

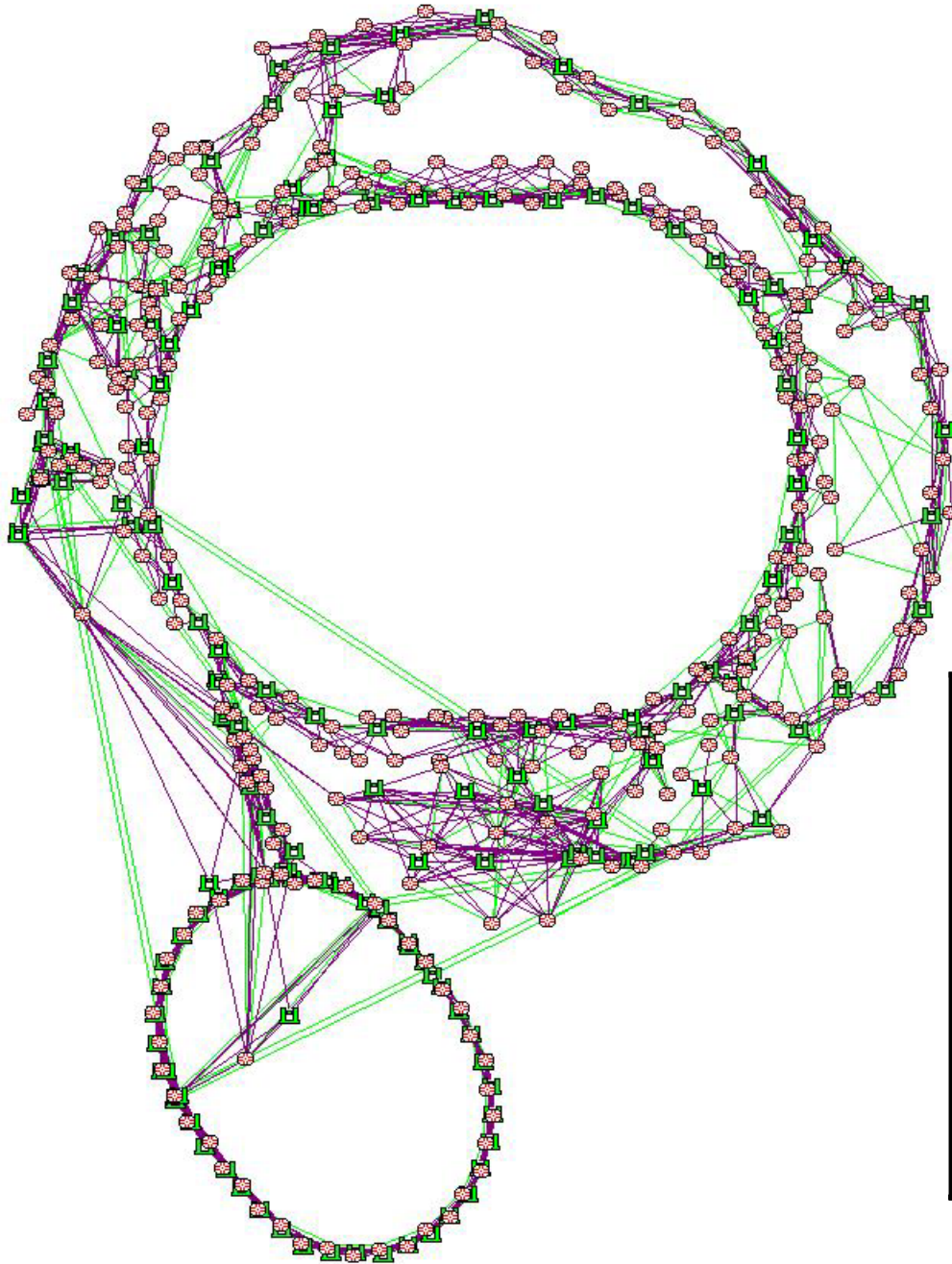
# SPEAR3 Network





- Combine all available current networks in SSRL site and adjust them together in a free datum solution.
- Choose a Minimal Constrained Solution.
- Look at the ring magnets positions.
- Put a Mean Sea Level (MSL) height to the SPEAR datum.
- Rotate the coordinate system to match the new girder order.

