Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote
Audio/Video

Proc Folder:	1006767	Reason for Modification:
Doc Description:	CORS GNSS Receivers and Components (81220064)	
Proc Type:	Central Purchase Order	

Date Issued	Solicitation Closes	Solicitation No	Version
2022-03-16	2022-03-31 13:30	CRFQ 0803 DOT2200000146	1

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON   WV   25305
US

VENDOR

Vendor Customer Code:

Vendor Name : Technology International, Inc.

Address : 1349 South International Pkwy, Suite 241

Street :

City : Lake Mary

State : Florida

Principal Contact : Shaji Habib

Vendor Contact Phone: 407-359-2373

Country : Seminole

Zip : 32746

Extension:

03/31/22 10:02:23
WV Purchasing Division

FOR INFORMATION CONTACT THE BUYER
John W Estep
304-558-2566
john.w.estep@wv.gov

Vendor Signature X	RAFAT HABJE	FEIN# 650342335	DATE 03-30-22

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION

REQUEST FOR QUOTATION:

The West Virginia Purchasing Division is soliciting bids on behalf of WV Department of Transportation to establish a contract for the one-time purchase of GNSS (global navigation satellite system) receivers and its related components. WV Department of Transportation owns and operates a current license of Trimble CORS (continuous operation reference station) software. The GNSS receivers and its related components must be compatible with Trimble CORS software with the last official product and/or firmware release at the date of release of this tender. Per the Bid Requirements, Specifications, Terms and Conditions attached to this solicitation.

INVOICE TO	SHIP TO
DEPT. OF TRANSPORTATION 1900 KANAWHA BLVD E, BLD. 5 RM-720 CHARLESTON WV US	DEPT. OF TRANSPORTATION 1900 KANAWHA BLVD E, BLD. 5 RM-720 CHARLESTON WV US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Trimble Alloy GNSS Receiver 109100-00 or Equal	24.00000	EA	$14,715.00	$353,160.00

Comm Code	Manufacturer	Specification	Model #
52161526			

Extended Description:
Trimble Alloy GNSS Receiver 109100-00 or Equal

INVOICE TO	SHIP TO
DEPT. OF TRANSPORTATION 1900 KANAWHA BLVD E, BLD. 5 RM-720 CHARLESTON WV US	DEPT. OF TRANSPORTATION 1900 KANAWHA BLVD E, BLD. 5 RM-720 CHARLESTON WV US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Trimble Zephyr 3 Geodetic Antenna Kit 158295-00 or Equal	24.00000	EA	Included	Included

Comm Code	Manufacturer	Specification	Model #
43221712			

Extended Description:
Trimble Zephyr 3 Geodetic Antenna Kit 158295-00 or Equal

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Questions due by 10:00am	2022-03-24

	Document Phase	Document Description	Page 3
DOT2200000146	Final	CORS GNSS Receivers and Components (81220064)	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SPECIFICATIONS

1. **PURPOSE AND SCOPE**: The West Virginia Purchasing Division is soliciting bids on behalf of WV Department of Transportation to establish a contract for the one-time purchase of GNSS (global navigation satellite system) receivers and its related components.

   WV Department of Transportation owns and operates a current license of Trimble CORS (continuous operation reference station) software. The GNSS receivers and its related components must be compatible with Trimble CORS software with the last official product and/or firmware release at the date of release of this tender.

2. **DEFINITIONS**: The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.

   2.1 **"Contract Item"** means components provided by a qualified manufacturer that is authorized to sell the equipment as more fully described by these specifications.

   2.2 **"Pricing Page"** means the pages, contained in wvOASIS or attached as Exhibit A, upon which Vendor should list its proposed price for the Contract Items.

   2.3 **"Solicitation"** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

   2.4 **"API"** means application programming interface.

   2.5 **"BINEX"** means binary exchange: an open and operational binary format for GNSS data.

   2.6 **"CMR"** means compact measure record.

   2.7 **"CORS"** means continuous operating reference station.

   2.8 **"FTP"** means file transfer protocol.

   2.9 **"GNSS"** means global navigation satellite system.

   2.10 **"GPS"** means global positioning system.

   2.11 **"MSM"** means multiple signal message.

   2.12 **"NEBS"** means network equipment-building system.

   2.13 **"NTRIP"** means networked transport of RTCM via internet protocol.

2.14 "POE" means power over ethernet.

2.15 "PPM" means parts per million.

2.16 "PPP" means precision point positioning.

2.17 "RAIM" means receiver autonomous integrity monitoring.

2.18 "RINEX" means receiver independent exchange format.

2.19 "RMS" means root metered square.

2.20 "RNDIS" means remote network driver interface specification.

2.21 "RTCM" means radio technical commission for maritime.

2.22 "RTK" means real-time kinematic.

2.23 "SBAS" means satellite-based augmentation systems.

2.24 "UDR" means user datagram protocol.

2.25 "VRS" means virtual reference station.

3. **QUALIFICATIONS:** Vendor, or Vendor's staff if requirements are inherently limited to individuals rather than corporate entities, shall have the following minimum qualifications:

   3.1 Vendor must provide, upon request, attestation from Trimble showing its bid product is compatible with the State's current owned Trimble CORS software.

   3.2 Vendor must provide, upon request, showing their experience with having successfully completed support of an existing VRS (virtual reference station) network modernization consisting of a full exchange of network CORS in excess of fifty (50) stations managed via one transaction with equal to receivers for this solicitation.

