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

Request for Quotation

RFQ NUMBER	PAGE
639000024	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
MICHAEL AUSTIN
304-558-2402

VENDOR
*129151331 304-545-2527
GPS INNOVATIONS INC
506B OLD GOFF MOUNTAIN RD

CROSS LANES WV 25313

SHIP TO
DIVISION OF HIGHWAYS
CHIEF OF INFORMATION SYSTEMS
BUILDING 5
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0430 304-558-0408

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
02/02/2009	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 02/11/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 7		
				CHANGES AND ADDITIONS TO THE SPECIFICATIONS ATTACHED.		
				BID OPENING DATE AND TIME REMAINS 02/11/09 @1:30 P.M.		
				NO OTHER CHANGES		
0001	11	EA		840-45	6,990.00	76,890.00
				GPS POSITIONING SYSTEMS WITH RECEIVER		
				TRIMBLE: 6720 XH 2008 w/ TERRASYNC PROFESSIONAL SOFTWARE		
0002	32	EA		840-45	32,820.00	1,050,240.00
				GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		
				TRIMBLE: NETR5 GPS NET RTK NET		
				****** THIS IS THE END OF RFQ 639000024 ****** TOTAL:		$1,127,130.00

RECEIVED
2009 FEB 11 PM 12:21
WV PURCHASING DIVISION

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2527 DATE 304-545-2527

TITLE BUSINESS MANAGER FEIN 55-0710962 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.

2. The State may accept or reject in part, or in whole, any bid.

3. All quotations are governed by the ***West Virginia Code*** and the ***Legislative Rules*** of the Purchasing Division.

4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required $125 fee.

5. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.

6. Payment may only be made after the delivery and acceptance of goods or services.

7. Interest may be paid for late payment in accordance with the ***West Virginia Code***.

8. Vendor preference will be granted upon written request in accordance with the ***West Virginia Code***.

9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.

11. The laws of the State of West Virginia and the ***Legislative Rules*** of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.

12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.

13. BANKRUPTCY: In the event the vendor/contractor files for bankruptcy protection, this Contract may be deemed null and void, and terminated without further order.

14. HIPAA BUSINESS ASSOCIATE ADDENDUM: The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (**http://www.state.wv.us/admin/purchase/vrc/hipaa.htm**) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

15. WEST VIRGINIA ALCOHOL & DRUG-FREE WORKPLACE ACT: If this Contract constitutes a public improvement construction contract as set forth in Article 1D, Chapter 21 of the West Virginia Code ("The West Virginia Alcohol and Drug-Free Workplace Act"), then the following language shall hereby become part of this Contract: "The contractor and its subcontractors shall implement and maintain a written drug-free workplace policy in compliance with the West Virginia Alcohol and Drug-Free Workplace Act, as set forth in Article 1D, Chapter 21 of the West Virginia Code. The contractor and its subcontractors shall provide a sworn statement in writing, under the penalties of perjury, that they maintain a valid drug-free work place policy in compliance with the West Virginia and Drug-Free Workplace Act. It is understood and agreed that this Contract shall be cancelled by the awarding authority if the Contractor: 1) Fails to implement its drug-free workplace policy; 2) Fails to provide information regarding implementation of the contractor's drug-free workplace policy at the request of the public authority; or 3) Provides to the public authority false information regarding the contractor's drug-free workplace policy."

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division.

2. SPECIFICATIONS: Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.

3. Complete all sections of the quotation form.

4. Unit prices shall prevail in case of discrepancy.

5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.

6. BID SUBMISSION: All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130

ADDENDUM NO. 7

Page 16, Technical Specifications, Section 202, Antenna
Revise specification to read:
Specification: The vendor shall supply a multi-channel GNSS antenna.

Page 17, Technical Specifications, Section 202.1 – Interfaces
Move the ten bullets to: Item 201.7

ADD THE FOLLOWING TO THE END OF SECTION 100

Vendor's CORS Hardware and Firmware Support Agreement shall be extended to Five Years. Vender should review the attached "Phase I" and "Phase II" with station addresses for Station Locations.

ADD THE FOLLOWING BID ITEMS:

Phase 1 Software Quantity: 1

Vendor shall provide Multiple Base Software for unlimited number of CORS Stations to Interface via a WVDOH provided high speed internet network and network hardware. Phase 1 Software will permit individual Base Stations to come online as installs are completed. Vendor will provide remote Software Support, Upgrades, and Warranty for Phase 1 Software for a period of five years from date of issued Purchase Order.

- The Control software must be capable of communicating with CORS using native Trimble RT17 and TRT27 protocols to assure compatibility with currently-owned state equipment.
- Detect if real-time Ethernet connections to CORS have been lost. Upon reconnection the software must automatically download all remote CORS receiver memories and store the data in existing files. This will assure a high degree of data integrity.
- The software must work as a fully-integrated system with existing State-owned CORS receivers.
- The software must be capable of simultaneously operating as:
  - A single-base correction generator
  - RTCM 3.1 NET (Master Auxiliary Concept - MAC) standard generator
  - Virtual Reference Station (Non-Physical or Computed Reference
  - Station) generator
  - DGPS and RTK correction generator – simultaneously
- The software must incorporate SPAM filters for web site registration and post-processing services.
- The software will validate registration entries, searching for duplicate entries or assigning login values for new users. All users will be required to key in a security code for registration validation.

- The software security code activation will make use of CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) to generate security code
- The Control Centre software must be capable of distributing logged-on rover locations via NMEA format to other applications.

Phase 2 Software Upgrade Quantity: 1

Vendor shall provide VRS Network Software Upgrade for unlimited number of CORS Stations to Interface via a WVDOH provided high speed internet network and network hardware. Vendor will provide remote Software Support, Upgrades, and Warranty for Phase 2 Software for a period of five years from date of issued Purchase Order. Vendor will supply a recommended Minimum Network Server / Hardware Component List for full VRS Network Upgrade to insure WVDOH IT Professionals specify and provide adequate network hardware from the system start up. Vendors should be aware the CORS Network might be expanded to include additional surrounding States CORS Stations to insure full Network coverage of the State of West Virginia.

Masonry Building Mounting Kit

Vendor must supply a sketch and parts list of supplied components of the proposed Masonry Building Mounting Kit. Vendor must refer to NGS Technical Specification Document titled "Guidelines for New and Existing Continuously Operating Reference Stations (CORS)" Dated " February, 2006" to insure the Masonry Building Mounting Kit design complies with those requirements set forth to be designated as a "National CORS". This line item also includes all previously unaddressed CORS installation hardware components in this bid document including: Low signal loss GPS Antenna Cables, GPS Antenna inline lightening arrestor, Uninterruptable power supply for CORS Receiver.

Vendor requirement

- The supplier must state at least three (3) networks with more than 100 reference stations connected supporting the VRS or FKP technology.
- The supplier must have installations in three or more networks of at least 50 stations owned and operated by North American State Departments of Transportation.
  - The networks must be operating and not consist of sales whereby equipment is uninstalled or non-commissioned.
  - The system(s) must be in operational use as part of a real-time network to be considered references.

TEXAS - 128
THE NATION OF GREECE - 108
SWEDEN - 150

OHIO DOT - 53
TEXAS DOT - 128
MINNESOTA - 88
NC DOT - 54
WASHINGTON DOT - 60

17. Seth Substation
WV 3 – 0.75 Mi. South of Jct. CR 3/3
304-837-3642
Boone County

18. Hurricane Substation
WV 34 – 0.2 Mi. East of Hurricane Creek Road
304-562-6641
Putnam County

19. Maysel Stockpile
Jct. WV 4 & WV 36
Clay County

20. Crum Substation
US 52 – 2.5 Mi. South of Jct. WV 152
304-393-4052
Wayne County

21. Roane County Headquarters
296 Charleston Road
Spencer, WV 25276
304-927-0962

22. District Three Headquarters
624 Depot Street
Parkersburg, WV 26101
304-420-4595

23. Taylor County Headquarters
Route 2, Box 502
Grafton, WV 26354
304-265-6110

24. Aurora Substation
US 50 – 0.5 Mi. West of Aurora
304-735-3311
Preston County

25. Grant County Headquarters
HC 59, Box 245
Petersburg, WV 26847
304-257-4455

26. Slanesville Substation
WV 29 – 0.8 Mi. East of Jct. CR 3 & CR 45/20
304-496-7387
Hampshire County

27. Pine Grove Substation
WV 20 – 0.3 Mi. West of Pine Grove
304-889-3251
Wetzel County

28. Brooke County Headquarters
RD 2, Box 615
Wellsburg, WV 26070
304-238-1199

29. District Seven Headquarters
255 Depot Street
Weston, WV 26452
304-269-0407

30. Pickens Substation
CR 45 – at the Jct. of CR 46/1 & CR 45
304-924-5544
Randolph County

31. Thornwood Stockpile
CR 28/19 – 0.2 Mi. North of US 250 near Bartow
Pocahontas County

32. Summers County Headquarters
HC 77, Box 99
Hinton, WV 25951
304-466-2802

33. District Ten Headquarters
270 Hardwood Lane
Princeton, WV 24740
304-487-5228

West Virginia Department of Transportation: Proposed COR Stations Phase I & II

1. Logan County Headquarters
P.O. Box 511
Wilkinson, WV 25653
304-792-7035

2. Smithville Stockpile
WV 47 - 0.2 Mi. East of Jct. WV 47 & WV 165
Ritchie County

3. Colin Anderson Stockpile
Near WV 2 - 3.2 Mi. North of Jct. WV 2 & WV 16
Pleasants County

4. Corridor D, Section 2 (Tunnel Hill)
US 50 Flinderation Rd.
West Clarksburg, WV 26426
304-627-2410

5. District 5 Headquarters
P.O. Box 99
Burlington, WV 26710
304-289-3521

6. Berkeley County Headquarters
1867 Rock Cliff Drive
Martinsburg, WV 25401
304-267-0060

7. District Six Headquarters
1 DOT Drive
Moundsville, WV 26041
304-843-4000

8. Braxton County Headquarters
1001 State Street
Gassaway, WV 26624
304-364-5238

9. District Eight Headquarters
P.O. Box 1516
Elkins, WV 26241
304-637-0220

10. Pendleton County Headquarters
P.O. Box 36
Franklin, WV 26807
304-358-2702

11. Pocahontas County Headquarters
Rt. 1, Box 51
Marlinton, WV 24954
304-799-4867

12. District Nine Headquarters
103 1/2 Church Street
Lewisburg, WV 24901
304-647-7450

13. Curtin Substation
8238 Ridgewood Rd.
Craigsville/Fenwick, WV
Nicholas County
304-846-9501

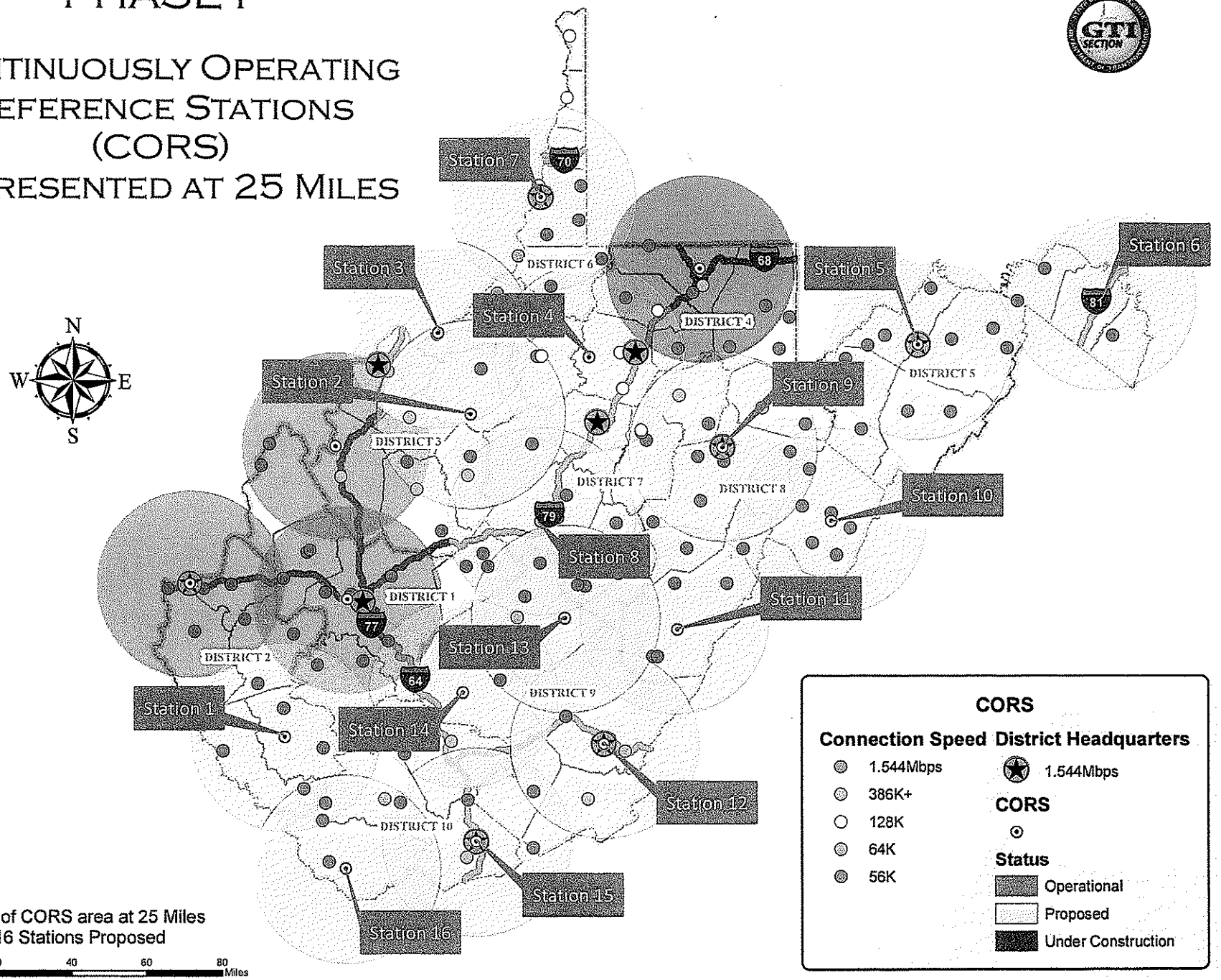
14. Fayette County Headquarters
1885 East Main Street
Oak Hill, WV 25901
304-256-6940

