipment with variations from specifications where efficiency of operation will not be impaired, and to award bids to best serve the interest of the State.
2. **PRICES:** Unless otherwise stated in the Bid Invitation, the following will apply: (1) unit prices shall be bid, (2) prices should be stated in units of quantity specified (feet, each, lbs., etc.), (3) prices must be F.O.B. destination specified in bid, (4) prices must be firm and not subject to escalation, (5) bid must be firm for acceptance for 30 days from bid opening date. In case of errors in extension, unit prices shall govern. Discounts from bid price will not be considered in making awards.
3. **BID BONDS AND PERFORMANCE BONDS:** If required, a **Bid Bond** in the form of a cashier's check, certified check, or surety bond issued by a surety company, in an amount stated in the Bid Invitation, must accompany bid. **Personal and company checks are not acceptable as Bid Bonds.** Failure to submit a Bid Bond as required will cause a bid to be rejected. The Bid Bond will be forfeited as liquidated damages if the successful bidder fails to provide a required Performance Bond within the period stipulated by AHTD or fails to honor their bid. Cashier's checks and certified checks submitted as Bid Bonds will be returned to unsuccessful bidders; surety bonds will be retained. The successful bidder will be required to furnish a **Performance Bond** in an amount stated in the Bid Invitation and in the form of a cashier's check, certified check, or surety bond issued by a surety company, unless otherwise stated in the Bid Invitation, as a guarantee of delivery of goods/services in accordance with the specifications and within the time established in the bid. **Personal and company checks are not acceptable as Performance Bonds.** In some cases, a cashier's check or certified check submitted as a Bid Bond will be held as the Performance Bond of the successful bidder. Cashier's checks or certified checks submitted as Performance Bonds will be refunded shortly after payment has been made to the successful bidder for completion of all terms of the bid; surety bonds will be retained. Surety bonds must be issued by a surety company authorized to do business in Arkansas, and must be signed by a Resident Local Agent licensed by the Arkansas State Insurance Commissioner to represent that surety company. Resident Agent's Power-of-Attorney must accompany the surety bond. Certain bids involving labor will require Performance Bonds in the form of surety bonds only (no checks of any kind allowed). In such cases, the company issuing the surety bond must comply with all stipulations herein and must be named in the U. S. Treasury listing of companies holding Certificates of Authority as acceptable sureties on Federal Bonds and as acceptable reinsuring companies. Any excess between the face amount of the bond and the underwriting limitation of the bonding company shall be protected by reinsurance provided by an acceptable reinsuring company.
4. **TAXES:** The AHTD is not exempt from Arkansas State Sales and Use Taxes, or local option city/county sales taxes, when applicable, and bidders are responsible to the State Revenue Department for such taxes. These taxes should not be included in bid prices, but where required by law, will be paid by the AHTD as an addition thereto, and should be added to the billing to the AHTD. The AHTD is exempt from Federal Excise Taxes on all commodities except motor fuels; and excise taxes should not be included in bid prices except for motor fuels. Where applicable, tax exemption certificates will be furnished by the AHTD.
5. **"ALL OR NONE" BIDS:** Bidders who wish to bid "All or None" on two or more items shall so stipulate on the face of bid sheet; otherwise, bid may be awarded on an individual item basis.
6. **SPECIFICATIONS:** Complete specifications should be attached for any substitution or alternate offered, or where amplification is necessary. Bidder's name must be placed on all attachments to the bid.
7. **EXCEPTIONS TO SPECIFICATIONS:** Any exceptions to the bid specifications must be stated in the bid. Any exceptions to manufacturer's published literature must be stated in the bid, or it will be assumed that bidder is bidding exactly as stated in the literature.
8. **BRAND NAME REFERENCES:** All brand name references in bid specifications refer to that commodity or its equivalent, unless otherwise stated in Bid Invitation. Bidder should state brand or trade name of item being bid, if such name exists.
9. **FREIGHT:** All freight charges should be included in bid price. Any change in common carrier rates authorized by the Interstate Commerce Commission will be adjusted if such change occurs after the bid opening date. Receipted common carrier bills that reflect ICC authorized rate changes must be furnished.
10. **SAMPLES AND LITERATURE:** Samples or technical literature must be provided within 14 days of AHTD request unless AHTD extends time. Failure to provide samples or literature within this period may cause bid to be rejected. When required, samples of items must be furnished free of charge, prior to or after the opening of bids, and, if not destroyed, will be returned upon request at the bidder's expense. Each individual sample must be labeled with bidder's name and item number. Request for return of samples must be made within 10 days following submission of sample. Samples from successful bidders will be retained for comparison with items actually furnished.
11. **GUARANTY:** Unless otherwise indicated in Bid Invitation, it is understood and agreed that any item offered or shipped on this bid shall be newly manufactured, latest model and design, and in first class condition; and that all containers shall be new, suitable for storage or shipment and in compliance with all applicable laws relating to construction, packaging, labeling and registration.
12. **BACKORDERS OR DELAY IN DELIVERY:** Backorders or failure to deliver within the time required may constitute default. Vendor must give written notice to the AHTD, as soon as possible, of the reason for any delay and the expected delivery date. The AHTD has the right to extend delivery if reasons appear valid. If reason or delivery date is not acceptable, vendor is in default.
13. **DEFAULT:** All commodities furnished will be subject to inspection and acceptance by AHTD after delivery. Default in promised delivery or failure to meet specifications authorizes the AHTD to cancel award or any portion of same, to reasonably purchase commodities or services elsewhere and to charge full increase, if any, in cost and handling to defaulting vendor. Applicable bonds may be forfeited.
14. **ETHICS:** *"It shall be a breach of ethical standards for a person to be retained, or to retain a person, to solicit or secure a State contract upon an agreement of understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies maintained by the contractor for the purpose of securing business."* (Arkansas Code, Annotated, Section 19-11-708).

