

HMS Controls History

- Systems include HMS Quadrupoles, Dipole, Carriage Rotation, Cryogenics.
- Systems are getting old ~9 years.
- Radiation damage is occurring to software and electronics.
- Maintenance problems for some components.
- Software authors have disappeared.
- System configurations (watchdogs, SLC4, proprietary components, etc.) are a nuisance.
- Nonstandard systems.

HMS Controls Upgrade

- Three pronged assault is being developed.
 - Environment Improvements.
 - Unified Control Systems.
 - Updating Equipment and Controls.

Environment Improvements

- Radiation Harden Environment via better shielding and relocation of sensitive equipment.
- Requires Data and Signal Conditioning. Noise reduction, signal strength improvement, grounding solutions, converting to 4-20mA signals where possible and other issues will be addressed.
- Chris Cuevas's group will be employed for this.

Environment Improvements

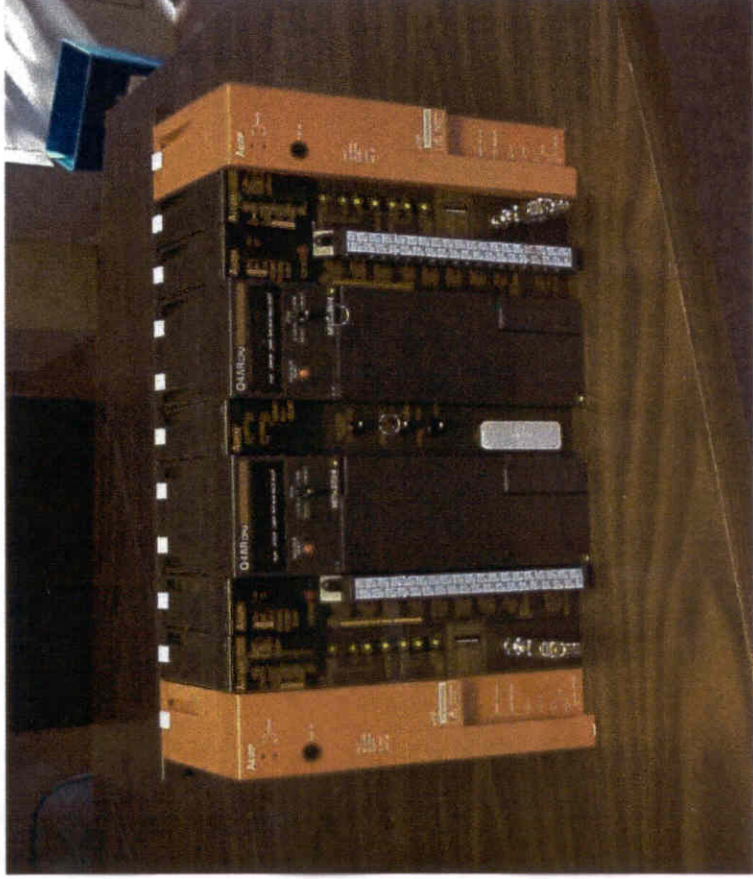
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Unified Control Systems

- All systems will use the same control package. Standardizes the software and hardware in the Hall.
- Each control system will utilize a redundant PLC controller with a remote PC, acting as the human to machine interface, much like the HMS dipole employs now.
- Removes the troublesome PC's from the Hall's environment. Rebooting the PC does not bring down the system (HMS Dipole).