# Network History

- Booster TC2002 Survey: 9/2001
- BTS TC2002 Survey: 3/2002
- Building 130 Tracker Survey: 7/2002
- SSRL Tracker Survey: 9/2002
- SPEAR Ring Tracker Survey: 11/2002
- SSRL BL0 TC2002 Survey : 2/2003

# Network Layout



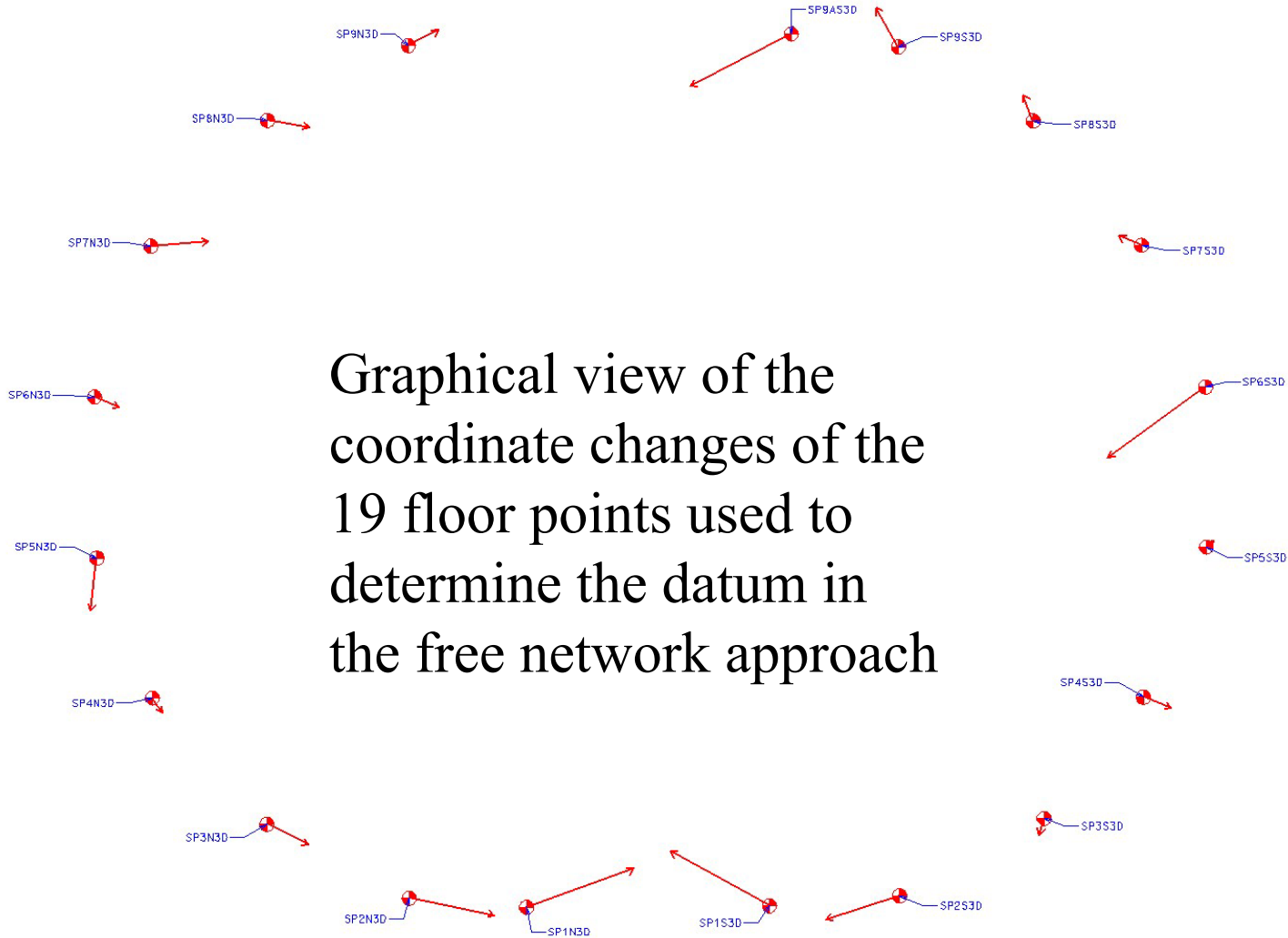
	Number of Points	330
	Number of Stations	173
	Number of Triplets	1356
	Number of Height Differences	400

