

**Acknowledgement :** \* This work has been supported through KOMAC (Korea of Multi-purpose Accelerator Complex) operation fund of KAERI by MSIP (Ministry of Science, ICT and Future Planning)

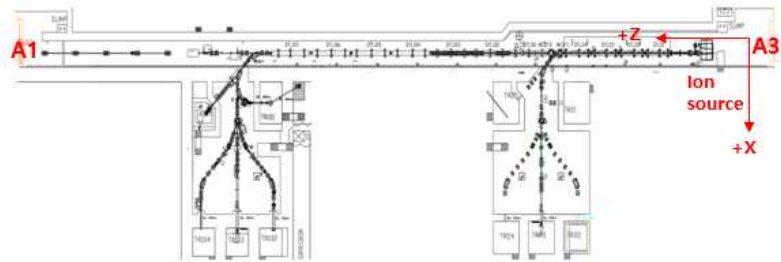
## Introduction

The alignment network points have been measured for checking the alignment of accelerator machines at KOMAC.

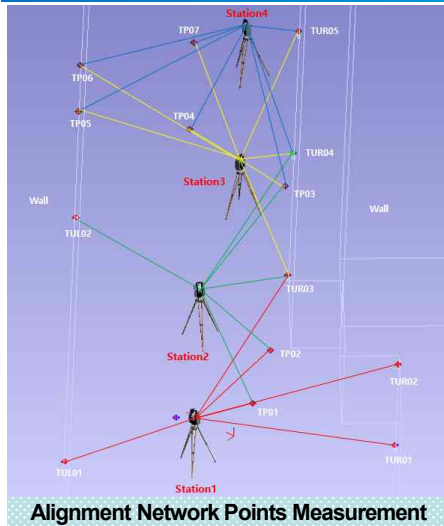
As a result of measurements for many years, we confirmed that there was an error in the measurement of the alignment network point comparing with HLS results.

We assumed there are three types of error factors.

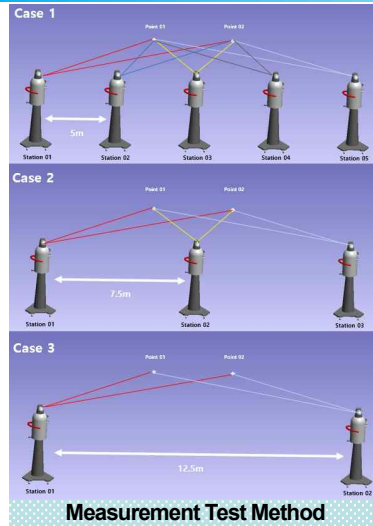
1. The station interval error
2. The laser tracker error (the angular error)
3. The lack of reference network points



## Test Method

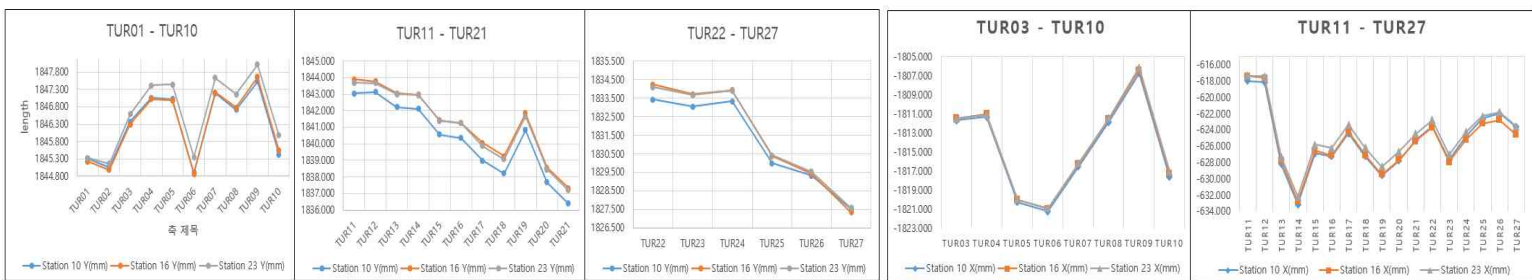


For measuring the alignment network points, it has to move the laser tracker. In this case, it is required to overlap measure points. At least 3 points for the laser tracker position should be overlapped with previous ones in order to match the position of the laser tracker.



We measured 3 times network points by changing the intervals of the laser tracker station.  
case 1 : 5 m interval,  
case 2 : 7.5 m interval,  
case 3 : 12.5 m interval.

## Result



Comparison of the station intervals Case 1, 2, 3 (TUR01 – 27 Y axis (left), TUR03 – 27 X axis (right))

Interval	Case 1 5 m (Station 23)	Case 2 7.5 m (Station 16)	Case 3 12.5 m (Station 10)
A3 to A1 (Z-axis) [mm]	134794.444	134795.961	134794.760

Measurement of the total length (A3 to A1)

The difference between the longest and shortest total length values was 1.517mm. This value is smaller than X and Y compared to the total length. If the station interval error had been applied equally to the X (horizontal, 6.4 m range), and Y (vertical, 2 m range) values, the Z (length, 135 m range) values should be significantly larger. So, we assumed that the station interval difference is not critical more than other errors.

## Conclusion

- We conducted this measurement to find out how the laser tracker station interval affects the network point value. As a result of the measurement, we found that the laser tracker station interval and data value had no significant effect.
- In the future, we have to find a method of compensation to errors from measurement like to use the theodolite and add reference network points.