15. District Ten Headquarters
270 Hardwood Lane
Princeton, WV 24740
304-487-5228

16. Yukon Substation
WV 83 - West of Jct. WV 16, near War
304-875-3845
McDowell County

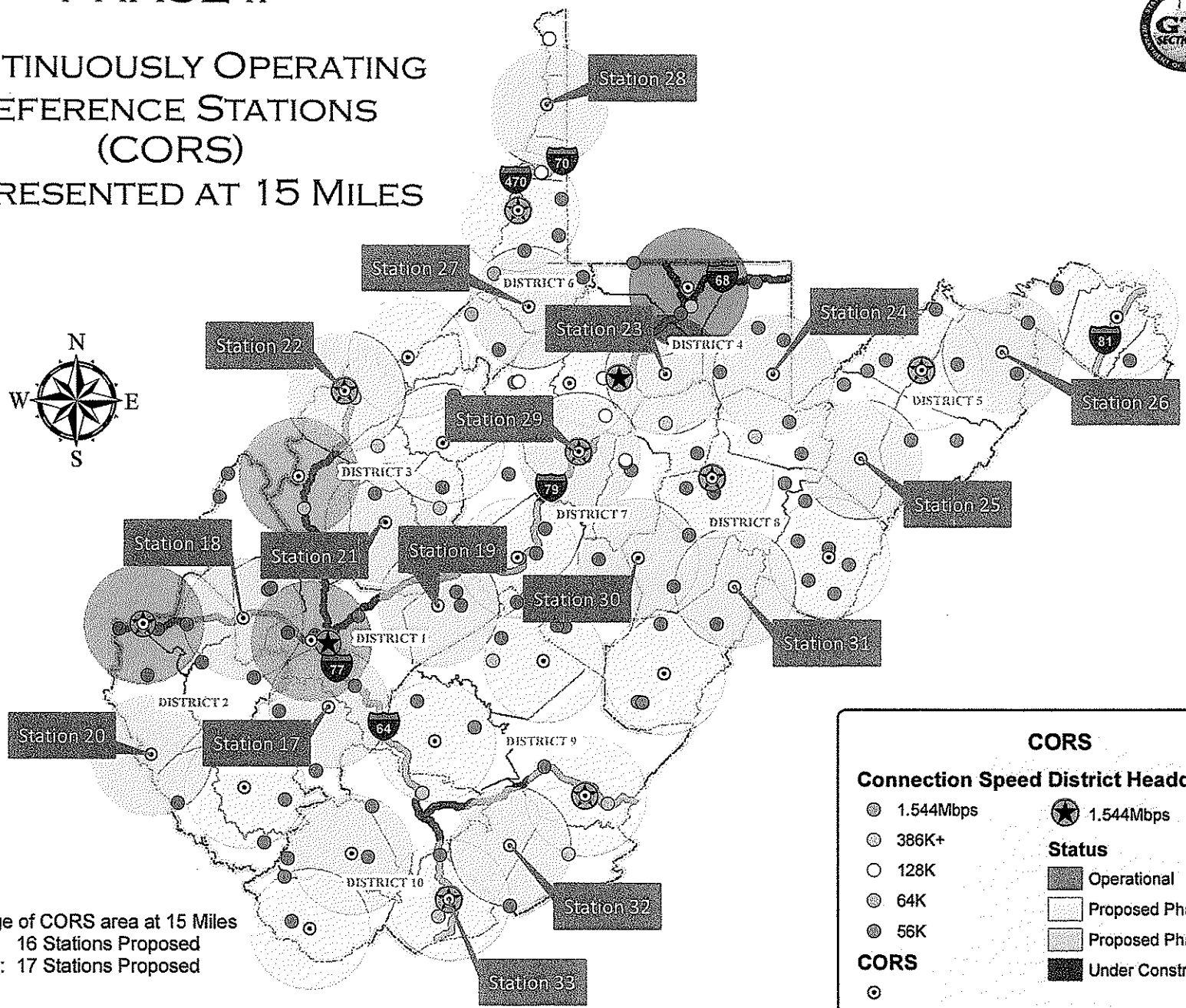
PHASE I

CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) REPRESENTED AT 25 MILES



PHASE II

CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) REPRESENTED AT 15 MILES



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Request for Quotation

RFQ NUMBER	PAGE
639000024	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
MICHAEL AUSTIN
304-558-2402

VENDOR
*129151331 304-545-2527
GPS INNOVATIONS INC
506B OLD GOFF MOUNTAIN RD

CROSS LANES WV 25313

SHIP TO
DIVISION OF HIGHWAYS
CHIEF OF INFORMATION SYSTEMS
BUILDING 5
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0430 304-558-0408

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
01/26/2009	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 02/11/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 6		
				BID OPENING DATE AND TIME CHANGED		
				FROM: 01/28/09 AT 1:30 P.M.		
				TO: 02/11/09 AT 1:30 P.M.		
				NO OTHER CHANGES		
0001	11	EA		840-45		N/A
				GPS POSITIONING SYSTEMS WITH RECEIVER		
0002	32	EA		840-45		
				GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		
				****** THIS IS THE END OF RFQ 639000024 ****** TOTAL:		N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2527 DATE 2/9/09

TITLE BUSINESS MANAGER FEIN 55-0710962 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

State of West Virginia
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1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0430 304-558-0408

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B	FREIGHT TERMS
01/16/2009	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 01/28/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 5		
				BID OPENING DATE AND TIME CHANGED		
				FROM: 01/21/09 AT 1:30 P.M.		
				TO: 01/28/09 AT 1:30 P.M.		
				NO OTHER CHANGES		
0001	11	EA		840-45		
				GPS POSITIONING SYSTEMS WITH RECEIVER		
0002	32	EA		840-45		N/A
				GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		
				****** THIS IS THE END OF RFQ 639000024 ****** TOTAL:		N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2527 DATE 1/23/09

TITLE BUSINESS MANAGER FEIN 55-0710962

ADDRESS CHANGES TO BE NOTED ABOVE

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CHARLESTON, WV
25305-0430 304-558-0408

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
01/06/2009	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 01/21/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 4		
				BID OPENING DATE AND TIME CHANGED		
				FROM: 01/07/2009 AT 1:30 P.M.		
				TO: 01/21/2009 AT 1:30 P.M.		
				NO OTHER CHANGES		
0001	11	EA		840-45		N/A
				GPS POSITIONING SYSTEMS WITH RECEIVER		
0002	32	EA		840-45		N/A
				GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		
				****** THIS IS THE END OF RFQ 639000024 ****** TOTAL:		N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2527 DATE 1/23/09

TITLE BUSINESS MANAGER FEIN 55-0710962 ADDRESS CHANGES TO BE NOTED ABOVE

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304-558-2402

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*129151331 304-545-2527
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506B OLD GOFF MOUNTAIN RD

CROSS LANES WV 25313

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CHIEF OF INFORMATION SYSTEMS
BUILDING 5
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0430 304-558-0408

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
12/22/2008	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 01/07/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM #03		
				BID OPENING DATE AND TIME CHANGE		
				FROM: 12/23/2008		
				TO: 01/07/2009		
				NO OTHER CHANGES		
0001	11	EA		840-45		N/A
				GPS POSITIONING SYSTEMS WITH RECEIVER		
0002	32	EA		840-45		N/A
				GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		
				****** THIS IS THE END OF RFQ 639000024 ****** TOTAL:		N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE Mark Mullins TELEPHONE 304-545-2527 DATE 1/23/09

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ADDRESS CORRESPONDENCE TO ATTENTION OF:
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☐ RFQ COPY
TYPE NAME/ADDRESS HERE

GPS Innovations Inc.
506B Old Goff Mountain Road
Cross Lanes, WV 25313

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DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
12/11/2008	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 12/23/2008 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM #02		
				LINE 2 GPS POSITIONING SYSTEMS CONSTANTLY OPERATING STATION.		
				READS: 11		
				TO READ: 32		
				NO OTHER CHANGES		
0001	11	EA		840-45		N/A
				GPS POSITIONING SYSTEMS WITH RECEIVER		
0002	32	EA		840-45		N/A
				GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		

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SIGNATURE [signature] TELEPHONE 304-543-2527 DATE 1/23/09

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LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM #01		
				LINE 1 GPS POSITIONING SYSTEMS WITH RECEIVER READS: QUANTITY 1 TO READ: QUANTITY 11		
				LINE 2 GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION. READS: QUANTITY 1 TO READ: QUANTITY 32		
				BID OPENING DATE AND TIME REMAINS 12/23/08 @ 1:30 P.M NO OTHER CHANGES		
0001	11	EA		840-45 GPS POSITIONING SYSTEMS WITH RECEIVER		N/A
0002	11	EA		840-45 GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION		N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2527 DATE 1/23/09

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12/04/2008	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 12/23/2008 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	EA		840-45		N/A

GPS POSITIONING SYSTEMS WITH RECEIVER

0002	1	EA		840-45		N/A

GPS POSITIONING SYSTEM CONSTANTLY OPERATING STATION

OPEN END CONTRACT

TO PROVIDE (GPS) GLOBAL POSITIONING SYSTEM WITH RECEIVER, ANTENNA, AND USER INTERFACE. DEVICE MUST USE MICROSOFT WINDOWS MOBIL 6 AND FULLY COMPATABLE WITH EXISTING TRIMBLE PATHFINDER OFFICE SOFTWARE CURRENTLY USED BY THE WEST VIRGINIA DIVISION OF HIGHWAYS AND GPS POSITIONING CONSTANTLY OPERATING REFERENCE STATIONS. PER THE ATTACHED SPECIFICATIONS.

THE MODEL/BRAND/SPECIFICATIONS NAMED HEREIN ESTABLISH THE ACCEPTABLE LEVEL OF QUALITY ONLY AND ARE NOT INTENDED TO REFLECT A PREFERENCE OR FAVOR ANY PARTICULAR BRAND OR VENDOR. VENDORS WHO ARE BIDDING ALTERNATES SHOULD SO STATE AND INCLUDE PERTINENT LITERATURE AND SPECIFICATIONS. FAILURE TO PROVIDE INFORMATION FOR ANY ALTERNATES MAY BE GROUNDS FOR REJECTION OF THE BID. THE STATE RESERVES THE RIGHT TO WAIVE MINOR IRREGULARITIES IN BIDS OR SPECIFICATIONS IN ACCORDANCE WITH SECTION 148-1-4(F) OF THE WEST VIRGINIA LEGISLATIVE RULES AND REGULATIONS.

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2527 DATE 1/23/09

TITLE BUSINESS MANAGER FEIN 55-0710962 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

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

Request for Quotation

RFQ NUMBER	PAGE
639000024	2

ADDRESS CORRESPONDENCE TO ATTENTION OF:
MICHAEL AUSTIN
304-558-2402

RFQ COPY
TYPE NAME/ADDRESS HERE

GPS Innovations Inc.
506B Old Goff Mountain Road
Cross Lanes, WV 25313

SHIP TO
DIVISION OF HIGHWAYS
CHIEF OF INFORMATION SYSTEMS
BUILDING 5
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0430 304-558-0408

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
12/04/2008	NET 30	DELIVERY	DESTINATION	PREPAID

BID OPENING DATE: 12/23/2008 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO	ITEM NUMBER	UNIT PRICE	AMOUNT

EXHIBIT 3

LIFE OF CONTRACT: THIS CONTRACT BECOMES EFFECTIVE ON ..... AND EXTENDS FOR A PERIOD OF ONE (1) YEAR OR UNTIL SUCH "REASONABLE TIME" THEREAFTER AS IS NECESSARY TO OBTAIN A NEW CONTRACT OR RENEW THE ORIGINAL CONTRACT. THE "REASONABLE TIME" PERIOD SHALL NOT EXCEED TWELVE (12) MONTHS. DURING THIS "REASONABLE TIME" THE VENDOR MAY TERMINATE THIS CONTRACT FOR ANY REASON UPON GIVING THE DIRECTOR OF PURCHASING 30 DAYS WRITTEN NOTICE.

UNLESS SPECIFIC PROVISIONS ARE STIPULATED ELSEWHERE IN THIS CONTRACT DOCUMENT, THE TERMS, CONDITIONS AND PRICING SET HEREIN ARE FIRM FOR THE LIFE OF THE CONTRACT.

RENEWAL: THIS CONTRACT MAY BE RENEWED UPON THE MUTUAL WRITTEN CONSENT OF THE SPENDING UNIT AND VENDOR, SUBMITTED TO THE DIRECTOR OF PURCHASING THIRTY (30) DAYS PRIOR TO THE EXPIRATION DATE. SUCH RENEWAL SHALL BE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE ORIGINAL CONTRACT AND SHALL BE LIMITED TO TWO (2) ONE (1) YEAR PERIODS.

CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM TO THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.

OPEN MARKET CLAUSE: THE DIRECTOR OF PURCHASING MAY AUTHORIZE A SPENDING UNIT TO PURCHASE ON THE OPEN MARKET, WITHOUT THE FILING OF A REQUISITION OR COST ESTIMATE, ITEMS SPECIFIED ON THIS CONTRACT FOR

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-545-2577 DATE 11/23/09

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IMMEDIATE DELIVERY IN EMERGENCIES DUE TO UNFORESEEN CAUSES (INCLUDING BUT NOT LIMITED TO DELAYS IN TRANSPORTATION OR AN UNANTICIPATED INCREASE IN THE VOLUME OF WORK.)

QUANTITIES: QUANTITIES LISTED IN THE REQUISITION ARE APPROXIMATIONS ONLY, BASED ON ESTIMATES SUPPLIED BY THE STATE SPENDING UNIT. IT IS UNDERSTOOD AND AGREED THAT THE CONTRACT SHALL COVER THE QUANTITIES ACTUALLY ORDERED FOR DELIVERY DURING THE TERM OF THE CONTRACT, WHETHER MORE OR LESS THAN THE QUANTITIES SHOWN.

ORDERING PROCEDURE: SPENDING UNIT(S) SHALL ISSUE A WRITTEN STATE CONTRACT ORDER (FORM NUMBER WV-39) TO THE VENDOR FOR COMMODITIES COVERED BY THIS CONTRACT. THE ORIGINAL COPY OF THE WV-39 SHALL BE MAILED TO THE VENDOR AS AUTHORIZATION FOR SHIPMENT, A SECOND COPY MAILED TO THE PURCHASING DIVISION, AND A THIRD COPY RETAINED BY THE SPENDING UNIT.

BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED WITHOUT FURTHER ORDER.

THE TERMS AND CONDITIONS CONTAINED IN THIS CONTRACT SHALL SUPERSEDE ANY AND ALL SUBSEQUENT TERMS AND CONDITIONS WHICH MAY APPEAR ON ANY ATTACHED PRINTED DOCUMENTS SUCH AS PRICE LISTS, ORDER FORMS, SALES AGREEMENTS OR MAINTENANCE AGREEMENTS, INCLUDING ANY ELECTRONIC MEDIUM SUCH AS CD-ROM.

REV. 04/11/2001

PURCHASING CARD ACCEPTANCE: THE STATE OF WEST VIRGINI

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

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CURRENTLY UTILIZES A VISA PURCHASING CARD PROGRAM WHICH IS ISSUED THROUGH A BANK. THE SUCCESSFUL VENDOR MUST ACCEPT THE STATE OF WEST VIRGINIA VISA PURCHASING CARD FOR PAYMENT OF ALL ORDERS PLACED BY ANY STATE AGENCY AS A CONDITION OF AWARD.

EXHIBIT 10

REQUISITION NO.: 639000024

ADDENDUM ACKNOWLEDGEMENT

I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.

ADDENDUM NO.'S:

NO. 1 JM
NO. 2 JM
NO. 3 JM
NO. 4 JM
NO. 5 JM

NO 6 JM
NO 7 JM

I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.

VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-595-2527 DATE 1/23/09

TITLE BUSINESS MANAGER FEIN 55-0710962 ADDRESS CHANGES TO BE NOTED ABOVE

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Request for Quotation

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Cross Lanes, WV 25313

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CHIEF OF INFORMATION SYSTEMS
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AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.