# Free Network Solution

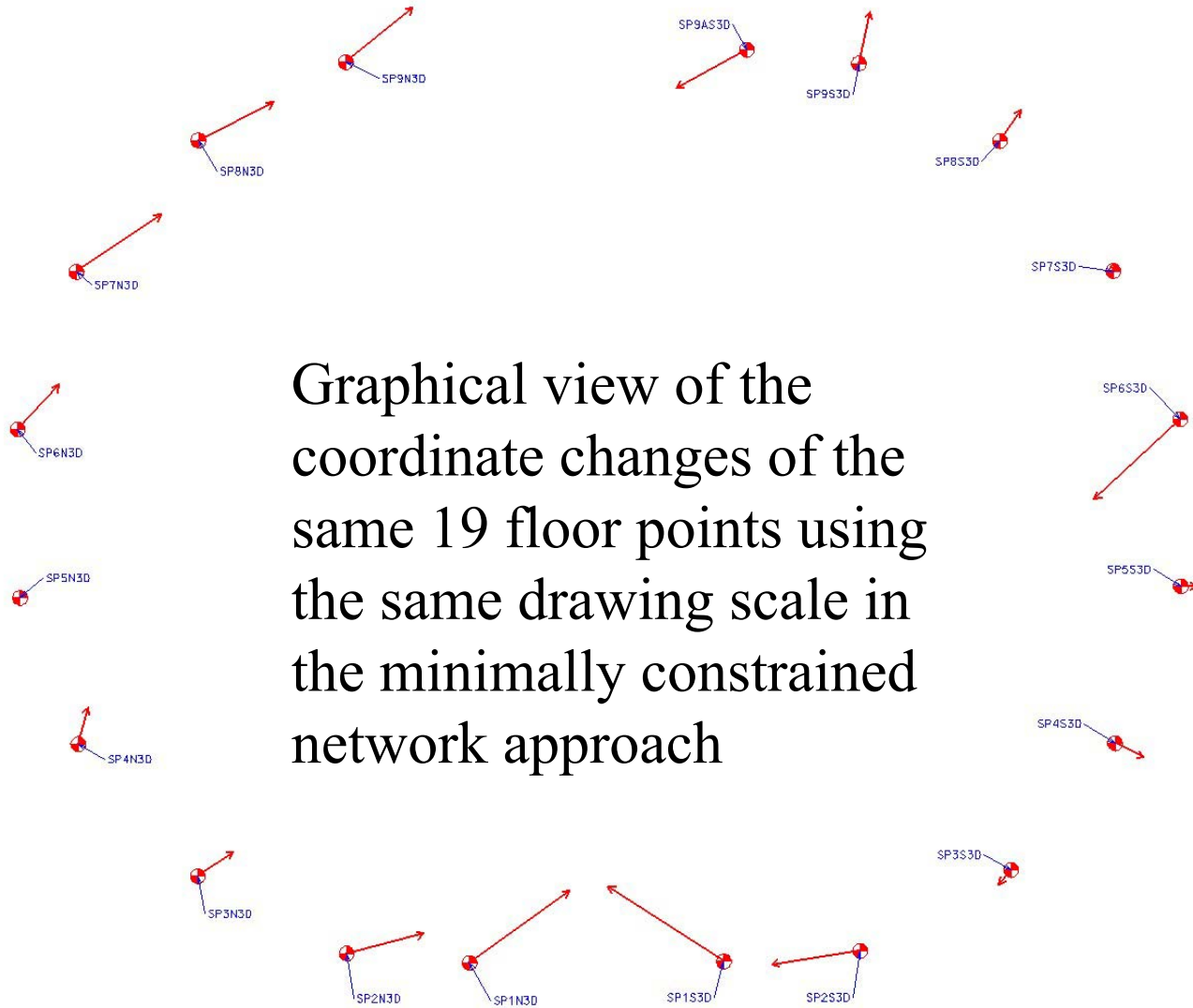
Number of Degree of Freedom	2613
Global a-posteriori Standard Deviation	0.978150