**ARKANSAS STATE HIGHWAY
AND TRANSPORTATION DEPARTMENT**

NOTICE OF NONDISCRIMINATION

The Arkansas State Highway and Transportation (Department) complies with the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VI of the Civil Rights Act of 1964 and other federal equal opportunity laws and therefore does not discriminate on the basis of race, sex, color, age, national origin, religion or disability, in admission or access to and treatment in Department programs and activities, as well as the Department's hiring or employment practices. Complaints of alleged discrimination and inquiries regarding the Department's nondiscrimination policies may be directed to James B. Moore, Jr., Section Head - EEO/DBE (ADA/504/Title VI Coordinator), P. O. Box 2261, Little Rock, AR 72203, (501) 569-2298, (Voice/TTY 711), or the following email address: james.moore@arkansashighways.com.

This notice is available from the ADA/504/Title VI Coordinator in large print, on audiotape and in Braille.

**ARKANSAS STATE HIGHWAY
AND
TRANSPORTATION DEPARTMENT**



BID INVITATION

**FOR
THREE (3)
GLOBAL POSITIONING SYSTEM (GPS)
SURVEY SYSTEM**

CONSISTING OF

**GPS CONTINUOUSLY OPERATING
REFERENCE STATION (CORS) SYSTEM**

February 19, 2010

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1.0 GENERAL INFORMATION

1.1 Introduction and Background

The purpose of this document is to provide interested parties with information to enable them to prepare and submit a bid for Global Positioning System (GPS) Continuously Operating Reference Station (CORS) System. The Arkansas State Highway and Transportation Department intends to award a contract for GPS CORS System.

1.2 General Instructions

The evaluation and selection of a contractor will be based on the information submitted in the bid plus references and any required site visits. Bidders should respond clearly and completely to all requirements.

Note: Bids will be rejected for failure to respond completely and as specified in the sections that follow.

2.0 BID PROPOSAL ORGANIZATION AND FORMAT

Bids should be submitted and bound with the following sections.

Section A - VENDOR DATA SHEET/REFERENCE DATA SHEET.

- Include here Attachment A - Reference Data Sheet that has been requested in Section 3.6 in this BID INVITATION.
- Each vendor shall furnish a list of a minimum of four (4) references that will be capable of verifying information supplied by the vendor in their bid. Vendors should submit additional Reference Data Sheet forms if they have more than four (4) references.

Section B - RESPONSE TO GENERAL REQUIREMENTS.

