

Distributed I/O for Dynamic Equipment

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There are currently two major controller-based systems in use at each beamline at NSLS-II. These are the Equipment Protection System and the Personnel Protection System. As the names imply, these systems work to protect equipment and personnel from hazards which could impact the safety, efficiency, usability, and integrity of the facility.

A third controller-based solution (DIODE) was proposed to further enhance the reliability and maintainability of the beamline subsystems. This additional approach will better decouple the class of equipment which does not serve an equipment or personnel protection purpose, but which nonetheless requires full integration into the beamline control system. We can call this class of devices *Dynamic Equipment*.

Historically, when Dynamic Equipment was integrated into a beamline, it would be lumped onto the EPS. There are two main reasons why the EPS was burdened this way: the EPS is much more mutable than the PPS, which is subject to stricter oversight and regulation, and because the EPS is typically more physically-distributed throughout the beamline.

While using the EPS has been a simple solution to the growing need for control and automation of Dynamic Equipment, it is not without consequences. The inclusion of non-protective and non-protected equipment has added unnecessary complexity within the EPS. This has introduced an undesirable volatility which makes it difficult to keep the EPS fully characterized and documented. Such consequences come with real costs and impact, including an increased difficulty when troubleshooting, extra time or resources needed when integrating new equipment, and the overloading of I/O boxes in terms of amperage and heat dissipation.

With DIODE, these problems can be subverted and even corrected. DIODE reduces the risk that comes from integrating Dynamic Equipment without introducing changes to the EPS. As a result, new devices can be added or modified at the beamline more quickly with less engineering and development overhead.

Track

Other

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