SIGNATURE

GPS INNOVATIONS INC

COMPANY

1/23/09

DATE

REV. 11/96

NOTICE

A SIGNED BID MUST BE SUBMITTED TO:

DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
BUILDING 15
2019 WASHINGTON STREET, EAST
CHARLESTON, WV 25305-0130

THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:

SEALED BID

BUYER:

33

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
	304-545-2527	1/23/09

TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
BUSINESS MANAGER	55-0710962	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

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

Request for Quotation

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BID OPENING DATE: 12/23/2008 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT

RFQ. NO.: 639000024

BID OPENING DATE: 2/11/09

BID OPENING TIME: 1:30

PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:

304-776-6790

CONTACT PERSON (PLEASE PRINT CLEARLY):

MARK McGOLRICK

****** THIS IS THE END OF RFQ 639000024 ****** TOTAL: N/A

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-595-2527 DATE 1/23/09

TITLE BUSINESS MANAGER FEIN 55-0710962 ADDRESS CHANGES TO BE NOTED ABOVE

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Device

- Device must contain integrated GPS receiver, antenna, and user interface.
- Device must use a Microsoft Windows Mobile 6 operating system with a minimum of 128 MB RAM and 1 GB of non-volatile flash data storage capacity and a minimum 520 MHz processor.
- Display must be a minimum of 3.5 inches with 480x640 resolutions and be sunlight readable with LED backlight.
- Must meet or exceed durability standards for IP 55.
- Battery should be internal and provide a minimum of 27 Watt hours which will power the device all day.
- Must contain at least one SD card slot compatible for standard SD and also SDHC (high capacity) storage cards.

GPS Receiver

- Must be integrated, dual frequency GPS receiver with L1 (code and carrier) and L2 (carrier) with internal antenna. Must be able to track a minimum of two WAAS satellites simultaneously.
- Must be capable of 30cm accuracy with a minimum number of five satellites and maximum PDOP of 6.
- With an optional external antenna, GPS positions must be capable of 10cm level accuracy.

Device Software

- Software must use full capability of GPS receiver for feature and attribute data collection.
- Software must be fully compatible with existing Trimble Pathfinder Office software currently held by WV DOH. GPS positions recorded with this software must be able to be processed with differential corrections by the existing Pathfinder Office.
- Features and attribute templates must be fully editable and created within the device software. The attributes should include the ability to use pick or category listings.
- Software must be allow viewing of multiple background images at the same time while showing GPS collected data and current GPS position. These background images should include but not limited to the following geo-referenced formats: MrSID, JPEG, TIFF, and BMP.

Specifications

Global Positioning System

Continuously Operating Reference Stations

The goal of this project is to build the infrastructure required for the development of "smart" transportation applications for the State of West Virginia. Technological advances in mapping and surveying has outpaced supporting infrastructure that enables engineering design and construction, spatial management of assets, and navigation. At the heart of this rapid advance in technology is the Global Positioning System (GPS).

In response to GPS technology, government entities, from state to the federal level, are working to increase efficiency by making GPS-related technologies more readily available, while reducing liabilities by insuring compatibility. The National Geodetic Survey has guided this effort by establishing the National GPS Constantly Operating References Stations (CORS) program. The National CORS system is a network of hundreds of GPS base stations whose data are made publicly available for various post-processing applications. In particular, CORS data is utilized to calculate GPS-derived positions with horizontal and vertical accuracies of less than a few centimeters. The National CORS system benefits from multi-purpose cooperative endeavors involving government, academic, commercial, and private organizations.

The infrastructure we are building would provide real-time kinematic (RTK) capabilities for the State of West Virginia which will significantly improve the accuracy of Global Positioning system (GPS) surveying in the State of West Virginia by comparing satellite data with known reference stations.

We are planning to implement the most recent advancement in GPS technology - the scalable GPS reference station infrastructure. GPS infrastructure consists of permanent or semi-permanent GPS receivers operating continuously (24/7). By implementing this infrastructure the State will receive several benefits:

- Geospatial Community no longer needs to set up a separate base station to achieve centimeter accuracy.

- Provide the infrastructure necessary to reduce the cost of future build/design construction projects.
- Life saving capabilities (ex: Sago mining disaster)
- Integrate with a national system that connects with surrounding states.
- Common coordinate reference frame.
- Reference station security.
- Reduced cost for state and private sector field crews for field setup and equipment cost.

Projected users of this information include the West Virginia Department of Transportation, US Army Corps of Engineers, US National Geodetic Survey, WV Department of Environmental Protection, WV Department of Natural Resources, WV Department of Mine Safety, WV Department of Homeland Security, WV Department of Agriculture, and other state and federal agencies. Private and academic institutions as well as research centers would receive significant benefit.

Location and Requirement:

The implementation for this project will consist of two phases. Phase 1 will be the initial densification as shown in figure 1 which will consist of a total of 16 reference stations at the 25 mile radius covering the State. Phase 2 will consist of the improved densification with the goal of reducing the coverage radius to 15 miles but not to include more than 16 additional reference stations. The anticipated time between Phase 1 and Phase 2 will consist of one year.

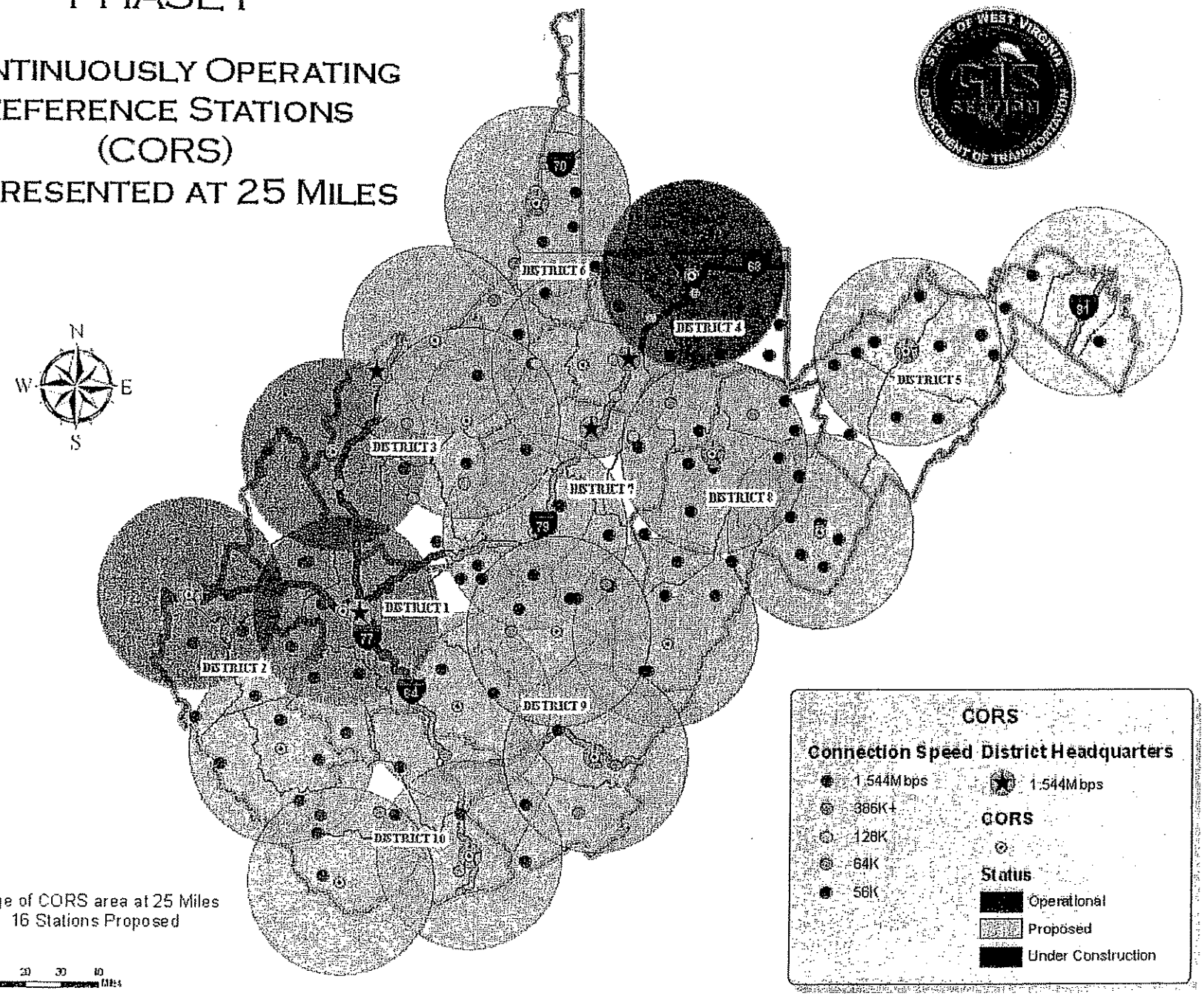
The station will be located at the District office if the location permits; if not, we shall use any of the fuel sites or county offices since there are some requirements for the installation. All potential sites should be verified with the National Geodetic Survey to meet the requirements of the National Geodetic Survey – continuously Operating Reference Stations – National CORS program. If the requirements are not met, we will evaluate other State-owned facilities to meet the requirements.

The network should be set up as Multiple Base – One address. With this setup, as you move closer to one base and away from the one you are currently connected to, it will automatically switch to the closer base.

The receivers should have multiple ports, allowing for corrections to be broadcast multiple ways. The receivers should also have RS232 ports that would allow for local CMR or RTCM correction transmission or a remote dial-up through a modem. The RS232 ports will need to be available for the DOH survey crews or contractors to connect their radio and broadcast a correction when in weak cell coverage areas. This will benefit the DOH by providing the ability to connect cellular modems and gaining selective IP addresses for use in real time monitoring of bridge towers or other structures. In addition, the use of radio repeater will be required to work with link (cell) connections to the reference station. The receiver should have the ability to use radio repeaters with air link (cell) connections. The air link modem or cell phone would dial up to the CORS Station, then the data would rebroadcast through a radio repeater into the areas of poor cell phone coverage to allow real time surveying.

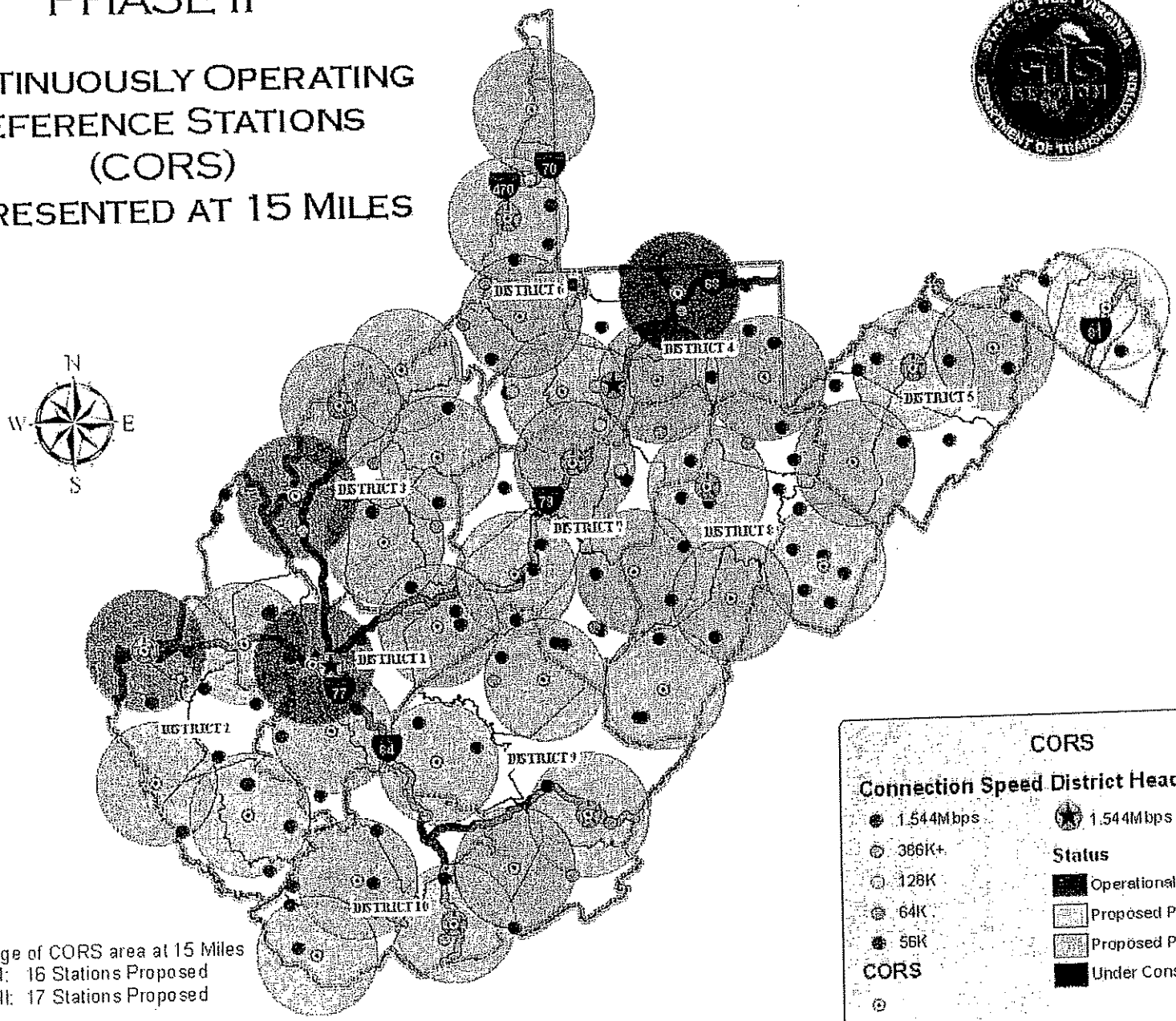
PHASE I

CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) REPRESENTED AT 25 MILES



PHASE II

CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS) REPRESENTED AT 15 MILES



TECHNICAL SPECIFICATION

100 - GENERAL

This specification defines the requirements for GPS Continuously Operating Reference Station equipment and software. All provided items must be standard production models. For each station the hardware will consist of a GPS Geodetic receiver with dual frequency, and many independent channels, up to 20Hz sampling, ~ 1 mm phase precision, with a masonry building mounting kit, antenna, power supply, data cable(s), antenna pre-amp, power supply, manuals, training and support. The system must track all signals from all three global satellite positioning constellations (GPS-Glonass-Galileo) and will need to track 72 channels, with the incorporation of GPS, GPS L1 C/A, L1 and L2 P, L1 and L2 phases, GPS L2C, L5, GLONASS L1 C/A Code, L1 P and L2 P, L1 and L2 phase, and Galileo – IOC/FOC. The receiver must provide all information required for precise surveying with all types of RTK and GIS rovers. Output from the base station must provide GPS, RTK, WASS/EGNOS and DGPS data for transmission from the site by radio or phone, or for distribution from a control center by radio, phone or Internet. RTCM, CMR and CMR+ formats must be supported. Receiver must be capable of meeting requirements for a Continuously Operating Reference Station (CORS) for geodetic, survey, high-accuracy GIS and monitoring applications. The software is to provide the necessary tools for configuration of CORS hardware, receiver operation, data collection and manipulation. NOTE TO VENDORS: The WVDOT currently operates Trimble Brand GPS survey equipment. Any modifications to the Department's equipment for the purposes of compatibility with the provided Stations equipment and/or software shall be at the full expense of the Vendor.

200 - SYSTEM HARDWARE

All GPS hardware that will be included in the bid will be of the same make and model. All hardware and software (including available software specified under ADDITIONAL REQUIREMENTS) shall be from and supported from one source or manufacturer.

201 - RECEIVER

The Vendor shall supply a multi-frequency. minimum 72 channel (GPS L1/L2, L2C, L5, GLONASS L1/L2), network compatible GNSS receiver for CORS reference station purposes.