- Provide a point-by-point response to each and every general requirement specified in Section 3.0 in this BID INVITATION.
- Responses to general requirements shall be in the same sequence and numbered as they appear in this BID INVITATION.
- Responses shall indicate that either vendor's bid "does comply" with specifications or that it "does not comply".
- A succinct explanation of how each requirement can be met or cannot be met shall be included.

Section C - RESPONSE TO TECHNICAL REQUIREMENTS.

- Provide a point-by-point response to each and every technical requirement specified in Section 4.0 in this BID INVITATION.
- Responses to technical requirements shall be in the same sequence and numbered as they appear in this BID INVITATION.
- Responses shall indicate that either vendor's bid "does comply" with specifications or that it "does not comply".
- A succinct explanation of how each requirement can be met or cannot be met shall be included.

PRIOR TO THE BID OPENING - THE VENDOR SHALL PROVIDE SUFFICIENT INFORMATION THAT GUARANTEES THE PROPOSED SYSTEM WILL COMMUNICATE AND BE ABLE TO BE CONTROLLED REMOTELY BY THE TRIMBLE GPSNET VERSION 2.7 REFERENCE STATION SOFTWARE.

Section D - RESPONSE TO PERFORMANCE REQUIREMENTS.

- Provide a point-by-point response to each and every performance requirement specified in Section 5.0 in this BID INVITATION.
- Responses to performance requirements shall be in the same sequence and numbered as they appear in this BID INVITATION.
- Responses shall indicate that either vendor's bid "does comply" with specifications or that it "does not comply."
- A succinct explanation of how each requirement can be met or cannot be met shall be included.

Section E - RESPONSE TO SUPPORT REQUIREMENTS.

- Provide a point-by-point response to each and every support requirement specified in Section 6.0 in this BID INVITATION.
- Responses to support requirements shall be in the same sequence and numbered as they appear in this BID INVITATION.
- Responses shall indicate that either vendor's bid "does comply" with specifications or that it "does not comply".
- A succinct explanation of how each requirement can be met or cannot be met shall be included.

Section F - ADDITIONAL INFORMATION.

Include additional information that will be essential to an understanding of the bid. This might include diagrams, excerpts from manuals, or other explanatory documentation that would clarify and/or substantiate the bid. Any material included here should be specifically referenced elsewhere in the bid.

Section G - GLOSSARY.

Provide a glossary of any abbreviations, acronyms, and technical terms used to describe the services or products proposed that are not industry standard. This glossary should be provided even if these terms are described or defined at their first use in the bid.

Section H – SUMMARY.

Provide a summary with each item provided including model number, manufacturer name, and quantities.

2.1 Multiple Bids

Multiple bids from a vendor shall be permissible; however each bid shall conform fully to the requirements for bid submission. Each such bid shall be separately submitted and labeled as Bid #1, Bid #2, etc. on each page included in the response. Alternate plans do not constitute multiple bids.

2.2 Demonstrations

Bidders may be required to install and demonstrate their product(s) and/or service(s) at an Arkansas State Highway and Transportation Department site. Product(s) being demonstrated shall be delivered to the Department site. Any demonstration shall be done prior to the bid opening date as shown on the bid invitation. The Department will furnish detailed specifications concerning the demonstration site and particular tests it will use to exercise the bidder's product(s) and/or service(s) no later than the date of notification of product demonstration.

Bidders who demonstrate a product(s) and/or service(s) shall also comply with all other requirements as specified in this document.

Failure of a bidder to furnish the product(s) and/or service(s) it has proposed for demonstration within the time constraints of the preceding paragraph will result in rejection of the bid. Failure of any product(s) and/or service(s) furnished by the bidder for the purposes of this demonstration shall be identical in every respect to those that will be furnished for acceptance testing under the terms of the Department contract.

3.0 GENERAL BID REQUIREMENTS

Vendors shall respond to the general requirements in this selection in accordance with the instruction given in Section 2.0 (b) above.

3.1 Description of Equipment

Global Positioning System (GPS) Continuously Operating Reference Station (CORS) System

The Department desires to procure three (3) GPS CORS systems. Each system consists of one (1) receiver, other related hardware, and software that utilize the Global Positioning System (GPS) and Global Navigation Satellite System (GNSS) for continuously operating reference stations. The units shall be capable of acquiring the L1, L2, L2C, and L5 carrier frequencies, and the L1 and L2 Precise (P) codes. The unit shall maintain performance capabilities outlined in this specification when Selective Availability (SA) and Anti-Spoofing (A-S) are implemented.