Name	DZ meter	DX meter	DYmeter
SP1N3D	0.000752	0.000272	-0.000020
SP1S3D	-0.000693	0.000380	0.000024
SP2N3D	0.000599	-0.000123	-0.000076
SP2S3D	-0.000514	-0.000165	0.000021
SP3N3D	0.000292	-0.000147	-0.000075
SP3S3D	-0.000030	-0.000117	0.000014

Name	DZ meter	DX meter	DYmeter
SP4N3D	0.000074	-0.000108	-0.000121
SP4S3D	0.000199	-0.000079	0.000024
SP5N3D	-0.000046	-0.000370	-0.000094
SP5S3D	0.000056	0.000040	-0.000045
SP6N3D	0.000174	-0.000074	-0.000025
SP6S3D	-0.000686	-0.000495	0.000033
SP7N3D	0.000406	0.000032	0.000052
SP7S3D	-0.000154	0.000066	0.000086
SP8N3D	0.000295	-0.000053	0.000032
SP8S3D	-0.000067	0.000180	0.000091
SP9AS3D	-0.000709	-0.000367	0.000005
SP9N3D	0.000210	0.000109	0.000030
SP9S3D	-0.000157	0.000269	0.000044



Graphical view of the coordinate changes of the 19 floor points used to determine the datum in the free network approach