201.1 – Compliance

- Class B Part 15 and Part 90 FCC certification
- ACMA AS/NZS 4296 approval
- US ST/SG/AC.10.11/Rev. 3, Amend. 1 and 10/27/Add. 2 (Li-Ion Battery)

201.2 – Physical Requirements

- Rugged and suitable for use in field environments that may be hot, cold, wet or dusty.
- Must meet waterproof specification IP67.
- Electronics must be fully sealed from sand, dust and moisture.
- Capable of sustaining vibrations under operating mode according to mil spec MIL-STD 810-F
- Able to operate to measurement specification in temperatures between -40° to +65°C (-40°F to +149°F).
- 100% condensing humidity proof.
- Able to be transported or stored in the following temperature range without sustaining damage to the equipment -40° to +80°C (-40°F to 176°F).

201.3 - Power requirements

- Nominal voltage range of 9 VDC to 30 VDC.
- Multiple power source inputs
- Include over-voltage protection on all power inputs.
- Include reverse polarity protection.
- Allow for power inputs over 30 V without sustaining damage.
- Have nominal power consumption of no more than 4.8W

- Turn on automatically when connected to a DC source that is produced by the manufacturer's AC power supply.
- Auto switch between power sources
- The GNSS receiver must automatically switch between power sources. There must not be a cycle slip or a new logging file created.
- Must be equipped with a non-field-removable Li-Ion battery capable of powering the unit for minimum 12 hours

201.4 - Internal Data Storage

- Minimum 64 MB internal data storage
- Provide for memory expansion via USB-compatible memory media or hard drive
- The internal memory must not be removable.
- Data must be stored in non-volatile RAM.
- Be capable of downloading memory via HTML web browser, Internet Explorer 6.0 or later, Firefox (v1.50) and FTP client.

201.5 – Signal Tracking

- Must support, in RINEX notation: L1, C1, P1, D1, L2, P2, D2*, L5, R1 & R2. On L1: C/A Code, Carrier Phase and Doppler; On L2: P Code (derived under encryption) or, when available, L2C, Carrier Phase On L5 (when available).
- When L2C signals are available, the receiver must be capable of tracking and logging L2C-L and L2C-M range data as the L2 pseudo range.
- Must be able to track and compute corrections available from WAAS geostationary satellites.
- Provide improved tracking in areas of high radio interference such as under power lines, around airports, near radio-intensive construction sites.
- Must be capable of tracking a WAAS / EGNOS / MSAS satellite for real time free of cost differential positioning and base station location.

201.6 – Operation

- Receiver must be capable of logging data at operator selected intervals of 0.1, 0.2. 0.5, 1, 2, 5, 10, 15, 30, 60, 300, 600 seconds.
- The system must be controlled by an HTML web browser; Internet Explorer v 5.0 or newer
- Must have RTCM Output Version 2.1, 2.2, 2.3 and 3.0 available as a standard.
- Must support Virtual Reference Stations server operation as a standard.
- The Receiver must support CMR output and RTCM V2.0 (Type 1 and 3) simultaneously via separate ports.

202 - ANTENNA

The vendor shall supply a multi-channel GNSS antenna that provides a keyboard and display for CORS reference station purposes.

- Cable of receiving GNSS multi-frequency GPS L1, L2 and L2C, L5, as well as GLONASS L2 and L2 frequencies.
- Must operate in the following temperature range -40°C to +70°C (-40°F to 158°F)
- Must be able to be transported and stored in the following temperature range -55°C to +85°C (-67°F to 121°F).
- Must pass the following environmental standards MIL-810-F Figure 514.5c-17 vibration levels on each axis, (while operational) and Shock tested table MIL-810-F Table 516.5-I a 2m (6.56ft) drop (while operational).
- Must be sealed and 100% humidity proof protected against Dust, Wind, Rain, Sand and Snow.
- Sub-millimeter phase center error and enhanced right-hand circular polarization.
- Provide low elevation tracking technology
- Phase center with a <1mm precision stability.
- Must be high gain of at least 50dB on all frequencies.
- Must have a TNC connector for cable connection
- Must have a non-removable ground plane at least 30cm (11.8") in diameter to reduce ground based multipath.

202.1 – Interfaces

- Minimum three independently configurable RS232 ports for serial data input or output.
- Internal LAN interface
- Support an RJ45 connector with links to 10BaseT/100BaseT networks
- PPP server capability through a serial port to enable remote operations.
- All network functions must be performed through a single IP address
- Network connection must allow multiple security options for varying levels of user access.
- Must support streaming of GNSS observables, RTCM, or CMR data over TCP/IP or UDP links.
- Must support configuration using a web browser over HTTP links.
- Must allow download of logged data files using either FTP or HTTP.
- Minimum three ports capable of handling baud rates up to 115,200.

203 - Software/Firmware

The following specifications outline the requirements of software used to control and manage multiple GNSS CORS stations from a central location.

203.1 - General:

- The Software must be a fully integrated software solution for all functionalities needed at the control center of a reference station network.
- The Software must be capable of working as a system with commercially offered GPS/GLONASS receivers.
- All reference station receivers within the network must be controlled by the software.
- The software must archive all reference station data for Post-Processing services, and processes receiver data epoch by epoch to create RTK Network Corrections from single stations and /or Virtual Reference Stations (VRS), which improve the RTK and DGPS fieldwork.

- The software must also be able to provide both Master Auxiliary Concept style and Non-Physical or Computed Reference Station style Network RTK Corrections as described the RTCM 10403.1 standards.
- Must support legacy RTK and DGPS equipment using RTCM version 2.3 in a VRS mode while also *simultaneously* supporting RTCM 3.1Net style corrections in a Master Auxiliary format.

In general the software must be able to perform the following functions:

- Data collection from the reference stations
- Data storage and processing in the control center
- Produce correction data to field users
- Detect if real-time Ethernet connections to CORS have been lost. Upon re-connection the software must automatically download all remote CORS receiver memories and store the data in existing files. This will assure the State of a high degree of data integrity.
- The Software must work as a fully-integrated system with existing State-owned CORS receivers.

203.2 - Distribution of RTK data:

- The control center software must be capable of generating RTCM or CMR format RTK correction data. The software must be capable of generating RTCM and CMR simultaneously and distributing them on separate ports.
- The software must be capable of simultaneously operating as:
    - a single-base correction generator
    - RTCM 3.1 NET (Master Auxiliary Concept – MAC) standard generator
    - Virtual Reference station (Non-Physical or Computed Reference Station) generator
    - DGPS and RTK correction generator – simultaneously
    - FKP format must be supported *simultaneously* with other formats.

The Software must manage following tasks in this order:

- The software must take streamed (real-time raw data) from all connected reference stations and process the data to produce correction parameters for all observables.
- Antenna phase center corrections (relative or absolute) must be pre-catalogued in the software and are added to the observables.
- The control center software must compute models of ionospheric error, tropospheric error, orbit errors and real-time Multipath.
    - Tropospheric model: Based on a Modified Hopfield Model the software must compute corrections for the troposphere for the reference station. Tropo-model parameters must be sent with each data-block from the Network Processor.
    - Ionospheric model: Based on a Single Layer Model the software must compute corrections for the ionosphere for the reference station. Ionomodel parameters must be sent with each data-block from the Network Processor Processor.
    - Orbit model: Based on ultra rapid orbits the software must compute corrections for the satellite orbits for the reference stations.
- The carrier phase ambiguities must be fixed for the network stations.
- All the parameters of the network error influences must be stored in a database or in the Windows Registry
- Models must be used to predict the errors at each discrete users location.
- A Virtual Reference Station (VRS) must be created for the user location when requested via a rover's NMEA GGA position string. Network Corrections must be sent to the rover in the field using using a bi-directional IP based communication such as: GPRS, CDMA2000, IDEN.
- The VRS data is transmitted to the user in standard formats (RTCM 2.3 messages 18 and 19), RTCM 2.3 messages 20,21, message, released RTCM 3.1 and RTCM3.1NET messages or CMR.

203.3 - Data Communication to the Reference Station Receivers:

- Control Center software must be capable of full IP control of ethernet connected GNSS CORS receivers.
- The Control Center software must be capable of decoding all major brand GNSS CORS receivers.
- The software must be capable of decoding RTCM 3.1 messages with 1 Hz update rate as alternative real-time data input.
- Capability for remote configuration of the CORS Receivers must be via TCP/IP.
- The software must be able to support the following communication types to the Reference Station Receivers:
    - Serial Port Handler: connecting a data source (receiver, network router modem) using a serial cable directly to the software.
    - Socket Client: for connecting the software with the data source (receiver, network router) within a WAN/LAN using a TCP/IP interface. In this case, the data source will act as Socket Server.
    - Socket Server: for connecting the software with the data source (receiver, network router) within a WAN/LAN using a TCP/IP interface. In this case, the data source will act as Socket Client.
    - TAPI Ver 1.4 -2.2 Data Modem: For a connection to the data source (network router modem) via telephone line using any type of modem supported by Windows TAPI interface.
    - Multicast Socket Server: Multiple connections on one TCP/IP address on the same port
- The software must be able to accept Trimble RT27 raw data as streamed from existing GNSS CORS.
- The software must support a backup data line and be capable of automatically switching to a backup communications scheme if the main data line fails. The switch to a backup communications line must be user adjustable from the time of the main communication line failure.

- The software must be able to split the incoming raw data from the reference station receivers to another IP address to share the data with other service providers.

203.4 - Software Features:

- The software must be installed on a central computer(s).
- The software must not require a computer to be installed at each CORS site.
- The software must run under Windows Server 2003.
- The software must be configurable to use backup computers in a way that will allow distributed processing across multiple servers, provide redundancy, provide redundant archiving and split data to other services.
- The backup computer configuration capabilities must be documented and installed in at least three State DOT systems.
- The software must be able to run modular on different computers to support any network size and to support any numbers of incoming connections from field RTK rovers.
- The software must be able to process a network of 50 stations or more on one single PC computer.
- The graphical user interface of the software must contain the following items: a menu bar, a status bar, a navigator pane, an information pane, graph windows, output windows and control windows.
- The Software must be able to control an unlimited numbers of Reference Station Receivers.
- The software must be able to display the data (network) latency of the incoming data from the reference stations. This display must be in the form of a continuously updating bar graph showing latest packet delay and average network latency over a known number of epochs. This display must be capable of showing status and latency of all stations in a single window.
- The software must be able to analyze the data quality of the Reference Station Receivers.

- The software must be able to do Real-Time Multipath analyses of the reference station antennas and display this data as a color-coded polar plot.
- The software must be able to display temperature and voltage for suitably equipped receivers.
- The software must be able to save and load different configurations (without terminating the software).
- The software must be able to analyze and check the following subjects (with graphical and numerical display):
    - Point Position Analysis: showing difference, with respect to time, of north, east, height and horizontal differences between calculated and known position in meters
    - Single Point Position: computation of position averages and standard deviations from a receivers raw data
    - Raw Data: analysis and display of consistency of dual-frequency data for each satellite
    - Ionospheric Analysis: values show the effects on the measurement of satellites. These must be displayed for L1 in meters or as Total Electronic Count of the ionosphere. Values must be available in a single window for the current epoch, mean for the past 60 seconds, standard deviation for the past 60 seconds, minimum and maximum values over the past 60 seconds.
    - RAIM (Receiver Autonomous Integrity Monitoring) Analysis: The software must perform two RAIM functions. First, a receiver must monitor its own integrity without external position information. Second the RAIM capability must cross check to a Single-Point Position.
    - Availability: calculates and reports the availability of satellite observations. This data must be capable of being stored in a MS Office Access database
- The Software must be able to utilize Predicted Ultra Rapid Orbits published on the Internet by NASA Jet Propulsion Labs and the University of Bern.
- The software must be able to perform continuous coordinate monitoring of the reference stations. Graphical displays of the results must be implemented in the

software. The coordinate monitoring analysis must be capable of detecting errors in defined coordinates, wrong definition of antenna heights or antenna types.

- The software must have a network model integrity function.
- Software must be able to store multiple different files in RINEX, compact RINEX and Trimble .DAT format for each station as supplied by existing State-Owned CORS.
- The software must be able to support the NGS cooperative CORS file site structure.
- The software must be able to upload the RINEX data on a FTP Server automatically.
- The Software must be able to simultaneously support two network wide-area modelled real-time techniques.
- The software must display the I95 Index.
- Optionally, the software must be able to provide a web based solution for the delivery of RINEX data and provide VRS (modelled) RINEX data for a user-defined position.
- The Control Center software must be capable of distributing logged-on Rover locations via NMEA format to other applications.
- The software must be able to run continuous statistical analysis of rover positioning precision and accuracy, as well as initialization time and reliability.

203.5 - Alarm Generation:

The software must be able to generate alarms based on the following status:

- *Disk Watch*: Low disk space
- *Receivers*: No data from receiver
- Low virtual memory
- Station not available, corrections for station not available
- *RTK*: Not enough satellites fixed for a station
- *DGPS*: Not enough satellites fixed for a station
- *Rover positioning*: Initialization reliability too low, Initialization time >200 seconds, RMS of 3D position too high

If one of the software modules reports an error, an alarm window must pop up. Once an alarm is issued based on the individual configuration, the software must support different actions to perform after the alarm is issued:

- Send E-mail(s)
- Send compact E-mail(s)
- Play acoustic signal
- Send modem command
- Send boot command to power switch.
- Run a batch file

203.6 - Data Communication to the Users in the Field:

- Software must support the RTCM 3.1 standard
- Software must support the RTCM 3.1NET standard
- Software must support the RTCM 2.3 standard
- Software must support the CMR and CMR+ formats
- The software must be able to provide VRS and networking corrections in FKP at the same time.
- The software must be able to provide unlimited numbers of individual VRS stations to the users in the field
- The software must be able to support GSM, GPRS, CDMA2000, 1xRTT, IDEN for rover connections.
- The software must be able to support a dial-in broadcast when using GPRS.
- The software must be able to support NTRIP when using IP capable cellular connections.
- The software must provide user Authentication through username and password when using IP capable cellular connections.

203.7 - **References**:

- The supplier must state a proven track record supplying hardware and software for GNSS networks using the VRS technology.
- The supplier must state at least three networks with more than 100 reference stations connected supporting the VRS or FKP technology.
- The supplier must have installations in three or more networks of at least 50 stations owned and operated by North American State Departments of Transportation.
- The supplier must manufacture and own all rights to supplied hardware and software under a common label.

ADDITIONAL REQUIREMENTS:

This software must enable a single PC to centrally control and monitor all reference stations in network. Software must provide user with graphical analysis tools for monitoring the quality of the GPS reference network. Must provide user defined warnings and alarms and will notify the user or users on computer screen and/or text messages over cellular phone or pager when there are problems with the system. Software must be stable on MS Windows platforms. Software must log raw data in real-time and covert data to rinex files for storage on a central networked computer or server. Software must be able to compute and provide differential correctors using RTCM format for each station through the computer network.

The manufacturer must have been in business for a minimum of 5 years.

Annual service agreements or extended warranties must be available.

Minimum of 2 year warranty on hardware.

