Overview of the USGS Albuquerque Seismological Laboratory (ASL)
ASL History

- 1960 – Sited by Jim Devine
- 1961 – Opened under the US Coast and Geodetic Survey
- 1962 – Tasked with the World-Wide Standardized Seismographic Network (WWSSN)
- 1972 – Transferred to the USGS (along with NEIC)
Facilities
- Located on Pueblo of Isleta
- 2 subsurface vaults in granite
- 21 boreholes and postholes
- Several surface vaults

Current Staff
- 32 Total
  - 14 USGS (3 in Golden, CO)
  - 18 Contractor (HTSI)

Mission
- Support the operation of seismic networks for monitoring and research
**ASL Seismic Network Operations**

- **Global Seismographic Network (GSN) Program**
  - 100 stations including the IU, IC, and CU networks.

- **Advanced National Seismic System (ANSS)**
  - National “Backbone” Network
  - Regional Networks (Teton & New England)
  - Regional Equipment Depot

- Maintain pool of 32 aftershock systems
ASL Seismic Network Operations

ASL network operations include:

- Station operations
- Data (and metadata) Quality Control
- Instrument testing
USGS-ASL has MOU’s and agreements with 54 different countries.
### Sensors Currently Installed

<table>
<thead>
<tr>
<th>IU primary broadband (81)</th>
<th>IU secondary broadband (72)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 43 STS-1’s</td>
<td>• 48 STS-2</td>
</tr>
<tr>
<td>• 17 KS-54000 borehole</td>
<td>• 14 Trillium 240</td>
</tr>
<tr>
<td>• 2 KS-36000 borehole</td>
<td>• 9 CMG3-T</td>
</tr>
<tr>
<td>• 16 STS-2</td>
<td>• 1 Trillium-120 post hole</td>
</tr>
<tr>
<td>• 3 Trillium-120 post hole</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IC primary broadband (10)</th>
<th>IC secondary broadband (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 10 STS-1’s</td>
<td>• 10 STS-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CU primary broadband (9)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• 9 STS-2</td>
<td></td>
</tr>
</tbody>
</table>

All upgraded sites (97/100) have Episensor strong motion accelerometers
On to the tour!

Underground Test Vaults

Kirtland AFB

Isleta Pueblo
ASL underground vaults
ASL Underground Vault (West Side)
ASL Cross-Tunnel
Typical long-period noise levels from STS-1 reference seismometers in cross tunnel during quiet conditions (little or no wind). Red = Z, Blue = NS, Green = EW. Upper and lower black lines are Peterson’s (1993) New High Noise Model (NHNM) and New Low Noise Model (NLNM), respectively.
ASL Boreholes

Barren Mountain Water Well
(ASL’s water source)
Drilled Depth 402 ft.

North

Concrete Pad
BH5

ANMO Building 10014
Concrete Pad

Concrete Pad

BH1
Concrete Pad

BH2
Concrete Pad

BH3
Concrete Pad

BH4
Concrete Pad

BH5
Concrete Pad

BH6
Concrete Pad

BH7
Concrete Pad

BH8
Concrete Pad

BH9
Concrete Pad

BH10
Concrete Pad

BH11
Concrete Pad

BH12
Concrete Pad

BH13
Concrete Pad

BH14
Concrete Pad

BH15
Concrete Pad

BH16
Concrete Pad

BH17
Concrete Pad

1.2 m VSAT
Solar Panels

19 Tower
Solar Panels

2.4m Satellite Dish
Building 10017

2.4m Satellite Dish

100.0’

