UNAVCO, INC.
REQUEST FOR PROPOSALS/RFP

RFP Number:	RFP Title:
P022015	**GNSS Systems Supplier**

RFP Due Date and Time:	
5:00 p.m. Mountain Daylight Time, on March 20, 2015	Number of Pages: **20**

ISSUING AGENCY INFORMATION

Purchasing Agent :	Issue Date:
Tim Reeme	**March 2, 2015**
UNAVCO, Inc. 6350 Nautilus Drive Boulder, CO 80301 reeme@unavco.org	**Fax: (303) 381-7501** **rfp@unavco.org** **Website: http://www.unavco.org/**

INSTRUCTIONS TO VENDORS

	Mark Face of Envelope/Package:
COMPLETE THE INFORMATION BELOW AND RETURN THIS PAGE WITH YOUR PROPOSAL AND ANY REQUIRED DOCUMENTS TO THE PURCHASING AGENT LISTED ABOVE UNDER "ISSUING AGENCY INFORMATION."	RFP Number: **P022015** RFP Due Date: **March 20, 2015**
	Special Instructions: **Proposals sent by fax must have a cover sheet noting the total number of pages being sent.**

VENDORS MUST COMPLETE THE FOLLOWING

Delivery Date:	Delivery Method:
Vendor Name/Address:	Authorized Vendor Signatory:
Vendor Phone Number:	Vendor FAX Number:
Vendor E-mail Address:	Vendor Web Address:

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SECTION 1: GENERAL CONDITIONS

1.1   INTRODUCTION

The purpose of this Request for Proposals (RFP) is to receive competitive Proposals from GNSS System Suppliers so that UNAVCO may select a Preferred Vendor for replacement of aging instruments in the continuous GPS networks that UNAVCO operates for the National Science Foundation (NSF) (e.g. the EarthScope Plate Boundary Observatory (PBO), COCONet, TLALOCNet, and POLENet) and in the UNAVCO equipment pool used to support NSF and community PIs. The vast majority of the receivers and antennas in UNAVCO's instrument pool have reached end-of-life status. UNAVCO intends to begin replacing our current inventory with modernized GNSS receivers and antennas. To ensure that our community is best served, we are seeking the most capable permanent station GNSS Systems at the most competitive pricing. The total number of units to be procured will depend on a number of factors, which include the availability of funding for the GAGE Facility through September 30, 2018 from our core sponsor, the NSF, UNAVCO community guidance, internal UNAVCO funding priorities, and the bids obtained through this RFP. UNAVCO anticipates that the first order to the Preferred Vendor selected through this RFP will be approximately $500K.

1.2   GENERAL REQUIREMENTS

1.2.1   Modifications of Firmware and Hardware.

The Preferred Vendor will be allowed up to 180 days from the date of selection to modify device firmware and hardware to meet the agreed upon specifications. In other words, if a Prospective Vendor has new products nearing release that may make a Proposal more competitive, UNAVCO is willing to consider those products, as long as they will be modified to meet the agreed upon specifications within 180 days from the date of selection.

Following selection of the Preferred Vendor, future modifications to hardware and firmware may be made by mutual agreement through the lifetime of the Preferred Vendor Agreement (PVA). UNAVCO may make specific requests for added firmware features and bug fixes during the lifetime of the PVA, and will expect these requests to receive high priority for implementation by the Preferred Vendor. Firmware modification requests will be made in writing by UNAVCO and should be acknowledged by the Vendor within five (5) business days. Vendors must then respond with an implementation timeline within five (5) business days of the acknowledgement.

1.2.2   Warranty, Firmware Upgrades, and Repairs.

A 3-year product replacement warranty for both receiver and antenna with the option to purchase a 5-year extended warranty is required. Warranty begins at the time of product delivery. During the warranty period, broken parts will be returned to the Vendor, and a no-cost replacement will be returned to UNAVCO. In the event that repairs exceed 10% or more of an ordered lot, orders will be suspended until the deficiency can be remedied to UNAVCO's satisfaction. All firmware upgrades for purchased products will be made available free of charge during the life of the product.

1.2.3   First Article Delivery for UNAVCO Evaluation and Testing.

GNSS SYSTEMS RFP TIMETABLE

March 2, 2015 — Release of request for proposal on UNAVCO website.
March 20, 2015 — Deadline for vendor response
March 24, 2015 — Vendor conference at UNAVCO HQ in Boulder, CO
March 30, 2015 —Vendor provides first article for testing upon UNAVCO request
April 3, 2015 — Deadline for modification of initial vendor response
April 27, 2015 — Final selection of preferred vendor for new GNSS CORS instrument
April 30, 2015 — Expected issue of purchase requisition for 2015 receiver buy
May 11, 2015 — First shipment of new instruments to UNAVCO from Vendor

UNAVCO may request a loan prototype, first-article, or standard systems from Prospective Vendors for evaluation and testing purposes at any time following the initiation of Vendor conferences per the above schedule. Systems will be returned at the earliest possible date by UNAVCO, but no later than two weeks following the selection of the Preferred Vendor. UNAVCO is willing to enter into a formal Non-Disclosure Agreement (NDA) with regard to proprietary details of the evaluation systems, if required by the Vendor and requested in writing.

