

Design and Status of the SuperKEKB Accelerator Control Network

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1. SuperKEKB project

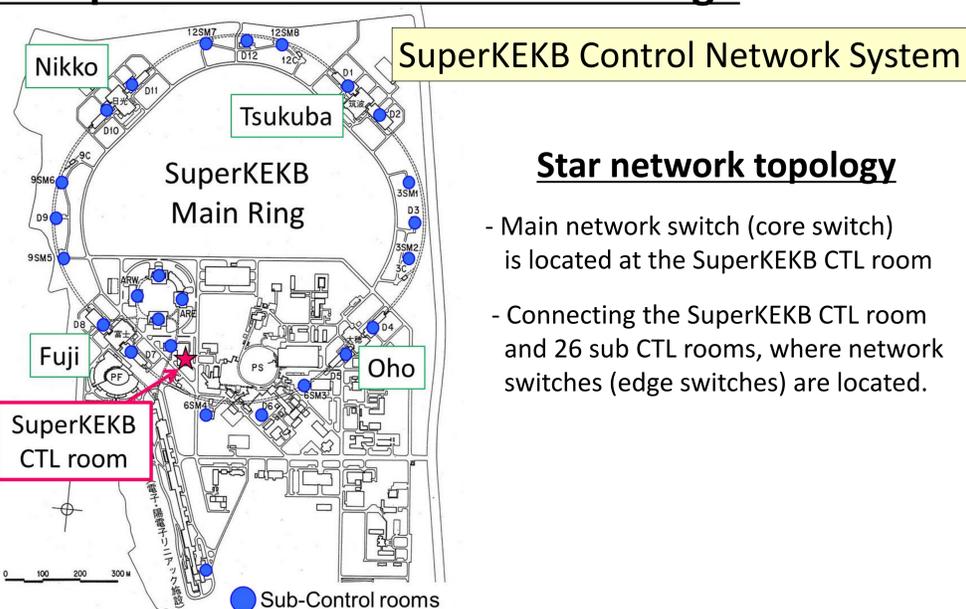
SuperKEKB : Upgrade plan of the KEKB B-factory project

Target luminosity
 $8 \times 10^{35} \text{ cm}^{-2}\text{s}^{-1}$ **x40 of KEKB**

- KEKB operation finished in 2010 June.
 - SuperKEKB operation starts from 2015 Jan.
- Currently under construction

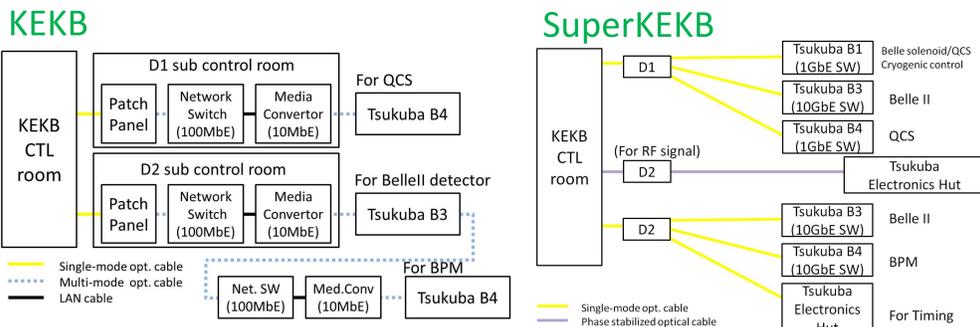
We have upgraded the accelerator control network system for SuperKEKB

2. SuperKEKB Control Network Design



Network connections and Network bandwidth

Network connection btw KEKB and Tsukuba



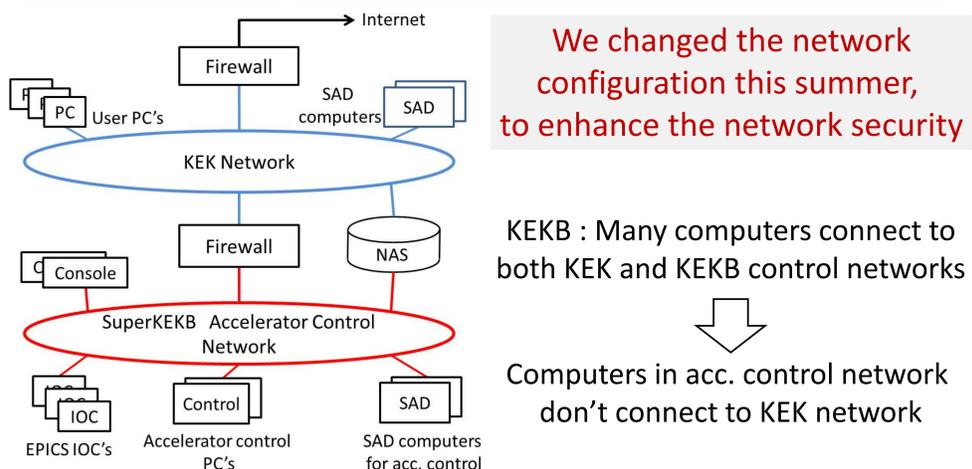
There are 10MbE media convertors in the network line

10GbE switches will be installed
 Redundant configuration (Active-Standby)

VLAN segmentation for the SuperKEKB Control Network

EPICS : Main software tools to control SuperKEKB
 EPICS uses UDP broadcast → Many UDP broadcast packets in the network.
 Accelerator components with Ethernet interface also receive these.
 We prepare VLANs for the accelerator components.

