

# SPEAR3 Ring Network

June 13 – July 16, 2003

- June 13 – June 19: Install new floor monuments in the ring.
- June 19 – June 21: Survey all ring monuments as well as selective SSRL monuments.
- June 23 – June 25: Densify previous survey.
- July 14 – July 16: Check ring network for potential floor deformation.

# Network Description

- 204 points.
- 71 laser tracker stations.
- 762 triplet observations:
  - Distance: 30  $\mu\text{m}$
  - Horizontal angles: 40  $\mu\text{m} / \text{D}$
  - Vertical angles: 50  $\mu\text{m} / \text{D}$
- 242 height differences: 50  $\mu\text{m}$

# Point Distribution

- Ring points:
  - 38 floor monuments: 34 new & 4 old.
  - 50 wall, 32 aisle, 1 ceiling.
- SSRL points:
  - 32 in beamlines.
  - 25 in SSRL building.
- Others:
  - 5 in BTS area.
  - 21 temporary points

# Datum Determination

- Goal: reproduce the coordinate system of SPEAR2 in order to keep the beamlines in the same absolute positions.
- Data available: coordinate set derived from global adjustment of SPEAR2 ring – BTS line – SSRL building, see:  
[http://www-group.slac.stanford.edu/met/Align/TechAnalysis/2003/SPEAR3\\_Datum.pdf](http://www-group.slac.stanford.edu/met/Align/TechAnalysis/2003/SPEAR3_Datum.pdf)
- Strategy:
  - select a set of points that have no special reason to have moved and that are well observed in the new survey.
  - decide on a computational method: free, weighted or constrained.

# What is defining a Coordinate System in a combined Laser Tracker and Precise Level Survey?

- **Scale:** laser tracker
  - set of all distances
- **Orientation:** precise level
  - set of all height difference
  - ⇒ missing 1 orientation around the Y axis
- **Translation:** nothing
  - ⇒ missing 3 parameters

# Datum Controlling Points

- 3D coordinates:
  - 2 floor points in the East Straight:
    - SM09F8, SM10F1
  - 2 floor points in the West Straight:
    - SM01F1, SM18F8
  - 5 floor points in SSRL / Beamlines area:
    - HRLS100, HRLS105
    - HRLS090
    - HRLN025
    - HBL8N10
- 1D coordinate (height only):
  - 10 beamline floor points
  - 20 SSRL building floor points

# Network Results

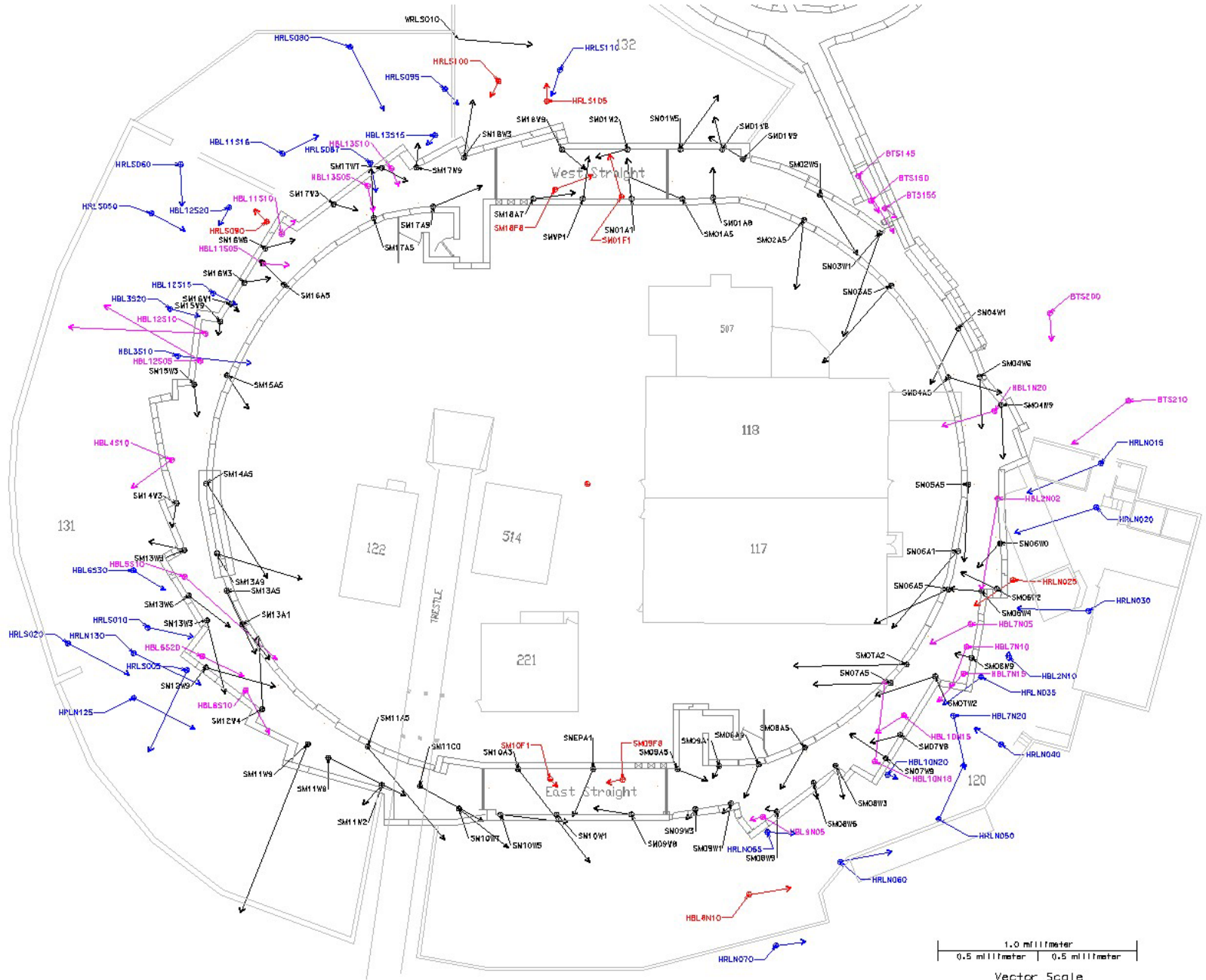
DZ,DX,DY in meter for Free Net Option

- Ring Points

– TNTB130	0.000103	-0.000045	-0.000021
– TNTB135	0.000218	0.000069	-0.000047
– TNTB140	0.000449	0.000070	0.000031

- Others

– N3DTB170	-0.001393	-0.000632	-0.000547
– N3DTB175	-0.001655	-0.000250	-0.000797
– S3DTB170	-0.001445	0.000095	-0.001654
– S3DTB175	-0.001193	0.000591	-0.001964
– S3DTB175	-0.001193	0.000591	-0.001964





# Control Network Description

- 152 points.
- 47 laser tracker stations.
- 676 triplet observations:
  - Distance: 30  $\mu\text{m}$
  - Horizontal angles: 40  $\mu\text{m} / \text{D}$
  - Vertical angles: 50  $\mu\text{m} / \text{D}$
- 123 height differences: 50  $\mu\text{m}$

