Improvement of Temperature and Humidity Measurement System for KEK Injector Linac

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Temperature and Humidity Measurement System

- Consists of 26 data loggers connected to 720 sensors, one EPICS IOC, and CSS archiver.
- There are 17 types of objects to be measured.
- The temperature stability of the cooling water is very important for stable beam operation.
- The temperature change may cause the rf phase drift and eventually the beam energy change.

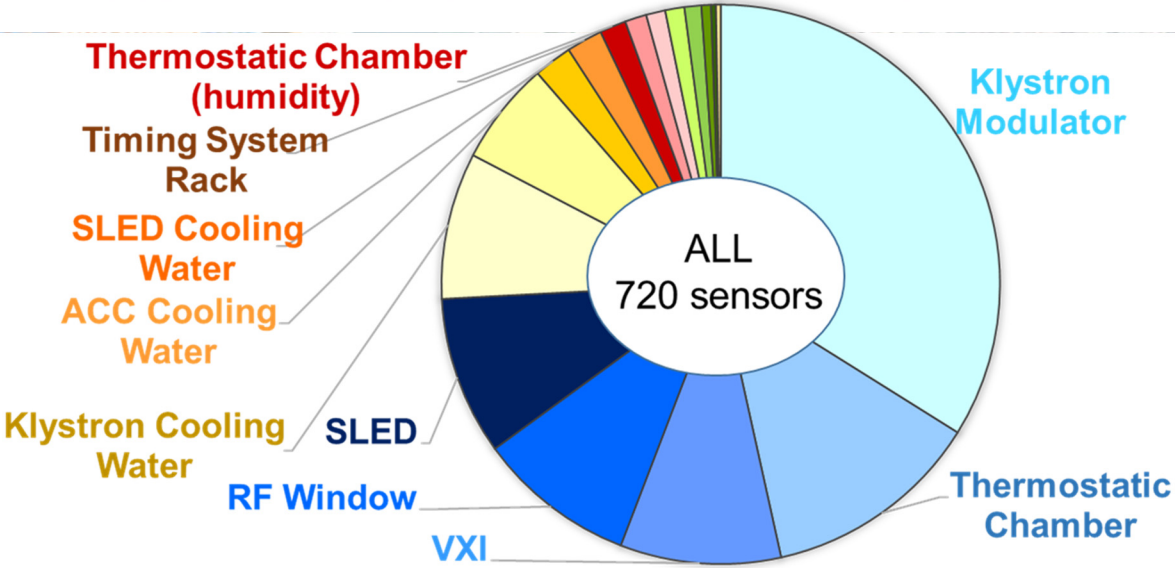

Fig.1: Measurement object.

Table 1: The stability goal of cooling water temperature

Type	Cooling water temperature
Accelerating structure and SLED	30 ± 0.3 ℃
Klystron	30 ± 0.5 ℃

Data logging system

- Measurement data obtained by each sensor is firstly sent to the data logger.
- EPICS IOC obtains the temperature data and stores them into EPICS PVs in 0.1 Hz.
- CSS archiver w/ PostgreSQL backend retrieves the data from EPICS PVs in 0.1 Hz.