State of West Virginia RFQ NO. 639000024

VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with ***West Virginia Code***, §5A-3-37. (Does not apply to construction contracts). ***West Virginia Code***, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the ***West Virginia Code***. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

1. ___ **Application is made for 2.5% resident vendor preference for the reason checked:**
Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**

X Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**

___ Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; **or,**

2. X **Application is made for 2.5% resident vendor preference for the reason checked:**
Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

3. ___ **Application is made for 2.5% resident vendor preference for the reason checked:**
Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

4. X **Application is made for 5% resident vendor preference for the reason checked:**
Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; **or,**

5. ___ **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; **or,**

6. ___ **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: GPS INNOVATIONS INC Signed: [signature]

Date: 1/23/09 Title: BUSINESS MANAGER

**Check any combination of preference consideration(s) indicated above, which you are entitled to receive.*

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

VENDOR OWING A DEBT TO THE STATE:
West Virginia Code §5A-3-10a provides that: 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 the debt owed is an amount greater than one thousand dollars in the aggregate.

PUBLIC IMPROVEMENT CONTRACTS & DRUG-FREE WORKPLACE ACT:
West Virginia Code §21-1D-5 provides that: Any solicitation for a public improvement construction contract shall require each vendor that submits a bid for the work to submit at the same time an affidavit that the vendor has a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the West Virginia Code. A public improvement construction contract may not be awarded to a vendor who does not have a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the West Virginia Code and who has not submitted that plan to the appropriate contracting authority in timely fashion. For a vendor who is a subcontractor, compliance with Section 5, Article 1D, Chapter 21 of the West Virginia Code may take place before their work on the public improvement is begun.

ANTITRUST:
In submitting a bid to any agency for the state of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the state of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the state of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the state of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership or person or entity submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

LICENSING:
Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agencies or political subdivision. Furthermore, the vendor must provide all necessary releases to obtain information to enable the Director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

CONFIDENTIALITY:
The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures and rules. Vendors should visit **www.state.wv.us/admin/purchase/privacy** for the Notice of Agency Confidentiality Policies.

Under penalty of law for false swearing (West Virginia Code §61-5-3), it is hereby certified that the vendor acknowledges the information in this said affidavit and is in compliance with the requirements as stated.

Vendor's Name: GPS INNOVATIONS INC

Authorized Signature: [signature] Date: 1/23/09

DATASHEET

GeoXH handheld

KEY FEATURES

Real-time H-Star technology for decimeter to subfoot accuracy in the field

High-resolution VGA display for crisp and clear map viewing

Bluetooth and wireless LAN connectivity options

1 GB onboard storage plus SD slot for removable cards

Windows Mobile version 6 operating system

Rugged handheld with all-day battery

YOUR ULTIMATE SOLUTION FOR HIGH-ACCURACY ASSET MANAGEMENT

For high-accuracy GIS data collection and asset relocation, the Trimble® GeoXH™ handheld is the ultimate integrated solution. Engineered with H-Star™ technology, the GeoXH handheld delivers decimeter (10 cm) to subfoot (<30 cm) accuracy when you need it, making it the ideal device for electric and gas utilities, water and wastewater services, land reform projects, and other applications where on-the-spot positioning is crucial.

The unique GeoExplorer® 2008 series combines a Trimble GPS receiver with a rugged handheld computer, built for all-day use and packed with connectivity options. Technology this clever has never been more convenient.

Subfoot accuracy when you need it

When your GIS database requires the highest levels of accuracy, the GeoXH handheld is the answer. Using revolutionary Trimble H-Star technology, the GeoXH handheld delivers real-time subfoot (<30 cm) accuracy with the internal antenna, and decimeter (10 cm) accuracy with an optional Zephyr™ external antenna. Back-office data processing is eliminated, streamlining asset inventories and as-built mapping jobs.

Need to relocate assets in the field? The GeoXH handheld has you covered. Buried and hidden assets can be tracked down with ease, as the real-time high accuracy gets you straight to the point. Cables and pipes can be excavated without wasted effort or risk of damage to nearby assets.

Packed full of power

With a powerful 520 MHz processor, 128 MB RAM, and 1 GB of onboard storage, the GeoXH handheld is a high performance device designed to work as hard as you do. The handheld gives you all the power you need to work with maps and large data sets in the field, and its high resolution VGA display allows for crisp and clear viewing of your data.

The GeoXH handheld is powered by the industry-standard Windows Mobile® version 6 operating system so you can choose a software solution designed for your field requirements, whether off-the-shelf or purpose-built.

The Windows Mobile 6 operating system includes familiar Microsoft® software, including Word Mobile, Excel Mobile, and Outlook® Mobile, giving you all the tools you need for a seamless exchange of data between the field and the office.

Get the data you need, when you need it

With the GeoXH handheld you have the flexibility to work exactly the way you want to. Use the built-in wireless LAN connection to access your organization's secure network and get the most up-to-date information. And with Bluetooth® wireless technology, the GeoXH handheld offers wireless connection to a Bluetooth-enabled cellular phone for access to the Internet to receive real-time corrections from a VRS™ network and background map data. You can also wirelessly connect to other devices such as Bluetooth-enabled laser rangefinders and barcode scanners for convenient cable-free solutions that keep you productive in the field.

Built for the field

The GeoXH handheld has an integrated battery, good for a full day's work; simply charge the battery overnight and you're ready to go again. The GeoXH handheld will last the distance, and its rugged design can take a lot of punishment. Rain, hail or shine, it's built to keep working, whatever the weather throws at you.

When accuracy is critical

Rugged design and powerful functionality are the hallmarks of the GeoExplorer series. And now with H-Star technology providing decimeter to subfoot accuracy in real time, the 2008 series GeoXH handheld is your ultimate solution for high-accuracy asset management.

When accuracy is critical, the GeoXH handheld delivers—with unprecedented efficiency and reliability, when and where you need it.

Trimble

GeoXH handheld

STANDARD FEATURES

System
- Windows Mobile 6 (Classic edition)
- VGA display (480 x 640), sunlight-readable color touchscreen
- Integrated Bluetooth 1.2 wireless technology
- Integrated 802.11b/g wireless LAN
- Ergonomic cable-free handheld
- Rugged and water-resistant design
- All-day internally rechargeable Li-ion battery
- Marvell 520 MHz XScale processor
- 128 MB RAM
- 1 GB non-volatile Flash data storage
- Sealed SD/SDHC card slot
- Integrated speaker and microphone

GPS
- Integrated high-performance GPS/SBAS[1] receiver and L1/L2 antenna
- H-Star technology for subfoot (<30 cm) real-time or postprocessed accuracy
- Decimeter (10 cm) accuracy with an optional external Zephyr antenna
- RTCM and CMR real-time correction support
- TSIP and NMEA[2] protocol support
- EVEREST™ multipath rejection technology

Standard Software
- GPS Controller for control of integrated GPS and in-field mission planning
- GPS Connector for connecting integrated GPS to external ports
- Microsoft Office Mobile
- Transcriber (handwriting recognition)

Standard Accessories
- Support module
- AC Power supply with International adapter kit
- USB data cable
- Stylus (x 2)
- Screen protectors (2-pack)
- Quick Start Guide
- Getting Started CD
- Hand strap
- Pouch

OPTIONAL FEATURES

Optional Software
- TerraSync™ software
- Trimble GPScorrect™ extension for ESRI ArcPad software
- GPS Pathfinder® Tools Software Development Kit (SDK)
- GPS Pathfinder Office software
- Trimble GPS Analyst™ extension for ESRI ArcGIS Desktop software

Optional Accessories
- Power/serial dip (9-pin RS-232 serial connector and power input)
- Vehicle power adaptor[3]
- Li-ion external power kit[3]
- Null modem cable[3]
- Backpack kit
- Hard carry case
- Zephyr antenna kit
- 2 meter range pole
- Range pole bracket
- GeoBeacon™ receiver
- Anti-glare screen protectors (2-pack)

TECHNICAL SPECIFICATIONS

Physical
Size ..... 21.5 cm x 9.9 cm x 7.7 cm (8.5 in x 3.9 in x 3.0 in)
Weight ..... 0.81 kg (1.79 lbs) with battery
Processor ..... 520 MHz Marvell PXA-270 XScale processor
Memory ..... 128 MB RAM and 1 GB internal Flash storage
Battery ..... Internal 7500 mAh lithium-ion
27.8 Watt-hours, rechargeable in unit

Power usage
Low (no GPS or backlight) ..... 1.8 Watts
Normal (with GPS and backlight[4]) ..... 3.2 Watts
High (with GPS, backlight[4], Bluetooth, and wireless LAN)[5] ..... 4.3 Watts

Environmental
Operating temperature ..... –20 °C to +60 °C (–4 °F to 140 °F)
Storage temperature ..... –30 °C to +70 °C (–22 °F to 158 °F)
Casing ..... Dust-proof and resistant to heavy wind-driven rain per IP 65 standard
Slip-resistant grip, shock and vibration resistant
Drop ..... 0.9 m (3 ft) MIL-STD-810F, Method 516.5, Procedure IV

Input/Output
Expansion ..... SD card slot (SD or SDHC storage cards)
Display ..... 8.9 cm (3.5 in) VGA (480 x 640 pixel) TFT, 16 bit (65,536) colors
LED backlight
Interface ..... Touch screen, 10 hardware control keys, power status LED
Audio system events, warnings, and notifications
Soft Input Panel (SIP) virtual keyboard and handwriting recognition software
Audio ..... Microphone and speaker, record and playback utilities
I/O ..... USB 1.1 dient via support module
Serial via optional 9-pin RS-232 power/serial clip adaptor
Radios[6] ..... Bluetooth 1.2, Wireless LAN 802.11b/g

GPS
Channels ..... 26 (12 L1 code and carrier, 12 L2 carrier, 2 SBAS)
Integrated real-time ..... SBAS[1] (dual-channel tracking)
Update rate ..... 1 Hz
Time to first fix ..... 30 seconds (typical)
Protocols
Data output ..... TSIP, NMEA-0183 v3.0 (GGA, VTG, GLL, GSA, ZDA, GSV, RMC)[2]
Real-time corrections ..... RTCM 2.x, RTCM 3.0, CMR, CMR+

Accuracy (HRMS)[7] after differential correction
Real-time positioning
H-Star[8] with internal antenna (within a VRS network, or <80 km) .. Subfoot (<30 cm)
H-Star[8] with optional Zephyr antenna
Short baseline (within a VRS network, or <30 km) ..... 10 cm
Long baseline (30–80 km) ..... Subfoot (<30 cm)
Code corrections (SBAS[1] or external correction source) ..... Submeter
Postprocessed positioning
H-Star[8] with internal antenna (<80 km, or 3 bases within 200 km) . Subfoot (<30 cm)
H-Star[8] with optional Zephyr antenna
Short baseline (<30 km) ..... 10 cm
Long baseline (30–80 km, or 3 bases within 200 km) ..... 20 cm
Code postprocessed ..... Submeter

1 SBAS (Satellite Based Augmentation System). Includes WAAS available in North America only, EGNOS available in Europe only, and MSAS available in Japan only.
2 NMEA output of real-time H-Star corrected data is not supported.
3 Power/serial dip also required.
4 With backlight at default setting (50% brightness).
5 Power draw will vary depending on radio usage.
6 Bluetooth and wireless LAN type approvals are country specific. GeoExplorer 2008 series handhelds have Bluetooth and wireless LAN approval in the U.S. and in most European countries. For further information please consult your local reseller.
7 Horizontal Root Mean Squared accuracy, 1-sigma (63%). Requires data to be collected with minimum of 5 satellites, maximum PDOP of 6, minimum SNR of 39 dBHz, minimum elevation of 15 degrees, and reasonable multipath conditions. Ionospheric disturbances, multipath signals or obstruction of the sky by buildings or tree canopy may degrade precision by interfering with signal reception. Except when using VRS corrections, accuracy varies with proximity to base station by +1 ppm for postprocessing and real-time.
8 H-Star specified accuracy is typically achieved within 2 minutes. Requires data to be collected using Trimble field software.

Specifications subject to change without notice.

Bluetooth®

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE

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Trimble.

www.trimble.com
store.trimble.com

KEY FEATURES

Smart time-saving features for effortless GIS data collection and maintenance

Seamless GPS control for quality position data

Graphical navigation and real-time map display

Runs on Trimble's ruggedized Windows Mobile field computers

H-Star data collection for high accuracy with the GPS Pathfinder ProXRT and ProXH receivers, or the GeoXH handheld

Real time GLONASS support for the GPS Pathfinder ProXRT receiver and Trimble R8 GNSS receiver

FIELD SOFTWARE FOR QUALITY GIS DATA

The TerraSync™ software is powerful field software, designed for fast and efficient data collection and maintenance. Teamed up with a supported Trimble® GPS receiver and a field computer of your choice, it's all you need to collect quality feature and position data for your geographic information system (GIS).

Effortless data collection

Whether you need to collect many identical assets or a range of assets with many different attributes, the TerraSync software lets you capture high quality data quickly and easily. You can create a data dictionary based on the enterprise GIS so that features, attributes, and acceptable attribute values match the GIS data structure. Now you can be sure that the data you collect will always meet the decision makers' requirements.

Using a data dictionary improves efficiency and ease of use in the field, with time-savers like pre-defined pick lists and automatic generation of date and time values. And, to make your field session effortless, the TerraSync software puts smart features—like map-centric operation, graphical status display, and the ability to record a position offset if you can't get right to the feature—at your fingertips.

The TerraSync software makes it easy for you to incorporate photo capture into your data collection workflow when using a Trimble handheld with an integrated camera. TerraSync enables you to take and preview photos, automatically attaches them to the current feature, and stamps each photo with the time, date and location at which it was taken.

Smart data maintenance

When you need to go back into the field to verify and update your GIS data, the TerraSync software makes the job as quick as possible. Waypoint files can be created within TerraSync software, or imported from GPS Pathfinder® Office software, to help you navigate in the field. You can sort and filter imported features from your GIS, based on the order you want to visit them. Features can be viewed as a simple list, or on the color-coded map with an aerial photo or satellite image in the background for reference. To revisit an asset, select the corresponding feature from the list or map, and then let the intuitive graphical GPS navigation tools guide you to precisely where you need to go. TerraSync even integrates with popular turn-by-turn navigation software such as CoPilot Live 7 Professional. When you start navigating to a feature or waypoint, the TerraSync software passes that location to your turn-by-turn software, which quickly and safely guides you to your destination. Once you've visited an asset, the TerraSync software automatically marks it as updated.

Quality control made easy

With the TerraSync software it's a breeze to collect data to your required accuracy, either when collected in real time in the field, or to that predicted after postprocessing. Simply use the accuracy-based logging settings to specify the GPS data quality that your enterprise GIS demands and let TerraSync do the rest. To make sure your time in the field will be productive, use the Plan section to view a graphical prediction of the satellite constellation and identify the best times for data collection.

The TerraSync software integrates seamlessly with a range of Trimble GPS receivers to give you the high quality data you need. You can differentially correct your data back in the office, use real-time differential GPS, or both—the choice is yours. For extra precision, collect H-Star™ data with a GPS Pathfinder ProXRT receiver, a GPS Pathfinder ProXH™ receiver, or a GeoXH™ handheld. Completely integrated with existing data collection workflows, H-Star technology makes high accuracy data collection faster and easier than ever before.

Whichever combination of GPS receiver and correction method suits your needs, you can be sure of clear feedback while you work, and first-class data for your GIS.

Simple, effective, and productive in the field—the TerraSync software is the easy-to-use tool you need to collect and maintain quality GIS data.