4. GENERAL REQUIREMENTS:

4.1 Mandatory Contract Item Requirements: Contract Item must meet or exceed the mandatory requirements listed below.

4.1.1 Quantity of Twenty-four (24) Trimble Alloy GNSS Receiver 109100-00 or Equal. Vendor must provide a product with the following minimum features:

<u>Technology and Tracking Capabilities</u>

4.1.1.1 The receiver must be able to track all signals on all the available frequencies from the following GNSS constellations:

- GPS: L1 C/A, L2E/L2P, L2C, L5
- GLONASS: L1 C/A, L1P, L2 C/A, L2P, L3 CDMA
- GALILEO: L1 CBOC, E5A, E5B, E5AltBOC, E6
- BEIDOU: B1, B2, B3
- L-Band - GNSS Augmentation signals

4.1.1.2 The receiver must be enabled to utilize positioning information and data from the following GNSS constellations:

- GPS: L1 C/A, L2E/L2P, L2C, L5
- GLONASS: L1 C/A, L1P, L2 C/A, L2P, L3 CDMA
- GALILEO: L1 CBOC, E5A, E5B, E5AltBOC, E6
- BEIDOU: B1, B2, B3

4.1.1.3 The receiver must be able to track all signals on all the available frequencies from the following GNSS SBAS (satellite-based augmentation systems):
- EGNOS: L1 C/A
- MSAS: L1 C/A
- WAAS: L1 C/A, L5

4.1.1.4 The receiver must be able to simultaneously track all available signals on all satellites, including those signals from satellites marked as unhealthy.

4.1.1.5 The receiver must be able to track satellites to an elevation angle of 0 degrees.

4.1.1.6 The receiver shall have enough physical and independent channels to accommodate all requested signals. Dynamic channel allocation is not an acceptable substitute for physical channels.

4.1.1.7 The receiver must have the ability to enable and disable any code and carrier multipath rejection or mitigation technology.

4.1.1.8 The receiver must have the ability to enable and disable any pseudorange and/or phase smoothing.

4.1.1.9 The receiver must have the ability to enable and disable any receiver's clock correction system.

4.1.1.10 The receiver must allow the ability to recover unfiltered and unsmoothed pseudorange, signal-to- noise, Doppler, and carrier phase true observables from all signals individually. It is not acceptable to artificially generate observables from the primary signals for the other signals.

4.1.1.11 The receiver shall support RAIM (receiver autonomous integrity monitoring) to detect and reject degraded signals to improve position quality.

4.1.1.12 When and if the United States of America Department of Defense (DoD) disables the GPS (global positioning system) anti-spoofing, the receiver must be capable of tracking GPS L1 and L2 phase and P code observables.

Input and Output Formats

4.1.1.13 The receiver must support the following real-time correction formats for input and output:
- RTCM 2.x versions and RTCM 3.x versions including MSM 1 through 7 messages
- CMR, CMR+ and CMRx

4.1.1.14 The receiver must support the following real-time formats for observables:
- RTCM 3.x including MSM 1 through 7 messages
- BINEX
- Receiver's proprietary format

4.1.1.15 The receiver must support the input and output of position and status information with NMEA-0183 protocol.

4.1.1.16 The receiver must be capable of providing a data output up to 100 Hz.

4.1.1.17 The receiver must provide at a minimum one pulse per second (PPS) output.

4.1.1.18 The receiver must support input of external events.

4.1.1.19 The receiver must support external weather stations and tilt sensors.

Measurement and Position Performance

4.1.1.20 The receiver shall support differential, real-time kinematic (RTK) and static post-processing positioning using industry standard formats.

4.1.1.21 The receiver must support code differential positioning with a performance of 0.25 m + 1 ppm RMS in horizontal and 0.50 m + 1 ppm RMS in vertical.

4.1.1.22 The receiver must support SBAS differential positioning with a performance of 0.50 m RMS in horizontal and 0.85 m RMS in vertical.

4.1.1.23 The receiver must support static post-processing positioning with a performance of 3 mm + 0.1 ppm RMS in horizontal and 3.5 mm + 0.4 ppm RMS in vertical.

4.1.1.24 The receiver must support RTK positioning with single baseline of less than 30 km, with a performance of 8 mm + 1 ppm RMS in horizontal and 15 mm + 1 ppm RMS in vertical.

4.1.1.25 The receiver must support RTK positioning with networked RTK solution with a performance of 8 mm + 0.5 ppm RMS in horizontal and 15 mm + 0.5 ppm RMS in vertical.

4.1.1.26 Receiver shall support on-board absolute PPP in real-time, via both Internet Protocol (IP) and L-Band satellite delivery.

Physical and Environmental

4.1.1.27 The receiver must include a display with a screen and a physical keyboard. The keys must be illuminated so they are visible in the dark.

4.1.1.28 The receiver's screen must support rotation so the displayed information can be read normally if the receiver is installed upside down.

4.1.1.29 The receiver's display must allow the basic configuration of the receiver, including network configuration parameters, antenna model, antenna height, position, and station name.

4.1.1.30 The receiver must weigh no more than 2 kg (4.5 lbs) with at least one battery installed.

4.1.1.31 The GNSS receiver must have passed NEBS certification for use in a telecom installation environment.

4.1.1.32 Receiver must meet the following environmental specification:
- Operating temperature: -40 degrees C - +65 degrees C
- Humidity: 100% condensing
- Fully sealed with IP68 certification
- Shock: 1 meter drop on hard surface

Power Specifications and Management

4.1.1.33 The receiver shall offer a minimum of two power inputs supporting both AC and DC operation, with an input power range of 9.5 to 28 V DC.

4.1.1.34 The receiver must support Power over Ethernet (PoE) 802.3af (type 1) and 802.at (type 2) as a means of powering the receiver. PoE must allow for user configurability to enable or disable this feature.

4.1.1.35 The receiver shall have a power consumption of less than 5.5 W while tracking all satellite signals and having the Wi-Fi connection active.

4.1.1.36 The receiver must feature power-on and power-down with user-configurable voltages.

4.1.1.37 The receiver must be capable of supporting dual hot-swappable lithium-ion batteries with level of charge indicator in the batteries and include at minimum a quantity of two (2) – one included with the unit and one spare.

4.1.1.38 The batteries of the receiver shall be capable of operating the unit without external power supply for up to at least 15 hours. This feature must be use-configurable.

4.1.1.39 The receiver must feature an integrated internal battery charger with a configurable minimum input voltage for battery charging.

4.1.1.40 The receiver's integrated charger must be user-configurable to allow the option of setting when the batteries must be charged. The options available must be the following:
- Charge when the receiver is On or Off
- Charge when the receiver is On
- Charge when the receiver is Off
- Never charge the batteries

4.1.1.41 The integrated charger must be capable of charging from PoE input with user configurability to enable/disable this feature.

4.1.1.42 The receiver must support seamless switching between the internal and external power sources without any kind of interruption in its operations.