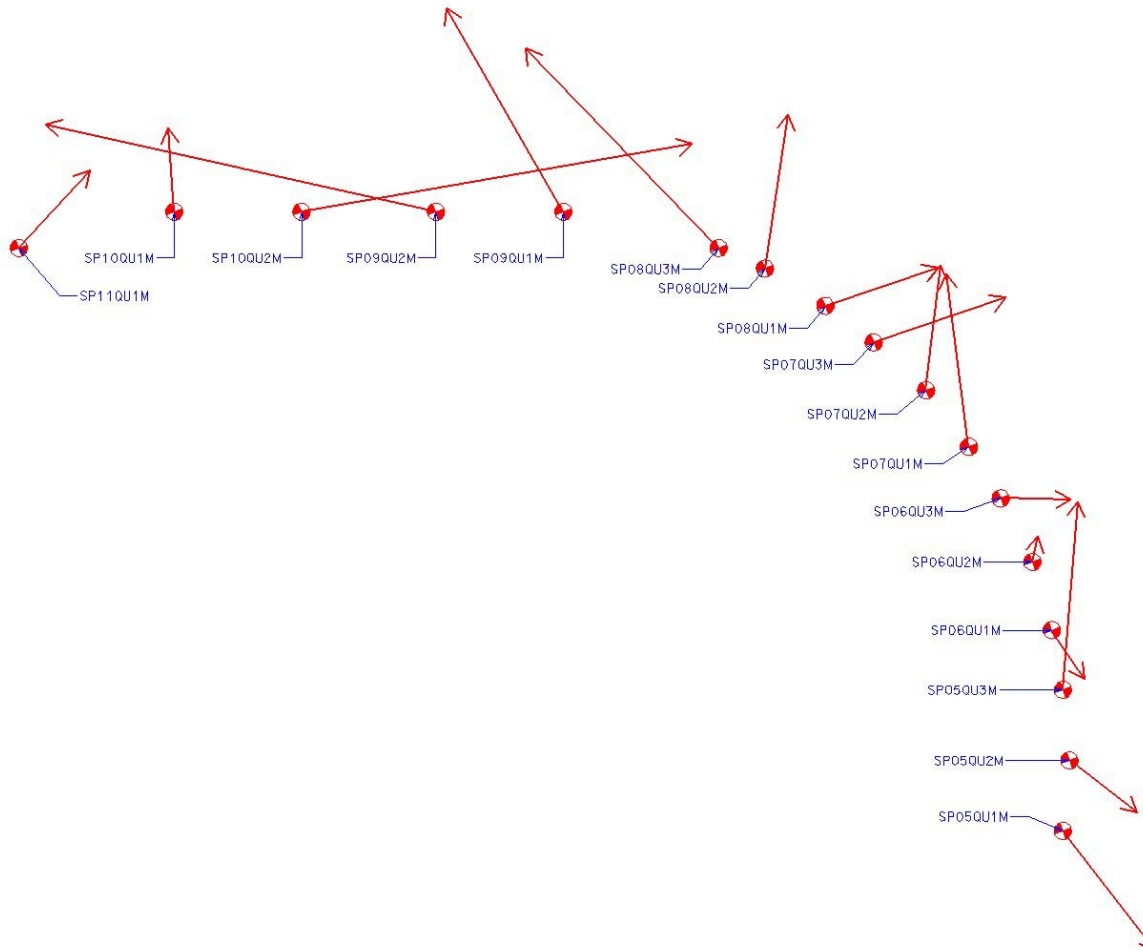


Graphical view of the coordinate changes of the same 19 floor points using the same drawing scale in the minimally constrained network approach

