

# SURVEY AND ALIGNMENT DESIGN OF NSRL BASED ON LASER TRACKER

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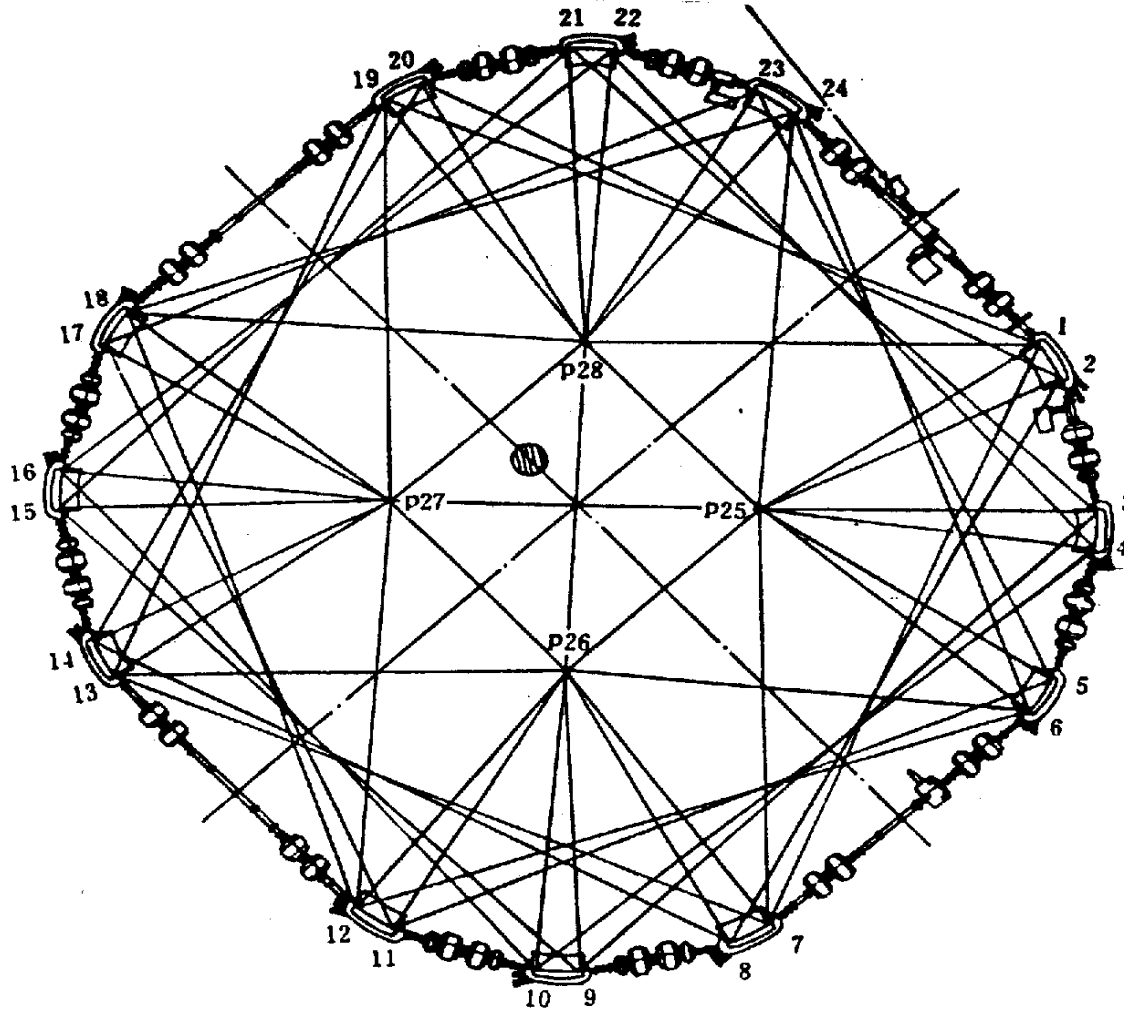
# Overview

- Introduction the alignment of NSRL
- Survey and alignment based on Laser Tracker
- Complement of the design

