The Plate Boundary Observatory:
GPS Operational & Data Status

Greg Anderson
PBO Data Products Manager
anderson@unavco.org

CORS Users Forum, 21 Sep 2004
Topics

- What is the Plate Boundary Observatory?
- Network Operations/Construction Status
- Data Management Status

Tom Herring, MIT
Topics

• What is the Plate Boundary Observatory?
• Network Operations/Construction Status
• Data Management Status
What is PBO?

• Geodetic component of NSF-funded EarthScope project

• Install & run large geodetic network to study:
  – Earthquake processes & seismic hazards
  – Magmatic processes & volcanic hazards
  – Active deformation & tectonics
  – Continental geodynamics
PBO Network Design

- 875 new CGPS stations
- 225 existing CGPS stations
- 100 SGPS receivers
- 143 BSM stations
- 5 LSM stations

Year 1 goals:
- 50 installed CGPS stations
- 1 installed BSM station
GPS Instrumentation

- Trimble NetRS receivers and choke-ring antennas
- SCIGN-type deep- and shallow-drilled monuments
- Solar/wind DC power, AC where possible
- IP-based data comms over CDMA, VSAT, Internet radio, etc.
Topics

• What is the Plate Boundary Observatory?
• Network Operations/Construction Status
• Data Management Status
• Project broken down into 6 regional offices.
  – Rocky Mountain
  – Basin & Range
  – Pacific Northwest
  – Northern California
  – Southern California
  – Alaska

• Use UNAVCO Facility engineers, when available.

• Installations occur simultaneously in all regions
## Network Progress: 21 Sep 2004

<table>
<thead>
<tr>
<th>Metric</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary station locations identified</td>
<td>342</td>
</tr>
<tr>
<td>Final station locations identified</td>
<td>203</td>
</tr>
<tr>
<td>Permits submitted</td>
<td>154</td>
</tr>
<tr>
<td>Permits accepted</td>
<td>80</td>
</tr>
<tr>
<td>Monuments installed</td>
<td>48</td>
</tr>
<tr>
<td>Data available</td>
<td>29</td>
</tr>
<tr>
<td>Routine archiving</td>
<td>22</td>
</tr>
</tbody>
</table>
Topics

• What is the Plate Boundary Observatory?
• Network Operations/Construction Status
• Data Management Status
Data Management Overview

- **Data Status**
  - 29 of 46 stations have returned data
  - 22 stations archived routinely
  - Others lack comms or have comms problems
  - Data for Jan-Sep available via GPS archives

- **Data Analysis**
  - 2 Analysis Centers & 1 GPS AC Coordinator
  - Data products: position & velocity solutions, time series, etc.
  - Archived at GPS Archives
  - All products available from Archives & EarthScope Data Access System

- **Data Management**
  - Data Management web site: [http://pbo.unavco.org/data](http://pbo.unavco.org/data)
  - GPS ACs/ACC RFPs in final review
PBO GPS Data Products

Level 0: Raw data & Metadata
- 15-sec, 24-hour BINEX files, at least daily download
- 5-sps BINEX, triggered download
- 1-sps real-time BINEX & RTCM, where possible

Level 1: Processed data
- GPS position solution
- Processing input & output files
- Created by 2 ACs, TBD

Level 2: Derived quantities
- Combined position & velocity solutions
- Position & baseline time series
- Coseismic offsets
- Created by ACC, TBD

Level 1 & 2: 3-day, 15-day, 6-month latencies
Archived at PBO GPS Archives
GPS Data Flow

- CGPS Stations
- PBO HQ (initial QC)
- GPS Analysis Centers (TBD)
- GPS AC Coordinator (TBD)
- GPS Archives (SOPAC, UNAVCO Fac)
- PBO Operational Database (POD)
- EarthScope Data Portal

**Legend:**
- **Sources**: Orange
- **Processing/Analysis**: Pink
- **Access**: Green
- **Storage/Archiving**: Blue

**Routine GPS Data Flow:**
- CGPS Stations to PBO HQ (initial QC) via `wget` and `rsync`.
- PBO HQ to GPS Analysis Centers (TBD) and GPS AC Coordinator (TBD) and GPS Archives (SOPAC, UNAVCO Fac).
- GPS Analysis Centers (TBD) and GPS AC Coordinator (TBD) to GPS Archives (SOPAC, UNAVCO Fac).
- PBO HQ to PBO Operational Database (POD).
- GPS Archives (SOPAC, UNAVCO Fac) to EarthScope Data Portal.

**Data Flow Types:**
- **Raw Data**: Red
- **Metadata**: Blue
- **Derived Products**: Orange
- **All Data**: Black
High-rate RT GPS Data Flow

- **CGPS Stations**
  - 1-sps BINEX RT stream

- **PBO HQ** (Download)
  - 1-sps BINEX
  - 1-sps RTCM
  - Socket connection
    - Each station has own port number

- **PBO Operational Database (POD)**

- **PBO RAID**
PBO Network Total Data

Total = 46.54 TB
Summary

• PBO is geodetic component of EarthScope project

• Network Operations Status
  – 875 new CGPS stations over next 5 years
  – 48 new stations are installed

• Data Management Status
  – Data Management web site: http://pbo.unavco.org/data
  – 29 of 48 stations have returned data, 29 routinely
  – Data for Jan-Sep available via GPS archives

• Data Analysis
  – RFPs for Analysis Centers & AC Coordinator in final review
  – Data products: position and velocity solutions, time series, etc.
  – All products available from Archives and EarthScope Data Access System
For more information...

http://pbo.unavco.org

www.earthscope.org

UNAVCO, Inc.
EarthScope & PBO
Plate Boundary Observatory

Augustine Volcano Installation Update
September 16, 2004

Yesterday, workers completed about 98% of station AC27. Unfortunately the weather was nice, with a little bit of a breeze keeping the mosquitoes away for the majority of the day. Once again the crew was safe from bears, but was joined by a small herd of caribou near the station.

More Details >> Updates Archive >> Augustine Web Cam >>

PBO Operations
- Station listing
- Operations Documents
- Strainmeter Design Specifications

Personnel
- Organizational Chart
- Current UNAVCO, Inc. Job Openings

Related links
- PBO Frequently Asked Questions

Data and Data Products
- PBO Data Management Plan
- Download PBO RINEX Data via ftp
- Download PBO RINEX Data via GSAC
- Data Questions? Contact Greg Anderson at anderson@unavco.org or (303) 381-7055

Related Publications
- PBO/EarthScope Publications
- PBO/EarthScope Presentations

Education & Outreach
- Map Tools
- Classroom Resources
- Related Links
- Documents

PBO Procurement
- Documents
- Request for Proposals
- Drawings
- UNAVCO Procurement Page

CORS Users Forum, 21 Sep 2004