TxDOT GPS Applications

Andre Fuegner

CGSIC Regional Meeting Austin 2012

TxDOT GPS Background

- 1984 - GPS R & D
- 1988 - Installed first TxDOT GPS Regional Reference Point (RRP)
- 1990 - 1st Generation RRP Network of 5 stations
- 1996 - Pioneered Centimeter Level Airborne GPS for Photogrammetry
- 1996 - 10 TxDOT GPS/RRP stations recognized as NGS/CORS
- 2003 - Initiated RTK Network
- 2012 - 182 RRPs, 133 CORS,

  RTK coverage in Texas by area: 51.97%

  RTK coverage in Texas by population: 93.32%

TxDOT‘s IOD/GPS Group

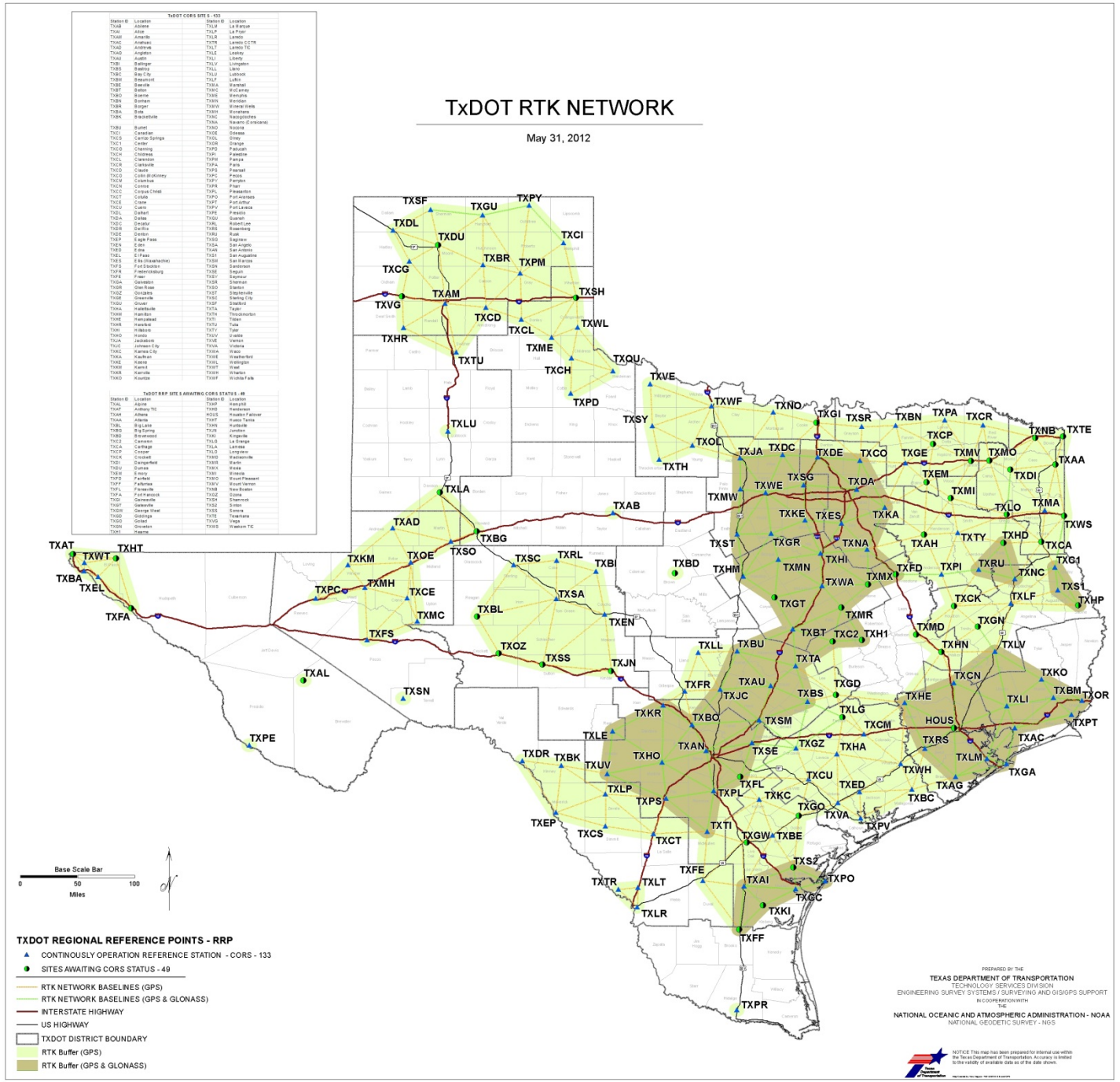
- GNSS Network Systems Management and Design
- GNSS Hardware / Software Maintenance
- GNSS Training and support for TxDOT‘s GPS users (Static, RTK, and mapping)
- GNSS Research and Developement

2012 RRP Facts

- 182 Regional Reference Points (RRP), 133 recognized as NGS/CORS
- GPS and combined GPS/Glonass receivers
- NAD83 epoch 2002 coordinates &NAD83 epoch 2010 coordinates
- 5 second data rate
- 5° elevation mask
- DAT files collected 1 daily file, archived 1 month
- RINEX (Receiver Independent Exchange) files 24 one hour files daily, archived 1 month
- All 182 RRPs single baseline RTK capability
- 175 RRPs in networked RTK solution (VRS)