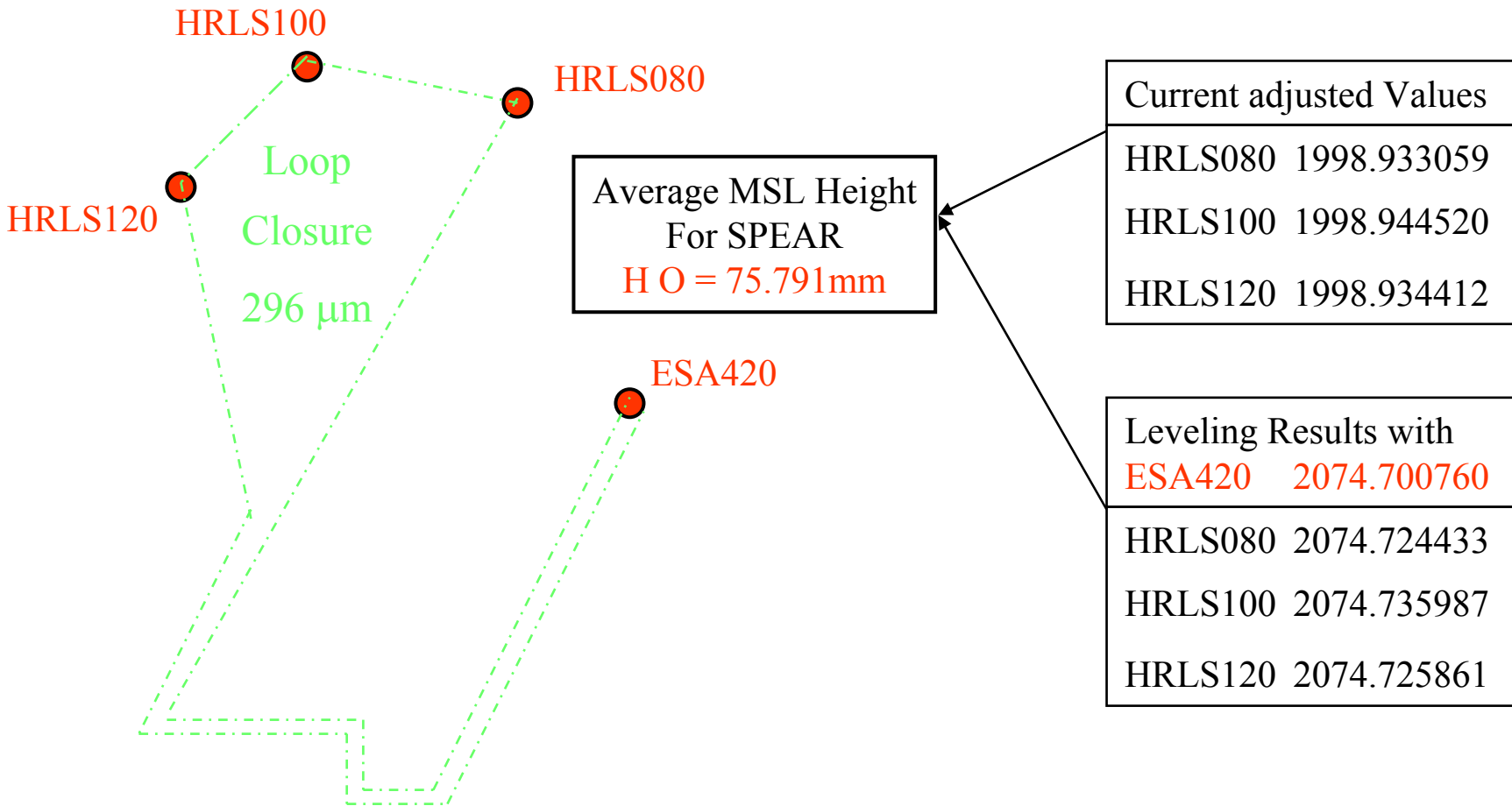
Fix in all directions

Fix in 1 direction only

# Magnets Position vs Ideal

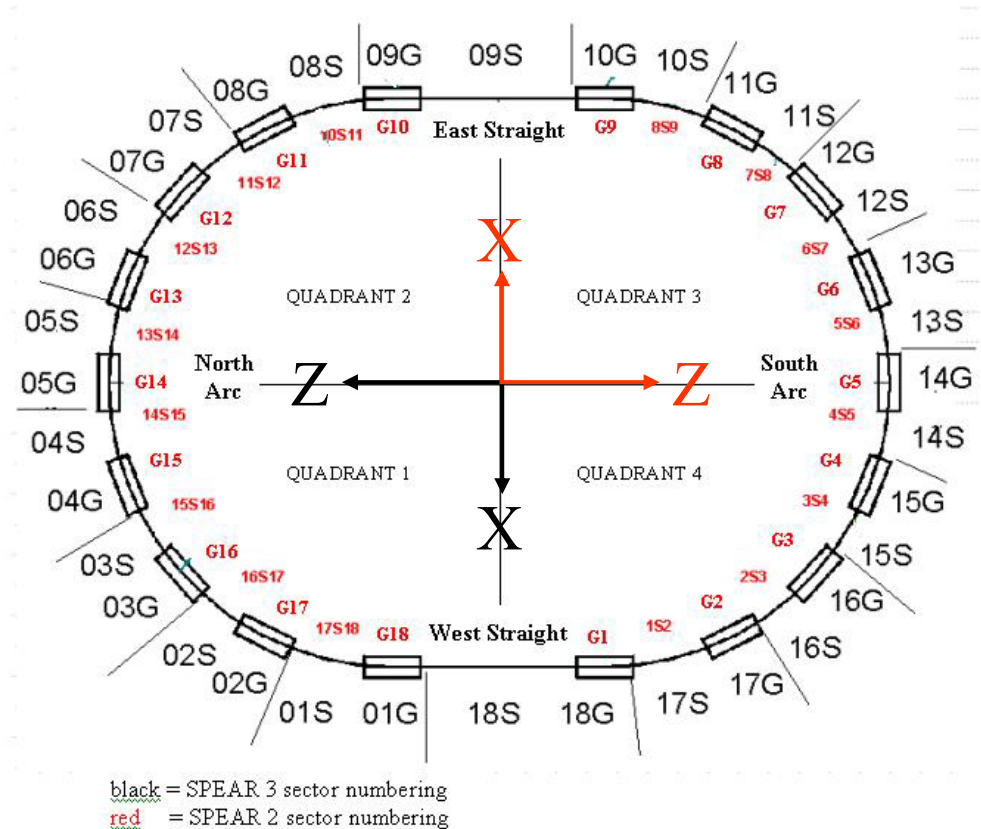


# MSL Value for SPEAR3 Datum



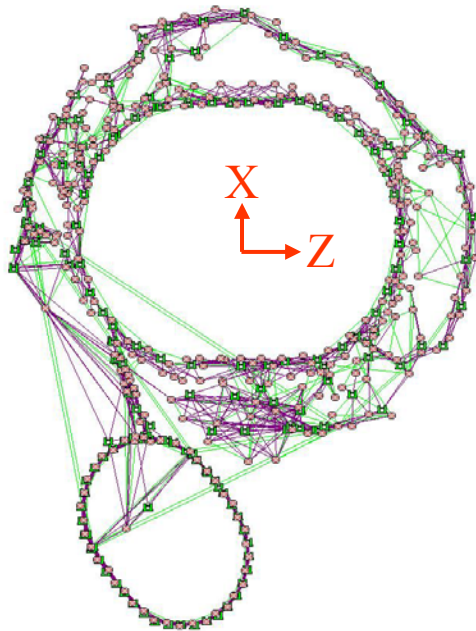
# SPEAR2/3 Conventions

SPEAR3 Quarterly Report  
April-June 2001, page 24:  
*SPEAR 3 component nomenclature was defined, resulting in a decision to reverse the numbering sequence for ring components from the original counter-clockwise