

Data Management System for the Plant Monitoring Data in JT-60SA

R. Yamazaki, S. Sakata, H. Urano

National Institutes for Quantum and Radiological Science and Technology

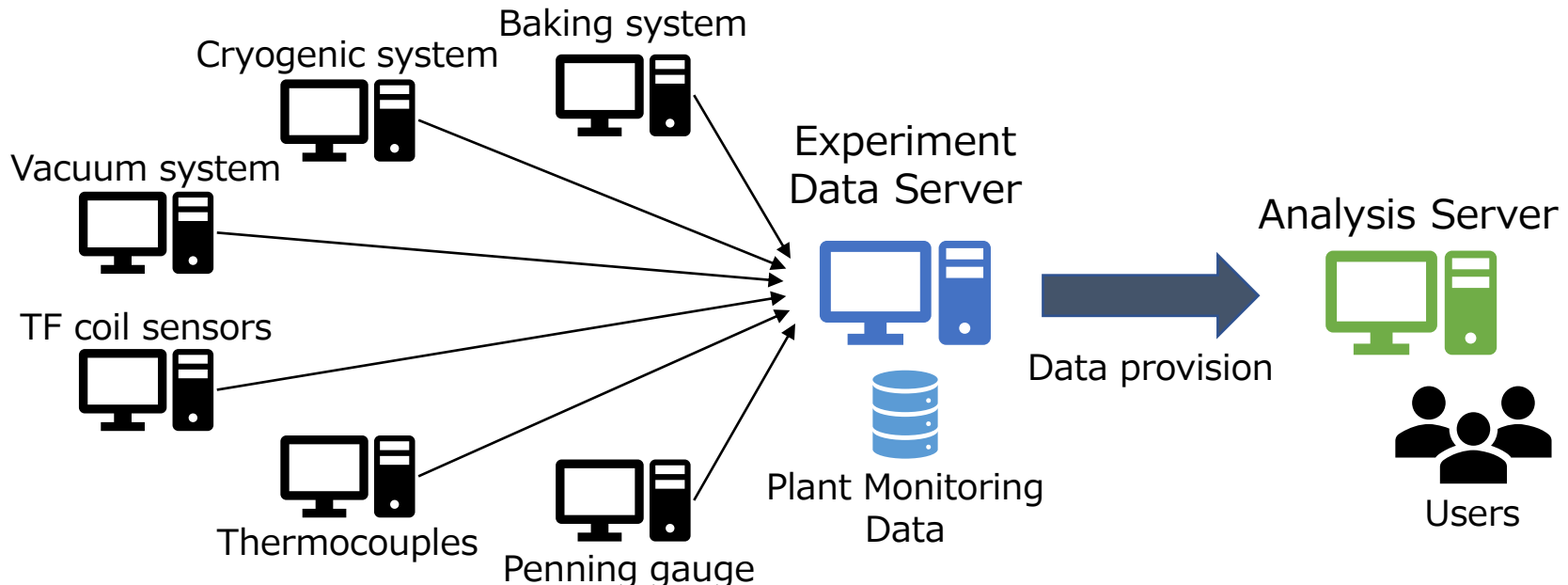
- It is important to manage the plant monitoring data to monitor the condition of the hardware systems composing JT-60SA tokamak. (e.g. vacuum vessel temperature)
- These data are also used for plasma research by comparing with the discharge data. (e.g. plasma current)
- In JT-60, the previous device of JT-60SA, the plant monitoring data were not acquired into the common platform of the database system whereas those were accessible individually to each plant system only for a short period.

A new database system is required;

- To integrate the plant monitoring data of many systems into one system
- To provide users with an appropriate environment to easily compare the plant monitoring data of several hardware systems