1.3   VENDOR CONFERENCE

There will be an opportunity for Prospective Vendors to meet with UNAVCO's Evaluation Committee for a Question and Answer Session at the Vendor Conference. This Question and Answer Session will be a closed-system session. Please submit at least two (2) questions, but not more than six (6) questions, to be discussed during the Question and Answer Session. All questions must be submitted, in writing, to the Evaluation Committee at rfp@unavco.org at least seven (7) days prior to the Vendor Conference. The Evaluation Committee will not address questions received less than seven (7) days prior to the Vendor Conference. Any substantial clarifications resulting from this Vendor Conference shall be posted on UNAVCO's Procurement website located at the following link:

https://www.unavco.org/contact/procurement/procurement.html

Vendor Conference Details: **Location:**   **UNAVCO's Boulder Facility**
                                             6350 Nautilus Drive
                                             Boulder, CO 80301
                             Date: **Tuesday, March 24, 2015**
                             Time: **9:00 am**

Participation at the Vendor Conference is mandatory and it is limited to two representatives per Vendor. The purpose of this meeting is to give Vendors the opportunity to hear UNAVCO respond to their pre-submitted questions regarding the RFP. All responses from UNAVCO will be distributed, in writing, to each Prospective Vendor at the Question and Answer Session.

There will be a ten (10) day Amendment Period following the Vendor Conference. This Amendment Period will allow Vendors to amend and address any Proposal issues or questions, which may have been clarified at the Vendor Conference. All amendments will be due by **5:00 pm MDT on Friday, April 3, 2015**.

Please send an electronic RSVP providing the names and titles of those attending the Vendor Conference to the UNAVCO Evaluation Committee at rfp@unavco.org.

SECTION 2: TECHNICAL SPECIFICATIONS

The information below is intended to delineate the overall GNSS Technical Specifications UNAVCO requires as part of this RFP to the Prospective Vendor. Complete technical and performance specifications are given for permanent station GNSS systems. These technical specifications are broken into three parts: the receiver, its antenna, and accessories.

2.1   GNSS SYSTEM RECEIVER TECHNICAL SPECIFICATIONS

2.1.1   Required.

1. Multi-frequency GNSS (Global Navigation Satellite System) receiver able to track all signals on all available frequencies from the following constellations: GPS, GLONASS, Galileo, Beidou, and SBAS. Also desirable are the capabilities to track the regional QZSS and IRNSS signals. Unsmoothed pseudorange, signal-to-noise, Doppler, and carrier phase observables must be recoverable from the receiver.

    a. Ability to purchase receivers with specific constellation tracking disabled (*i.e.* GPS-only or GPS-GLONASS only) at reduced price is preferred.

2. Receivers must be able to simultaneously track all available signals on all satellites, even if the SV is unhealthy, to an elevation angle of 0°.

3. Signal to noise observations should be measured and stored at a resolution of 0.1 dB*Hz or better.

4. Phase observations should be measured and stored at a resolution of 0.001 cycle or better.

5. Pseudorange observations should be measured and stored at a resolution of 0.001 meter or better.

6. Receiver performance must meet the following criteria:

a. Total Expected and Observed data—In the 90°- 10° elevation range, the receiver must have at least 99% observed to expected data with no more than 0.05% slips to observations. In the 10°- 5° elevation range receiver must have at least 90% observed to expected data with no more than 0.1% slips to observations. In the 5°- 0° elevation range receiver must have at least 30% observed to expected data with no more than 1.0% slips to observations.

b. Observations per Slip—Over the elevation range 90°- 0° the receiver should have greater than 20,000 observations, sampled at 15-sec intervals, per slip (total number of observations recorded divided by the combined MP1/MP2 slips). In the 10°- 5° and 5°- 0° elevation ranges the receiver must have less that 1% IOD slips.

c. Zero Baseline Tests—Carrier phase precision < 1 mm L1 and L2 (zero difference) and < 3 mm L3 (zero difference). L3 is defined as the linear combination of the phase data, or simply the L3 ionosphere-free observable (measured in units of L1 wavelength, $L3 = 2.546 * L1 - 1.984 * L2$). Non-smoothed Pseudorange precision < 30 cm on L1 and L2 (< 100 cm L3). Carrier phase and pseudorange precision would be demonstrated using zero baseline tests on 24-hour, double difference data sets.

d. Short Baseline Precision Tests—Short baseline (~2 m), 24-hour solution precision must be 0.2 mm or better in the north and east components and 0.4 mm or better in the vertical component for L1 and L2. Solution precision must be 0.4 mm or better in the north and east components and 0.8 mm or better in the vertical component for L3.

e. Short Baseline Residual Troposphere Delay Tests— Short baseline (~2 m) residual troposphere delay must be no larger than 1 mm for L3 (based on tracking down to 0° elevation range.