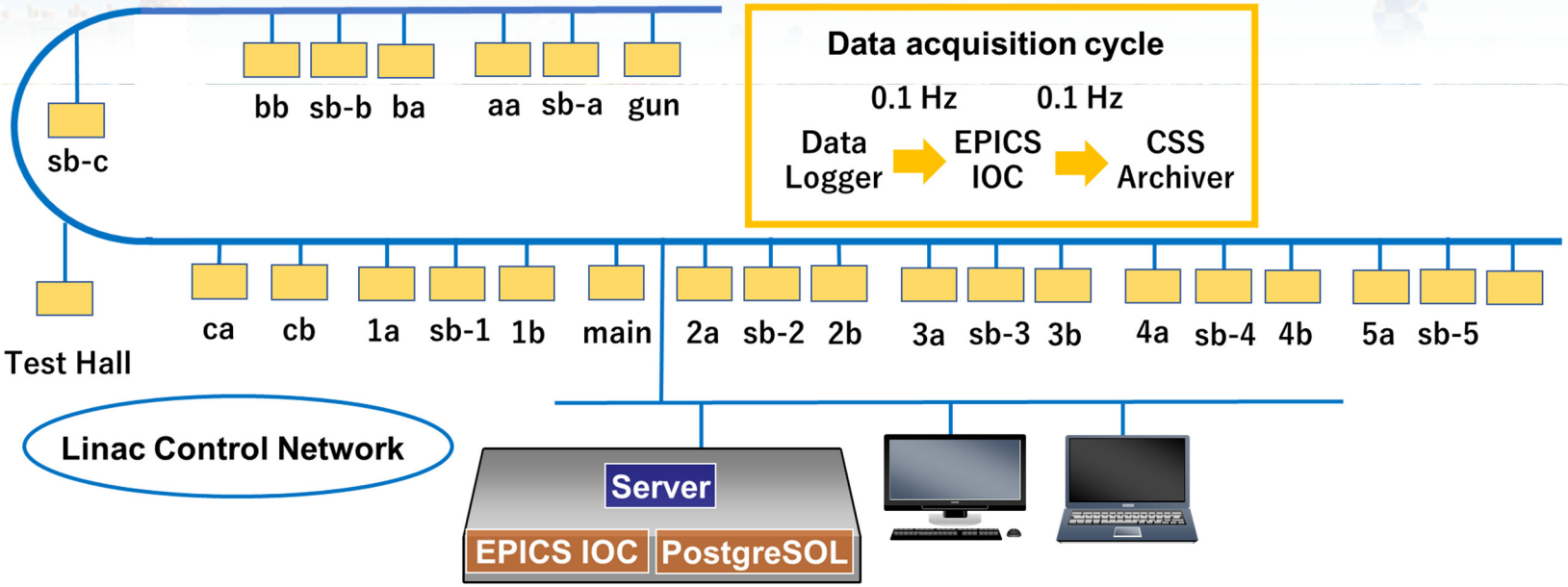

Fig. 2: Schematic layout of data acquisition software.

New Alarm System and Viewer

- Python scripting language, matplotlib, and Tkinter
- The new software for managing the temperature and humidity data.
- It can detect the anomalous temperature fluctuation with a good operable user interface.

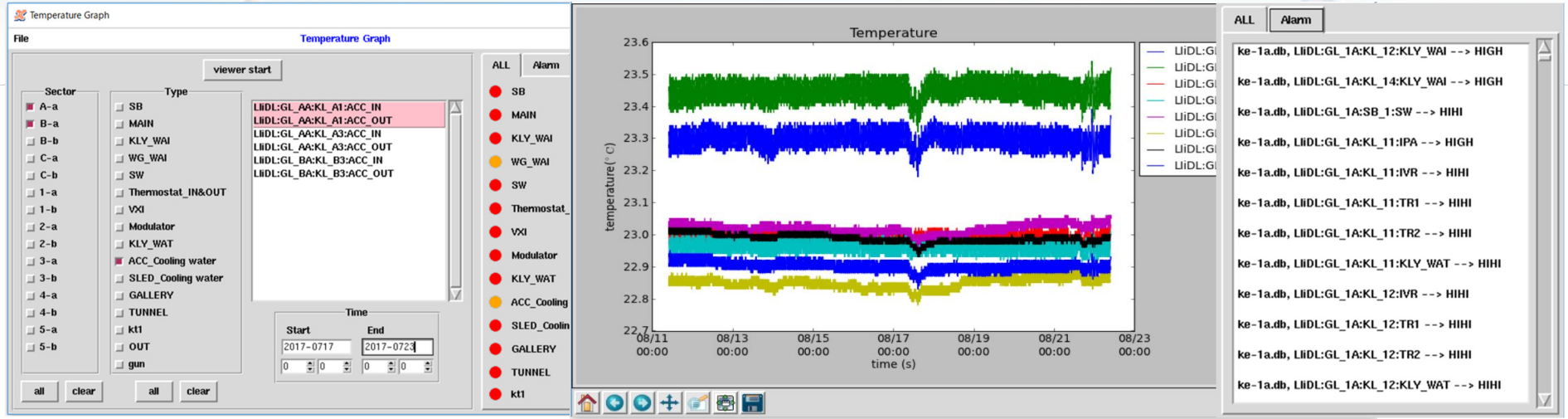

Fig. 3: Image example of the new archiver data viewer and alarm display panel.

- **We have a plan to detect the defects of equipments by using this alarm system not only for the temperature but also for the status of other subsystems.**