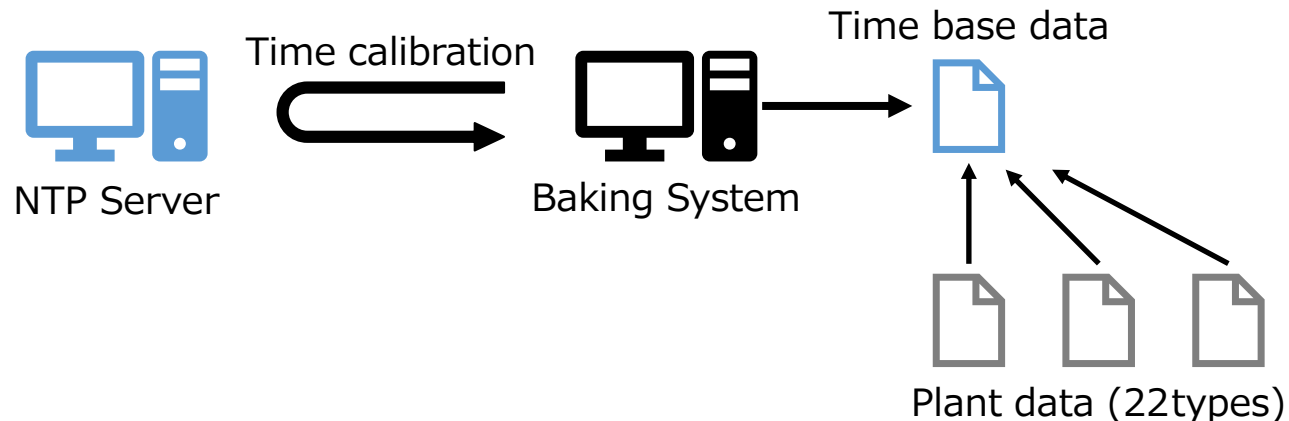
New data management system

- For integrating the control and management of the plant monitoring data of many hardware systems into one system, the plant monitoring data are transferred to the Experiment Data Server.
- The plant monitoring data are acquired in a common data format which provides stable control and safe management of the data acquisition process.
- The Analysis Server provides users with the appropriate environment to analyze the plant monitoring data.



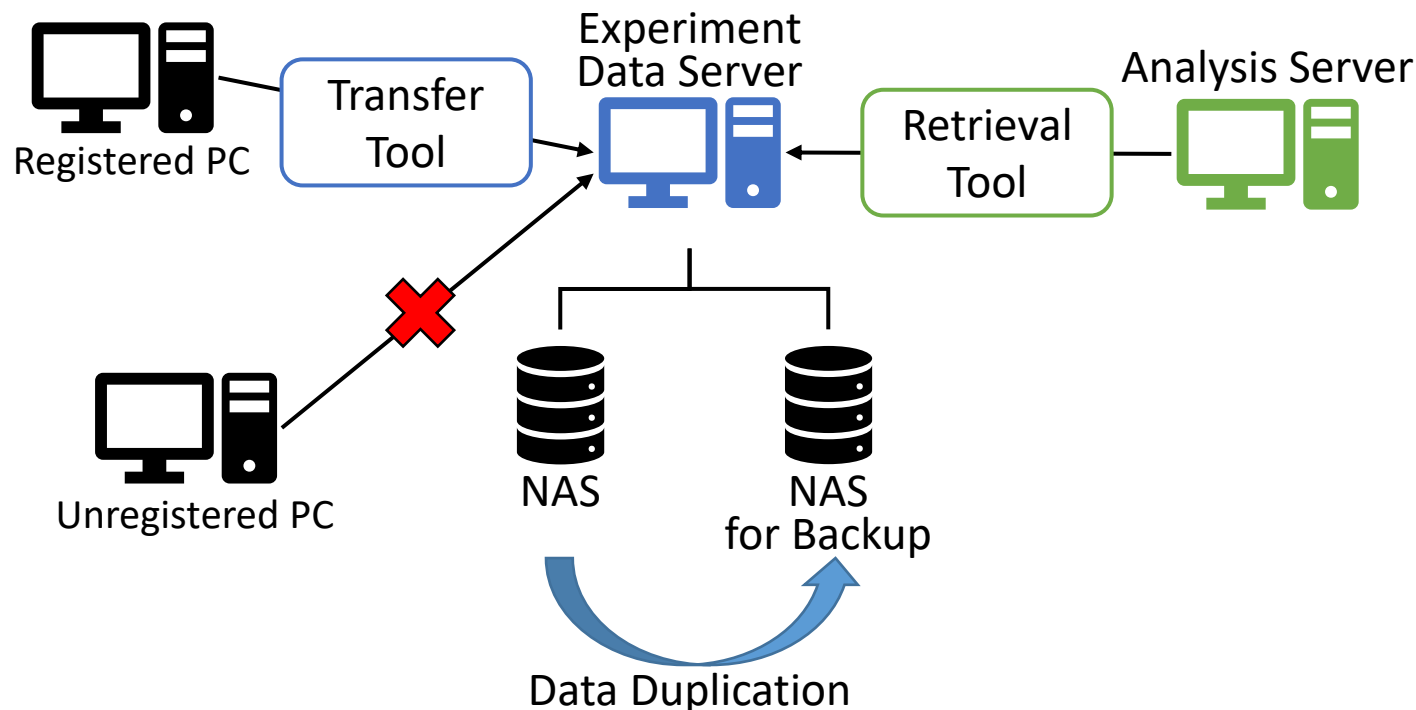
It is important to synchronize the time base data of plant systems for comparing the plant monitoring data of several hardware systems.