7. Ability to enable or disable any Vendor-defined code and carrier multipath rejection technology.

8. Receiver must meet the following environmental specification: Operating temperature: -40° C to +75° C; Humidity: 100%, fully sealed; Shock: 1 m drop to hard surface. Must be able to maintain tracking and operation during strong earthquake-induced vibrations.

9. Proprietary formats used in data streams and logged files must be thoroughly documented so that UNAVCO can update software to translate all pertinent contents and messages, including metadata. Modifications to proprietary formats that occur within the receiver warranty period must documented and made available to UNAVCO at the time of firmware release.

a. Full support for translation of data files to RINEX 3.02 format must be provided. This may be either onboard the receiver, where a data file is written in RINEX 3.02 format or a user can download a translated file on-the-fly, or in the form of software that will convert a native binary to RINEX 3.02 after downloading. All software executables must be compatible with LINUX operating systems.

10. Built-in Ethernet communications port allowing for TCP/IP configuration of all receiver features, data files, and data streams.

11. Receiver must be capable of producing data streams and downloadable logged data files in BINEX format, containing all GNSS observables, navigation messages, attached met/tilt and other ancillary serial devices, site metadata, and system status records. Minimum requirement is BINEX 0x7f-05 (or new BINEX 0x02 to supersede 0x7f-05 and 0x7f-04) with support for all GNSS observables, 0x00 for metadata and comments, and 0x01 for GNSS navigation messages. BINEX 0x7d for receiver state information is preferred, but not required. Streaming protocols supported should include TCP/IP, UDP, and NTRIP.

12. Receiver must be capable of producing data streams in RTCM3 format with support for IGS-standard Multi-System Messages (MSM), using the protocols noted above.

13. Serial port support for connection of at least 4 RS-232 meteorological devices, tiltmeters, or other sensors with data output integrated into both logged and streamed data. Message structure must be documented to allow "teqc" extraction as in requirement #8 above. Receiver must log data from serial devices even if no GNSS satellites are being tracked (*e.g.* if the GNSS antenna has failed). Serial interface must support poll mode at user-specified sample intervals of 1 sec. or greater and allow for simultaneous and independent operation of each device. The receiver must tag all serial data with UTC acquisition time. A Vendor supplied command line interface or graphical user interface (GUI), which allows direct user interaction with the serial device commands and output is desired.

14. Industry standard 1 PPS output hardware port.

15. Support for Real-Time Kinematic operation in both Base Station and Rover modes.

16. Minimum sample rate of 50 Hz (sampling interval of 0.02 second) is required for logging and streaming carrier phase, pseudorange, and SNR observables with no interpolation (true sample rates of 100 Hz (sampling interval of 0.01 second) for all observables is desired.

17. Onboard FTP server allowing access to all logged data files in receiver memory.

    a. Default TCP port 21 should be user-configurable to allow alternate ports.

    b. Support for resume-able file transfers using the REST command.

    c. Support for file time-stamp retrieval using the MDTM command.

    d. Support for file deletion by authenticated users using 'delete' command.

18.   HTTP-based file transfer support (*e.g.* using 'wget' and/or 'curl').

19. Data logging:

    a. Minimum of six months of onboard data storage capacity when recording full GNSS signals at 1 Hz using native or compressed file format, using manufacturer-provided and tested industrial-type memory. Required storage size in gigabytes (GB) will vary based on file format and storage method available.

    i.   Higher storage capacity is desired. Storage capacity should be specified by the manufacturer in terms of duration and sample rate of file capacity rather than in GB.

b. USB, SATA or other IEEE standard interface hosting for additional external data storage using SSD, flash, or other industry-standard devices. The receiver operating system must be robust enough that no function should be interrupted, if the external storage device suffers from either hardware or formatting failure.

c. Minimum of eight simultaneous data logging sessions of independent, user-configurable sample rates and durations, *e.g.* the receiver is creating an hour-length file at 10 Hz (sampling interval of 0.1 second) while also logging a daylong 15-sec file (0.07 Hz), etc. Receivers capable of logging more than eight simultaneous sessions will be preferred. Data logging sessions should be configurable to contain only the GNSS observations that are defined by the user, or only met/tilt or other serial device data, or both in combination.

d. File names must include either the ordinal date (*e.g.* YYYYDDD) or the Gregorian date (*e.g.* YYYYMMDD) from the time of creation of the file. A user specified station name must also be included in the file name or must default to some known token such as the receiver serial number or some portion thereof. File names must also include characters to distinguish when multiple files are created on the same day.

e. Data storage for each logging session must be independently managed in partitions of user-configurable size using ring buffers or memory pools, *i.e.* automatic deletion of older data files will occur while newer files of lower sample rates are preserved.

    i.   Option to stop logging a particular session when its memory pool has reached designated capacity instead of overwriting older files is required.

f. A user specified data directory structure that allows for: 1) separate directories for each calendar month; 2) user-specified naming of the directories; and 3) user-specified structure of the directories. At a minimum, each data logging session should be stored in a unique directory. This is critical in order to facilitate data flow strategies that commonly involve directory content queries.

g. Event-triggered data logging sessions (*e.g.* a session that would activate if an attached accelerometer detects strong ground motion at the site) is desired.

