EXPERION PKS
Control For Electrical Systems Too

Stu Sanderson
June 22, 2016
Abstract

In this session ...

• Acquire a basic understanding of an electrical control management system

• Understand how Experion can operate as a single integrated process control / electrical automation system

• The benefits of an integrated single system for both process & electrical systems
Experion Electric Industry Support

- Experion support for the electrical systems industry is not new
- Experion Supervisory
- Native SCADA Protocols
  - DNP3 – utilities (electric & water) communications - RTUs or IEDs
  - IEC 60870 – SCADA telecontrol for controlling electric power transmission grids and other geographically distributed electrical systems
  - IEC 61850 - a communication standard for electrical substation automation systems – SCADA based applications
- PLC/ RTU SCADA hybrid solutions
- Experion control level capabilities based on IEC 61850
ECMS - Description

• Electrical Control System - Terminology
  - ECMS – Electrical Control & Monitoring System
  - ECMS – Electrical Control & Management System
  - PMS – Power Management System
  - SAS – Substation Automation System
  - PMCS - Power Monitoring & Control System
  - ENMCS - Electrical Network  Monitoring & Control System

• ECMS can be divided into the 3 main groupings
  - Supervisory control & data acquisition
  - Electrical Substation Automation - distribution & feeder automation control
  - Power generation control / power management
Experion ECMS - Capabilities

• Supervisory control & data acquisition
  - Single line operator station displays, trending, detail pages
  - Real-time monitoring
  - Status, alarms, events/ SOE, reporting, trending
  - Engineering, configuration, troubleshooting analysis

• Electrical Substation Automation
  - Breaker operation & control
  - Load shedding / load restoration
  - Multiple power source distribution / synchronization
  - Protection system control

• Power generation control / power management
  - Turbine power generation & optimization
  - Active & reactive power control, auto-synchronizing
  - Multi-generator load sharing management
  - Operational set point control for generators
  - Transformer load tap changer
Powering the Process

Supplying Power to Process Assets
ECMS – Standalone Automation

ECMS / ICSS sharing a common infrastructure

Supervisory / HMI Server
Experion Server

PLC
Remote IO

Turbine Control Panel
Remote IO

ASDS Control Panel
HVAC Control Panel DSM
HVAC Control Panel DEM

Remote IO

Hardwired

Ethernet

Analog / Digital

Hardwired

Relay

Diesel Control Panel DSM

Turbine Unit Control Panel DEM
Experion – IEC 61850 Client / Host

• Supervisory
  - Support IEC 61850 MMS protocol
  - Capture & time synchronized alarms & events, SOEs from IEDs
  - Support common time base between FTE and IEC 61850 network
  - Standard tools, displays, trending, groups, faceplates, reporting

• Control Capabilities
  - C300 a participant on the IEC 61850 network with direct P2P access to electrical control devices (IEDs)
  - Experion Controller data publish / subscribe with IEDs
  - Redundant path from Experion Controller to IEDs
  - Fast C300 execution for electrical applications
  - Engineering – ICD / CID IED template libraries for offline configuration
ICSS / ECMS - Functional Overlap

ICSS
- LV Motor control start/stop
- Process sequences
- Regulatory control
- Process Safety functions
- Process Control strategies

ECMS
- Switchgear control
- Load shedding, balancing
- Generator management
- Electrical control logic
- IED engineering

Common
- HMI
- Historian
- Alarm configuration / management
- Supervisory
- Continuous monitoring & control
- Cyber Security Compliance
- Engineering, Maintenance
Experion ECMS Architecture

- Experion Server
- Engineering Workstation
- Time Source
- Orion Operator / Maintenance Console

- FTE Switch
- 3rd Party UCP Controller
- C300 Controller
- Universal I/O (Digital Input, Digital Output, Analog Input, Analog Output)
- IEC61850 Interface (EIM)
- IEC61850 PRP Network (HSR Option)
- MV, HV Electrical Equipment IEDs

- IEC61850 Switch

- Control Firewall

Honeywell Confidential - © 2016 by Honeywell International Inc. All rights reserved.
ICSS / ECMS – One System

Scope of Responsibility - Based on Asset Model
Experion Integrated Control & Electrical System

PMS - Control
- HV
- Power grid
- Protection & Control (IED)

SAS - Control
- MV
- Protection & Control (IED)
- Turbine Generator
- IEC61850 PRP, HSR Ethernet
- Turbine / generator SCADA com link
- UCP Controller SCADA com link

ICSS - Control
- LV
- LV Switchgear with IEDs
- Universal I/O
- Motor Drive (VFD)
- Protection & Control (IED)
- Universal I/O
- LV MCC
- Fault Tolerant Ethernet
- SM Logic Solver
- C300 Controller ECM Applications
- Experion PCS / ECM Op / Eng Stations

3rd Party UCP
- IEDs

HV
MV
LV

- Universal I/O
- Protection & Control (IED)
- Protection & Control (IED)
- Protection & Control (IED)

Experion Integrated Control & Electrical System

- Protection & Control (IED)
- Protection & Control (IED)
- Protection & Control (IED)
- Protection & Control (IED)
- Protection & Control (IED)

Universal I/O
- Motor Drive (VFD)
- Local Motor Control Station
- Universal I/O
- Field located

C300 Controller ECM Applications

- SM Logic Solver
- C300 Controller PCS
- Experion Server
- Asset Management Server

Experion PCS / ECM Op / Eng Stations

- IEDs
- 3rd Party UCP

Honeywell Confidential - © 2016 by Honeywell International Inc. All rights reserved.
Project Execution & Delivery

- Powell Electric is a Honeywell Channel Partner
  - Focused on the delivery & execution of ICSS / ECMS automation projects
  - Vertical market expertise

Honeywell Powell Integrated Project Team

- Common engineering standards & execution model
  - Standards, libraries, project schedule, delivery methodology (LEAP)
- Scope of supply
  - Electrical system design, engineering, testing, commissioning services
Summary

• A fully integrated common platform architecture serving both process and electrical automation
• Providing seamless power and electrical management information directly to operations and maintenance personnel
  - Experion Orion provides a common user interface
• Control type P2P data exchange between process & electrical controllers
• Delivering the highest level of reliability, safety and security
• An integrated project delivery approach based on LEAP methodologies leveraging common standards
• Reduced cost of ownership
  - Support, standard tools, training, technology

monitoring and control of electrical equipment is just as important as the process equipment it powers …
For more information …
Pay a visit to the Knowledge Centre

Please join us at the round table session