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Control system considerations for LANSCE modernization and integration of the LAMP front-end

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The Los Alamos Neutron Science Center (LANSCE) has embarked on a major modernization effort through the LANSCE Modernization Project (LAMP), which has recently received approval for mission need. LAMP proposes a new 100 MeV front end to replace aging components, including the proton sources, Cockcroft-Walton generators, and 100MeV drift tube linac. This new design will integrate with the existing cavity-coupled linac to reach the facility's full design energy of 800 MeV, with full deployment anticipated by 2030. The modernization project introduces significant control system challenges, particularly in integrating new high-performance subsystems while maintaining full operability of the legacy infrastructure, which will remain responsible for approximately 85% of the accelerator complex. This paper discusses control system strategies for timing synchronization, high-speed data acquisition, and software integration. Key topics include compatibility between legacy and modern control protocols, deployment of real-time data systems, and software development to ensure operational continuity. The LANSCE control system must provide seamless support for both existing and modernized hardware, enabling efficient operation and long-term sustainability.

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