20. The ability to save the configuration of the receiver in a downloadable file and upload it to other receivers remotely is required.

a. Configuration files should have the option of retaining network IP configuration or applying new user-specified IP settings.

21. Power consumption of less than 5 watts when tracking all GNSS signals and logging two data sessions of 10 Hz and 15 sec sample rates to onboard memory. Receivers with lower power consumption are preferred. Ability for the user to further reduce power consumption by disabling

any receiver functions (*e.g.* limiting tracking to GPS-only, or disabling specific network interfaces) is strongly preferred.

22. User-programmable reboot timer or other "watchdog" system that provides for automated system restarts without active user interaction.

23. Receiver must automatically restart following interruption of external power in exactly the same configuration as before and resume data logging for all sessions automatically.

24. Receiver must automatically power on when external voltage of 11.9 ± 0.2 volts is applied, and shutdown when external voltage drops to 11.0 ± 0.2 volts, unless user-configurable controls are provided, which is strongly preferred.

25. A minimum of two external DC power ports to allow independent primary and backup power systems to be connected.

    a. The receiver should automatically select the higher voltage port unless the Vendor provides user-configurable port selection or other well-documented and suitable logic.

    b. Receiver must be equipped with an AC power adapter for 120/220V mains power.

26. Voltage range: Unit should operate properly if external DC voltage of greater than 10.8 and less than 28 volts is applied. Wider operational power specifications are preferred.

27. On-board battery or UPS is not required, and if present, should be removable at user option OR must include user-configurable settings to control the circumstances under which power is used to maintain its charge. If a battery backup is present, the receiver must function properly if it loses its ability to maintain a full or partial charge to the backup system.

28. Network firewall or IP filtering scheme to protect the receiver from on-line attacks or unwanted access is required.

29. A command-line API for uploading and application of receiver configuration files and firmware updates over TCP/IP and serial interfaces.

2.1.2   Desired.

1. Options for true 100 Hz logging and streaming (carrier phase, pseudorange, Doppler, and SNR).

2. FTP push file transfer support. FTP push validates full file transfer after completion using checksum or similar method and re-transfers files that were incomplete on previous attempts.

3. Support for anonymous 'read-only' FTP file transfer (no file deletion permitted by anonymous users).

4. Rsync-based file transfer support

5. SFTP or other secure-shell file transfer support

6. Data logging:

    a. Logged data files interrupted by power loss or user restart should be resumed if the restart occurs during the session-defined time period rather than beginning a new file.

    b. Support for onboard data compression (*e.g.* zip, gz) to minimize bandwidth required during data transfer.

7. User configurable power-on and shutdown voltages for external power supply.

8. User-configurable logic available for external DC power-port selection.

9. Power-saving "sleep-mode" should be available, with user-programmable schedule to automatically resume signal tracking and data logging.

10. Optional internal battery/UPS, which can be easily removed by the user.

11. A command-line API for gathering receiver state of health (*e.g.* temperature, voltage, and uptime).

12. User-accessible activity log files to aid in system troubleshooting that records system reboots, boot sequences, voltages, low voltage shutdown activity, temperature and shutdown sequences. The log file directory must be able to record the last 180 days of activity.

2.2   REQUIREMENTS FOR "ARCHIVAL QUALITY STREAMING"

These requirements describe any prospective receiver from the Preferred Vendor to support streamed data buffering and packet re-transmission, hereafter referred to as "Archival Quality Streaming." Network Operations Center (NOC) and Real-time (RT) data are acronyms used in the schematic below.