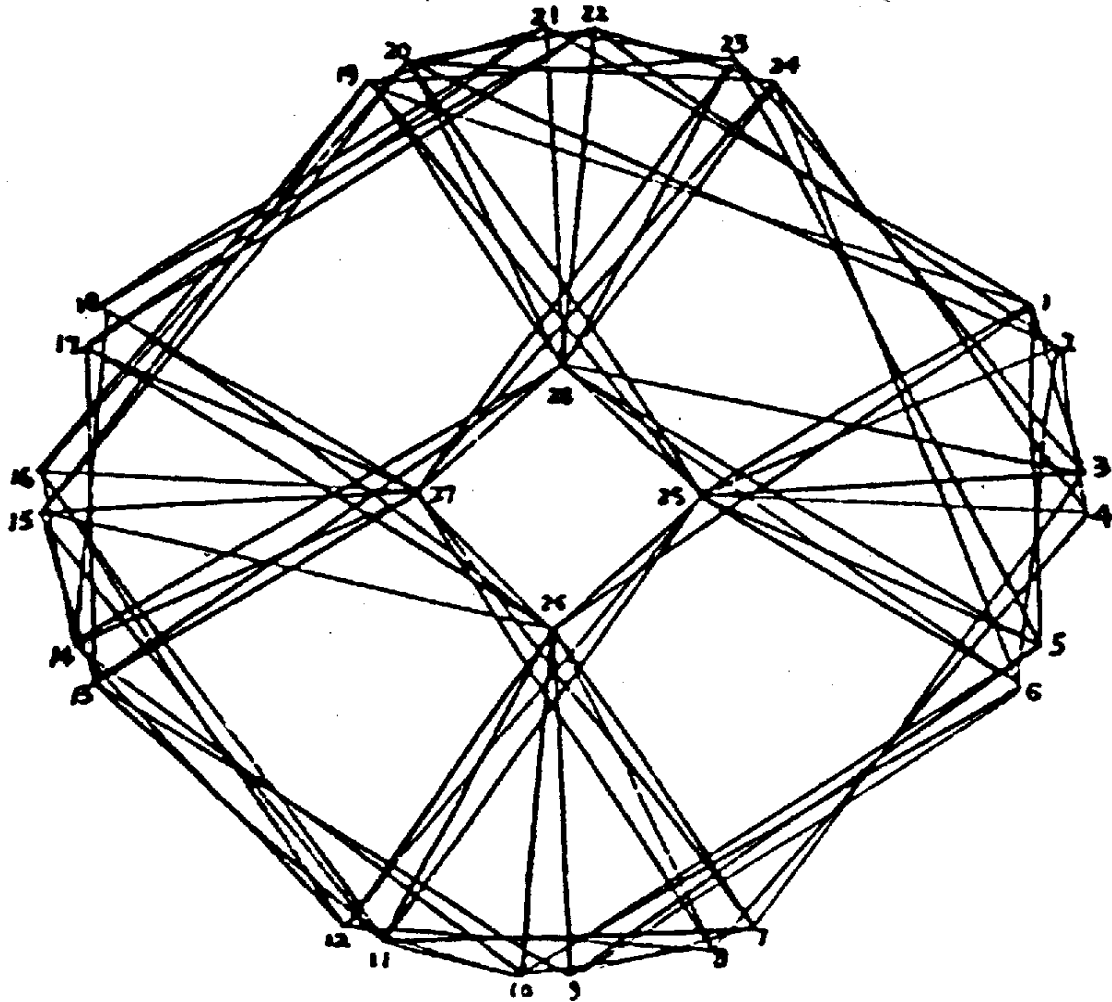
# Introduction the alignment of NSRL

- 1980s: Construction control network
- 1987: Installation Control Network
- 1990s: The control network for monitoring the deformation

