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# Experience with a Slow Control system based on industrial process control hardware and software for the Xenon1T Dark Matter Search

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Xenon1T is the next generation Dark Matter search using 3.5 tons of liquid Xenon for direct detection of Dark Matter. A dual-phase liquid-gas Xenon Time Projection Chamber (TPC) shielded below 1400m of rock at the Gran Sasso underground laboratory in Italy serves as both target and detector. The TPC is inside a 10m high by 9.5m diameter water Cerenkov detector serving as a shield and active muon veto.

The Slow Control system is based on industrial process control hardware and software. It is already being used to commission the experiment. The system provides monitoring and secure control by collaborators, shifters and experts at both local and remote locations. 3.5 tons of liquid Xenon requires extreme care to guard the safety of the instrumentation and to prevent the loss of any of the high value Xenon. Critical operations are guarded so that they can be executed only if conditions are safe. Important components are redundant; the experiment is fail-safe should all power be lost.

The system consists of a distributed architecture of networked local control units (Programmable Automation Controllers, PACs) with touch panels for local control and redundant central Supervisory Control And Data Acquisition (SCADA) computers. All operating parameters and their history are stored and can be displayed. Alarms are sent by text messages sent by both email and cellular network and by recorded voice over land telephone lines.

Experience with both the benefits and the disadvantages of using industrial process control hardware and software will be presented.

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