The basic system diagram is as follows:
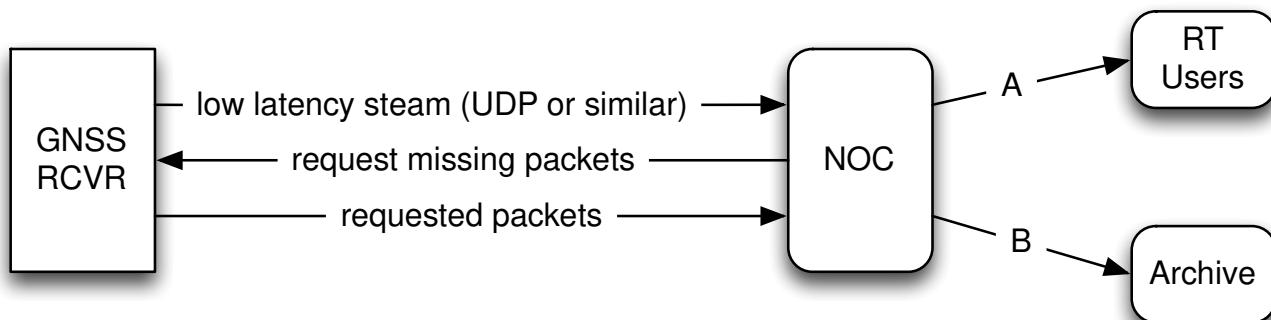
A: Low latency, lossy GNSS stream
B: High latency, lossless GNSS stream or files

2.2.1 Objective.

The objective of "Archival Quality Streaming" is as follows:

1. Deliver time ordered (BINEX or other open and defined protocol) data to client applications with low latency. The communications channel governs maximum latency tolerance, with minimal overhead introduced by the receiver (<250 ms).

2. Create time ordered (BINEX or other open and defined protocol) files for post-processed applications. These files should match the completeness of those collected and stored on the receiver. Data should be equivalent to that streamed (*e.g.* no on-board processing).

3. Support the ability to tolerate the catastrophic loss of a server or the ability to bring down a single server for maintenance while continuing real-time and post-processed data collection.

4. Support a UDP encapsulated (or equivalent open standard) protocol to start, maintain ("keepalive"), and stop data transmission to any requesting client. Continuous data transmission will be maintained for an interval defined in the UDP (or equivalent open standard) start/maintain packets and will terminate if no further start/maintain packets are received within the "keepalive" interval.

5. Provide an encapsulation of streamed (BINEX or other open and defined protocol) data over UDP (or equivalent open standard) links that includes packet-sequencing information at the resolution of the maximum buffer to allow correct sequencing by a client.

6. Accept packet re-transmission requests from the client and re-transmit only requested data packets to the client.

7. Support retry packet buffering for up to the full capacity of (BINEX or other open and defined protocol) data at the minimum required 1 sample per second rate. Support buffer size configuration with either duration or number of bytes. Higher data rates are desired.

8. Support, as necessary, UDP (or equivalent open standard) link "keepalive" packets to ensure 2-way communications over links included NATed firewalls.

9. All elements of this protocol will be considered public domain.

10. Receiver should have state of health information pushed via email or UDP at a user-specified rate.

2.3 GNSS ANTENNA TECHNICAL REQUIREMENTS

1. Vendors must provide pricing for separate purchases of receivers and antennas, which may be purchased in different quantities and at different times by UNAVCO after selection of the Preferred Vendor.

2. Either milled aluminum L1/L2 Choke Ring antenna using Dorne & Margolin C146-10 (or similar) vertical dipole element, or vendor geodetic antenna with ground plane and fully sealed, waterproof element. Any antenna provided as part of this RFP should be conformable with the existing PBO network installations with respect to all RF and physical characteristics.

3. Antenna must be physically separate from receiver. In addition, pricing for GNSS antennas must be distinct from GNSS receivers in response to this RFP.

4. Antenna must have well-defined phase (and gain) pattern to allow mixing with other standard antennas (*i.e.* the JPL D/M+crT) to International GNSS Service (IGS) specifications. Antenna gain patterns must be reproducible, that is all antennas provided by the Vendor must have identical phase patterns. Absolute phase center stability must be within ± 2 mm in the horizontal and ± 4 mm in the vertical. Antenna to antenna phase center repeatability (minimum 3 measurements, 1 sigma) must be ± 0.5 mm in the horizontal and ± 1 mm in the vertical. Antenna PCV calibrations must be conducted at an IGS-approved absolute calibration facility with and without radomes (*e.g.* SCIGN short and tall domes), with results made publically available in standard formats.

5. Antenna must have a preamplifier that provides enough gain to operate the antenna with up to 14 dB of cable loss.

6. Antenna must meet the following environmental specifications: Operating temperature range: -40° C to +75° C; Humidity: 100%, fully sealed.

7. Comprehensive GNSS signal support, including all modernized GPS signals, and those from the GLONASS, Galileo, and Beidou systems.