The system, to include accompanying software, shall be the latest model in current production as offered to commercial trade. The vendor represents that all equipment furnished shall be new. Demonstrator, prototype or discontinued models or releases will not be accepted.

3.2 Objectives

The Department's objective is to acquire GPS CORS Systems hardware and software to allow continuous data collection. The objective is for three (3) GPS CORS Systems to provide raw GPS observable data.

3.3 Needs

The Department has a need to collect GPS observational data using positioning techniques described under Section 4 for geodetic, engineering, right-of-way staking, topographic surveys, construction layout, mapping, and other GIS applications. All GPS CORS Systems shall be interchangeable and capable to provide uninterrupted ease in data

acquisition and post-processing of GPS observational data. CORS systems shall also be capable of acquiring GNSS (Global Navigation Satellite System) observational data.

The Department has a need to have the latest technology that provides the most cost effective and productive system for the applications specified.

3.4 Organization Capabilities

Describe the firm's experience and capabilities in providing similar services to those required. Be specific and identify projects, dates, and results.

3.5 Staff Qualifications

Provide resumes describing the educational and work experiences for each of the key staff that would be assigned to the project.

3.6 Bidder References

Bidders shall include in their proposals, a list of organizations, including points of contact (name, address, and telephone number), that can be used as references for work performed in the area of service required. Selected organizations may be contacted to determine the quality of work performed and personnel assigned to the project. The results of the reference check will be provided to reviewers and used in scoring the written bid. Attachment A - Reference Data Sheet as described in 2.0(a) will be considered your response to this section.

3.7 Summary

The Department has a need to collect GPS observational data for geodetic, engineering, right-of-way staking, topographic surveys, construction layout, mapping and other GIS applications. Specifically, the GPS receivers shall be used in the following manner:

- Three (3) Global Positioning Systems (GPS) Continuously Operating Reference Station (CORS) Systems with software and/or hardware locks and licenses that satisfy specifications described under Section 4.0, 5.0, and 6.0.

4.0 TECHNICAL REQUIREMENTS

Vendors shall respond to the technical requirements in this section in accordance with the instructions given in Section 2.0(c) above.

4.1 Global Positioning System (GPS) Continuously Operating Reference Station (CORS) System

The GPS CORS System shall include dual frequency GPS receiver, antenna, antenna cables, lightning protection, software licenses, and power cables.

4.2 GPS CORS System Hardware

4.2.1 Receiver Dimension & Weight

Each GPS CORS Receiver shall satisfy the following requirements:

- The maximum dimensions, which shall be no greater than 12"W x 6"H x 12"D (30.5cmW x 15.2cmH x30.5cmD)
- Unit Weight shall be no more than 3.5lb (1.61kg).

4.2.2 Power Requirements

Each GPS CORS System shall satisfy the following requirements.

- The receiver shall operate with a standard 110 volt US-type grounded plug.
- The vendor shall include an AC power supply that operates from 110 – 250 VAC, 50/60 Hz that is CE approved.
- The vendor shall include a cable with alligator style clips and inline fuse for an additional back-up external 12VDC battery
- The receiver shall have a nominal voltage range of 11VDC to 28 VDC.
- The receiver shall have at least two DC external power inputs
- The receiver shall include over-voltage protection on all power inputs.
- The receiver shall include reverse polarity protection.
- The receiver shall allow for power inputs of up to 28 V and greater without sustaining damage.
- The receiver shall have nominal power consumption of no more than 5.0W @ 12 V while powering the multi-frequency GPS antenna

Intelligent Power Management

- The receiver shall turn on automatically when connected to a DC power source that is produced by the manufacturer's AC power supply.
- The receiver shall power off automatically at a nominal 11V threshold and power on at a nominal 12V threshold.
- The receiver shall automatically switch between power sources. There must not be a cycle slip or a new logging file created.
- Operational Recovery - In the event of a power failure, the receiver shall restart with the same settings and configurations that were used before the power failure without the need for user intervention.
- When a power source is removed, the receiver shall automatically switch to the next best power source available without effect on the data being stored.
- A Sleep Mode feature that allows configuration of an automatic power-saving state when there is no active data-logging session.
- A failsafe wakeup alarm that assures scheduled periods of communication and receiver control when the sleep mode is activated.

