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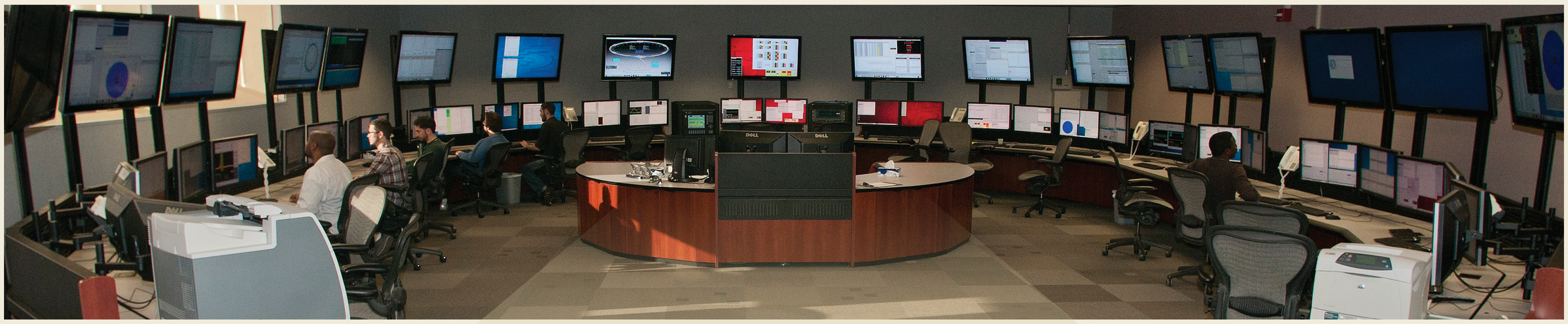
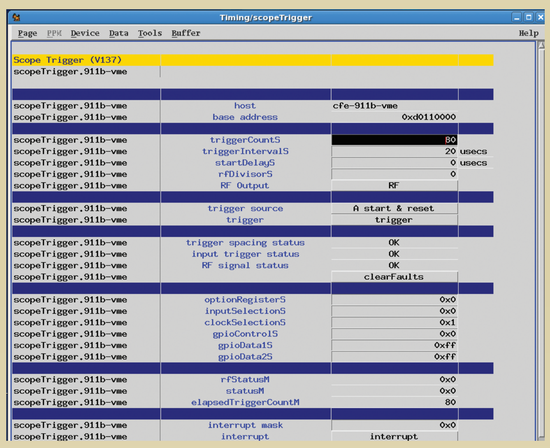
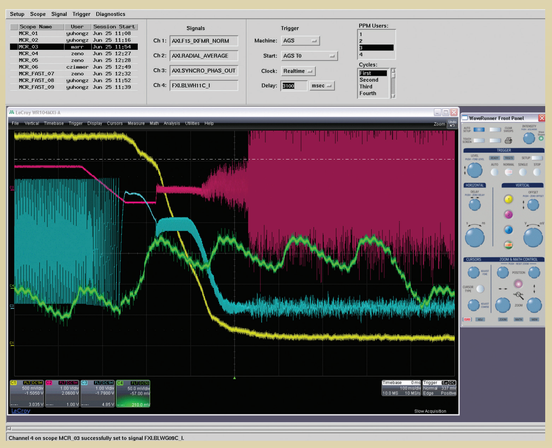
Paths to an All-Digital Control Room



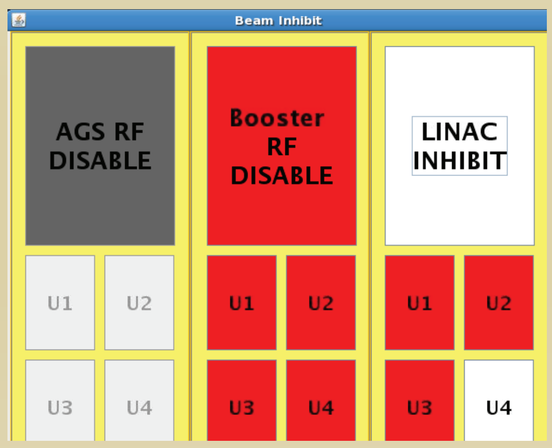
Three Facets of the RHIC MCR Upgrade



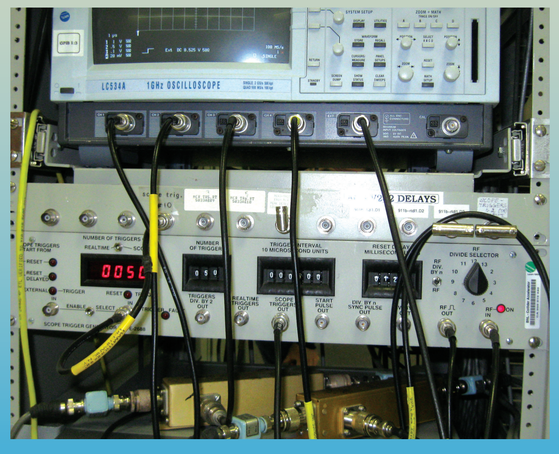
The trigger module interface is now accessed from a standard page in the Controls systems' Parameter Editing Tool (PET). The page exchanges data and settings with a host computer that interacts with a redesigned device in a VME card format.



Taking inspiration from a similar system at Jefferson Lab, the remote scope interface brings together: scope display/control, signal routing through the multiplexer system, and event-based trigger generation into a unified user interface. Setups can be saved/recalled and current users are identified. View/control can be passed-off to users running the application anywhere in the MCR or elsewhere.



The Beam Inhibit application provides clean, concise, access to the system. Color-coded states are controlled by clicking. Back-end hardware is made up of VME modules in chassis throughout the complex. Remote access decouples the hardware from users; one hardware module exists per injector system, but users are added by simply running another instance of the application.



The module above generated a series of oscilloscope triggers synchronized with the machine RF in programmable intervals. Thumbwheels, knobs and switches required a user to be physically present at the console. Further reconfiguration required changing patch cables.

In the old control room oscilloscopes were a major feature of user consoles. While signals to the scopes were switchable with a remote multiplexer system, control of the instrument was still accomplished by operating the front panel.

The Beam Inhibit system consisted of custom hardware modules that took user inhibit requests and presented system statuses on multiple panels at specific console locations. Interaction with the system is again limited to physical locations of hardware.

ABSTRACT: The new Main Control Room for the Relativistic Heavy Ion Collider (RHIC) was designed to eliminate the physical presence of dedicated hardware such as oscilloscopes, patch cables, and button panels, in favor of large LCD monitors and standard computer terminals. This arrangement has provided increased flexibility within the control room to accommodate operators, physicists, and specialists, and has increased the capacity for remotely-located staff to interact, troubleshoot, and monitor machine operations. One of the challenges associated with the migration to an all-digital control room is the employment of specialized hardware that can be remote-controlled and the translation of real front panels into software-based virtual front panels. Shown above are three examples of such a migration.

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