4.1.1.43 The receiver must automatically restart after loss of power. When powering-up the receiver must operate with the same configuration it had when powered-down or when loss of power event happened, including all real-time data output and all logging sessions.

4.1.1.44 The receiver's front panel display brightness and lightning must be user-configurable remotely from the receiver's user interface. The front panel display must also feature a power saving function.

Data Logging

4.1.1.45 The receiver must include an embedded (non-removable) solid state memory with up to 24 GB of space.

4.1.1.46 The receiver must be compatible with removable external memory supporting more than 1 TB of logging space.

4.1.1.47 The receiver must support true logging rates from 100 Hz to 600 seconds. Data generation with artificial methods is not a valid alternative.

4.1.1.48 The receiver must provide a combined logging rate of more than 180 Hz with all independent logging sessions.

4.1.1.49 The receiver must support 12 independent and concurrent logging sessions.

4.1.1.50 The receiver must be capable of producing both RINEX and BINEX file formats internal to the receiver without the need for external tools/converters.

4.1.1.51 The receiver must be capable of pushing logged and converted data files to three separate FTP servers.

4.1.1.52 The receiver must be capable of sending logged and converted data files via email.

4.1.1.53 The receiver must support both a configurable ring buffer style memory deletion scheme as well as session specific memory pools with similar functionality. Additionally, data must be able to be protected from being overwritten in the case of external events input.

Communication Interfaces

4.1.1.54 The receiver must include at least four physical serial ports. Serial port hubs or adaptors connected to the physical ports of the receiver are not a valid alternative.

4.1.1.55 The receiver must include at least one USB port supporting remote network driver inter- face specifications (RNDIS) in device and host modes.

4.1.1.56 The receiver must have a built-in Ethernet RJ45 communications port allowing for TCP/IP configuration of all receiver features, data files, and data streams. Must be compliant with IEEE 802.3.

4.1.1.57 The receiver must have a Wi-Fi 802.11 b/g connection supporting client mode and access point. The Wi-Fi connection must support WPA/WPA2/WEP64/WEP128 encryption. The Wi-Fi connection in access point mode must allow TCP/IP configuration of all receiver features, data files, and data streams.

4.1.1.58 The receiver must include a 2.4 GHz Bluetooth radio supporting up to three simultaneous connections.

4.1.1.59 The receiver must have a communication port supporting 10 MHz external frequency input.

4.1.1.60 The receiver must have a minimum of 10 unique TCP/IP ports. "Unique" means that one multicast TCP/IP port (allowing multiple connections) only counts as 1 TCP/IP port. Each port must be fully configurable independent of the other ports and outputs.

4.1.1.61 The receiver TCP/IP ports must support User Datagram Protocol (UDP), client and server connections. The TCP/IP ports must support password protection.

4.1.1.62 The receiver must include at least three independent NTRIP Clients.

4.1.1.63 The receiver must include at least three independent NTRIP Servers.

4.1.1.64 The receiver must include at least three independent NTRIP Casters supporting at least 30 different NTRIP logins.

4.1.1.65 The receiver must feature a fully configurable FTP server. It must support the FTP REST command.

Security

4.1.1.66 The receiver must have a secure network connection (secure means via an encrypted, authenticated session) as well as provide various access levels to the receiver controls.

4.1.1.67 The receiver must support IP filtering for incoming connections.

4.1.1.68 The receiver must support TLS v.1.2.

4.1.1.69 The receiver must be IPV6 compatible.

4.1.1.70 The receiver must have the possibility of being configured to use custom TLS certificates.

System Features

4.1.1.71 The receiver must have the ability of being configured without the use of any kind of proprietary software.

4.1.1.72 The receiver must have an user interface in the form of web page embedded in the receiver and compatible with most web browsers available (ie: Mozilla Firefox, Google Chrome, etc.). The receiver web interface must be compatible with the mobile device versions of the web browsers.

4.1.1.73 The receiver's web interface must feature help or reference information in the form of context-sensitive menus.

4.1.1.74 The receiver must allow alert configuration to automatically inform of any changes in the position, data logging, configuration, tracking, power, communications, and system access events.

4.1.1.75 The receiver must enable monitoring of its own absolute position to centimeter level accuracy using a PPP solution independent from the WVDOT CORS network. Communications of PPP correction data must not depend upon ground-based IT infrastructure. There must be no annual subscription costs for the PPP integrity feature. Out of tolerance alerting via both graphical user interface and email of any detected change in

antenna position must be automatically initiated. The tolerance at which alerts are generated shall be user configurable depending upon the solution type in use. When this tolerance is exceeded, the receiver must be able to automatically stop sending correction data until the antenna moves back within tolerance.

4.1.1.76 The receiver must have a built-in (internal) spectrum analyzer to identify spurious jamming signals in the GNSS frequency range. The spectrum analyzer must display information in real-time and also from the past 24 hours in the form of interactive charts, with zooming and panning capabilities.

4.1.1.77 The receiver must have the ability to save the configuration of the receiver in a downloadable file and upload it to other receivers to reconfigure them remotely.

4.1.1.78 The receiver must have a well-documented application programming interface (API) allowing the configuration and management of the system and supporting user authentication.

4.1.1.79 It must be possible to retrieve logged data from the receiver by using the API.

Software Capability

4.1.1.80 WVDOT owns and operates an existing Trimble VRS software system. The proposed receiver must have full compatibility of all signals with the existing software including BeiDou BDS3.

4.1.1.81 The vendor must assure the WVDOT that all receivers will be supplied along with any software modules needed to provide full GNSS compatibility with the existing software. The vendor must confirm the state that no additional software is required for full compatibility of all GNSS signals (GPS, GLONASS, Galileo, BeiDou including BDS3) from their proposed GNSS receiver.

4.1.1.82 Remote firmware upgrades of the receivers must be demonstrated through use of the existing CORS network management software without the addition of external applications or software modules.

4.1.1.83 Communication between the server and the CORS receivers have the flexibility to operate as:
- Dial-up modem (landline/cellular/GSM/high-speed wireless)
- Internet, intranet, local or wide area networks (TCP/IP)
- Direct serial link (RS232)

4.1.1.84 Streaming of raw data from the proposed receiver shall be via formats compatible with the existing software and not requiring additional modules or software modifications.