Power Batteries – External

- Each system shall have a cable that allows the system to be used with an external battery for extended operation.

Power Batteries – Internal

- The GPS receiver must be equipped with a non field-removable 7.4 V, 7800 mA-hr Li-Ion battery capable of powering the unit for 15 hours at 20°C.

4.2.3 External Interface

Each GPS CORS System shall have the following:

- Serial cables shall be supplied to connect the unit for data logging and maintenance.
- External data storage shall be possible using an Ethernet connection and Windows XP/Vista/Server 2003 based data logging software.
- The receiver shall have a minimum of three (3) independently configurable RS232 ports for serial data input or output.
- The receiver shall have an internal LAN interface.
- The receiver shall support an RJ45 connector with links to 10BaseT/100BaseT networks without the use of external terminal servers.
- The receiver shall provide PPP server capability through a serial port to enable remote operations.
- All network functions shall be performed through a single IP address – including web GUI access, FTP file transfer and RT17 streaming.
- Network connection shall allow multiple security options for varying levels of user access.
- The receiver shall support streaming of GPS/GNSS observables, RTCM, or CMR data over TCP/IP or UDP links.
- The receiver shall support configuration using a web browser over HTTP links.
- The receiver shall allow download of logged data files using either FTP or HTTP.
- The receiver shall have an external frequency input.
- The receiver shall be capable of handling baud rates up to 115,200 on all serial ports.
- The receiver shall have flow control on all serial ports.
- The receiver must use a TNC connector for the antenna
- The receiver shall be capable of one pulse per second (1PPS) time strobe output with an accuracy of 1usec.

4.2.4 Display

The system shall have front panel indicators for status of:

- External frequency input
- Ethernet
- Satellite reception
- Logging
- Primary and secondary power inputs

4.2.5 Environmental

Each GPS CORS System shall operate within the following environmental extremes without sustaining damage and interruption of data collection:

- The GPS antenna and receiver shall be rugged and suitable for use in field environments that may be hot, cold, wet or dusty.
- The receiver electronics shall be fully sealed from sand, dust and moisture.
- The receiver must meet waterproof specification IP67

- The receiver shall be shockproof for a drop onto a hard surface from a height of 1m (3.28ft) per mil spec MIL-810-F.
- The receiver shall be able to operate to measurement specification in temperatures between -40°F to +149°F (-40°C to +65°C).
- The receiver shall be not less than 100% condensing humidity proof.
- The receiver shall be able to be transported or stored with the following temperature range of -40°F to +167° (-40°C to 75°C) without sustaining damage to the equipment.

4.2.6 General Operation

- The data must be able to download to an IBM compatible computer through the RS232 port during data collection operation at a minimum of 38,400-baud rate.
- The receiver shall be able to be remotely controlled by Trimble's GPSNet reference station software.

PRIOR TO THE BID OPENING - THE VENDOR SHALL PROVIDE SUFFICIENT INFORMATION THAT GUARANTEES THE PROPOSED SYSTEM WILL COMMUNICATE AND BE ABLE TO BE CONTROLLED REMOTELY BY THE TRIMBLE GPSNET VERSION 2.7 REFERENCE STATION SOFTWARE.

- The receiver will be linked to the software via the TCP/IP intranet network connection.
- **Additional necessary licenses for GPSNet software shall be part of this bid.**
- The receiver shall provide raw GPS observable data compatible with the Department's existing GPS receivers and Geodetic Processing Software. The receiver shall also have the capabilities of providing GNSS observable data. This data can be in RINEX format as a minimum and any proprietary raw data format.
- If the power is lost the recovery time shall be:
 - Less than two minutes from power-on to start survey.
 - Less than thirty seconds when recent ephemeris is used.

4.2.7 Operating System

- The receiver shall have an internal operating system capable of networking and streaming data directly from the receiver.