# Installation control network



# Network for monitoring deformation



# Laser Tracker

the equipments  
inside the ring

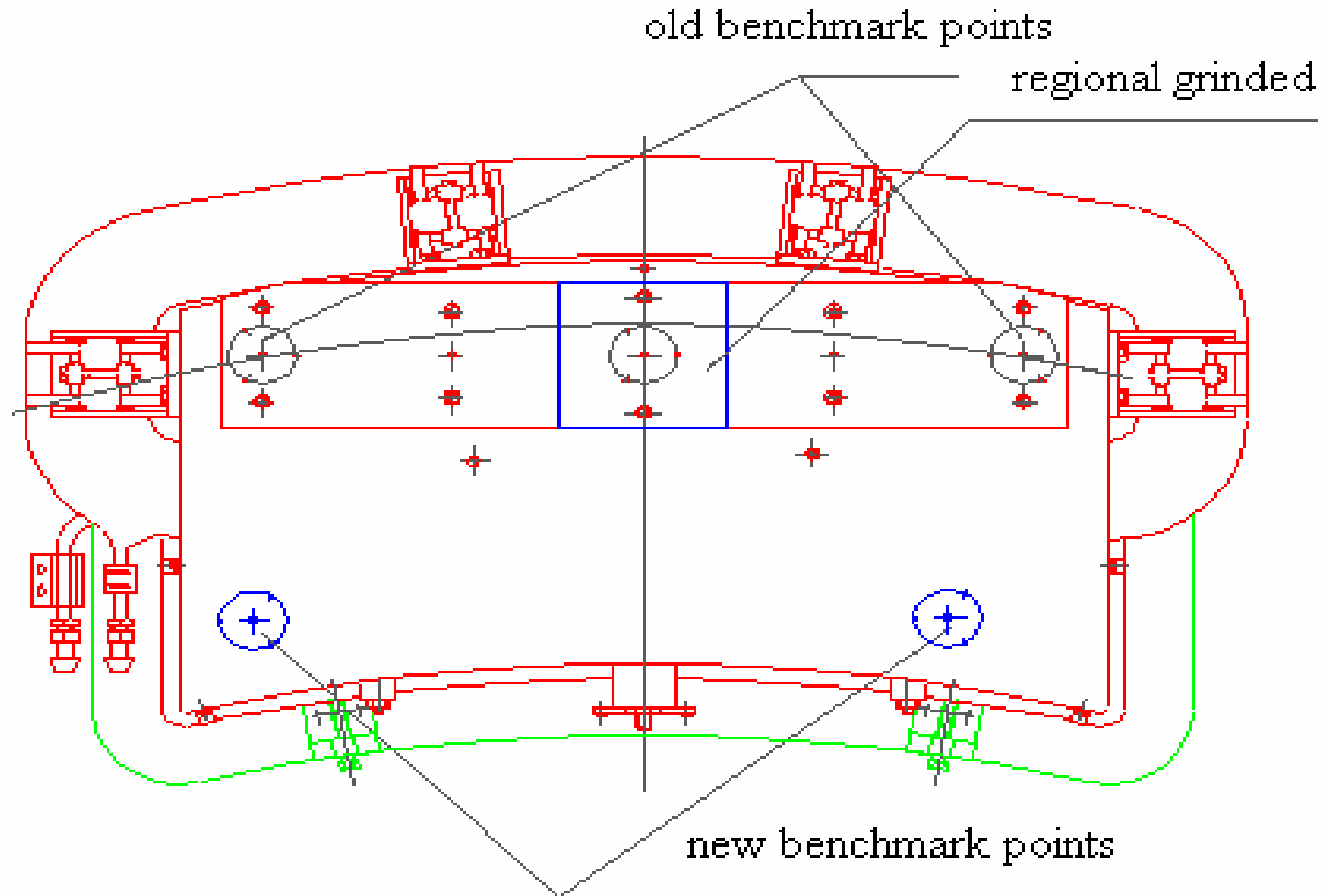
need



Laser Tracker  
(Leica)



