GPS NETWORK FOR SuperKEKB MAIN RING
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SuperKEKB requires precise alignment order of 100μm. But, after the earth quake, we lost reliable monuments in the KEKB tunnel completely!

Global Positioning System

I. Eight GPS antennas are mounted on the roof of the access buildings to the SuperKEKB main ring (3C, 6C, …) which can access to the KEKB tunnel.

II. As a fixed point, we use one of the GPS-based control stations (Tsukuba-1) of Geospatial Information Authority of JAPAN (GSI).

III. Distance between Tsukuba-1 and the KEKB is 5 km.

IV. To connect surface and tunnel networks, i.e., eight GPS points and tunnel monuments, we set special monuments on the wall and floor of service buildings (see the right figures).

V. Stability of slope distances between GPS antennas reaches the sub-millimeter level.

VI. Preliminary analysis indicates a good agreement between the GPS network and the underground tunnel network (within 3mm).

VII. The new surveying network in a tunnel is designed by the 24 hours daily monitoring of this GPS network.

Deformation Surveying By

1. Position accuracy: horizontal <3mm, vertical <6mm (from the spec sheet)