8. Antenna must be compatible with existing UNAVCO assets, including monuments, radomes, connectors, etc.

2.4   PERMANENT STATION ACCESSORIES

1. System must include DC power cable with polarity indicated.

2. Optional antenna cable - 10 m, low loss antenna cable with robust weatherproof connector.

3. Optional AC (110/240 V) power supply.

2.5   ADDITIONAL VENDOR QUESTIONS

UNAVCO is interested in procuring GNSS receivers that are well adapted to collecting data useful for ionospheric, tropospheric, hydrologic, cryospheric, and geodetic science applications. Please indicate whether your receiver currently supports the following features, or whether these features could be added as part of future firmware upgrades or receiver models. As part of this RFP, UNAVCO requires that all Prospective Vendors answer the following questions:

1. **Tracking loop characteristics**:

   a. Reconfiguration of tracking loops: Is it possible to change the bandwidth of the receiver's PLL and DLL?

   b. Is it possible to change the PLL and DLL update intervals?

   c. To anticipate how well a receiver might withstand the effects of ionospheric scintillation and earthquake-induced or other large ground motion, it is useful to know the phase-lock loop update (pre-detection) interval (*e.g.,* 1 ms, 10 ms, 20 ms), its order (e.g., 1st, 2nd, or 3rd), and its bandwidth (*e.g.,* 10 Hz).

   d. Is the DLL and/or PLL configuration recorded in the data files or streams? If so, please define how this information is recorded.

2. **Signal to Noise Observations**: At what frequency can the receiver measure the amplitude (or C/N_0) and phase of each signal being tracked (*e.g.,* 10 Hz, 20 Hz, 50 Hz). If less than 50 Hz, can the rate be increased to 50 Hz via a firmware upgrade or otherwise?

3. **L2C tracking**: does your receiver track both the L2CM and L2CL codes? Does your receiver correct for the ¼ cycle offset between L2C and L2P carrier phases?

4. **Code and Phase Biases**: How does you receiver handle all codes and ¼ phase biases, for example (L5 I, Q, I+Q, DCBs, etc.)?

5. Which **Galileo** signals does your receiver support at this time and what signals are going to be tracked in the future?

6. Which **GLONASS** signals are currently supported, and how will the planned GLONASS K modernized signals be implemented?

7. **Raw Navigation Messages:** Does your receiver have the ability to record and report raw GNSS navigation messages?

8. **Reference oscillators:** The phase stability of a receiver depends on the stability of its oscillator. Please indicate what type of internal reference oscillator your receiver uses, whether TSXO, TCXO, OCXO. What is the g-sensitivity of the onboard oscillator?

9. **Cycle slips:** How a receiver handles cycle slips in the carrier phase can impact ambiguity resolution in kinematic real-time and post processed applications. With that in mind, how does your receiver handle cycle slips in the raw carrier phase data? Are cycle slips repaired automatically in the raw carrier phase data? If so please describe the implementation method.

10. **RF interference:** As demands for spectrum increase and triple frequency GNSS samples a wider frequency range, RF interference is becoming more prevalent. Does your system support any active or passive mitigation of radio interference? If so, please indicate the technology used to achieve this.

11. **Data file formats:** Please detail the file storage and downloadable formats available on your receiver. To what degree can the user control the sizes and contents of files by changing message content? In the case of BINEX, RINEX, or other open source, non-proprietary format downloads, are the files stored on the receiver in these formats or converted on demand?

12. **Data file sizes:** How large is a daily GNSS file (with all available observations) at 15-sec sampling rate as stored on the receiver in the most efficient way possible? What is the size of an hour-long file at 1 Hz sampling?

13. **NTRIP Support:** Does the receiver support NTRIP version 2.0 protocol?

14. **RTCM3 Support:** Does the receiver support the RTCM 3.2 State Space Representation (SSR) message?

15. **Ionospheric analysis capabilities:** Does your receiver have the ability to calculate, log, or stream TEC and/or Scintillation Index (S4) in real time?

16. **Online Help Capability:** A comprehensive on line help and manual system is critical for users of complex GNSS receivers. Describe the operation and content of online help available through the receiver's GUI. Is this system capable of being updated as new features are added or as firmware is modified?

17. **Receiver activity log files:** Describe the level of receiver activity and debugging information available to the user through the examination of onboard log files.

18. **GPS Modernization:** How will your receivers behave when semi-codeless and codeless tracking of P1 and P2 are no longer supported for civilian stakeholders by the DoD after the currently planned sunset date of 2020?

19. **Repair Tracking:** Describe your capability of tracking changes in hardware components, firmware, modifications, and repairs.

20. **Repair Training for UNAVCO Staff:** Describe possible arrangements in which UNAVCO staff is trained and certified to repair GNSS systems in return for further price reductions.

21. **Power consumption:** Describe in as much detail as possible what reduction in power consumption can be achieved by the user selectively disabling any hardware features, such as networking, GNSS constellation or signal tracking (*e.g.* L5 or L2C), or data logging sessions. What is the minimum power consumption that can be achieved by a user?

22. **Static Protection of Hardware Ports:** Describe what, if any, protection against static electric damage to power, ethernet, and/or serial ports is present in the system?

SECTION 3: VENDOR MANDATORY ELIGIBILITY

1. A Vendor may be an individual or a business corporation, partnership, joint venture, or other legal entity duly organized and is authorized to do business in Colorado, financially sound, and able to provide the services being procured by UNAVCO.