- A Network Time Protocol (NTP) server was installed to synchronize the time base data of many hardware systems.
- The time base data are acquired into the absolute time format.
- The time base data of the plant monitoring data are transferred in a separate line to prevent duplicate storage of the time base data.
- The plant monitoring data are associated with their time base data information located in the header part of each data.



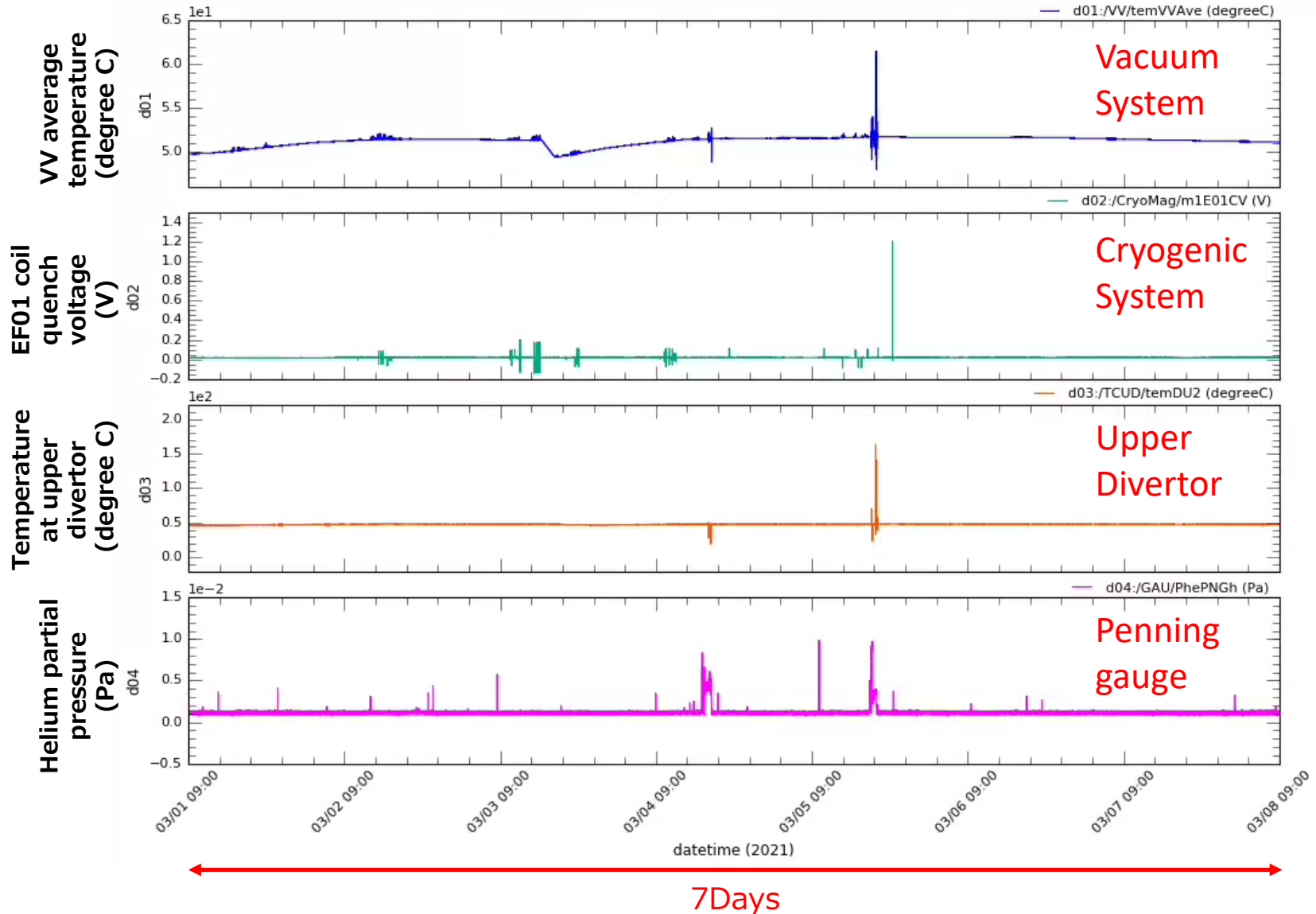
Data security and backup

- The dedicated tool for data transfer and retrieval allows users to access the plant monitoring data in the Experiment Data Server.
- The Experiment Data Server authenticates computers to prevent intrusions from unregistered computers.
- The plant monitoring data are backed up to two different Network Attached Storage (NAS).
- The stored data are made a copy to another storage during the night when the experiment is over.