Unified Control System

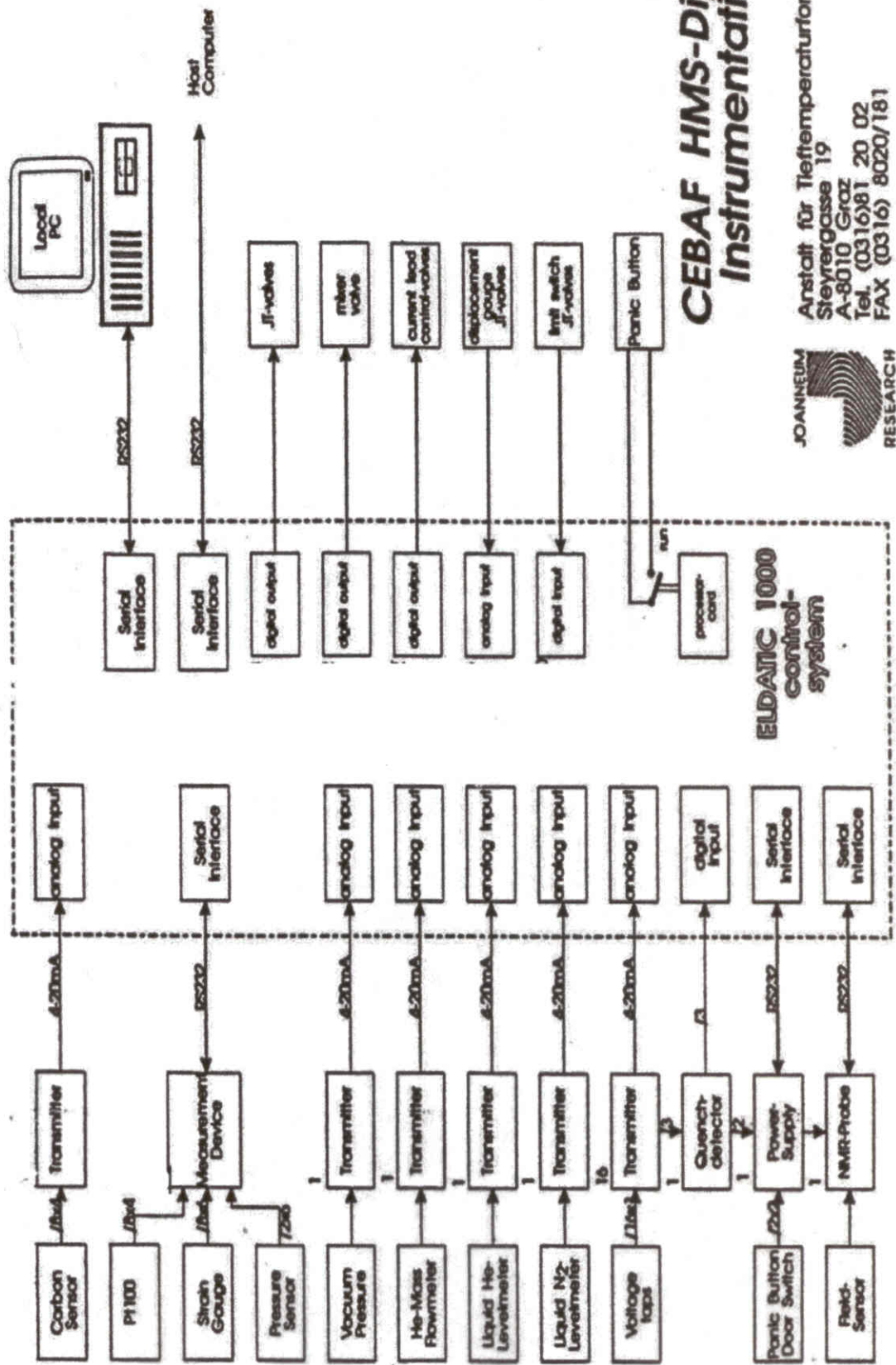
- Redundant PLC system is currently undergoing beam test within the Hall.
- Not being tested at this time are the Input/Output Modules nor the Communications hardware.



Updating Equipment & Controls

- New Dipole Power Supply
- Adding automatic cryogenic warm return valves on the quads
- Replace the SLC4 card, (RS-232 ports).
- Replace the HBM.
- Replace Dipoles Quench Protection.