Network reconfiguration to connect with the KEK network



3. WiressLAN installation into the beamline

For SuperKEKB beamline construction, we install the Wiress LAN system into the whole tunnel area

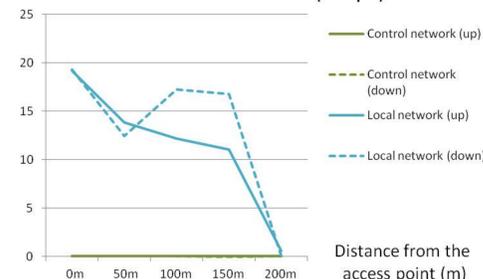
Measured network speed with a Leaky Coaxial (LCX) cable antenna

LCX cable parameters

200m length, 20D type, Coupling loss 70dB, Transmission loss 7(dB/100m)

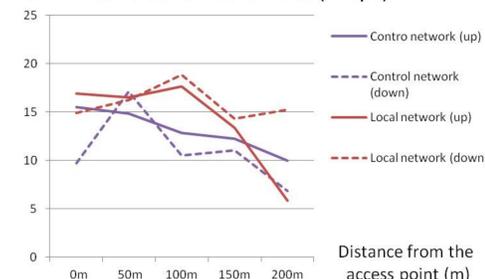
Access Point A

LCX Effective transmission rate (Mbps)



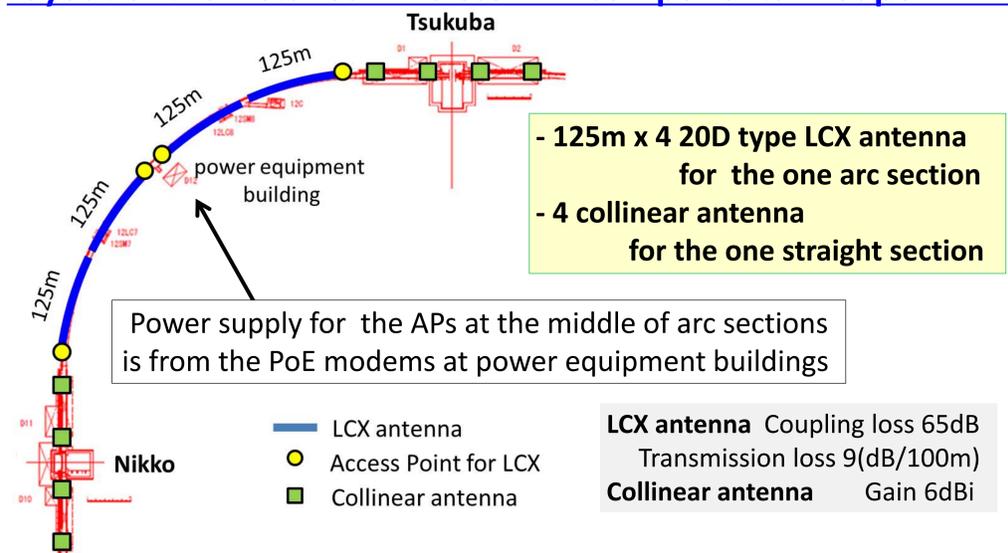
Access Point B

LCX Effective transmission rate (Mbps)

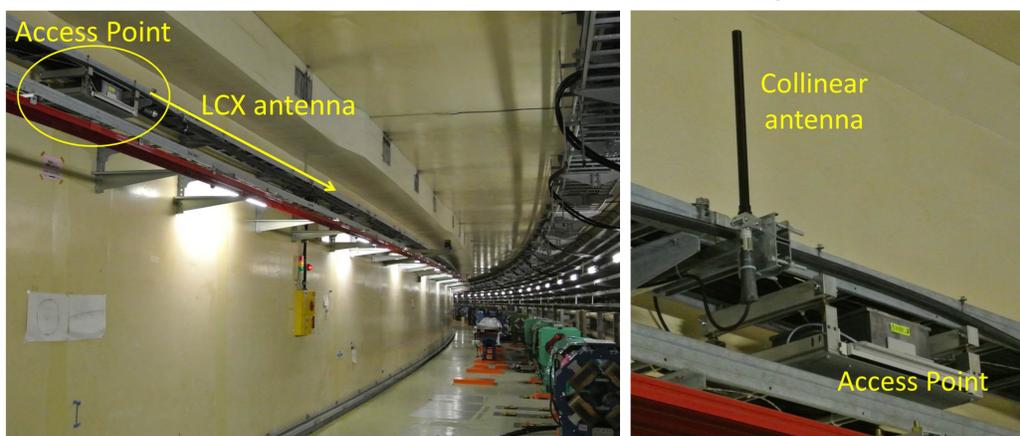


Based on this measurement, we chose access point B

Layout of the installed wireless LAN components in SuperKEKB

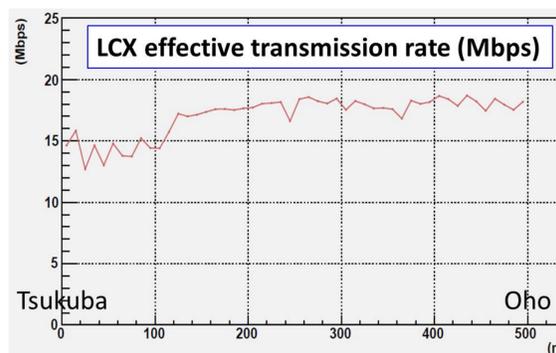


Installed LCX and Collinear antenna in SuperKEKB



We select LCX and Collinear antennas with good radiation hardness >1MGy.
 The all AP and PoE in the tunnel are installed within lead boxes.

Measured WiressLAN Network Speed at SuperKEKB tunnel



Good network speed performance of ~18Mbps in the whole tunnel area

4. Summary

We have upgraded the accelerator control network system for SuperKEKB.

The designed network system has the higher performance : the wider bandwidth data transfer and redundant configuration.
 We have installed the new wireless network system into the 3 km circumference accelerator tunnel.