4.2.8 Internal Data Storage

- The GPS receiver shall have an internal 150 MB data storage that is fully protected from sand, dust, moisture and 100% non-condensing humidity proof.
- The internal memory shall be able to log GPS/GNSS data (L1/L2, L2C, L5 and GLONASS L1/L2) data continuously for 150 days: 6 satellites and storing at 15sec intervals.
- Data shall be stored in compact flash memory, so that no battery backup is required for the data storage memory.
- Download software for an IBM compatible PC running Microsoft Windows XP/VISTA/Server 2003 or above shall be provided.

- The receiver shall support multiple simultaneous data logging sessions.
- The receiver shall be able to collect Meteorological data from a MET sensor or data from other type sensors while logging static data.

4.2.9 Survey Techniques

- Receiver needs to provide at least 16 channels of L1 carrier phase and P code, 16 channels of L2 carrier phase and P code and 16 channels of L5 carrier phase.
- The GPS receiver shall be able to track L1,L2, L2C and L5 on 12 satellites simultaneously
- The GPS receiver shall have a minimum of 48 channels
- The receiver shall be able to utilize the latest multi-path rejection technology and not limited to a ground plane.

4.2.10 Tracking

- The receiver signal tracking shall support in RINEX notation: L1, C1, P1, D1, L2, P2, D2, L5, R1 & R2.
 - On L1: C/A Code, Carrier Phase and Doppler
 - On L2: P Code (derived under encryption) or, when available, L2C, Carrier Phase.
 - On L5 (when available)
- The receiver, when Anti-Spoofing (A/S) (P-code) is activated, shall measure L1 C/A pseudo ranges, L2 range measurements and the full cycle L1 and L2 carrier phases.
- The receiver shall employ multi-bit analog to digital (A/D) conversion and Surface Acoustic Wave (SAW) filters at both RF and IF frequencies to provide superior anti-jamming performance.
- The receiver shall provide unfiltered and unsmoothed pseudorange data for low noise, low multipath error.
- The receiver performance shall not be lower during times when A/S is activated, compared to during times when A/S is not activated.
- The receiver shall have extremely low noise C/A code tracking technology.
- The receiver requires multipath mitigation techniques.
- The receiver shall report Signal-to-Noise Ratio (SNR) values for L1, L2, and L5 GPS signals for all satellites, in decibel-Hz (dB-Hz) referenced to a 1 Hz bandwidth.
- SNR values shall be reported in the same units for L1, L2 and L5.
- The receiver shall be able to track and compute corrections available from WAAS geostationary satellites.
- The GPS receiver shall not require any additional hardware or firmware options or the use of an additional antenna to track and use WAAS satellites.
- The receiver shall use multi-bit aided analog to digital (A/D) sampling.
- The receiver shall have technology that enhances low power satellite signal acquisition.

- The receiver satellite acquisition technology shall increase the receiver's ability to maintain firm lock on signals once acquired.
- The satellite acquisition technology used by the receiver shall provide improved tracking in areas of high radio interference such as under power lines, around airports, near radio-intensive construction sites.

4.2.11 Broadcast/Receive Options

- The GPS receiver shall have RTCM Output Version 3.x (most current) available as a standard.
- The GPS receiver shall support Virtual Reference Stations server operation as a standard.
- The GPS receiver shall support CMR output and RTCM Version 2.x (most current) simultaneously via separate ports.

4.2.12 System Controls

- The GPS receiver shall be capable of logging data at operator selected intervals of 0.1, 0.2, 0.5, 1, 2, 5, 10, 15, 30, 60, 300 seconds.
- The system shall be able to be controlled by an HTML web browser Internet Explorer version 5.0 or newer, and Netscape version 4.78 or newer.
- Multiple security options for varying levels of user access.
- Allows the storage of all operating parameters to a file thereby facilitating the transfer of identical operating parameters across a group of receivers installed within a network.
- The receiver shall be able to be **controlled** by Trimble's GPSNet reference station software.