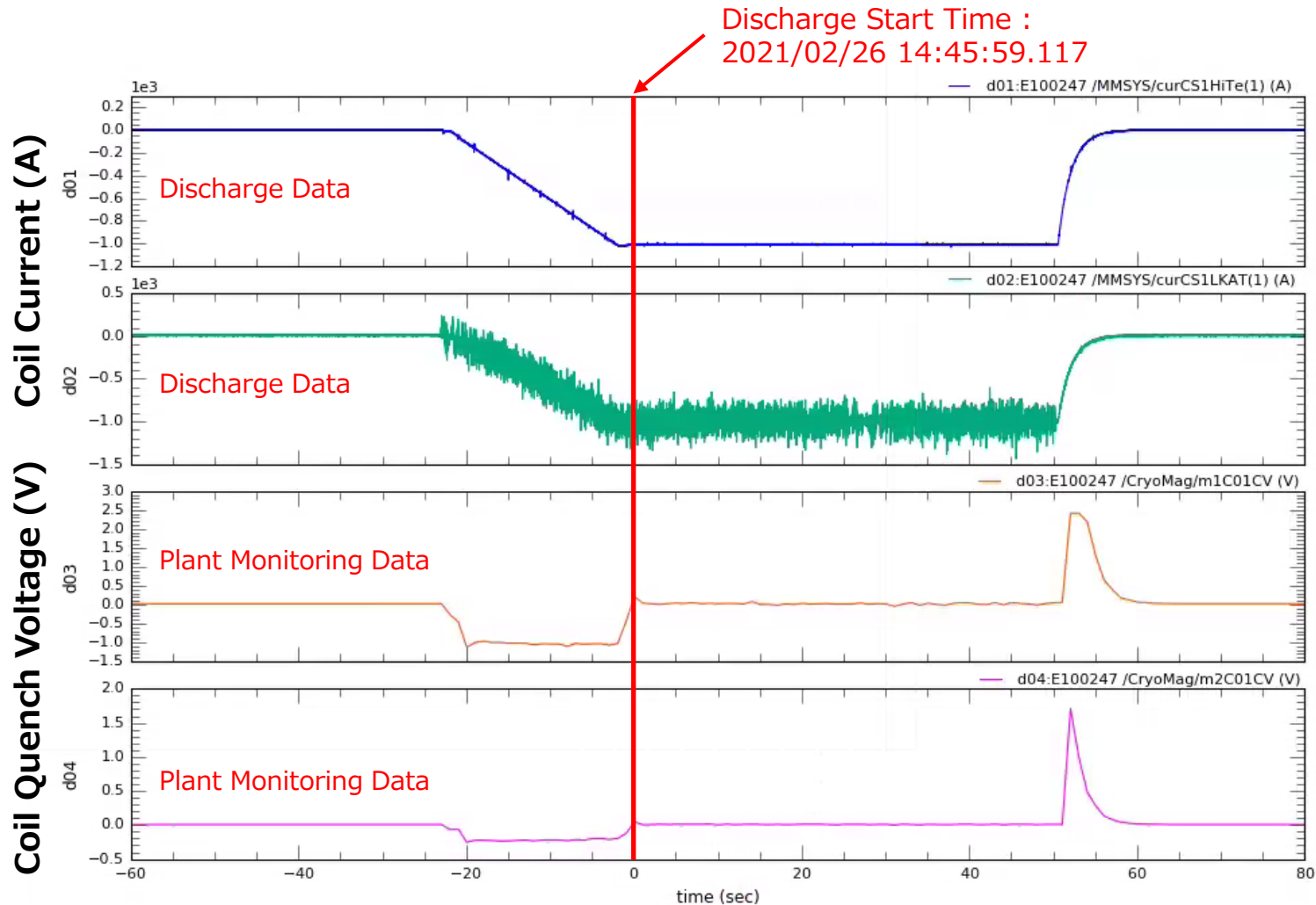
For monitoring

Compare the plant monitoring data for a long duration.



For analyzing

Compare the plant monitoring data with the discharge data.
CS1 coil current is acquired as the discharge data, while CS1 coil quench voltage is acquired as the plant monitoring data.



Most of hardware systems transfer the plant monitoring data every 15 minutes, therefore the time needed for data transfer and storage has evaluated.

The plant monitoring data transferred in JT-60SA integrated commissioning

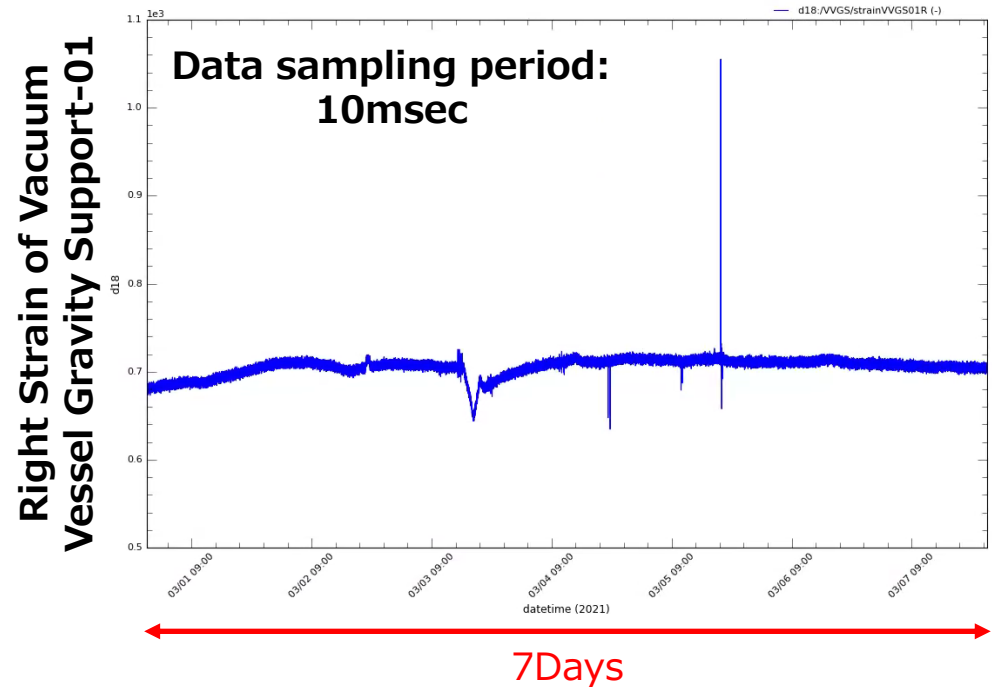
- Total data amount : 2 GB / 1day
- Number of data : 2858 types of data

Total Time : 6.5 min for 2858 data files

- Data transfer time : ~24 sec
- Data storage time : ~6 min
- This database system enables to store of the 2858 types of data within 15 minutes, and users to refer to the stored data quickly.

Data access time

- 1 day : 0.2~1 sec
- 7 days : 1.3~6 sec



- This database system has enough performance to refer to the plant monitoring data as soon as the data stored.
- The plant monitoring data have been accessed 100,000 times a day in JT-60SA integrated commissioning.

- The data management system for the plant monitoring data of JT-60SA has been developed for the purpose of integrating the plant monitoring data of many plant systems into one system.
- This database system has provided users with the environment to monitor the condition of plant systems and compare the data of several hardware systems.
- Evaluated the performance of this database system, we have confirmed that the new database system is operated effectively.

Future work

- Further investigation is needed to improve the processing speed of data storage.