Cryogenic controls for the RAON SRF test facility

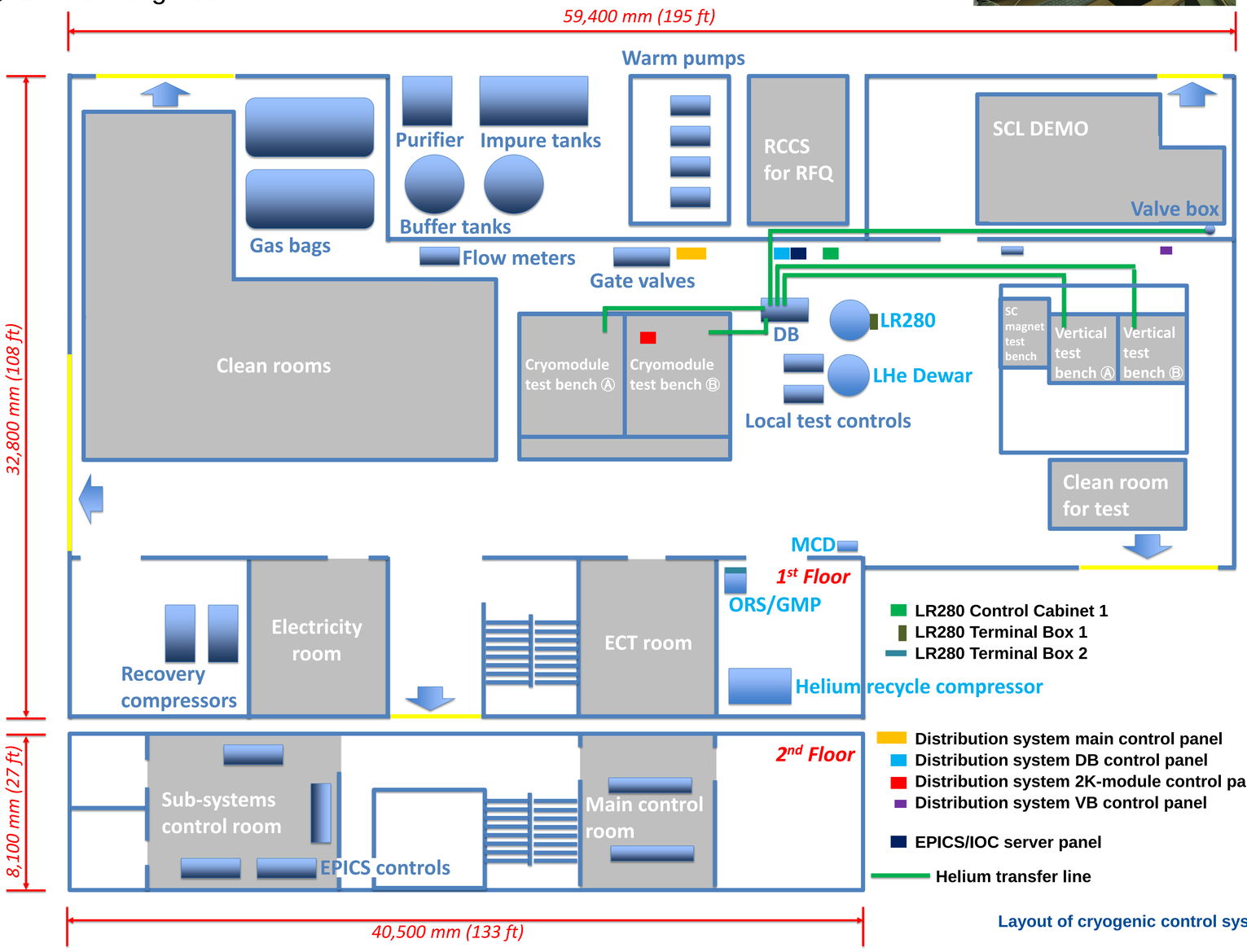
Sungwoon YOON*, Jae Hee SHIN, Ki Woong LEE, Sangil LEE, Chul Jin CHOI

Abstract

Rare Isotope Science Project launched on December, 2011 had constructed the SRF test facility for testing the SC cavities, the SC magnets and the cryomodules. A small cryogenic system included a helium liquefier and a helium distribution system was also set up. Two types of PLC controllers, which will be integrated by EPICS, control the cryogenic system. One of them was delivered with the helium liquefier and tested by the maker. The other control system was designed by RISP and a Korean vender built up. This system will supply the LHe and LN_2 to test benches, automatically.