4.1.1.85 Vendor must demonstrate that the existing WVDOT Software is compatible and capable of performing the following receiver configurations without the use of any external apps:

- General receiver settings
- Satellite tracking parameters
- Data logging parameters
- Downloads raw of data, analyses, reformats, archives and distributes GPS data via a FTP and web server

GNSS data management by existing software with proposed CORS

4.1.1.86 The CORS receiver vendor must demonstrate that the existing software performs the following tasks automatically and periodically at user-defined times and intervals without the use of external applications or software.

- Retrieve primary logged data files.
- Check all downloaded data for completeness and retrieve missing data automatically from the internal receiver memory.
- Convert to RINEX or to Hatanaka compact RINEX.
- Perform splitting, appending and decimating data as required by Administrator.
- Archive files, clean-up files after user-defined period of time for user defined file types based on two mechanisms, remaining free disk space and file age.
- Distribute files to FTP or WEB servers for easy access by the GNSS user community.
- Generates event logs, alarms and warnings on receiver status, network status and data quality status.

4.1.1.87 The vendor must demonstrate full functionality with the existing WVDOT software to manage assure completeness of CORS data. The completeness of data is of high value to WVDOT as it assures users will have access to complete postprocessing records. Steps of a successful demonstration compatible with this section are:

- CORS and software operate as intended archiving data on both the receiver and in software.

- If an IT network connection is lost the CORS must demonstrate continued logging of data.
- When the IT network connection is restored, the software will query the CORS and receive access to download the full database of the CORS.
- In the event of an IT outage, data from the CORS must be compatible to facilitate import of the data needed for "filling in" missing epochs in the existing WVDOT software database. This action will complete the record stored within the existing software and assure WVDOT of near 100% complete data logs.

Warranty

4.1.1.88 The receiver must include at a minimum five (5) year manufacturer's warranty from the date of purchase with next business day replacement.

4.1.1.89 The receiver must include lifetime firmware updates without the need of purchasing maintenance contracts.

4.1.2 **Quantity of Twenty-four (24) Trimble Zephyr 3 Geodetic Antenna Kit 158285-00 or Equal.** Vendor must provide a product with the following minimum features:

4.1.2.1 Geodetic antenna must track the following frequencies from GNSS constellations:
- GPS: L1, L2, L5
- GLONASS: G1, G2, G3
- GALILEO: E1, E5ab, E6
- BEIDOU: B1, B2, B3

4.1.2.2 The antenna must be compatible with the following SBAS:
- EGNOS
- WAAS
- GAGAN
- MSAS

4.1.2.3 The antenna must be compatible with correction services broadcast via L-band.

4.1.2.4 Phase center stability greater than 2 mm.

4.1.2.5 Minimum tracking elevation: 0 degrees.

4.1.2.6 Practical tracking elevation: less than 3 degrees.

4.1.2.7 Minimum Antenna gain: 50db.

4.1.2.8 Diameter at least 34.0 cm.

4.1.2.9   Weight less than 2.0 kg.

4.1.2.10   Absolute calibration file from IGS (ANTEX format) must be available.

4.1.2.11   Powered by receiver with supplied voltage between 3.5 V DC and 20V DC.

4.1.2.12   Nominal impedance: 50 Ohms.

4.1.2.13   Antenna shall operate in humidity, high winds, sandstorm and blowing rain. Proven survivability from tornado and hurricane.

4.1.2.14   Temperature range: –40 degrees C - +85 degrees C.

4.1.2.15   Humidity up to 100%.

4.1.2.16   Shock rating: 2m drop on hard surface.

4.1.2.17   Vibration rating: MIL-STD-810-F on each axis.

4.1.2.18   Cable connector: threaded neill concelman equipped

4.1.2.19   Mounting: 5/8" - 11 Female

4.1.2.20   Optional external radome must be available for the antenna upon request.

4.1.2.21   The absolute calibration file for the antenna and external radome bundle must be available from IGS (ANTEX format).

4.1.2.22   GNSS Antenna Cable for Continuously Operating Reference Stations must meet the following features:

- Length of cable: 30 m.
- Impedance: 50 Ohms.
- Maximal frequency: at least 10 GHz.
- Loss at 1.5GHz: less than 0.2 dB/m.
- The cable shall operate in humidity, high winds, sandstorm and blowing rain.

4.1.2.23   Antenna Kit must include at a minimum: five (5) year manufacturer's warranty from date of purchase with next business day replacement.

4.1.3   **Alternate bids that are equal to, meet, or exceed the specifications and requirements listed are invited. In order to receive full consideration, such alternate bids should be accompanied by sufficient descriptive literature and/or samples to clearly identify the offer and allow for a complete evaluation and will be required prior to award. The use of brand name or equal specifications is for describing the minimum standard of quality, technical performance and installation characteristics required and are not intended to limit or restrict competition.**

4.1.3.1   **Additionally, if alternate 'or equal' products are proposed, the vendor must include as part of their bid, all software, travel, hardware and services needed to migrate current WVDOT systems and data/files; train WVDOT staff; test systems; and test ALL migrated data/files. All information currently residing in**

the existing system(s) must be migrated. This process must be done with no interruption to the current business process within WVDOT and be totally completed within three (3) months of contract award.

5. CONTRACT AWARD:

5.1 Contract Award: The Contract is intended to provide Agencies with a purchase price for the Contract Items The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall total cost as shown on the Pricing Pages.

5.2 Pricing Page: Vendor should complete the Pricing Page by providing a total cost for the GNSS receivers and related components. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified.

Vendor should type or electronically enter the information into the Pricing Page to prevent errors in the evaluation.

6. ORDERING AND PAYMENT:

6.1 Ordering: Vendor shall accept orders through wvOASIS, regular mail, facsimile, e-mail, or any other written form of communication. Vendor may, but is not required to, accept on-line orders through a secure internet ordering portal/website. If Vendor has the ability to accept on-line orders, it should include in its response a brief description of how Agencies may utilize the on-line ordering system. Vendor shall ensure that its on-line ordering system is properly secured prior to processing Agency orders on-line.