4.2.13 Antenna

- The antenna shall be of geodetic quality.
- The antenna shall be external from the receiver/data logger and operate remotely at distances up to 60 meters. The cable shall not have a loss of no more than 12dB without the use of an inline amplifier.
- The antenna shall be capable of receiving both L1 (1575.42 MHz), L2 (1227.6 MHz), L2C, and L5 (1176.45 MHz), as well as GLONASS L1 and L2 frequencies.
- The antenna shall weigh no more than 3lbs (1.36kgs).
- The antenna maximum dimensions should be no greater than diameter of 14" x 3" H (dia. 35.5cm x 7.6cm H).
- The antenna shall operate within the temperature range of -40°F to 158°F (-40°C to +70°C).
- The antenna shall be able to be transported and stored within the temperature range of -67°F to 185°F (-55°C to +85°C).
- The antenna shall pass the following environmental standards:
 - MIL-810-F vibration levels on each axis (while operational).
 - Shock tested table MIL-810-F - a 2m (6.56ft) drop (while operational).

- The antenna shall be sealed and 100% humidity proof protected against dust, wind, rain, sand and snow..
- The receiver shall be not less than 100% condensing humidity proof.
- The antenna shall have a 4-point antenna feed for sub-millimeter phase center error and enhanced right-hand circular polarization.
- The antenna should provide low elevation tracking technology.
- The antenna shall have a phase center with a precision stability of less than one (1) mm.
- The antenna shall be high gain of at least 27dB in all frequencies.
- The receiver must use a TNC connector for the antenna
- The antenna shall have a non-removable ground plane to reduce ground based multipath.
- The antenna shall use a resistivity-tapered method for eccentricities.

4.2.14 Lightning and Surge Protection

The vendor shall provide lightning protection devices between the GPS antenna and the cable connected to the receiver.

- The lightning protection devices shall meet the following:
 - Frequency range of 1200 – 1600 MHz.
 - Insertion loss of less than 0.1dB over the frequency range.
 - Throughput energy less than 1000 μ J
 - Multi-strike capability
 - Surge protection up to 20kA.
 - Operating temperature range of -40°F to 158°F (-40°C to +70°C).
 - Shall be sealed and 100% humidity proof protected against dust, wind, rain, sand and, snow..

4.2.15 Carrying Cases

The GPS CORS system is intended for permanent installation; therefore, carrying cases for the antenna and GPS receiver are not required.

4.2.16 Hardware Operating Manuals

Each GPS CORS System shall include one (1) hard copy and one (1) digital set of hardware operation manual(s). The manual(s) shall be in easily understood English with a logically sequenced step-by-step description of the total system in general and shall also include specific sections devoted to the detailed operation of each system component.

4.2.17 Site Licenses

The vendor shall provide necessary site licenses for Trimble GPSNet V2.7 for each system.

4.3 **Standard of Performance**

The vendor shall successfully demonstrate the use of the proposed hardware as a condition of accepting the bid. A standard of performance shall also be met for all equipment by performing the function for which it is intended for a period of 45 consecutive calendar days, beginning at the conclusion of the initial training period, at an effectiveness level of 98 percent. In the event the equipment does not meet the standard of performance during the initial 45 consecutive calendar days, the standard of performance test shall continue on a day-by-day basis until the standard of performance is met for a total of 45 consecutive days. The GPS CORS System will not be accepted and no charges shall be paid until the performance requirements have been maintained for a period of 45 consecutive days. If the GPS CORS System fails to meet the standard of performance after 120 calendar days from commencement of the performance period, the Arkansas State Highway and Transportation Department may require a replacement system or terminate the contract.

5.0 **PERFORMANCE REQUIREMENTS**

Vendors shall respond to the performance requirements in this section in accordance with the instructions given in Section 2.0(d) above.

5.1 **GPS CORS System Requirements**

System accuracy is specified under Table "GPS CORS System Accuracy" and the accuracy obtained assumes that a minimum of five satellites is tracked continuously while utilizing both L1 and L2 signals.

GPS CORS System Accuracy				
Survey Technique	Accuracy (at σ)		Azimuth	Initialization Times
	Horizontal	Vertical		
Static	5 mm + 1 PPM	10 mm + 1 PPM	1 arc second +(5 / baseline in kilometers)	< 2 minutes

6.0 **SUPPORT REQUIREMENTS**

Vendors shall respond to the support requirements in this section in accordance with the instructions given in Section 2.0(e) above.

