Title: PLCNext & The Open Group's Open Process Automation Standard

Problem Statement:

This capstone project can help those students who desire to specialize in instrumentation and control systems and become professional control systems engineers following graduation.

Project Description

The team, up five (5) people, will become expert in designing, programming, and commissioning the PLCNext, an open and interoperable controller-based automation solution based on the Open Process Automation Standard providing high performance interfaces to process I/O that the ARC Advisory Board has called "a concrete step on the road to open automation systems and the future of industrial automation".

Equipment:

The PLCNext Is configured with the PLCNext Engineer programming software, which is compliant with the IEC 61131-3 standard, supporting the five high-level programming languages: FBD (Function Block Diagram), LD (Ladder Diagram), ST (Structured Text), IL (Instruction List) and SFC (Sequential Function Chart) as well as programming in Linux at the kernel level of the processor.

The team will design a modular control system testbed comprised of five subsystems.

1. the controller processor
2. the associated IO (input/output) for field instrumentation and control devices
3. the human machine interface (HMI) used by plant operators to monitor and control a physical process.
4. Control systems communication protocols allowing the subsystems' data/information transfer.
5. Control systems network architecture

Skills:

The team will learn about real time process control systems, web development, field instrumentation and hardware interfaces, applicable international standards and the best practices those standards offer to practitioners. These multi-discipline skills are very important in today's world of real time process control systems controlling industrial and commercial manufacturing that exists in everything from food and pharmaceutical, oil and gas, water and wastewater, pulp and paper, conventional and nuclear power generation, aircraft, automotive, and robotics.

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