Trimble

TerraSync software

FEATURES AND OPTIONS

Key features
- Collect position, feature, and attribute data
- Industry-leading GPS receiver configuration and control
- Fast, real-time map display supports multiple raster and vector background maps
- Graphical screens for navigation back to selected features
- Integrates with CoPilot Live 7 Professional software for TerraSync, and TomTom Navigator 6 software
- Waypoint support for productive use of field time
- Data dictionary editor for customized data collection requirements
- Data dictionary capabilities allow in-field modifications to data dictionaries
- Mission planning to find the best time to collect data
- Supports multimedia attributes such as voice and image files
- Optimized for Trimble handhelds with integrated digital cameras
- Send and receive files by e-mail directly in the field
- Supports ESRI Shapefiles

GPS accuracy
- Real-time differential correction (available sources depend on GPS receiver used)
- Improved position accuracy with differential postprocessing of GPS data
- Achieve up to decimeter accuracy using real-time or postprocessed H-Star technology (dependent on H-Star-capable receiver and antenna combination used)
- Support for collection of RTK data with Trimble 5800, R8, and R8 GNSS receivers

Software editions
- TerraSync Standard edition for data collection
- TerraSync Professional edition for data collection and maintenance

For a product comparison of the Standard and Professional editions visit: www.trimble.com/mgis_prodcomp.shtml

Supported GPS receivers
- GPS Pathfinder ProXT™ receiver
- GPS Pathfinder ProXH receiver
- GPS Pathfinder Pro XRS receiver
- GPS Pathfinder ProXRT receiver
- GPS Pathfinder XB receiver
- GPS Pathfinder XC receiver
- Trimble 5800 receiver
- Trimble R8 receiver
- Trimble R8 GNSS receiver

Supported field computers with integrated GPS
- GeoXH handheld
- GeoXT™ handheld
- GeoXM™ handheld
- Juno™ SB handheld
- Juno SC handheld
- Juno ST handheld
- Trimble Nomad™ G series handheld
- Trimble Recon® GPS XB edition
- Trimble Recon GPS XC edition

Supported field computers
- Trimble Ranger™ handheld
- Trimble Recon handheld
- Any field computer running a supported Windows® operating system

Available languages
- Chinese (Simplified)
- English
- French
- Russian
- German
- Italian
- Japanese
- Korean
- Portuguese
- Spanish

RECOMMENDED PLATFORM

Windows Mobile field computer

Operating system ..... Windows Mobile® version 5.0 software or Windows Mobile version 6
Processor type ..... ARM or XScale
Processor speed ..... 200 MHz or faster
Memory ..... 32 MB RAM at least 8 MB free memory
Input/output ..... Serial cable and RS-232 serial port (or appropriate adaptor) or Bluetooth® technology for connection to GPS Pathfinder Pro series receiver or GPS Pathfinder XB receiver
Display ..... Color touch screen (240 x 320 pixels or larger) Reflective screen (or other screen suitable for outdoor viewing)

Windows field computer

Operating system ..... Windows® 2000 or Windows XP (Home, Professional, or Tablet PC Edition) (32- or 64-bit versions) or Windows Vista® (Home, Business, or Ultimate editions) (32- or 64-bit versions)
Processor type ..... Intel Pentium CPU
Processor speed ..... 500 MHz or faster
Memory ..... 64 MB RAM at least 8 MB free memory
Input/output ..... Serial cable and RS-232 serial port (or appropriate adaptor) or Bluetooth technology for connection to GPS Pathfinder Pro series receiver or GPS Pathfinder XB receiver

SUPPORTED BACKGROUND FILE FORMATS

Vector formats
- Trimble SSF format (.ssf, .cor, .imp)
- ESRI Shapefiles (.shp)

Raster (image) formats
- JPEG (.jpg)
- JPEG 2000 (.jp2, .j2c)
- Enhanced Compression Wavelet (.ecw)
- MrSID (.sid)
- TIFF (.tif)
- Windows bitmap (.bmp)

GPS POSTPROCESSING OPTIONS
- GPS Pathfinder Office software
- Trimble GPS Analyst™ extension for ESRI ArcGIS Desktop software

Specifications subject to change without notice.

Bluetooth®

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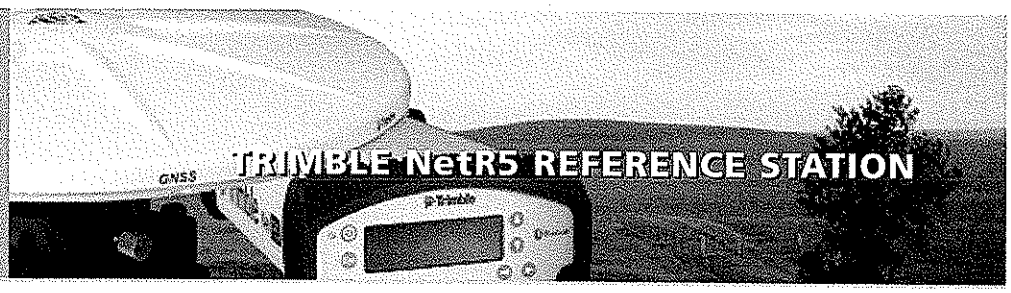
DATASHEET



TRIMBLE NetR5 REFERENCE STATION

KEY FEATURES

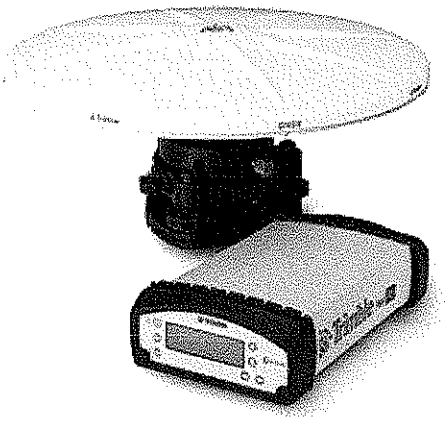
Proven GNSS technology from Trimble

Automatic and secure file upload

External memory options for greater data storage

Designed to optimally support the Trimble GNSS infrastructure solution

Rugged, lightweight, and power efficient



The Trimble® NetR5™ Reference Station is a multi-channel, multi-frequency GNSS (Global Navigation Satellite System) receiver designed for use as a stand-alone reference station or as part of a GNSS infrastructure solution.

TRIMBLE R-TRACK TECHNOLOGY FOR COMPREHENSIVE GNSS SUPPORT

Trimble® R-Track™ technology in the NetR5 receiver supports the modernized GPS L2C and L5 signals as well as GLONASS L1/L2 signals. This extensive GNSS support is capable of providing users with real field benefits.

With the world's GNSS in constant development, surveying businesses small and large can be confident in the results achieved using a Trimble solution. Trimble, already proven in GPS technology, will continue to lead the industry in GNSS support. And this will protect your investment in the Trimble NetR5 for many years to come.

HARDWARE AND SOFTWARE DESIGNED WITH THE USER IN MIND

The Trimble NetR5 is ideal for many different purposes. In the field it's rugged and lightweight, and consumes very little power due to its purpose-built ASIC (Application Specific Integrated Circuit) platform. The NetR5 can operate up to 15 hours in tough conditions on a single charge. It is also easy for any user to configure via its simple front panel; a software interface is not required. The front panel also enables you to quickly check the receiver's status.

Collect, store, and transfer large amounts of data easily and conveniently via the NetR5 receiver's limitless expandable memory. The receiver supports USB devices such as memory sticks as well as external hard drives. The Trimble NetR5 also offers "FTP Push", which is a function that automatically and securely uploads data files, and which removes the need for manually copying receiver files for significant time savings. The receiver can also function as an FTP server for those wanting to retrieve files manually. The receiver has an internal battery (~15 hours) which will act as backup in case of any external power failures.

The Trimble NetR5 works seamlessly with Trimble's infrastructure software Trimble® GPSBase™ and Trimble® GPSNet™. Additionally, the software has security options to restrict access to only those who are permitted. The software is available in eight languages, allowing most users to control the receiver in their language of choice.

AN IMPORTANT COMPONENT OF A TRIMBLE GNSS INFRASTRUCTURE SOLUTION

Trimble® GNSS Infrastructure is the most established and widely used GNSS infrastructure solution available. Additionally, all components of Trimble GNSS infrastructure—including the Trimble NetR5 reference station—are designed to work together. This means the solution is scalable; that is, it will grow with you as your business needs change. And the solution is part of Trimble's Connected Survey Site model, where products, techniques, services, and relationships combine to take your business to unprecedented levels of achievement.

With numerous fully modeled Trimble® VRS™ networks all over the world and dedicated Trimble GNSS infrastructure engineers on hand to support your unique needs, Trimble GNSS infrastructure solutions are always a wise investment. Surveying professionals can rely on Trimble's experience and expertise in this field, and be confident that choosing a Trimble GNSS infrastructure solution is the right decision.

Trimble

TRIMBLE NetR5 REFERENCE STATION

PERFORMANCE SPECIFICATIONS

- Trimble R-Track technology
- Advanced Trimble Maxwell™ Custom Survey GNSS Chip
- High precision multiple correlator for GNSS pseudorange measurements
- 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 ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- 72 Channels:
  - GPS L1 C/A Code, L2C, L1/L2/L5[1] Full Cycle Carrier
  - GLONASS L1 C/A Code, L1 P Code, L2 P Code, L1/L2 Full Cycle Carrier
  - SBAS WAAS/EGNOS support

Data Storage

Internal memory ..... 59 MB (1620 hours) of raw data observables based on recording data from 6 satellites at 15 sec epoch intervals

External memory ..... Support for USB memory stick and USB hard drives allowing several hundred GB to be stored for applications requiring more memory

Code differential GPS positioning[2]

Horizontal ..... ±0.25 m + 1 ppm RMS
Vertical ..... ±0.50 m + 1 ppm RMS
WAAS differential positioning accuracy[3] ..... typically <5 m 3DRMS

Static and FastStatic GPS surveying[2]

Horizontal ..... ±5 mm + 0.5 ppm RMS
Vertical ..... ±5 mm + 1 ppm RMS

Kinematic surveying[2]

(Available only when used as a rover integrity receiver in the GPSNet software)

Horizontal ..... ±10 mm + 1 ppm RMS
Vertical ..... ±20 mm + 1 ppm RMS
Initialization time ..... typically <10 seconds
Initialization reliability[4] ..... typically >99.9%

ELECTRICAL

- 10.5 V to 28 V DC input power range on lemo port with over voltage protection
- 9.5 V to 28 V DC input on 26 pin D sub connector with over voltage protection
- Integrated internal battery 7.4 V, 7800 mA-hr, Li-Ion 15 hours of continuous operation
- Internal battery operates as a UPS in the event of power source outage
- Internal battery will charge from external power source when input voltage is >15 V
- Integrated charging circuitry

Power consumption

Power ..... 4.8 W average
Size ..... 24 cm x 12 cm x 5 cm (9.4 in x 4.7 in x 1.9 in) including connectors
Weight ..... 1.55 kg (3.42 lb) receiver with internal battery

REGULATORY COMPLIANCE

FCC Part 15 (Class B Device), CE mark, C-tick Industry Canada ICES-003, RSS-210, RSS-Gen, RSS-310

ENVIRONMENT

Operating temperature[5] ..... –40 °C to +65 °C (–40 °F to +149 °F)
Storage temperature ..... –40 °C to +80 °C (–40 °F to +176 °F)
Humidity ..... MIL-STD 810F, Method 507.4
Vibration ..... Operating: 10 Hz to 300 Hz 0.04 g^2/Hz, 300 Hz to 1000 Hz -6dB/octave
Shock ..... Survival: 75g, 6ms, Non-operating: survives 1 m drop onto hard surface

- Waterproof to IP67 for submission to depth of 1 m (3.28 ft)
- Fully sealed from sand, dust and moisture

Communication

- NTRIP server and client functionality
- 1 LAN port:
  - 1 port with RJ45 connector supports links to 10BaseT/100BaseT networks
  - All functions are performed through a single IP address simultaneously—including web GUI access, FTP file transfer, and raw data streaming
- 3 RS232 ports[6]:
  - One or more serial ports can be used simultaneously for local CMR or RTCM correction transmission or a remote PPP dial-up through a modem supporting all the same functions that are available through the 10BaseT/100BaseT port
- Bluetooth® port[7]:
  - Multiple Bluetooth connections are supported to configure the receiver over PPP
- 1 USB port:
  - Allows the connection of external USB memory sticks or hard drives for increased data storage
- Security features:
  - Client authentication for datastreams
  - Configurable ethernet ports for HTTP, and FTP
  - WebGUI access can be password protected with variable security settings
  - Email client for alarming and notification of various receiver parameters

Positioning and Outputs

- 1 Hz, 2 Hz, 5 Hz, 10 Hz and 20 Hz positioning, internal/external logging and data streaming outputs
- RT-17/RT-27 outputs
- CMR, CMR+, BINEX and RTCM 2.1, 2.2, 2.3, 3.0 outputs

Control Software

HTML web browser ..... Internet Explorer 6.0 or later, Firefox 1.50 or later

ANTENNA

- Zephyr Geodetic model 2, and EDO Dorne & Margolin Choke Ring Antenna

1 The availability of the L5 signal is dependent on the US Government.
2 Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry, and atmospheric conditions. Always follow recommended survey practices.
3 Depends on WAAS/EGNOS system performance.
4 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
5 The receiver will operate normally to -40 °C, internal batteries are rated to -20 °C.
6 Use of three serial ports requires use of an adaptor that is not included with the kit. Contact your local Trimble authorized distribution partner for more information.
7 Bluetooth type approvals are country specific. Contact your local Trimble authorized distribution partner for more information.

Specifications subject to change without notice.

TRIMBLE AUTHORIZED DISTRIBUTION PARTNER

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TRIMBLE GPSNet SOFTWARE TECHNICAL NOTES

For complete GNSS reference station management, the worldwide preferred choice is Trimble® GPSNet™ reference station software. Trimble GPSNet manages more reference stations 24/7 than any other GNSS infrastructure solution; it is the industry standard for quality and reliability.

The Trimble® GPSNet software is designed to connect to and control multiple reference stations in a GNSS infrastructure network. It is an integral part of the scalable Trimble GNSS infrastructure solution of small, medium, and full installations. In the Trimble solution, users of GPSBase™ software with a single reference station can upgrade to GPSNet as they expand to multiple reference stations; with the addition of the RTKNet™ module, a multiple reference station solution can expand into a full Trimble® VRS™ network.

Trimble GPSNet enables one person to operate a large number of GNSS reference stations in a network covering a wide geographic area. Using GPSNet, any company or government organization can set up a fixed reference station network over a city, state, or country to provide continuous RTK corrections and postprocessed data. Such a network eliminates the need for temporary GNSS base stations for individual projects, thereby saving significant time and money. Authenticated users in a wide variety of applications can utilize and benefit from the network.

When used with a Trimble® NetR5™ reference station, GPSNet software can process both GPS and GLONASS data. The new civil signal GPS L2C is used by GPSNet to improve ambiguity resolution, provide ionospheric modeling, and generate network corrections.