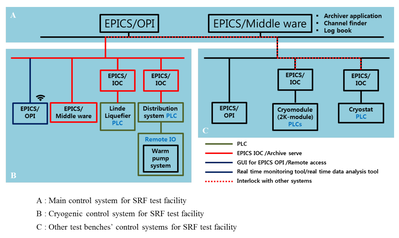
Cryogenic control system

① Allen-Bradley PLC(1756-L71) and Siemens PLC(S7 300) together : To test both PLCs
② Remote IOs : Because some analog signals are far from the PLC controller.
③ Switch module(MOXA, Nport 6650-16) from RS232 to TCP/IP
④ Modbus TCP EPICS driver for Siemens PLC instead of S7 PLC EPICS driver
⑤ Temperature sensor module(Lakeshore Model 240) : Beta version
⑥ EPICS integration

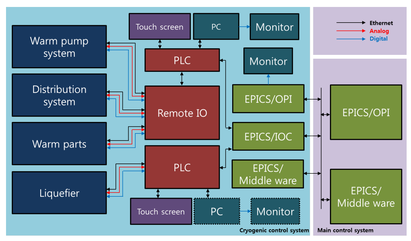


Layout of cryogenic control system

EPICS local integration

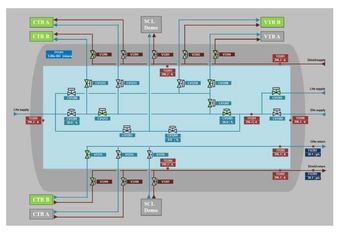


A : Main control system for SRF test facility
B : Cryogenic control system for SRF test facility
C : Other test benches' control systems for SRF test facility



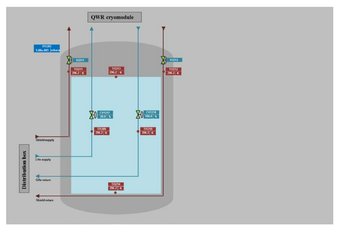
We are integrating two PLCs with EPICS.
① Modbus/TCP for Siemens PLC
② Ethernet/IP for AB PLC
③ Just one EPICS/IOC server for both PLCs
④ GUI by CS-Studio

Components and their GUIs

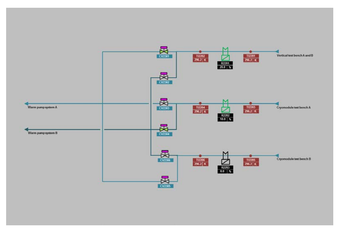


Distribution box and helium transfer lines

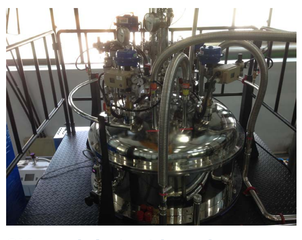
Warm pumps for superfluid helium

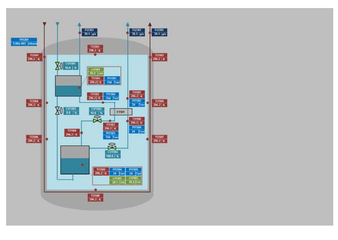


Valve box



Gate valves





2K-module test bench

AB PLC panels

Main control panel

Distribution Box control panel

2K-module control panel

Valve box control panel

Rare isotope Accelerator complex for ON-line experiments

Fermilab

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