2. If a Vendor has been debarred, suspended, or otherwise lawfully precluded from participating in any public procurement activity, such Vendor shall disclose that information in its offer, which may be sufficient ground for disqualification. If a Vendor is not in good standing with any Federal, State, or Municipality this must be disclosed.

3. Vendor shall fill out the UNAVCO Vendor Certifications and Representations Form. This Form will be distributed after the Preferred Vendor is selected.

4. Vendor shall include a current IRS Form W-9.

5. Vendor shall show registration with CCR at https://www.sam.gov/.

SECTION 4: PROPOSAL PREPARATION

4.1   GENERAL PROPOSAL PREPARATION

Please use the following as a guideline to format your proposal.

4.1.1   Length and Font Size.

Please use fonts no smaller than 12 point and standard formatting. Maximum proposal length including title page, cover letter, proposal, vendor information, and budget should not exceed 35 pages.

4.1.2   Title Page.

UNAVCO, GNSS Systems Supplier Proposal, your company name, your address, your web site address, your telephone number, your fax number, your e-mail address, and your primary contact person.

4.1.3   Cover Letter.

Signed by the person or persons authorized to sign on behalf of the Vendor (1-2 pages).

4.1.4   Proposal Content.

Discuss your proposed solution, including the features, benefits, and uniqueness of your services. The proposal should contain the following information (and lettering/numbering format):

A. Qualifications and Experience

    i.   Name of company
    ii.   Size and location of the office that would service the account
    iii.   Overall vendor qualifications, including but not limited to:
          a. Names of principal owners and/or team members.
          b. Resume summary/synopsis of all team members.
    iv.   Please submit copies of all State licenses, permits, certificates and authorizations needed to provide GNSS systems and support services.
    v.   Describe Vendor experience/capabilities to provide the listed services.
          a. Include a minimum of three (3) references that will attest to your ability (within the last three (3) years) to provide GNSS systems and support services similar in scope to those outlined.

B. Price Proposal

Provide a comprehensive schedule of any fees and prices that UNAVCO, Inc., UNAVCO's Member Institutions, and Associate Members would pay for your GNSS systems and services. Please clarify any and all associated costs. The cost estimate shall include the following information:

    i.   The unit cost per receiver, antenna, and associated accessories.
    ii.   Any costs or fees associated with system upgrades or specific features.
    iii.   Any miscellaneous charges, such as service and maintenance, system training for UNAVCO staff, and hardware/software updates.
    iv.   All requirements for UNAVCO Members and Associate Members to obtain special pricing

C. Summary of GNSS System Costs:

Following is a sample of GNSS system and service charges showing the information we would like to see addressed inside the Price Proposal.

GNSS System Charges			
Item	*Quantity*	*Rates*	*Total ($)*
Receiver		$_____ /each	_____
Antenna		$_____ /each	_____
Accessory 1		$_____ /___	_____
Accessory 2		$_____ /___	_____
Accessory 3		$_____ /___	_____
Accessory 4		$_____ /___	_____
Accessory 5		$_____ /___	_____
Accessory 6		$_____ /___	_____

GNSS System Total Costs for FY2015	$_____

C. Additional Cost Items

ADDITIONAL ITEMS	QUANTITY	UNIT	PRICE
System Upgrade		EACH	$ _____/unit
Station Service	Indefinite	HOUR	$ _____/hour
Contractor Miscellaneous Costs	Indefinite	EACH	Actual Cost

D. Optional Features

Any services offered as an option with the proposed Services should be listed separately with the service's associated price. If these options require amendments to a standard service agreement, please list the incremental cost of adding the option to the service agreement.

4.2   SELECTION PROCESS.

All proposals received at UNAVCO by the specified closing date will be reviewed to assess whether they are appropriately formatted and contain all required information as outlined in this RFP. After initial screening, all properly constructed and good-faith responses to this RFP will be evaluated and rated by UNAVCO's Evaluation Committee based on the Evaluation Criteria prescribed below. This Evaluation Committee will make a final recommendation for award to UNAVCO senior management.

Vendor Proposals will be subjected to a two-stage evaluation and selection process. The first stage will begin with a review of the response to the RFP. A Proposal must meet all mandatory eligibility and other requirements as outlined above to be considered.

Proposals not meeting mandatory eligibility requirements, or found to be incomplete, will not be considered and will be returned. UNAVCO may disqualify any Vendor, if it is deemed to be in the best interest of UNAVCO.

UNAVCO may request clarification related to any materials submitted in response to the RFP. Questions will be submitted to Prospective Vendors in writing and may also include additional information gathered during the evaluation process.