6.2 Payment: Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.

7. DELIVERY AND RETURN:

7.1 Shipment and Delivery: Vendor shall ship the Contract Items immediately after being awarded this Contract and receiving a purchase order or notice to proceed. Vendor shall deliver the Contract Items within sixty (60) working days after receiving a purchase order or notice to proceed.

Contract Items must be delivered to Agency – Attention: Dustin Feazell at 1900 Kanawha Blvd, Building 5, Room A720, Charleston, WV 25314.

7.2 Late Delivery: The Agency placing the order under this Contract must be notified in writing if the shipment of the Contract Items will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the Contract, and/or obtaining the Contract Items from a third party.

Any Agency seeking to obtain the Contract Items from a third party under this provision must first obtain approval of the Purchasing Division.

7.3 Delivery Payment/Risk of Loss: Vendor shall deliver the Contract Items F.O.B. destination to the Agency's location.

7.4 Return of Unacceptable Items: If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that item(s) are unacceptable or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.

7.5 Return Due to Agency Error: Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

8. VENDOR DEFAULT:

8.1 The following shall be considered a vendor default under this Contract.

    8.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.

8.1.2 Failure to comply with other specifications and requirements contained herein.

8.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.

8.1.4 Failure to remedy deficient performance upon request.

8.2 The following remedies shall be available to Agency upon default.

8.2.1 Immediate cancellation of the Contract.

8.2.2 Immediate cancellation of one or more release orders issued under this Contract.

8.2.3 Any other remedies available in law or equity.

9. MISCELLANEOUS:

9.1 No Substitutions: Vendor shall supply only Contract Items submitted in response to the Solicitation unless a contract modification is approved in accordance with the provisions contained in this Contract.

9.2 Vendor Supply: Vendor must carry sufficient inventory of the Contract Items being offered to fulfill its obligations under this Contract. By signing its bid, Vendor certifies that it can supply the Contract Items contained in its bid response.

10. Contract Manager: During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below.

Contract Manager: SHAJI HABIB

Telephone Number: 407-359-2373

Fax Number: _____

Email Address: TII@TII-USA.COM

West Virginia Ethics Commission

Disclosure of Interested Parties to Contracts

Pursuant to *W. Va. Code* § 6D-1-2, a state agency may not enter into a contract, or a series of related contracts, that has/have an actual or estimated value of $1 million or more until the business entity submits to the contracting state agency a Disclosure of Interested Parties to the applicable contract. In addition, the business entity awarded a contract is obligated to submit a supplemental Disclosure of Interested Parties reflecting any new or differing interested parties to the contract within 30 days following the completion or termination of the applicable contract.

For purposes of complying with these requirements, the following definitions apply:

"Business entity" means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership or corporation, but does not include publicly traded companies listed on a national or international stock exchange.

"Interested party" or *"Interested parties"* means:

(1) A business entity performing work or service pursuant to, or in furtherance of, the applicable contract, including specifically sub-contractors;
(2) the person(s) who have an ownership interest equal to or greater than 25% in the business entity performing work or service pursuant to, or in furtherance of, the applicable contract. (This subdivision does not apply to a publicly traded company); and
(3) the person or business entity, if any, that served as a compensated broker or intermediary to actively facilitate the applicable contract or negotiated the terms of the applicable contract with the state agency. (This subdivision does not apply to persons or business entities performing legal services related to the negotiation or drafting of the applicable contract.)

"State agency" means a board, commission, office, department or other agency in the executive, judicial or legislative branch of state government, including publicly funded institutions of higher education: Provided, that for purposes of W. Va. Code § 6D-1-2, the West Virginia Investment Management Board shall not be deemed a state agency nor subject to the requirements of that provision.

The contracting business entity must complete this form and submit it to the contracting state agency prior to contract award and to complete another form within 30 days of contract completion or termination.

This form was created by the State of West Virginia Ethics Commission, 210 Brooks Street, Suite 300, Charleston, WV 25301-1804. Telephone: (304)558-0664; fax: (304)558-2169; e-mail: ethics@wv.gov; website: www.ethics.wv.gov.

Revised June 8, 2018

West Virginia Ethics Commission
Disclosure of Interested Parties to Contracts
(Required by W. Va. Code § 6D-1-2)

Name of Contracting Business Entity: TECHNOLOGY INTERNATIONAL INC **Address:** 1349 S INTERNATIONAL PKWY, SUITE 2411

LAKE MARY, FL 32746

Name of Authorized Agent: RIFAT HABIB   **Address:** SAME AS ABOVE

Contract Number: CRFQ 08 DOT2200000146 **Contract Description:** GNSS RECEIVERS & COMPONENTS

Governmental agency awarding contract: DEPT OF ADMINSTRATION PURCHASING DIVISION

☐ **Check here if this is a Supplemental Disclosure**

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below *(attach additional pages if necessary)*:

1. **Subcontractors or other entities performing work or service under the Contract**

   ☑ Check here if none, otherwise list entity/individual names below.

2. **Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)**

   ☐ Check here if none, otherwise list entity/individual names below.

   MOHAMMED ZIAULLAH   100%

3. **Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)**

   ☑ Check here if none, otherwise list entity/individual names below.

Signature: *RIFAT HABIB*   Date Signed: 2/30/22

Notary Verification

State of FLORIDA _____, County of SEMINOLE _____:

I, RIFAT HABIB _____, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

Taken, sworn to and subscribed before me this 30TH ____ day of MARCH ____, 2022 .
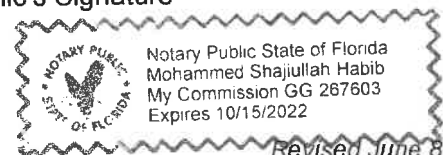
_____
Notary Public's Signature

To be completed by State Agency:
Date Received by State Agency: _____
Date submitted to Ethics Commission: _____
Governmental agency submitting Disclosure: _____

Revised June 8, 2018

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

> **EXCEPTION:** The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

> **DEFINITIONS:**

> **"Debt"** means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

> **"Employer default"** means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

> **"Related party"** means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: TECHNOLOGY INTERNATIONAL INC

Authorized Signature: *RAFAT HABAB*　　　　　Date: 3/30/22

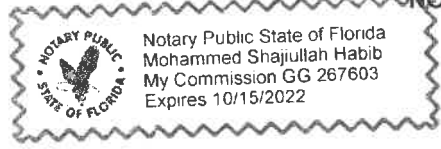State of FLORIDA

County of SEMINOLE , to-wit:

Taken, subscribed, and sworn to before me this ___ day of MARCH , 20 20.