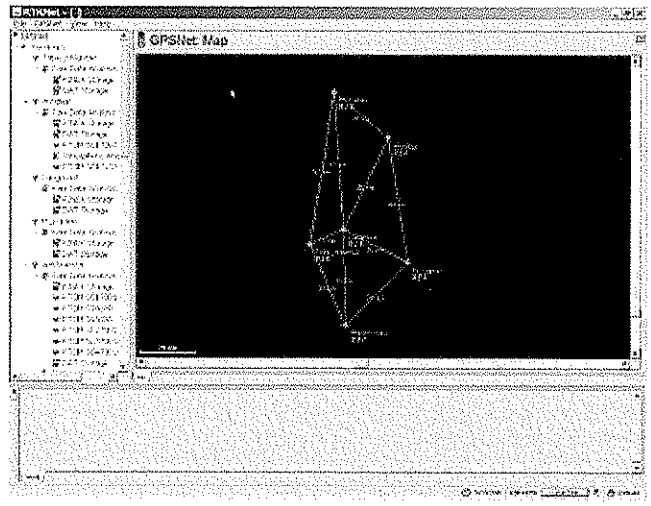
UNIQUE AND POWERFUL TOOLS FOR NETWORK MANAGEMENT

Trimble GPSNet connects to the GNSS reference stations in a network using either a LAN/Internet or modem connection. At a central location a single operator can then use the software to monitor the status and performance of all reference stations in the network. GPSNet also provides the operator with unique and powerful tools for data management and distribution, receiver operation, and integrity monitoring.

With Trimble software managing and monitoring the integrity of a GNSS infrastructure solution, all owners and users of the network can experience optimum performance from the network and quality assurance in their data.

CUSTOMIZED GNSS INFRASTRUCTURE SOLUTIONS

At Trimble, we focus on the needs of our customers, so every Trimble GNSS infrastructure solution with GPSNet software is completely customizable to meet unique or regional requirements. Whether a service provider needs to configure a handful of GNSS reference stations or model the systematic errors within a large network, Trimble has a practical, scalable, reliable solution.



The Trimble GPSNet software connects to and controls multiple reference stations in a GNSS infrastructure network.

1 GPSNet software is not limited to use with Trimble reference stations: when used with third-party reference stations, GPSNet not only provides connection, but also total control.

Trimble

In a medium-sized Trimble GPS infrastructure installation, a single operator uses the GPSNet™ software to manage a large number of permanent reference stations from a central location. Users receive single-reference-station GPS corrections over a wide geographic area.

TRIMBLE GPSNet: MULTIPLE REFERENCE STATION CONTROL

Trimble GPSNet connects to a reference station, such as the Trimble NetR5, via a LAN/Internet or modem connection. Through this connection the software is able to configure the receiver using settings specified by the operator. These settings typically include activation of data logging, epoch rate, and elevation mask. The software thus provides total control of the Trimble or third-party receiver.

The configured receiver sends raw data to the server for integrity analysis by GPSNet. Because this process uses raw observables from the receiver, valuable information is not lost through conversion to a message protocol such as RTCM.

The data analysis carried out in GPSNet includes a realtime multipath plot/reduction of data, which changes with time to accommodate seasonal variations. Continuous integrity monitoring is performed by the software to ensure that only high quality data is used in the network processing.

Following analysis, only high quality data is distributed for real-time correction broadcast from a single reference station, or passed on to the RTKNet module for realtime processing.

RTCM and CMR Generation

With Trimble GPSNet, data can be generated in standard message protocols such as RTCM and CMR. All types of RTCM outputs are supported, including 2.1–3 and 3.0. The new RTCM 3.0 network RTK messages are also supported by Trimble GPSNet. These messages can be either used in broadcast or "dial-in" mode.

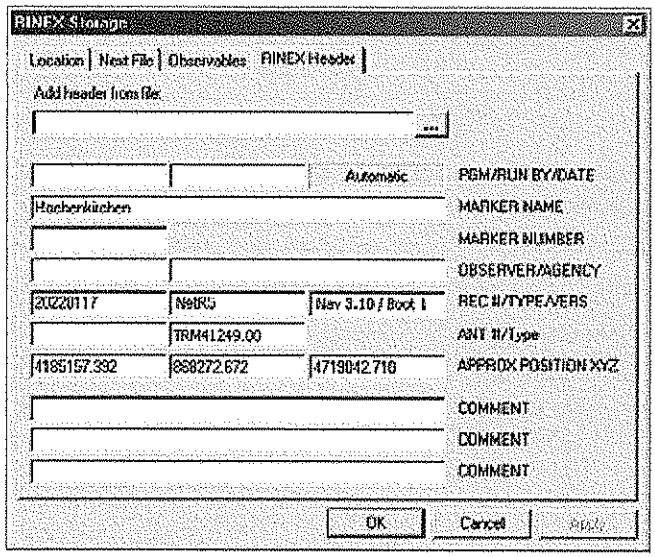
These outputs are fully configurable for maximum flexibility. And they can be output from each individual reference station either by direct Internet connection, NTRIP, modem link, or serial port.

Reference stations under GPSNet control can be equipped to broadcast corrections in the format of the operator's choice. Using a communication option such as the Trimble HPB450 radio modem, receivers can broadcast corrections for use by rovers in the field.

DATA STORAGE

GPSNet provides powerful features for storing data in industry-standard formats, for example, RINEX and DAT files:

- RINEX headers are fully customizable to meet the specific needs of a business or user.
- If data must be logged at different rates or for different file sizes, then multiple sessions can be logged.
- Several compression options are offered for data: RINEX and DAT files can be zipped, and Hatanaka compression is possible for RINEX files.
- Multiple FTP sessions can be created for upload to remote servers.
- Data storage space is managed by the DiskWatch utility. This customizable utility deletes files by date, type, or remaining disk space.



INTEGRITY MONITORING

Trimble GPSNet is designed to constantly monitor the integrity of the complete infrastructure solution. Its powerful integrity monitoring functions ensure that the system is fully operational and providing correct information. Its integrity checks include, but are not limited to:

- Coordinate Monitoring
- Position and status of the reference stations
- Quality of raw data observables
- Quality of final solution indices

Coordinate Monitoring

Trimble GPSNet continuously monitors the coordinates of all station positions with centimeter accuracy. This safeguards the consistency of the network and the quality of the service for field users. The Coordinate Monitor indicates changes in station positions caused by, for instance, human interference, subsidence, or land slides. It thus serves as a precise tool for deformation analysis.

Automated Fault Tolerance

GPSNet warns of critical situations via an automatic alarm system. An e-mail, sound, or visual cue is used to warn of issues such as low disk space, communication or satellite tracking problems, inability to compute network corrections, and reference station movement.

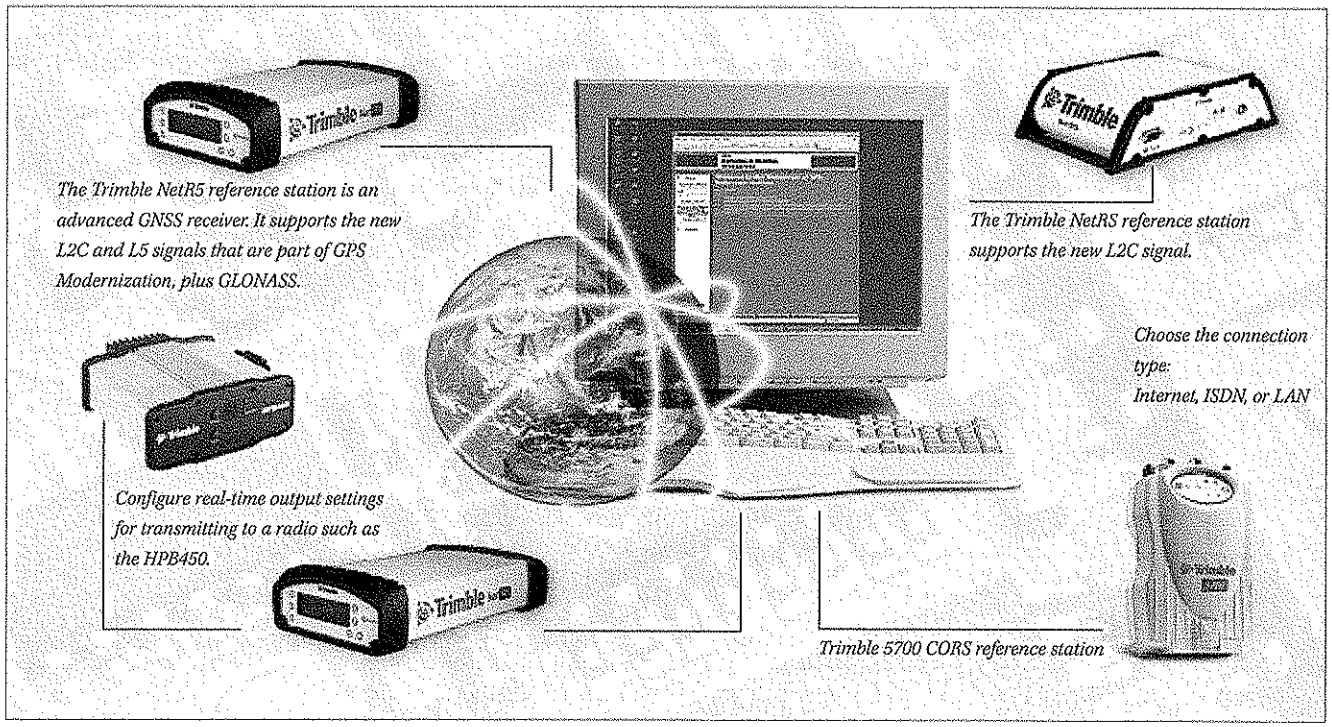
Data Storage Integrity Check

GPSNet includes a Storage Integrity module that works with the Trimble GNSS system to ensure that DAT and RINEX files are complete. In the event of real-time data transfer problems, the module downloads missing data from the reference station automatically once communication is restored. This feature ensures that in any communication outage or server problem DAT and RINEX files can be obtained to maintain 100% of the data for postprocessing.

Fully Redundant Systems

Trimble GPSNet supports multi-server installations to distribute functionality among PC hardware. A fully redundant system can be set up in such a configuration. Each part of the software can be configured in a way that a backup Server-PC is taking over the functionality once the primary server-PC is malfunctioning. Such a fault-tolerant system set up is ideal for 24/7 operation.

GPSNET REFERENCE STATION MANAGEMENT

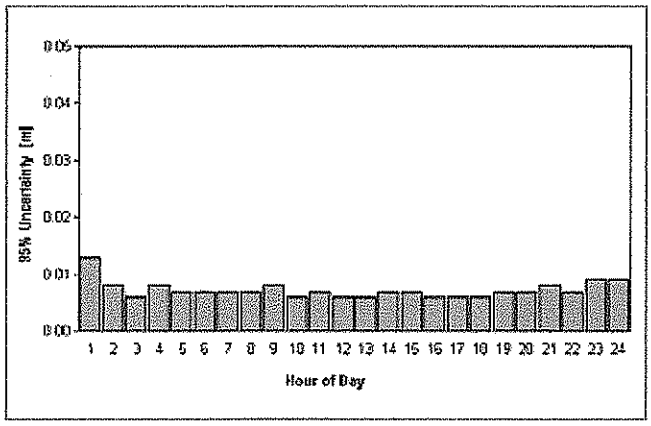


FULL REFERENCE STATION NETWORKS: RTKNet AND TRIMBLE VRS

With the addition of the powerful Trimble RTKNet module to GPSNet™, a multiple reference station solution can expand into a full Trimble VRS network. Trimble VRS is the ultimate step in a scalable Trimble GPS infrastructure solution.

Once the reference stations in a network have sent raw data to the GPSNet software, the data can be processed in the Trimble RTKNet module. RTKNet uses the data to produce real-time correction models that allow users in the field to access RTK (real-time kinematic) positioning over a wide area. Centimeter accuracy is possible 24/7 throughout the network.

RTKNet can process up to 100 reference stations on one PC[2] to maximize the ease of managing large reference station networks. This is achieved by a new technology developed by Trimble based on parallel filters modeling all error sources in the network.



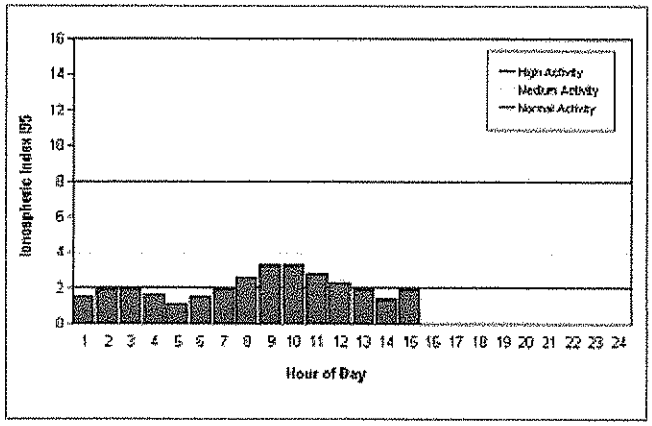
View the remaining ionospheric errors in your network after applying the corrections.

Ionospheric and Tropospheric Modeling for Generating Corrections

When Trimble GPSNet receives data from the reference stations in a network, it synchronizes the raw observables to the same epoch before forwarding them to the RTKNet processor. RTKNet then uses the data to calculate ionospheric and tropospheric models. This modeling enables an operator to monitor ionospheric activity during the day and to predict the remaining geometric and ionospheric errors at each reference station after the models are taken into account. The operator is thus able to see how well the system is performing in times of high ionospheric activity, which assists in troubleshooting and integrity monitoring.

Using automatically downloaded predicted orbits[3], the network is solved in RTKNet, and ionospheric activity can be viewed using industry-standard I95 plots. Once the network is solved—in just a few minutes—users with access can perform VRS surveys.

Again, the quality control information that the Trimble GNSS infrastructure software produces is extensive and indepth, so data and network integrity is assured. RTKNet regularly produces reports on the network, and displays the status of each reference station in real-time.



View the actual inospheric activity in your network over the day and see how it changes.

2 *Dual-processor, >3 GHz, 2 GB RAM required.*
3 *Downloaded predicted orbits are significantly more accurate than broadcast ephemerides from the satellites.*

CONVENIENT, EASY-TO-USE WEB INTERFACE

With the optional Trimble WebServer software, multiple reference station supervision is as easy as logging onto a customized Web site. The Trimble WebServer application presents the data produced by Trimble GPSNet in a Web page that can be completely customized to suit a service provider's unique needs in appearance, functionality, and controlled access.

The WebServer interface publishes several useful items, including:

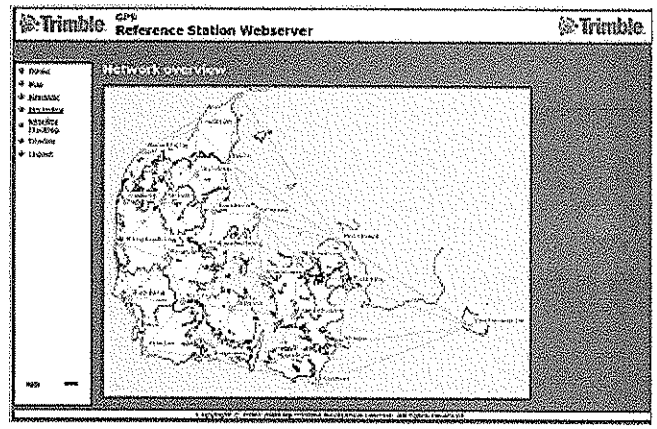
- View I95 plots and reports
- Monitor ionospheric activity and tropospheric errors in the network
- View satellite tracking and coordinates for each reference station
- Download RINEX files (virtual and actual) for a user-specified time span
- Request RINEX files to be automatically e-mailed at a specified time

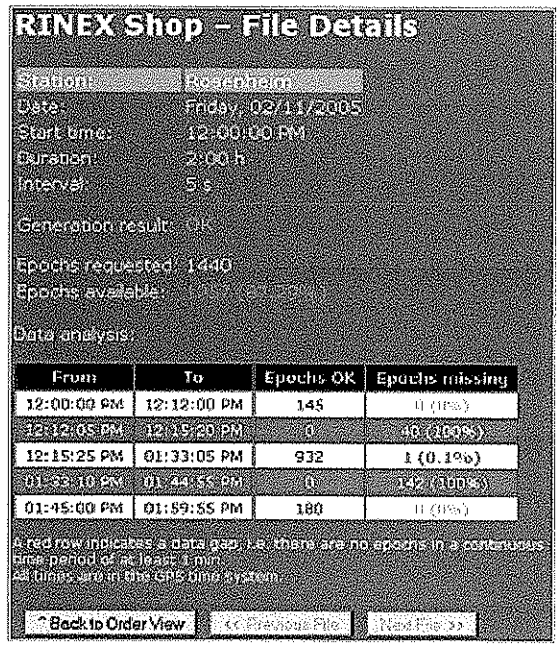
Like the network itself, the WebServer Web site is easily adapted, so that user groups can have varying levels of secure access.

