L17 - Introduction to the PlantPAx® Process Control System for Operations and System Engineering
From the 1985 through the 90s, Rockwell was selling a lot of PLCs and IO hardware.

In 1997 we launched the Logix control platform with the introduction of the 5550 controller and RSLogix™ 5000 programming software. Rockwell and continued to sell a lot of PLCs, controllers, drives and I/O hardware.

Rockwell’s portfolio of control hardware has always been plant-wide, scalable, open and flexible, and extensive. That made it difficult to sell process systems against the DCSs at the time.

Because a DCS when sold had well defined parameters (processor speed and loading, graphics counts, tag limits, client counts …) it was fairly easy to estimate the real-world performance of a DCS in the proposal and sales stage.

Rockwell saw the need to market a DCS so in 2008 Rockwell’s modern DCS, the PlantPAx Process Automation System, was born.
PlantPAx is Rockwell Automation’s modern distributed control system for large and small applications. It is hardware and software that scales to your needs.

PlantPAx is a characterized system that delivers known performance by providing Guidelines and Reference manuals to size and build your PlantPAx system.

Following selection guidelines and design reference manuals and rules makes it a PlantPAx system. You get known performance before you put the system together.
Engineering Magazine’s 2017 Reader’s Choice Award

Users regularly rank PlantPAx the best in:
- Continuous Regulatory Control
- Batch Process Automation
- Sequential Logic
- Process Safety

2017 “Engineer’s Choice” winner for process control systems
The Connected Enterprise is focused on integrating production with enterprise functions such as product design, supply chain, distribution and customer management.

The Connected Enterprise is integrated Control and Information.
About the LAB (90 min lab)

The student will be engineering a PlantPAx system using templates and library objects and then operating various plant systems using the Process Library faceplates.

Lab is broken into eight (8) sections:

- 3 engineering sections and 5 operations sections
- Each lab section is from 5 to 12 minutes long (total of 63 min of hands-on-lab)
**Engineering - Studio 5000 Architect**

- Studio 5000 Architect provides an integrated environment to create and use a **graphical** representation of your system for easier system design and maintenance.
- Build Logix and FactoryTalk View projects from an integrated environment.
- Re-use Logix and FactoryTalk View content as well as use content from the Rockwell Automation Library of process objects.
System Architecture Templates for Small to Large Systems

Small Process Skid with VersaView and CompactLogix

Large Distributed System with Servers, and ControlLogix

**PROCESS CELL SIZE**
- 136 I/O
- 125 Alarms
- 132 Library Objects
- 20 Phases
- 125 Historical Tags

**SYSTEM SIZE**
- 10,880 I/O
- 10,050 Alarms
- 10,560 Library Objects
- 1,600 Phases
- 10,000 Historical Tags
Student to start the lab on Page 5

- Using Architect to Create Your PlantPAx Project
- Student to complete lab pages 5-14
- This section is timed for 7 minutes
In the engineering part of the lab the student will configure the code for a discharge pump and a tank level.
Process Strategies from the RA Library of Process Objects (sample code)

Process Strategies from the RA Library of Process Objects support the concept of Re-use engineering to save time.

In this lab section you will:

- Import a pre-configured Process Strategy routine for a motor
- Import a pre-configured Process Strategy routine for a level

We can save engineering time by starting with pre-configured and tested control strategies. **Simply import them into the controller application as routines.** By organizing a controller into Programs (for example each Tank is a Program) and Routines (levels, pumps, valves) can Re-use code in line with best practices and standards management.
- Using Studio 5000 Logix Designer to Configure the Controller
- Student to complete lab pages 15-24
- This section is timed for 7 minutes
In this section of the engineering part of the lab the student will configure the operator graphic for a discharge pump and a tank level using Studio5000 Designer.
- Using FactoryTalk View Studio to Configure a Graphic
- Student to complete lab pages 25-31
- This section is timed for 7 minutes

Student to continue with lab on Page 25
Start of the Operator Part of the lab

We now have code and a HMI application we will use FTView Client to operate some simulated plant process areas.

- Basic control w/ Faceplates
- Pump Group (Lead-Lag) with PF755 Drives and Premier Integration
- Reactor with Alarming
Process Applications

- Sequencer (P_Seq) on Storage Tank
- Waste Water Plant
FactoryTalk View SE Client is software for viewing and interacting with the FactoryTalk View SE application at run time.