The second stage of the evaluation process will be a presentation and interview of finalists by the Evaluation Committee and shall be conducted at UNAVCO's Boulder Facility. A representative for the proposing Vendor will be required to attend. Other key staff members (*e.g.* service technicians or key technical developers) who would be assigned to this project are also encouraged to attend. All costs will be borne by potential Vendors.

4.3   EVALUATION CRITERIA

Evaluation and rating of the responses will be based on:

- ❑ Unit and Bulk Order Price
- ❑ Vendor Experience
- ❑ Technical Specifications of GNSS systems
- ❑ Compatibility with Existing UNAVCO GNSS assets
- ❑ Regulatory Compliance
- ❑ Technical Support Staffing of Vendor
- ❑ Ability of Vendor to Adapt to New Technologies and Provide Upgrades
- ❑ Estimated Additional Costs (including upgrade and additional feature fees)

The weight of each of these evaluation criteria will be defined by the Evaluation Committee and will form the basis of the final recommendation for selection of the Preferred Vendor.

SECTION 5: PROPOSAL SPECIFICATIONS

5.1   INSTRUCTIONS TO VENDORS

5.1.1   Examination of RFP Documents and Explanation to Vendor.

Potential Vendors are responsible for examining the RFP documents, and any requests for additional information issued by UNAVCO. Failure to do so is at the sole risk of the Vendor. Should the Vendor find discrepancies in or omissions from the RFP documents, or should the intent or meaning appear unclear or ambiguous, the Vendor shall promptly notify the Evaluation Committee in writing at rfp@unavco.org. The Vendor making such request will be solely responsible for its timely receipt by the Evaluation Committee. Replies to such notices may be made in the form of an RFP Amendment.

5.1.2   Interpretation or Representations.

UNAVCO assumes no responsibility for any interpretation or representation made by any of its agents unless such explicit interpretation or representation is incorporated into a formal written addendum to the RFP.

5.1.3   Valid Period of Proposal Offer.

The pricing terms and conditions stated in your submitted proposal must remain valid for ninety (90) days from the date of delivery of the proposal to UNAVCO. UNAVCO anticipates that a successful respondent to this RFP will provide these goods and services through September 30, 2018.

5.1.4   Proposal Preparation Costs.

The costs for developing and delivering responses to this RFP are entirely the responsibility of the Vendor. UNAVCO is not liable for any expense incurred by the Vendor in the preparation and presentation of Vendor's Proposal or any other costs incurred by the Vendor prior to execution of a contract.

5.2   PROPOSAL SUBMISSION

5.2.1   Proposals Must Be Sealed and Labeled.

Proposals must be sealed and clearly indicating with a label that they are in response to RFP #P022015. ***All Proposals must be received at UNAVCO's Office prior to 5:00 p.m., Mountain Daylight Time, on the due date specified on the coversheet.***

5.2.2   Vendor Signature.

The RFP must be signed in ink by an individual authorized to legally bind the Vendor submitting the proposal. The Vendor's authorized signature on a proposal in response to this RFP guarantees that the offer has been established without collusion and without effort to preclude UNAVCO from obtaining the best possible supply or service.

5.3   PROPOSAL AWARDS

5.3.1   Basis for Award.

A contract will be awarded to the Vendor whose Proposal is determined to be the most advantageous to UNAVCO, taking into consideration the price and such other factors or criteria which are set forth in this RFP (see section 4.3).

5.3.2   Disqualification.

The Proposal of a Vendor who is currently debarred, suspended, or otherwise lawfully prohibited from any public procurement activity will be rejected. In addition, if the selected Vendor becomes disqualified after the initial awarding of the contract or during the performance period, the contract will be deemed null and void.

5.3.3   Rejection of Proposals.

While UNAVCO has every intention to award a contract as a result of this RFP, issuance of a RFP in no way constitutes a commitment by UNAVCO to award and execute a contract. Upon a determination such actions would be in its best interest, UNAVCO, in its sole discretion, reserves the right to:

1. Cancel or terminate this RFP;

2. Reject any or all and late Proposals or portions thereof; or

3. Waive any undesirable, inconsequential, or inconsistent provisions of this RFP, which would not have significant impact on any Proposal.

5.3.4   Contract Inception.

This RFP is not a contract offer. Receipt of a Proposal neither commits UNAVCO to award a contract to any Vendor, even if the Proposal meets all requirements stated in this RFP, nor limits UNAVCO's right to negotiate in its best interest.

5.4   SINGLE POINT OF CONTACT

From the date this RFP is issued until a Vendor is selected and the selection is announced by UNAVCO, *Vendors are not allowed to communicate with any UNAVCO staff or officials regarding this RFP, except at the direction of Dr. Frederick Blume*, UNAVCO's Project Manager for Development and Testing and the UNAVCO designated agent in charge of this RFP.

5.5   ORAL AGREEMENTS OR ARRANGEMENTS

Any oral agreements made by any Prospective Vendor with any UNAVCO employee will be disregarded in any Proposal evaluation.