ASL Borehole Test Area and ANMO Operational Boreholes

CRH
23 August 2013
### ASL Boreholes

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Where</th>
<th>Depth</th>
<th>ID or OD</th>
<th>Casing</th>
<th>Date Drilled</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASL BH1</td>
<td>ANMO Area</td>
<td>498.8’ (152.0m)</td>
<td>7.0” ID</td>
<td>Steel</td>
<td>01 Aug 1973</td>
<td>~33’ soil, then granite. ANMO KS5400 at 476’ (145m).</td>
</tr>
<tr>
<td>ASL BH2</td>
<td>ANMO Area</td>
<td>701’ (213.7m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>01 Jul 1973</td>
<td>~33’ soil, then granite. ANMO CMG-3TB at 57m (187’). Severe tilt below about 200’ (up to 11° at bottom).</td>
</tr>
<tr>
<td>ASL BH3</td>
<td>Snake Pit Area</td>
<td>31’ (9.4m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>1973(?)</td>
<td>~6’ soil, then granite North hole.</td>
</tr>
<tr>
<td>ASL BH4</td>
<td>Snake Pit Area</td>
<td>29’ (8.8m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>1973(?)</td>
<td>~6’ soil, then granite South hole.</td>
</tr>
<tr>
<td>ASL BH5</td>
<td>ANMO Area</td>
<td>617.5’ (188.2m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>16 Apr 1974</td>
<td>~33’ soil, then granite. North test hole.</td>
</tr>
<tr>
<td>ASL BH6</td>
<td>ANMO Area</td>
<td>492.6’ (150.1m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>06 Nov 1984</td>
<td>~33’ soil, then granite. South test hole.</td>
</tr>
<tr>
<td>ASL BH7</td>
<td>ANMO Area</td>
<td>350’ (106.7m)</td>
<td>12 5/8” ID</td>
<td>Steel</td>
<td>27 Aug 1990</td>
<td>~33’ soil, then granite. Russian test hole.</td>
</tr>
<tr>
<td>ASL BH8</td>
<td>ANMO Area</td>
<td>10’ (3.0m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>Aug 1973(?)</td>
<td>In soil, not cemented.</td>
</tr>
<tr>
<td>ASL BH9</td>
<td>ANMO Area</td>
<td>9’ (2.7m)</td>
<td>8.0” ID</td>
<td>PVC</td>
<td>April 2012</td>
<td>In soil, not cemented. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH10</td>
<td>ANMO Area</td>
<td>14’ (4.3m)</td>
<td>6.0” ID</td>
<td>PVC</td>
<td>April 2012</td>
<td>In soil, not cemented. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH11</td>
<td>ANMO Area</td>
<td>25’ (7.6m)</td>
<td>6.0” ID</td>
<td>PVC</td>
<td>April 2012</td>
<td>In soil, not cemented. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH12</td>
<td>ANMO Area</td>
<td>15’ (4.6m)</td>
<td>6.0” ID</td>
<td>PVC</td>
<td>April 2012</td>
<td>In soil, not cemented. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH13</td>
<td>ANMO Area</td>
<td>9’ (2.7m)</td>
<td>6.0” ID</td>
<td>PVC</td>
<td>April 2012</td>
<td>In soil, not cemented. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH14</td>
<td>Snake Pit Area</td>
<td>5’ (1.5m)</td>
<td>8.0” ID</td>
<td>None</td>
<td>April 2012</td>
<td>Cored into granite, no casing. Hole closest to snake pit. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH15</td>
<td>Snake Pit Area</td>
<td>4.5’ (1.4m)</td>
<td>6.0” ID</td>
<td>None</td>
<td>April 2012</td>
<td>Cored into granite, no casing. Drilled by Earthscope TA project.</td>
</tr>
<tr>
<td>ASL BH16</td>
<td>ANMO Area</td>
<td>95’ (29.0m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>18 Sep to 15 Oct 2012</td>
<td>~33’ soil, then granite.</td>
</tr>
<tr>
<td>ASL BH17</td>
<td>ANMO Area</td>
<td>192’ (58.5m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>18 Sep to 15 Oct 2012</td>
<td>~33’ soil, then granite.</td>
</tr>
<tr>
<td>ASL BH18</td>
<td>West Underground Vault</td>
<td>12’ (3.7m)</td>
<td>8.0” ID</td>
<td>None</td>
<td>Nov 2012</td>
<td>Cored through vault floor into granite, no casing. East hole.</td>
</tr>
<tr>
<td>ASL BH19</td>
<td>West Underground Vault</td>
<td>12’ (3.7m)</td>
<td>8.0” ID</td>
<td>None</td>
<td>Nov 2012</td>
<td>Cored through vault floor into granite, no casing. Center hole.</td>
</tr>
<tr>
<td>ASL BH20</td>
<td>West Underground Vault</td>
<td>12’ (3.7m)</td>
<td>8.0” ID</td>
<td>None</td>
<td>Nov 2012</td>
<td>Cored through vault floor into granite, no casing. West hole.</td>
</tr>
<tr>
<td>ASL BH21</td>
<td>ANMO Area</td>
<td>10’ (3.0m)</td>
<td>6.5” ID</td>
<td>Steel</td>
<td>25 Jun 2013</td>
<td>In soil, cemented. Casing is tilted 5° off vertical.</td>
</tr>
<tr>
<td>ASL PD</td>
<td>ANMO Area</td>
<td>401.6’ (122.4m)</td>
<td>6.5” OD</td>
<td>PVC</td>
<td>11 Jan 1990</td>
<td>Water well with 4” ID PVC inside outer PVC casing. Bottom part from 337’ to 401.6’ is screen PVC.</td>
</tr>
</tbody>
</table>
ASL Shake Table Facility
ASL Vault Farm
Thank You!