6.1 **Training for GPS CORS System**

A qualified representative of the manufacturer shall provide instruction in the operation, calibration, and maintenance of the GPS CORS System at no extra cost. This instruction shall be provided to at least four (4) operators from the AHTD. The training is to begin no later than 10 calendar days after delivery and installation of the GPS CORS System. The training will typically consist of a four (4) hour session or longer if necessary, with a four (4) hour follow-up approximately 60 days later. At the conclusion of training, all trainees should be able to operate the GPS CORS System in all normal production modes.

The vendor shall provide a proposal on the training and include, but not be necessarily limited to, the following:

- Topics of instruction.
- Format of training (i.e. how will the training be presented).
- Number of days of training

The successful bidder will be notified if the above training is necessary.

6.2 Warranty for GPS CORS System

The successful bidder shall guarantee the GPS CORS System against defective workmanship or materials for a period of three (3) years of actual field services, commencing with the successful completion of the standards of performance. Any defect of workmanship, material, or software failure that develops during the first year of field operation shall be replaced, repaired or corrected at no expense to the Department. During the last 30 days of the warranty period, the GPS CORS System will be checked and service personnel will make any necessary adjustments from the company. This service will be performed at the Arkansas State Highway and Transportation Department, Surveys Division, 10324 Interstate 30, Little Rock, AR.

If the vendor's standard warranty is for a period in excess of 36 months the standard warranty shall apply.

6.3 Maintenance Support for GPS CORS System

The manufacturer of the GPS CORS System shall provide maintenance support. Indicate your maintenance policies with regard to hardware and software problem diagnosis, error resolution and charging policies. The bid response shall state in detail the terms and conditions of the monthly maintenance agreement for the proposed GPS CORS System. Such statements shall include but, not be limited to the following: the location and staffing of the closest services point, how preventive maintenance is scheduled, the nature and frequency of preventive maintenance, the size and location of your spare parts inventory, the total size of your maintenance organization and response time for maintenance. Response time on maintenance calls shall be the time between the receipt of a call by the vendor's representative including any answering services, and the arrival, ready for repair work, of the maintenance personnel at the customer's site. State the response time to the remedial service that your company is willing to commit to.

6.4 Firmware and Software Upgrades

Within the warranty period, the vendor shall provide at no extra cost any and all released firmware and software upgrades to the GPS CORS System. The vendor shall indicate in the bid their method and procedure of supplying and installing firmware and software.

7.0 REFERENCE DATA SHEET

FOR VENDER: _____

Provide company name, address, contact person, telephone number, and appropriate information of contracted services that are similar to this solicitation document. (Any subcontractor arrangements for the completion of this work shall be listed on a separate bid page.)

Company Name: _____

Address: _____

Contact Person: _____

Phone Number: _____ Services Provided: _____

Company Name: _____

Address: _____

Contact Person: _____

Phone Number: _____ Services Provided: _____

Company Name: _____

Address: _____

Contact Person: _____

Phone Number: _____ Services Provided: _____

Company Name: _____

Address: _____

Contact Person: _____

Phone Number: _____ Services Provided: _____

ATTACHMENT B – SUMMARY SHEET

FOR VENDER _____

PRODUCT(S) SUPPLIED:

LIST ALL ITEMS AND QUANTITIES AS REQUIRED BY THIS BID INVITATION. USE THE ADDITIONAL LINES PROVIDED FOR THOSE ITEMS NOT CURRENTLY LISTED THAT MAKE UP THE SYSTEM BID.

THE QUANTITIES LISTED SHALL BE FOR ONE (1) SYSTEM. THE BID TOTAL SHALL REFLECT THE SYSTEM BID TOTAL TIMES (X) THE NUMBER OF SYSTEMS.

(Use as many sheets as necessary)

<u>ITEM NO.</u>	<u>DESCRIPTION MAKE, AND MODEL NUMBER</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1.	GPS CORS System				
a.	GNSS Receiver	1	Ea		
b.	GNSS Antenna	1	Ea		
c.	60m Coaxial Cable	1	Ea		
d.	Ethernet Cable w/ Adapter	1	Ea		
e.	AC power supply	1	Ea		
f.	Lightning protector	1	Ea		
g.	PC cable (9 pin Serial or USB)	1	Ea		
SYSTEM BID TOTAL:					
NUMBER OF SYSTEMS :					3
2.	Training (if requested)	1	Lump		
BID TOTAL :					