CUSTOMIZABLE APPEARANCE

A service provider can customize the appearance of its WebServer Web site by adding colours and images, such as a company logo, for branding purposes. Links to supporting Web sites can also be added. The WebServer Web site becomes an integral part of your company and business.

WebServer can also be customized to support most languages.





Many different reports and graphs are available via the Web browser to keep users and/or administrators informed of current network status. A RINEX shop allows users to request and download RINEX files for postprocessing.

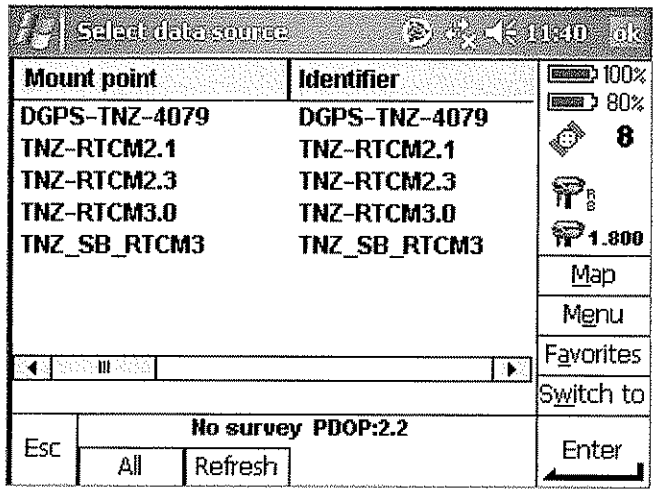
Once a Trimble GNSS network is established, a surveyor or engineer in the field with a GNSS rover that supports RTCM 2.*X*, 3.0 and CMR can access centimeter-accurate positioning information at any time. Access is obtained via cell phone "dial-in" or the NTRIP protocol.

SOPHISTICATED AND SECURE ACCESS

NTRIP Standard Protocol

The Trimble GNSS infrastucture solution supports NTRIP (Networked Transfer of RTCM via Internet Protocol), which is an RTCM-approved, publicly available, non-proprietary Internet protocol for distributing differential corrections and other GNSS data over the Internet. NTRIP allows multiple receivers to connect to the network simultaneously and securely. It also supports wireless Internet access through Mobile IP Networks such as GPRS and 1xRTT. NTRIP is therefore ideal for supporting precision navigation applications worldwide.

NTRIP provides secure access by allowing multiple users to connect without coming into direct contact with each other or the service provider. And NTRIP streams are usually not blocked by firewalls or proxy servers protecting Local Area Networks.



NTRIP source table listed in Trimble Survey Controller field software.

Authenticated User Access, Auditing and Accounting

To protect the infrastructure network from exploitation by unauthorized users, GPSNet™ offers powerful authentication features to ensure that only approved users can access the network. Using Trimble GPSNet a service provider can control user access in many different ways. Access can be unlimited or selective:

- Users trying to connect to the network must enter a password before they are granted access.
- Users can be granted different levels of services. For example, a service provider may offer three levels of service: a Trimble VRS (centimeter accuracy) for premium users, a networked DGPS solution (50 cm accuracy), and a traditional single-base RTK or DGPS.

GPSNet also enables service providers to implement their own tools to audit user access, that is, for information on the number of times a user accesses the network, the length of time spent on the network, and the amount of data accessed. Accurate billing is therefore assured, as well as transparency of invoicing to the client.

GPSNet offers authentication via the NTRIP protocol or the CISCO Access Server.

Powerful Trimble Survey Controller Field Software

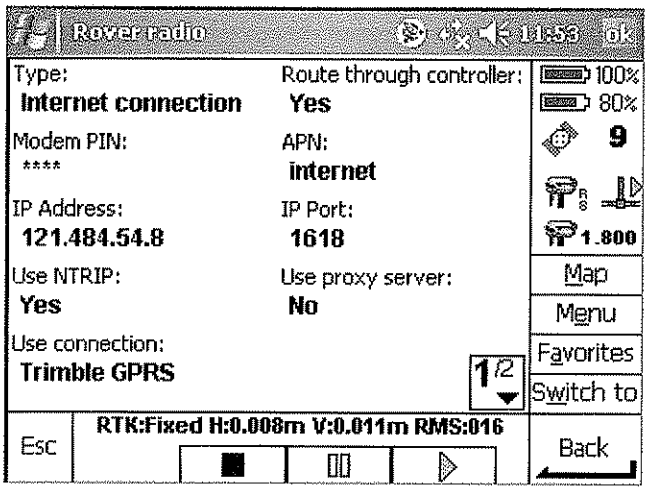
The Trimble Survey Controller™ field software is a powerful field solution for infrastructure network users. Its unique infrastructure-supporting features include:

- Cable-free connection to the Internet through a GSM/GPRS cell phone with Bluetooth, or the internal GSM/GPRS module in the Trimble R8 GNSS system.
- The ability to receive network status information from GPSNet, that is, to confirm whether the network is in VRS mode or single base (raw) mode.
- RTK-on-Demand

RTK-on-Demand (Patented)

RTK-on-Demand is a unique feature of GPSNet that ensures efficient Internet connection to minimize costs for GPRS users in the field. When GPRS is used for connection to the Internet, payment is required for the amount of data received. RTK-on-Demand works by allowing the user to pause the data stream as necessary. This capability ensures that data is only streamed from the server to the rover when a point is being measured or if initialization is lost.

The RTK-on-Demand function is available when Trimble Survey Controller field software is running on the GNSS rover controller, for example, the Trimble CU. Trimble Survey Controller automatically prompts the GPSNet server when to stream data.



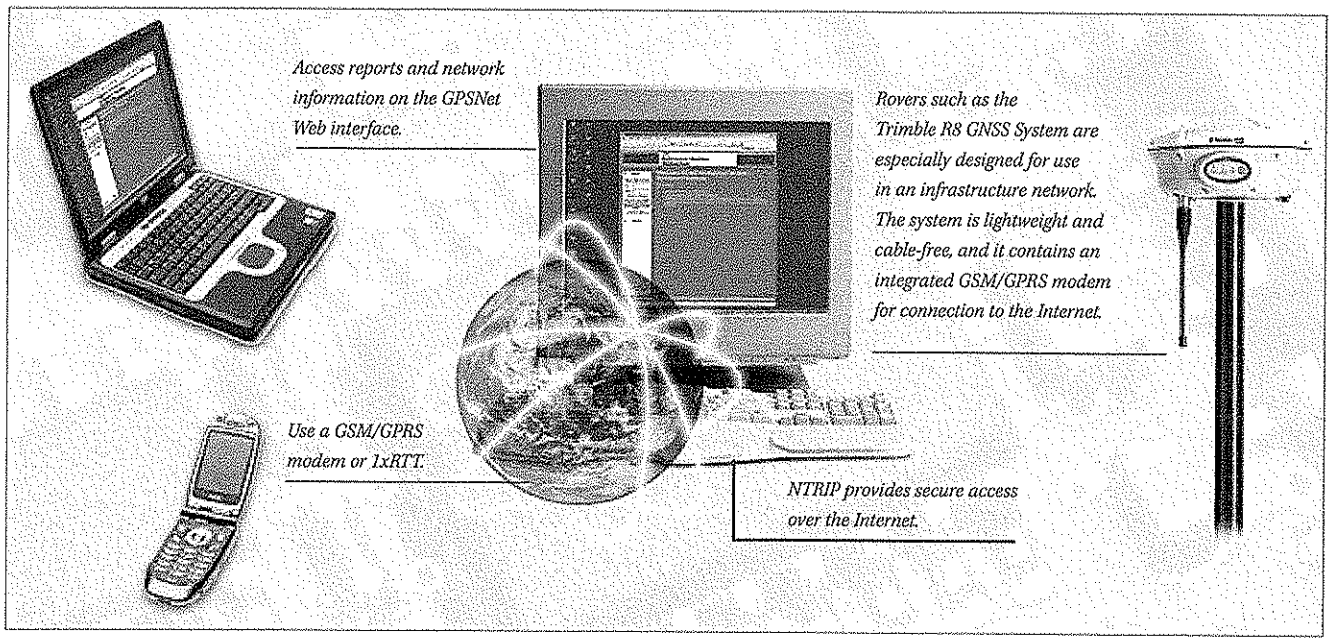
To pause the data stream, users just click on the pause button as shown.

Rover Integrity Module

At the same time GPSNet is sending corrected GNSS data to a rover, the rover is transmitting a position estimate and other data back to GPSNet. However, the reliability of a rover's data can vary due to factors such as its receiver firmware, satellite visibility, multipath, and the network data. The GPSNet software's optional Rover Integrity module allows a service provider using GPSNet to monitor the performance of the network, plus the expected performance of RTK users within the network area.

To monitor the reliability of rover data, clients can set up a rover in a known location within the network area. This rover will continuously send position data and initialisation information for the Rover Integrity module to analyze. The module analyzes the NMEA string and performs statistical computations on it, then reports the findings.

GPSNET USER ACCESS



ACCURACY AND CONVENIENCE FOR ALL USERS

The need for accurate positioning is not limited to surveying. Today, many different industries need accurate positioning and geomatics data sharing.

A multiple reference station solution managed by the Trimble GPSNet™ reference station software is ideal for a range of precision GNSS applications. Users collecting data for surveying, engineering, construction and high-accuracy GIS applications can all utilize and benefit from the quality data, and time and cost savings, provided by the network.

Service providers, clients, and users alike all benefit from the innovative and easy-to-use Trimble GNSS infrastructure solution with GPSNet software.

CONCLUSION

Trimble GPSNet reference station software provides total control in a GNSS network. As an integral part of the scalable Trimble GNSS infrastructure solution, GPSNet enables clients to grow their infrastructure solution as their business needs expand. With unique and powerful tools for network management and reference station control, GPSNet offers service providers and users complete confidence in the performance of the network and the integrity of their data.

SYSTEM REQUIREMENTS

A Trimble representative will work with you to install the GPSNet software as part of a customized Trimble GPS infrastructure solution that will meet the unique and regional needs of your organization.

For the GPSNet software:

- Microsoft® Windows® XP Operating System OR Windows 2003 Server
- 1 GB Memory
- 80 GB Hard Drive

For network access[4]:

- Trimble Survey Controller 10.7 or later
- Trimble R8 GNSS system, and Trimble R8/5800 and Trimble R7/5700 GPS systems
- Any third-party GPS rover that supports the NTRIP protocol, RTCM[5] 2.*X*, 3.0 or CMR

4 GSM data access without NTRIP is also possible, for example, via hardware such as an access server.
5 RTCM 2.1 and RTCM 2.3 also support FKP broadcast for network corrections for use in areas where the service provider may prefer that format.

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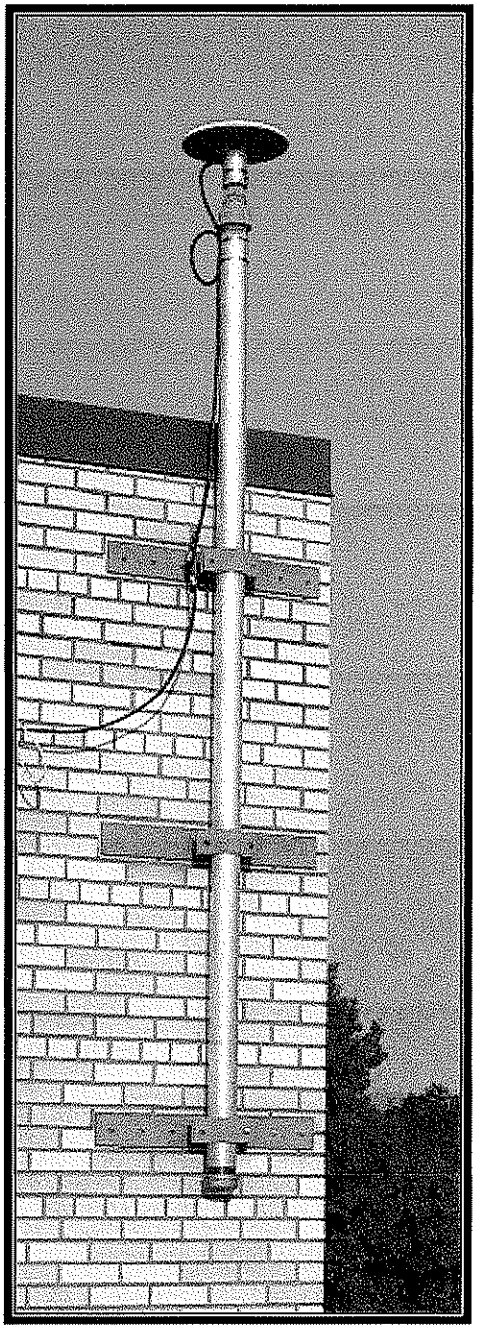
GPS INNOVATIONS INC
PROPOSED WVDOH GPS BASE ANTENNA
MASONARY BUILDING MOUNT, PAGE 1 OF 2 :



GPS INNOVATIONS INC
PROPOSED WVDOH GPS BASE ANTENNA
MASONARY BUILDING MOUNT, PAGE 2 OF 2 :

BILL OF MATERIALS:

1) SECO PN: 2072-32 ADJUSTABLE TILT STAINLESS STEEL MONUMENT
   ADAPTER FOR 3" PIPE WITH MPT 3 ½ X 8 TPI

2) 10 FOOT JOINT – 3" DIAMETER GALVANIZED STEEL PIPE, THREADED BOTH ENDS

3) 3" GALVANIZED STEEL PIPE THREADED END CAP

4) 3 EACH, ¼" x 3'BAR MAST MOUNT WITH CUSTOM FABRICATED FLANGE PIPE CLAMP AND VARIBLE OFFSET FOR BUILDING EVE OVERHANG CLEARANCE. UNITS CAN BE VERTICALLY SPACED TO MATCH CEMENT JOINTS IN BRICK OR CINDER BLOCK BUILDINGS. 6 EACH ¼" x 2" TAPCON SCREWS OR ¼ x 20 x 2 1/2" QUICK BOLTS MAKE FOR EASY INSTALL OF EACH BAR. BARS ARE PRIMED AND PAINTED WITH GALVICON SPRAY PAINT TO MINIMIZE RUSTING

5) DESIGN COMPLIES WITH CURRENT NGS CORS BASE STATION MOUNT REQUIREMENTS