My Commission expires 10/15 , 20 22

AFFIX SEAL HERE　　　　　　　　　　NOTARY PUBLIC _____

Purchasing Affidavit (Revised 01/19/2018)

TECHNOLOGY INTERNATIONAL

Technology International, Inc.
1349 South International Pkwy, Suite 2411
Lake Mary, FL 32746
Tel: (407) 359-2373
Fax: (407) 359-2372
E-mail: tii@tii-usa.com
Website: www.tii-usa.com

Equipment Proposal

Description: CORS GNSS Receivers and Components (81220064

Solicitation #: CRFQ 0803 DOT2200000146

Attention: Bid Clerk
Department of Administration
Purchasing Division
2019 Washington St., E
Charleston, WV 25305

TII Ref: TII/WV/0322/21653

Date: 03/30/2022

In response to your quote request for CORS GNSS Receivers and Components (81220064,
Technology International, Inc. is pleased to submit the following for consideration:

ITEM NO.	QTY	DESCRIPTION/ MODEL NO.	UNIT PRICE	EXTD. PRICE
1	24	Trimble Alloy & Zephyr 3 GEO Alloy Receiver 8GB Memory 20 Hz Data Logging GPS / Glonass Programmatic Interface CMR/CMR+/CMRx/RTCM I/O formats Alloy Accessory Kit Zephyr 3 Geodetic Antenna 30m GPS LMR-400 TNC cable (64922-30)	$14,715.00	$353,160.00
		See attached data sheets		
		Total........................$353,160.00		

Warranty: Manufacturer's standard warranty applies.

Delivery:
- Estimated delivery is **20-24 Weeks** after receipt of order and approved submittal.
- *Please note, due to COVID-19 there may be unanticipated disruptions and delays in the supply chains globally, for parts, components, equipment and internal manufacturing services such as engineering, production allocation, and logistics. This may result in manufacturing & delivery delays out of our control. We will do our best to communicate all such impacts and reduce the effects of any such delays.*
- All delivery dates quoted are subject to manufacturer's confirmation at time of order.
- Submittal data will be provided for approval after receipt of order (if applicable)
- Customer to provide equipment and personnel to unload
- TII will provide MSO at time of payment confirmation. Customer is responsible for all titling and registration of trailer (If Applicable)

Freight: Included to Charleston, WV 25305

Payment Terms: NET 30
Prompt Payment discount: 1/4 % 10 days

Quote Validity: 30 days.

*** Notes:
- Quoted price is not available on a line item basis. This is an offer for a lump sum contract.
- Used one combined part number for the both the Alloy and Zephyr 3 kit.

Technology International, Inc. Corporate data:
We are a small business and our Tax Payer Identification Number (TIN): 650342335. The price quoted does not include any sales excise or similar taxes.
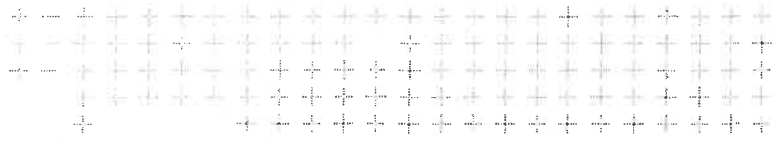
We trust that this proposal will meet your requirements and we look forward to hearing from you.

If you have any questions or need more information, please contact us by phone at 407-359-2373, fax at 407-359-2372 or email us at tii@tii-usa.com

Respectfully submitted,

RIFAT HABIB

RIFAT HABIB
BUSINESS DEVELOPMENT EXECUTIVE
TECHNOLOGY INTERNATIONAL INC

Alloy
GNSS REFERENCE RECEIVER

THE FUTURE OF GNSS IS HERE

The Trimble Alloy GNSS receiver offers powerful performance with the latest GNSS technology in a sleek new design that is easy and intuitive to use. Whether you need GNSS for campaign work or in permanent installations, the flexible configuration delivers reliable, robust data when and where you need it.

MODERNIZED GNSS TRACKING

Using powerful Trimble 360 receiver technology in combination with dual Trimble Maxwell™ 7 chipsets, the Alloy GNSS receiver supports all known and planned GNSS constellations, ensuring your GNSS data is robust and reliable including GPS Block IIIA and BeiDou Generation III.

INTELLIGENT DESIGN

Review Key Info at a Glance
With a four-line angled display you can read all important information such as satellite tracking, position solution type, data logging, IP address, Wi-Fi, firmware information and battery status right on the home screen. Setup and verifying status information is now quick and easy.

Plug in and get to work
Multiple ports are easily accessible without the need for adapters in a configuration that makes it simple to plug in a variety of external sensors and antennas.

Power when you need it
The Alloy receiver provides the most robust power options for any GNSS system. Featuring multiple power inputs with dual hot-swappable batteries, power over Ethernet, and advanced power management features, the Trimble Alloy GNSS receiver is ideal for any GNSS base station deployment.

Stackable Design
With a versatile, stackable design the Alloy GNSS receiver is built with a lightweight rugged aluminum alloy chassis which features IP68 certification. When you need to organize multiple units for deployment, simply stack and prep.

SECURITY 24/7

Using Trimble Sentry™ technology, you can easily configure alerts that will automatically inform you of any changes to the position, data logging, configuration, tracking, power, communications, and system access events. Combined with advanced security measures such as anti-spoofing, Trimble Sentry technology ensures continued operation of your Trimble Alloy GNSS receiver.

TRIMBLE RTX ON BOARD

The Alloy GNSS receiver is available with Trimble RTX™ advanced positioning technology allowing for rapid real-time network coordination. Whether this is for base station deployment or monitoring, Trimble RTX technology remains locked onto your real world absolute position.