Typical TxDOT RRP/CORS

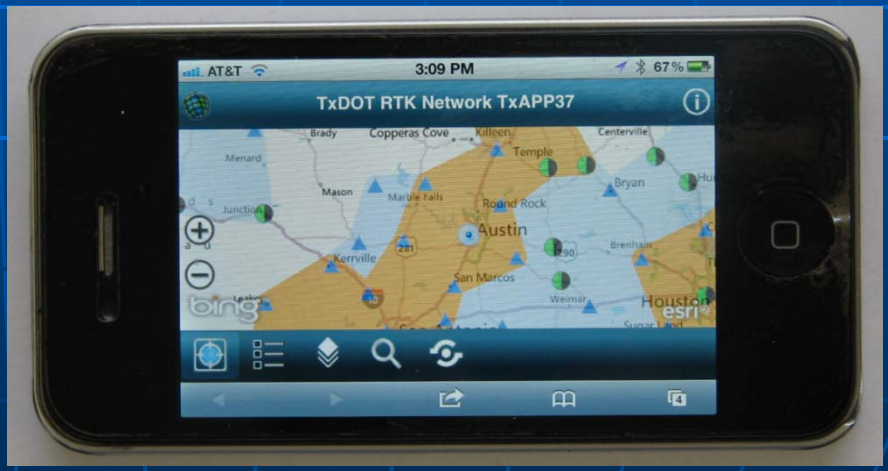
- Built to NGS CORS guidelines
- Building mount – TXGZ
- Tower – TXKC
- GNSS receiver box


TxDOT RTK NETWORK
May 31, 2012
TxDOT CORS SITE S - 133
TxDOT RRP SITE S AWAITING CORS STATUS - 49
Base Scale Bar
0
50
100
Miles
TXDOT REGIONAL REFERENCE POINTS - RRP
CONTINOUSLY OPERATION REFERENCE STATION - CORS - 133
SITES AWAITING CORS STATUS - 49
RTK NETWORK BASELINES (GPS)
RTK NETWORK BASELINES (GPS & GLONASS)
INTERSTATE HIGHWAY
US HIGHWAY
TXDOT DISTRICT BOUNDARY
RTK Buffer (GPS)
RTK Buffer (GPS & GLONASS)
PREPARED BY THE
TEXAS DEPARTMENT OF TRANSPORTATION
TECHNOLOGY SERVICES DIVISION
ENGINEERING SURVEY SYSTEMS / SURVEYING AND GIS/GPS SUPPORT
IN COOPERATION WITH
THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION - NOAA
NATIONAL GEODETIC SURVEY - NGS
NOTICE This map has been prepared for internal use within the Texas Department of Transportation. Accuracy is limited to the validity of available data as of the date shown.

TxDOT RTN Map Sources

- TxDOT ftp
- http://www.txdot.gov/business/contractors_consultants/gps.htm

- Mobile App
- http://bit.ly/wJfp4n



TxDOT RTN Users

- TxDOT RTN is not public
- TxDOT RTN users:
  - TxDOT employees
  - TxDOT contractors
  - TxDOT consultants

TxDOT RTN applications

- Aerial Photography & Processing IMU Data
- As-Built Verification
- Borehole Location
- Boundary Work - Tie In Corners
- Bridge Inspection
- Check Consultant Control
- Check Contractor Construction Staking
- Construction
- Construction Layout
- Cross Section Project
- Culvert And Flowline Alignments
- Design Aerial Photography
- Design Survey
- Design Topo Survey
- Determine The Extent Of Encroachments Into The ROW
- DTM Topo
- GIS Collection
- Grade - To Check Contractors
- High Density Scanning Surveys
- Locating Bridge Corners
- Locative Surveys For ROW
- Machine Control
- Old ROW Monuments
- Project Inspection Construction
- Quality Control And Topography/Grade
- ROW Recovery
- Set Control
- Set New ROW
- Stakeout
- Stock Pile Volumes
- Survey Control Verification
- Topo Survey
- TRM Texas References Markers
- Tying Existing ROW
- Utility Location

TxDOT RRP Static Data Users

- TxDOT and TxDOT contractors
- Private surveying companies
- GPS mapping community
- NGS CORS program
- NOAA GPS Weather Modelling

TxDOT GPS Static Applications

- Statewide/District-Wide Control Densification
- Primary Project Control
- Control for Airborne GPS for Photogrammetry
- Control for LiDAR Data Gathering
- Photogrammetric Control Panels
- Boundary Corners
- ROW
- Local Control

TxDOT GPS Photogrammetry Applications

- Precision design level mapping for engineering projects
- County-wide and District-wide Flights
- Map accuracy verification

TxDOT GPS Mapping Applications

- Post processing

- Highway Inventory Project - Texas Reference Markers
- Texas County Road Inventory
- Pavement Management Information Systems
- HBA Project
- Bridge Data Collection

TxDOT GPS Application
- Sign Inventory -

- Sign Inventory collected in the Corpus district. Information regarding signage is available and its future uses not only include the location but maintenance status
- http://bit.ly/KIq0KB

TxDOT GPS Application - Travel Division -

- TRV Division is using this map showcasing their flora as well as events that are taking place throughout the state.
- http://bit.ly/tU9JCu

TxDOT's GPS Partnerships

- NGS CORS program
- NOAA GPS Weather Modelling
- Texas Spatial Reference Center
- LSU data sharing

Thank you!

More Information:

ftp://ftp.dot.state.tx.us/pub/txdot-info/isd/gps/

GNSS helpdesk

Dial 512 302 2350 then press 3 and 6

TSD_GPS-Support@dot.state.tx.us