

# EPICS: CSS-Phoebus

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## EPICS Alarm System in Phoebus

I am developing an EPICS alarm system based on CS-Studio Phoebus. Phoebus will be used for new EPICS system development and will replace the existing applications using ALH for alarms and MEDM for monitoring and control screens. Phoebus will also be used to replace Eclipse-based CS-Studio applications ([DSG Note 2021-37](#)).

The Phoebus alarm system is an EPICS client application that monitors process variables (PVs) from EPICS Input / Output Controllers (IOCs) for alarm conditions. To develop and test the alarm system, a source of EPICS process variables (PVs) is needed.

To provide a reliable and controllable source of PVs without the requirement of a working detector and readout hardware, I am developing an user controllable EPICS-based detector signal simulator as a software tool for EPICS client development and testing.

The simulator is being utilized first on the development of the Phoebus NPS alarm system using my Phoebus test system (figure1). Initially, I designed, programmed, and implemented a four detector signal prototype simulator on an EPICS host-based softIOC running in the Phoebus alarm system development computer ([DSG Note 2022-06](#)).

This prototype simulator design is being used as the basis of my next phase of development to simulate the NPS detector signals by producing EPICS PV's. The Phoebus alarm system under development is tested ([DSG Note 2023-06](#)) by properly reacting to PV alarm conditions generated by the softIOC. In the actual detector system, the NPS signal PVs are produced by the Hardware Interlock System (HIS) ([DSG Note 2021-15](#)).

To simulate these signals, I developed a EPICS database template via the EPICS Visual Database Configuration Tool program (VisualDCT). The template contains a block of EPICS records that are common to a group of simulated signals. The groups for NPS include the crystal array

- **Developing CS-Studio Phoebus based controls, monitoring, and alarm system**
- **Writing a program to simulate NPS detector signals via EPICS process variables**

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thermocouples (figure 2), crystal and electronics zone chillers, detector frame environmental monitoring, cooling circuit monitoring, electronics zone environmental monitoring and hall environmental monitoring, This block of EPICS records is repeated for each individual signal that is simulated in a group.

The use of a signal group template requires a substitution text file containing the PV data needed for that group. The text substitution file also contain the initial alarm limits for the PV's being simulated.

At the start of the signal simulator, my application startup script uses the database templates for each signal group and the substitution text file I wrote to form the complete database. Following the database formation, the startup script initializes it and the simulation begins.

Using the Phoebus test station user interface (UI) (Figure 3) I developed, the signal simulator can be set to produce a user selected or a random value for each of the independently simulated detector signal. The alarm limits for the signal can also be set via the UI.

The first NPS detector signals simulated in Phoebus test station softIOC are the crystal array 112 thermocouples. (DSG Note 2023-23). The programming for the detector frame environmental monitoring is underway.

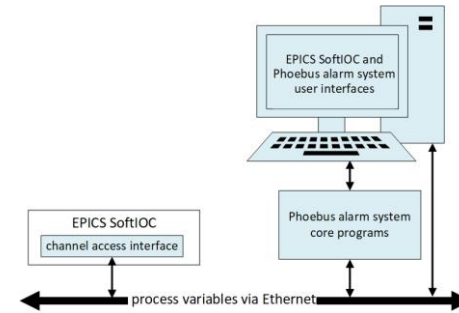


FIG.1. Phoebus Test Station

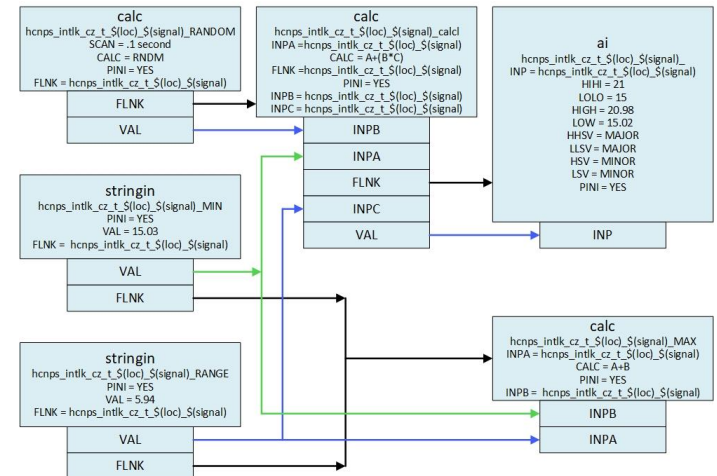


FIG.2. NPS VisualDCT template for thermocouples

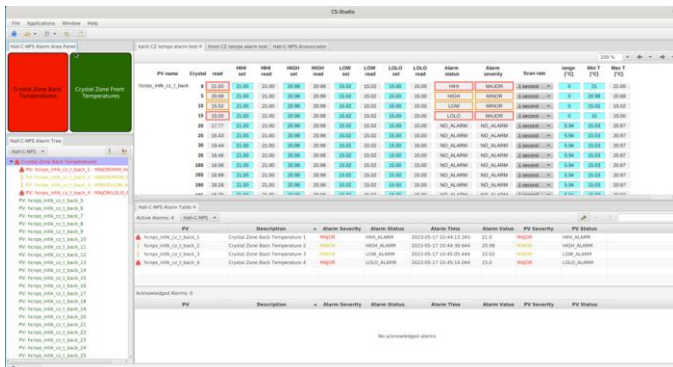


FIG.3. Phoebus Test Station User Interface