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RTST vacuum control system design

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This paper presents the design and implementation of the Integrated Control Systems (ICS) vacuum control system for the Second Target Station (STS) within the Ring-to-Second Target Beam Transport Line (RTST) of the Spallation Neutron Source (SNS). The RTST vacuum system is crucial for maintaining a high-vacuum environment necessary for the operation of a high-intensity proton beamline, extending from the existing Ring to Target Beam Transfer (RTBT) to the new STS. The system is composed of various components, including vacuum assemblies, sensors, pumps, and an architecture based on established SNS control systems utilizing Allen-Bradley Programmable Logic Controllers (PLCs) coupled with EPICS Soft Input/Output Controllers (IOCs). The design emphasizes reliability and safety, incorporating sector gate valves for isolation, remote controls for turbomolecular and ion pumps, and pressure monitoring through advanced gauge systems. This paper details the architectural framework, instrumentation, control layers, and operational interfaces to ensure robust management of the vacuum conditions necessary for the successful operation of the RTST

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