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Design of a laser safety system for S3

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The S3 (Super Spectrometer Separator) project involves the installation of laser systems in the building housing the S3 separator. To ensure personnel safety, a dedicated safety system is required. This system manages signaling, beam-blocking components, and laser power supplies. It ensures that all safety conditions are met to authorize the production and transmission of laser beams in the designated areas.
The constraints enforced for the implementation of this control panel include to use non-programmable system to facilitate maintenance and diagnostics by the laser operations team. The system must also allow that a single failure does not result in the loss of the safety function.
This article describes the system architecture, the sensors and actuators selected to answer these requirements, as well as the relay-based safety processing system. It also describes the system's responses to component failures and the tests conducted to demonstrate proper system functionality.

Footnotes

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