# Addition on the dipole magnet



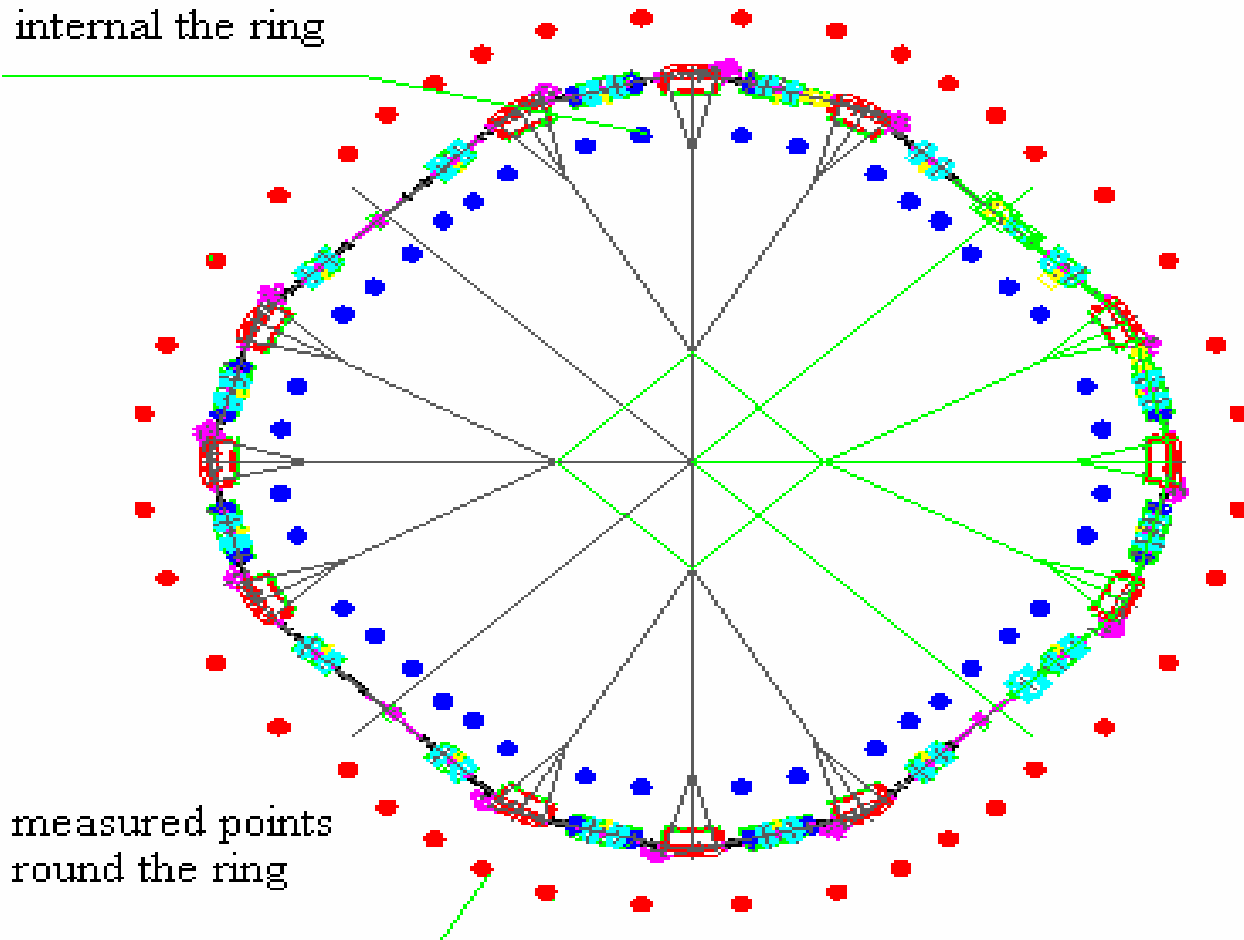
# Purpose of the addition

- Benchmark points need as separate as possible, in order to control the coordinates of points.
- Grind a regional on the top of dipole magnet to control the level.



