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An environmental monitoring and control system for the ATLAS Outer Barrel QC and Integration

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The Inner Tracker (ITk) will be one of the major upgrades that the ATLAS experiment will undergo during the long shutdown 3 of the LHC. The ITk Pixel detector will be composed by an Inner System (IS), two Endcaps (EC) and an Outer Barrel (OB). The OB itself will be composed of more than 4,000 pixel modules, arranged on modular "local support" structures (longerons and half rings).

In total, 158 local support structures will compose the OB. QC testing will be performed at the different stages of production (modules standalone, module loaded on cells and modules integration to loaded local supports, and after integration of several loaded local supports).

Dedicated environmental boxes will be developed for the purpose, providing the required connectivity to services (CO_2 cooling, power and data connectivity), light tightness and safe operation area during testing.

In order to ensure the safety of operation of several modules at the loaded local support QC testing and integration stage, a dedicated DCS and Interlock system was developed at CERN, based entirely on industrial PLC solutions and providing a Scada WinCC-OA interface. Such system is meant to be employed in a standalone configuration during QC tests, while at the integration stage it is foreseen to be coupled to the specific interlock crate of the ITk.

The system is meant to be modular and adaptable to the several different test configurations which are foreseen at the QC and integration stage.

The talk will give an overview of the system and its capabilities as well as describe the validation of its operation in a representative use case, with a system test setup currently operating at CERN.

Collaboration

ATLAS-ITK-pixel

Primary authors: MUNOZ SANCHEZ, Francisca; PACIFICO, Nicola (CERN)

Presenter: PACIFICO, Nicola (CERN)

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