

Integrating Externally Developed Systems for SNS Linac Cooling and Vacuum

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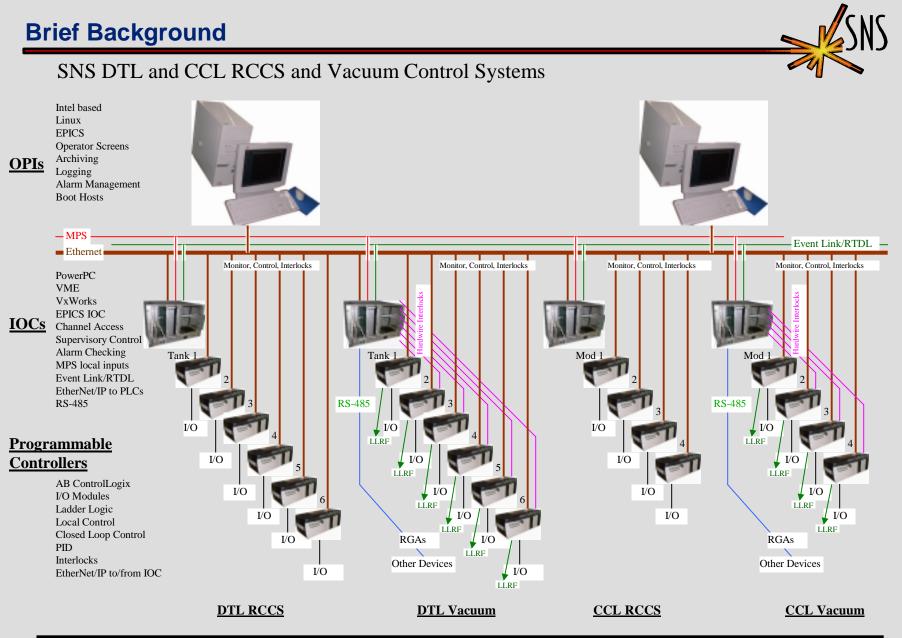
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External contractors are developing the local **cooling and vacuum control systems** for the **Spallation Neutron Source** (SNS) linac. Soon these systems will be integrated into the facility-wide controls system. Allen-Bradley Logix5000 series programmable controllers, populated with appropriate input/output modules, were selected as the local controllers. These controllers will be interfaced to the facility-wide control system via VME systems with PowerPC processors running the Wind River VxWorks operating system and Experimental Physics and Industrial Control System (EPICS) front-end controller software. This paper describes the **interface and integration issues** driven by project, cooling system and vacuum system requirements and hardware selections.







SNS Linac



Interface Between IOC and PLC

- Selection of a communication protocol, EtherNet/IP
- Creating and reaching agreement on signal lists
- Mapping IOC process variables (PV) to PLC tags
- IOC issuing commands in the form of requests
- Creating and naming tags for transfer to IOC
- Optimizing data transfer between PLC and IOC





Serial Based Devices

- Decision to use serial ports on IOC rather than PLC
- Device driver development
- Serial type selected, RS-485, and network layout
- Distributed control





Control loops over Ethernet

• PID loops dispersed over IOCs and PLCs on non-dedicated networks





EPICS displays vs. PLC displays

- Cost, development and maintenance of local PanelView displays
- Redundant control screens on different platforms





Alarm Checking and Management

- The IOC as the appropriate location for alarm checking functions versus the PLC
- Alarm limit parameter maintenance in one place





The criteria used to make these decisions include:

- Meet system requirements
- Provide reliable operation
- Minimize equipment cost
- Minimize development and maintenance efforts

By working closely with external systems integrators we are able to consider these issues from an integrated system perspective.