# Measured points

measured points  
internal the ring

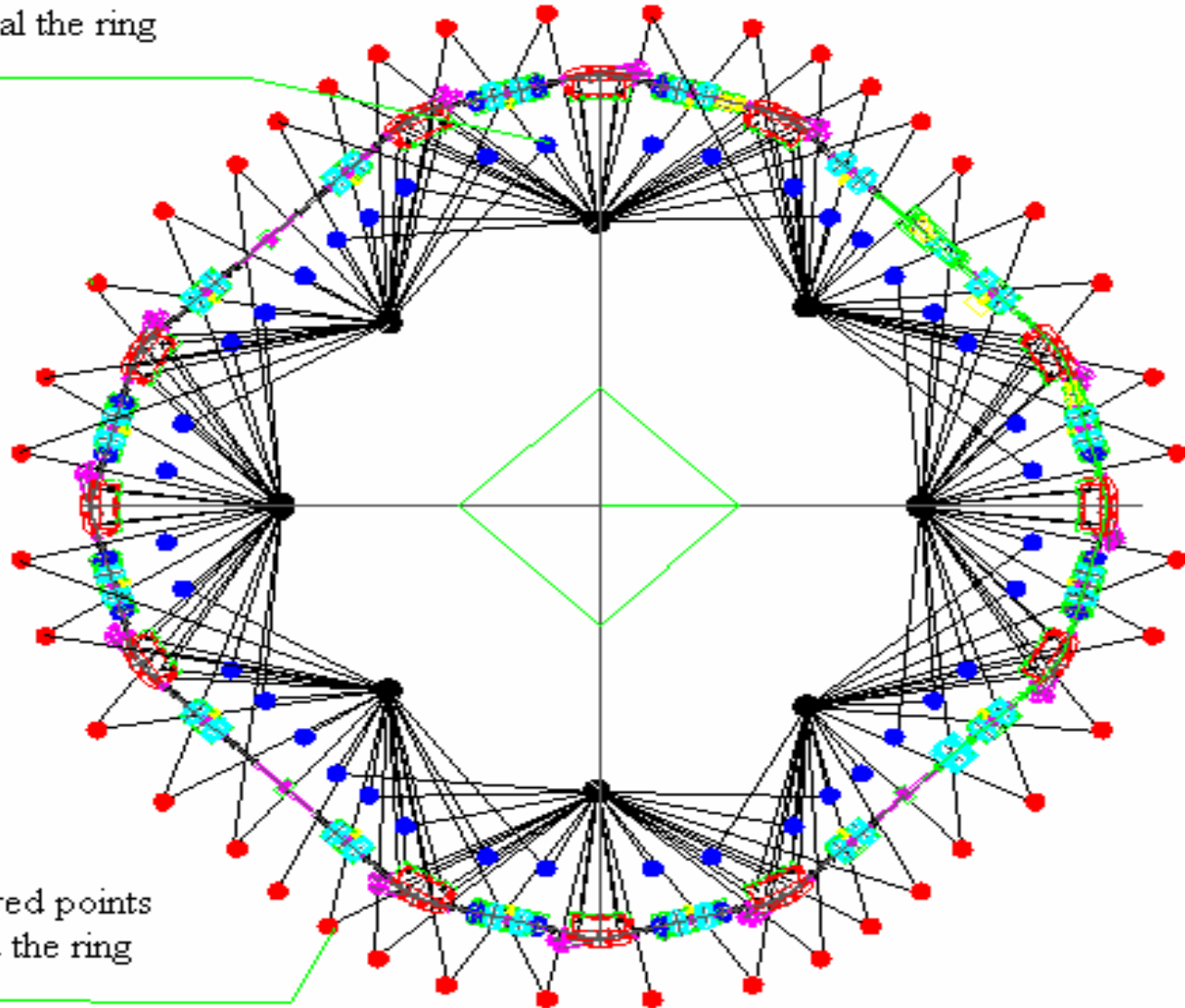


# Points request

- There is no request for these points with its location, but requires stability.
- Internal the ring and on the wall around the ring.
- The number of points must enough.