COMMUNICATION

The Trimble Alloy GNSS receiver supports a wide range of communication protocols including Ethernet (IPv4 / IPv6), Bluetooth®, and Wi-Fi for flexible easy access via the built-in multi-language web interface and mini-web interface for mobile devices.

DATA

Storage
The Alloy GNSS receiver can store more data in less space by using specialized compression formats. Up to twelve independent high-rate data logging sessions can be stored internally, and using USB storage you can be sure the data you collect and store is specific for your application.

Access
Leveraging advanced communication protocols, data can be accessed via the web interface, built-in FTP server, or configured to be pushed to remote FTP sites or email accounts in multiple industry formats.

Benefits

► Dual Trimble Maxwell 7 chipsets combined with a powerful processor provides the ultimate in tracking and processing power

► Ethernet and Wi-Fi support provide ease of access, configuration, and transfer of data. Using the built-in web interface gives instant access to a simple-to-use configuration suite

► Dual hot-swappable internal batteries with integrated charging makes the Alloy receiver suitable for use in the office or remote locations, and anywhere in-between

► The intelligent design features multiple connectors and stackable housing, making the Alloy receiver easy to configure for deployment

► Seamless integration to Trimble Pivot Platform software for easy Real-Time Network operations

► Designed to an IP68 certification the Alloy receiver is ready for any environment

► Includes firmware for life so it's easy to keep your Alloy reference receiver up-to-date with the latest features, enhancements and security updates. free to install from **www.alloy.trimble.com**

Trimble

SPECIFICATIONS[1]

GNSS TECHNOLOGY

- Trimble RTX worldwide corrections
- Advanced Trimble Maxwell 7 GNSS chipset provides 672 channels with simultaneous satellite tracking and anti-spoofing capability
- Trimble EVEREST Plus multipath signal rejection
- Trimble 360 receiver technology
- High-precision multiple correlator for GNSS pseudorange measurements
- Spectrum Analyzer to troubleshoot GNSS jamming
- Trimble Sentry delivers anti-spoofing security
- Unfiltered, unsmoothed pseudorange measurements data for low noise, low multipath error, low-time domain correlation and high dynamic response
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Signal-to-noise ratio reported in dB-Hz
- Proven Trimble low elevation tracking technology
- Proprietary Receiver Autonomous Integrity Monitor (RAIM) systems to detect and reject degraded signals to improve position quality

SATELLITE TRACKING

- GPS: L1C, L1 C/A, L2E (L2P), L2C, L5
- GLONASS: L1 C/A and unencrypted P code, L3 C/A and unencrypted P code, L3 CDMA
- Galileo: E1, E5A, E5B and E5AltBOC, E6
- BeiDou: B1, B2, B3, B1C, B2A
- QZSS: L1 C/A, L1C, L1S, L2C, L5, LEX/L6
- IRNSS: L5, S-Band
- SBAS: L1 C/A (EGNOS/MSAS GAGAN/SDCM), L1 C/A and L5 (WAAS)
- L-Band: Trimble RTX

INPUT/OUTPUT FORMATS

- Correction Format:
  - CMR, CMR+, CMRx, SAGAN RTX, RTCM 2.x, RTCM 3.x
- Observables:
  - RT17, RT27, BINEX, RTCM 3.x
- Position/Status I/O
  - NMEA-0183 v2.30, GSOF
- Up to 100 Hz Output
- 10 MHz External Frequency Input
  - Normal input level 0 to +10 dBm
  - Maximum input level +17 dBm, ±30 V DC
  - Input impedance 50 Ohms @ 10 MHz, DC blocked
- 1 PPS Output
- Event Input
- Met/Tilt Sensor Support

POSITIONING PERFORMANCE

Differential Positioning

Code differential GNSS positioning[4]
- Horizontal ....0.25 m + 1 ppm RMS
- Vertical ....0.50 m + 1 ppm RMS

SBAS differential positioning accuracy[5]
- Horizontal ....0.50 m RMS
- Vertical ....0.85 m RMS

Static GNSS Surveying[4]

High-accuracy Static
- Horizontal ....3 mm + 0.1 ppm RMS
- Vertical ....3.5 mm + 0.4 ppm RMS

Static and Fast Static
- Horizontal ....3 mm + 0.5 ppm RMS
- Vertical ....5 mm + 0.5 ppm RMS

Real Time Kinematic Surveying[4]

Single Baseline < 30km
- Horizontal ....8 mm + 1 ppm RMS
- Vertical ....15 mm + 1 ppm RMS

Networked RTK[6]
- Horizontal ....8 mm + 0.5 ppm RMS
- Vertical ....15 mm + 0.5 ppm RMS
- Initialization time ....typically <10 seconds
- Initialization reliability ....typically >99.9%

COMMUNICATION

- Serial Ports:
  - Two 9-pin Male
  - Two 7-pin Lemo
- USB: one Mini-B USB 5-pin / RDNIS (Device and Host modes)
- Ethernet: one RJ45 (Full-duplex, auto-negotiate 100Base-T)
  - HTTP, HTTPS, TCP/IP, IPv4 / IPv6, UDP, FTP, NTRIP Caster, NTRIP Server, NTRIP Client, Proxy server
  - Routing table, NTP Server, NTP Client support
  - Email Alerts and File Push
  - DNS client support
- Wi-Fi: 802.11 b/g, access point and client mode, WPA/WPA2/WEP64/WEP128 encryption
- Bluetooth[7]: Integrated 2.4 GHz Bluetooth; supports three simultaneous connections

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1 Specifications subject to change without notice.
2 L2 C/A on GLONASS-M satellite
3 LEX/L6 supported on QZSS block I-eat rates.
4 Accuracy may be subject to degradation by multipath, site reruption obstructions, satellite geometry and atmospheric conditions. Always follow recommended survey practices.

5 Depends on WAAS/EGNOS system performance.
6 Networked RTK PPM values are referenced to the closest physical base station.
7 Bluetooth type approvals are country specific.