Operators can use the client to view and interact with multiple graphic displays, manage alarms, view trends and adjust set points.
Framework Template and Faceplates

Framework graphics:
- Header
- Footer
- Button Bar
- Trends
- Navigation
- System Status

Faceplate Tabs:
- Home
- Maintenance
- Engineering
- Diagnostics
- Alarms
- Help
Student to continue with lab on Page 32

- Device Faceplates and Operating the Plant
- Student to complete lab pages 32-37
- This section is timed for 5 minutes
Premier Integration

The foundation of Premier Integration is a Logix-based control architecture and intelligent Allen-Bradley® devices. It is unique to specific control-system elements from Rockwell Automation, including:

- Controllers
- **PF Drives**
- Switches
- Motor control centers
- Overload relays
- Soft starters
The Studio 5000 design environment is the only framework engineers need when designing, integrating and configuring drives.

- Reduced engineering time by as much as 70%
- Fewer errors during configuration
- Reduced start-up time
- Improved Diagnostics
- Reduced downtime

The P_PF755 (PowerFlex 755 drive) object is used to operate a variable-speed motor when using a PowerFlex 755 drive.
The Lead Lag standby motor group Add-On Instruction (P_LLS) provides control of a group of motors.

- Use this instruction to control a set of pumps with common intake source and discharge destination.
- The number of motors to run depends on the demand on the system.
- The P_LLS group can be configured to consist of as few as 2 or as many as 30 motors.
- PF755 Drive Fault Simulation and Lead Lag Standby Motor group (P_LLS)
- Student to complete lab pages 38-54
- This section is timed for 7 minutes
Previously we configured alarms from a faceplate and using the PF775/LeadLag demo were introduced to alarming and device diagnostics.

- In this section of the lab we will operate and interact with a simulated reactor designed with good alarm management practices.
- We will see how device alarms and device diagnostics help operators and maintenance personnel trouble shoot issues.
Listed below are bad alarms that can occurred with poor alarm implementation:

- Nuisance alarms
- Chattering alarms
- Stale alarms
- Incorrect priorities
- Incorrect alarm setpoints

Applying good alarm management practices eliminates the bad alarms.
Student to continue with lab on **Page 55**

- Faceplate Diagnostics and Alarm Management
- Student to complete lab pages 55-65
- This section is timed for 8 minutes
Batch and Sequence Control

We offer scalable batch and sequencing solutions ranging from controller level to enterprise wide systems.

Rockwell has the most scalable and comprehensive Batch and Sequencing solutions in the market including:

- Sequencer Object (P_Seq)
- Sequence Manager
- FTBatch
The Sequencer Object (P_Seq) provides a flexible controller-based step sequencing solution that reduces engineering time by automating common operator procedures. The step-by-step configuration makes it easy to configure procedures directly from the HMI.
Sequencer Add-On Instruction

- 32 discrete outputs
- 32 discrete inputs for feedbacks
- 32 floating-point REAL outputs for setpoints
- An unlimited number of sequence (limited by available memory)
- Intuitive human-machine interface (HMI) screens for operation, monitoring and configuration
- State model for Idle, Running, Complete, Held, Paused, and Stopped
- Sequencer (P_Seq) Library object
- Student to complete lab pages 65-79
- This section is timed for 10 minutes

Student to continue with lab on Page 65
Wastewater Treatment Plant

Our portfolio of products and systems, expertise and network of knowledgeable solution partners provide you with the tools you require. Our technology helps industrial and municipal wastewater treatment plant operators:

- Reduce cost of engineering and implementation
- Reduce energy costs
- Minimize lifecycle costs
- Meet regulatory compliance
Control a wastewater application built using the Process Library, which includes the basic building blocks for the system including HMI faceplates with tabs are tailored for specific plant roles.

Simulated plant includes:
- Waste Water Influent
- Aeration with PID Control
- Sludge Pumping with motor control
- Digesters with Sequencers

We have domain expertise and offer remote support services and asset management solutions to help keep your plant running.
Running a Waste Water Plant Application

Student to complete lab pages 79-98

This section is timed for 12 minutes
PlantPAx is Rockwell Automation’s scalable modern distributed control system for large and small applications.

PlantPAx is a characterized system that delivers known performance by providing Guidelines and Reference manuals to size and build your PlantPAx system.

Supported by system templates, the Process Object library, sample control strategies and Premier Integration to PF drives.

With PlantPAx, engineering your modern DCS has never been easier.
Thank You!