# Laser Tracker survey network

measured points  
internal the ring

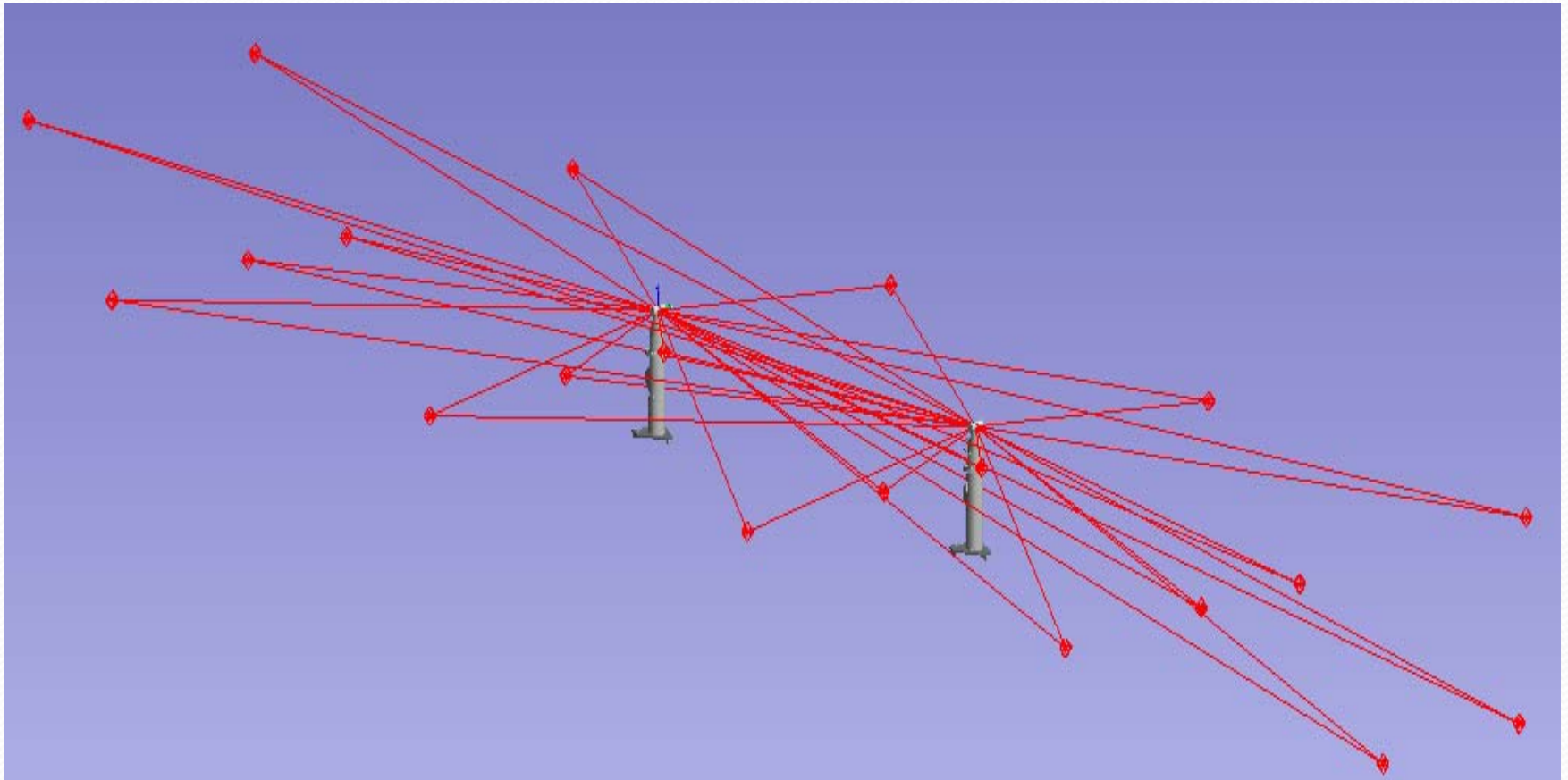


measured points  
around the ring

# Transfer station

- Transfer station survey  
agency points :not less than 6 points
- Transfer station 8 times
- Need more points

# Laser Tracker survey network



# Necessary complement

- The addition of the points will not attain the purpose.
- The equipments inside the ring will disturb the measurement.
- The result of the transfer station will not so good.

All of these should be considered.

- In fact, the alignment needs different instruments to measure the same control network.

Thank you for your attention!