DATA LOGGING

Storage Capacity
  Onboard Memory (Journaling) .... up to 24 GB[8]
  External Memory .... greater than 1 TB
Maximum Data Logging Rate .... 100 Hz
Maximum Combined Data Logging Rate .... 85 Hz
File Durations .... 1 minute to continuous
Storage Sessions .... 12 concurrent, independent sessions with
                                       dedicated memory pooling
File Formats .... T02, T04, BINEX, RINEX v2 v3.0x,
                                       Google Earth KML/KMZ
File Naming Conventions .... Multiple
Data Retrieval and transfer .... HTTP, FTP Server, USB
Events .... Defieable file production on events

PHYSICAL SPECIFICATIONS

Alloy receiver dimensions (L x W x H) ..... 20.58 cm x 21.00 cm x 7.62 cm
                                       (8.41 in x 8.26 in x 3 in)
Alloy receiver dimensions
  with brackets attached (L x W x H) ..... 20.77 cm x 26.36 cm x 8.3 cm
                                       (8.41 in x 10.54 in x 3.27 in)
Weight .... 2.34 kg (5.17 lbs)

ENVIRONMENT

Operating Temperature[10][11] .... -40 °C to +65 °C (-40 °F to +149 °F)
Storage temperature .... -40 °C to +80 °C (-40 °F to +176 °F)
Humidity .... 100% condensing
Shock
  Operating .... 40 g per MIL-STD-810G Table 5 16 6-VII
  Non-Operating .... 75 g per MIL-STD-810G Table 5 16 6-VII
                                 Design to survive 1m bench drop
Vibration
  Operating .... MIL-STD-810G Fig 514.6C-1 Category 4
  Ingress protection .... IP68 per rule 5 per IEC 60529 -
                                 waterproof/dustproof (to submersion for 1 m)

USER INTERFACE

- Front Panel Display
  - 4-line x 32 character reversible OLED display
  - 7 button input configuration
  - Adjustable LED backlighting
- Multiple language support for front panel and web UI - Chinese, Dutch, English,
  Finnish, French, German, Italian, Japanese, Norwegian, Polish, Portuguese, Russian,
  Spanish, Swedish
- Web User Interface. Allows remote configuration, data retrieval, and firmware updates
  over HTTPS/HTTP.

ANTENNA SUPPORT

Output Voltage .... 5 V DC nominal
Maximum output current .... 150 mA
Maximum cable loss .... 12 dB
Recommended antennas .... Trimble Zephyr 3 Geodetic,
                                       Trimble GNSS-Ti v2 Choke Ring

SECURITY

- HTTP login
- HTTPS/SSL
- Programmatic Interface authentication
- NTRIP
- IP Filtering

ELECTRICAL

- Power over Ethernet (PoE) 802.3at (Type 1), 802.at (Type 2)
- 10.8 to 28.0 V DC input on 2 Lemo ports
  - User-configurable power-on voltage
  - User-configurable power-down voltage
- User-configurable 12 V DC power output on serial port #2
- Integrated dual hot-swappable smart batteries (7.4 V, 7800 mA-hr, Li-Ion batteries)
  with up to 15 hours of continuous operation
- Seamless switching between external/internal power sources
- Configurable minimum input voltage for battery charging
- Integrated battery charging circuitry
- Power Consumption – 3.8 W or higher, dependent on user settings
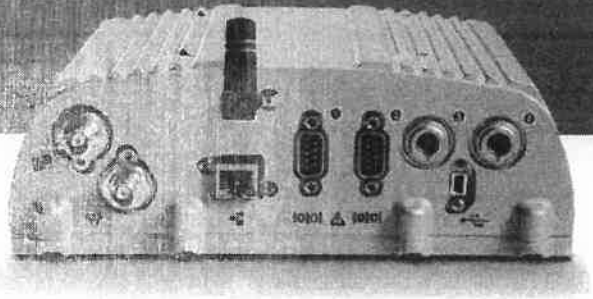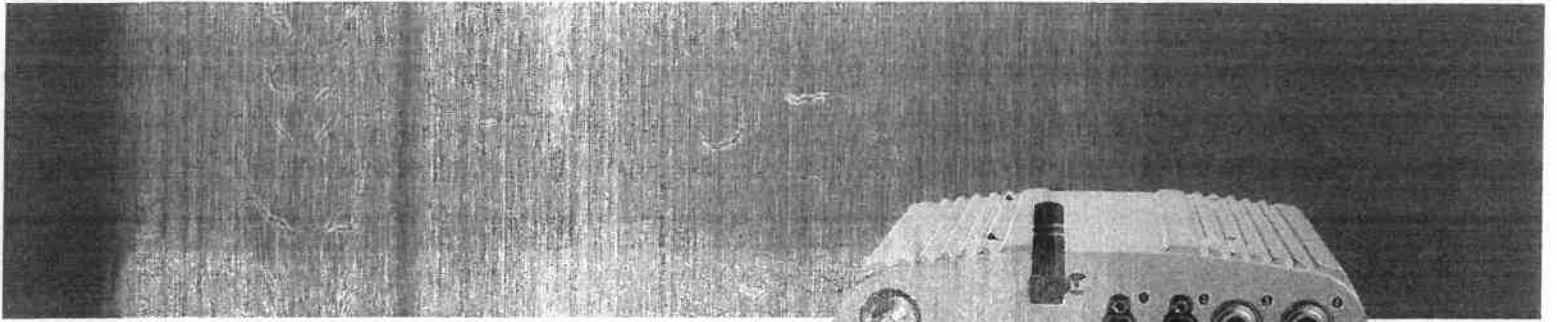
REGULATORY COMPLIANCE

- FCC Part 15 (Class B device), CISPR 32, 24
- RED CE Mark
- RCM
- UN 38.3 – ST/SG/AC.10/27/Add.2 Rev.5 (Li-Ion battery)
- IEC 62133(Ed.2) and EN 62133: 2013 (Li-Ion battery)
- RoHS, China RoHS, WEEE

8. Trimble's highly efficient T00 data logging format has an effective equivalent 3.1 GB to 24.0 GB for competitive receivers.
9. Solid state drives are recommended for external performance.
10. Operating temperature when connected to external DC supply. To protect the battery from extreme temperature, the battery charger only operates from 0 °C to 45 °C (+32 °F to +113 °F).
11. If operated only with batteries and no external DC supply, operating temperature is -20 °C to +55 °C (-4 °F to +131 °F).

Alloy GNSS
REFERENCE RECEIVER