Existing HMS Dipole Controls

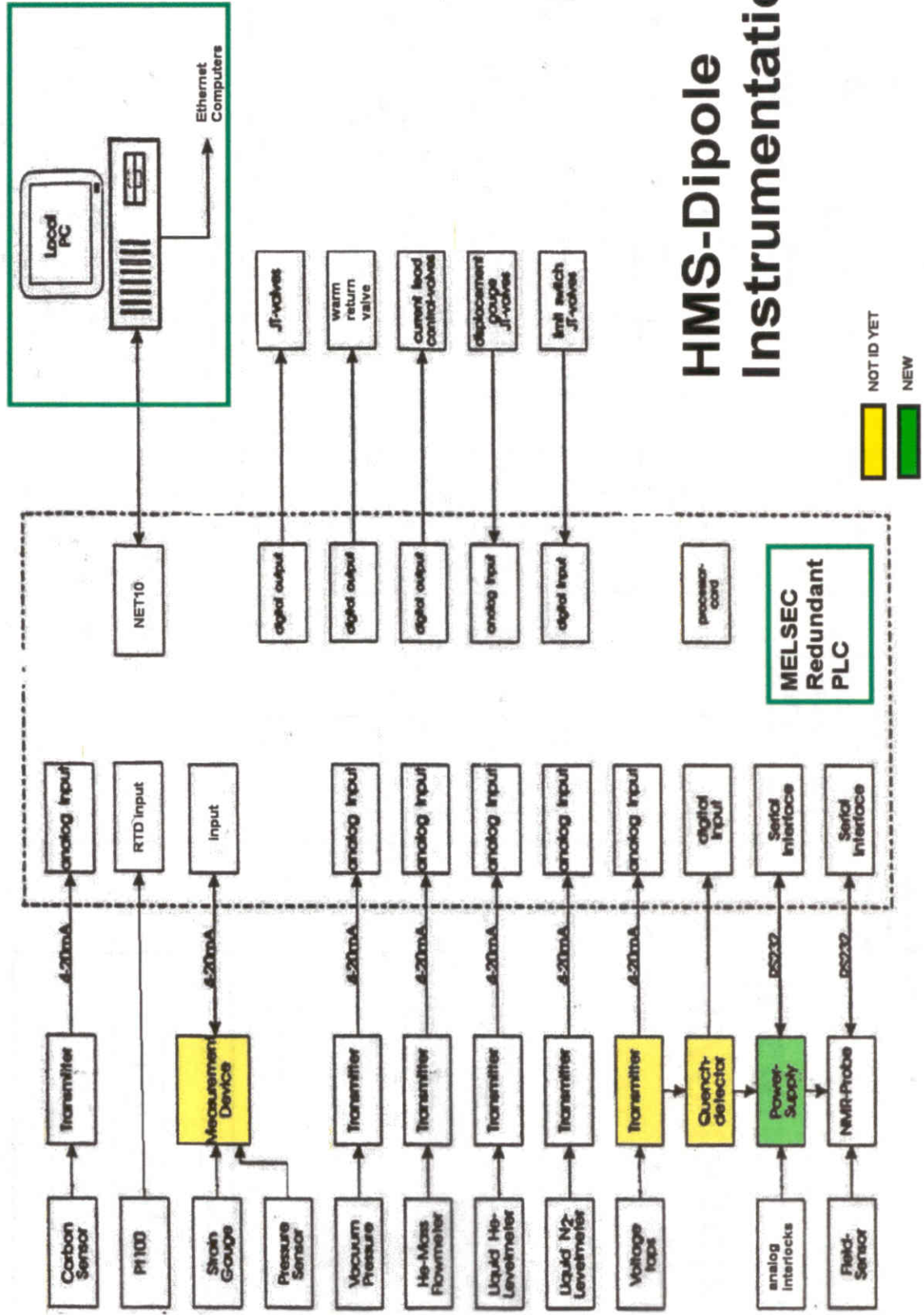


CEBAF HMS-Dipol Instrumentation



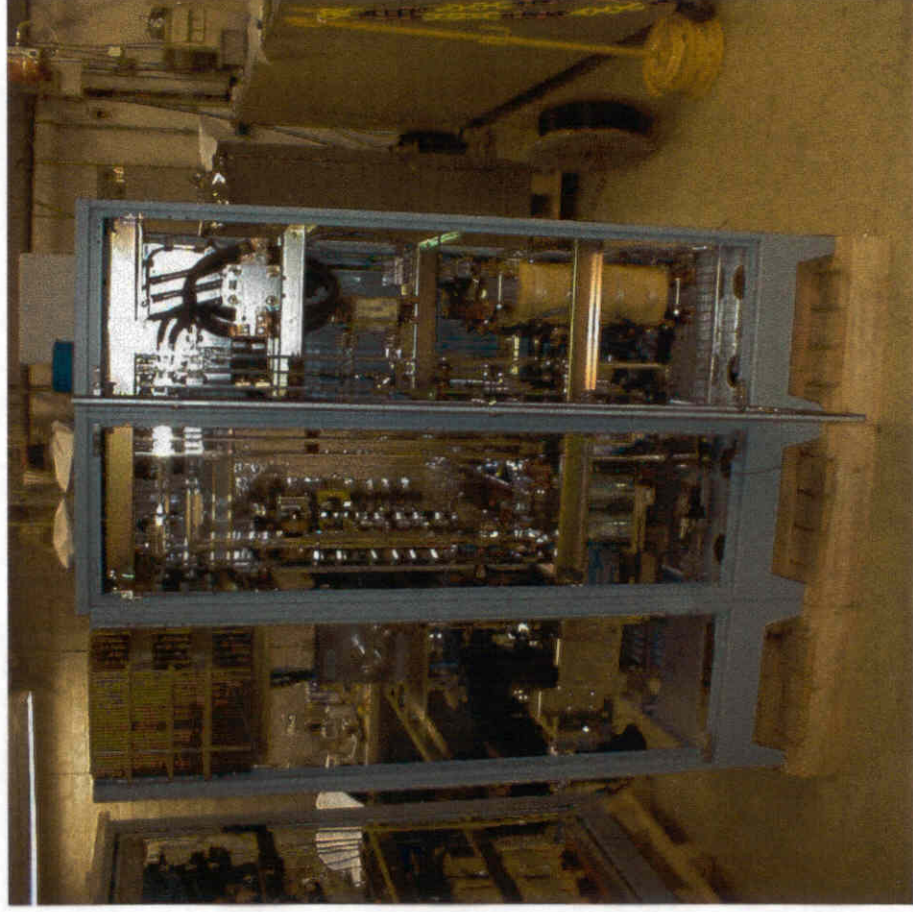
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Proposed HMS Dipole Controls



HMS-Dipole Instrumentation

Updating Equipment & Controls



- The new Danfysik HMS Dipole Power Supply
- Regulation is 10 times better than now.
- Has been successfully tested at Denmark.
- Installation set for March 2003.

Updating Equipment & Controls

- Separate the analog interlocks from the digital components. Will allow for a complete power cycle of the PLC units without bringing down systems.
- Protection of systems would be maintained via the analog circuit to the power supplies.
- Provides a temporary override to the computers watchdog clock.

User Friendly GUIs

- Human to Machine Interface (HMI) to be improved. HMI running on a PC can be ethernet connected to other computers.
- More data logging of Hall and Accelerator variables.
- Remote paging of Experts by the control system.
- Remote control of system by Experts.