direction (positron direction for SPEAR 1 and 2) to the clockwise, electron beam direction.*



# Conclusion

Starting today all alignment work will be expressed in the new defined SPEAR3 system. Here is a summary of both systems:

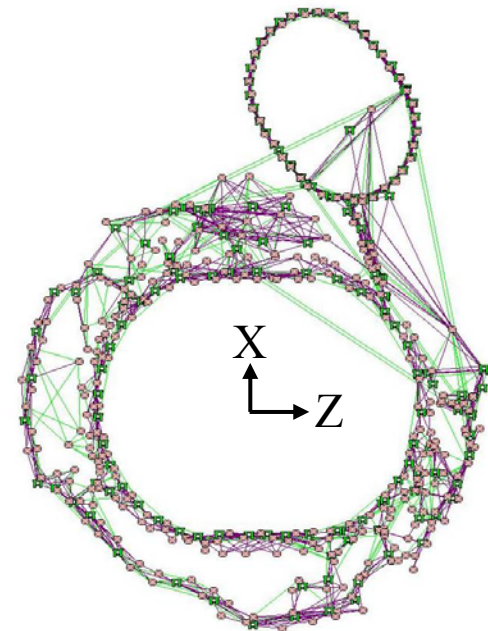


## SPEAR2

Z offset = 90000 m  
X offset = 70000 m  
Y offset = 2000 m  
H O = 0.0 m

## SPEAR3

Z offset = 6000 m  
X offset = 3000 m  
Y offset = 500 m  
H O = 75.791 m



# Monument Renaming Example

