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Experion PKS and APACS

Honeywell

Agenda

- Project overview
- Conceptual design
- Testing
- Applications
- Lessons learned
- Recommendations

Project Overview

- Islands of automation
- Legacy DCS and SLDC
- Experion PKS
- Centralized control
- Operator-friendly environment
- The SRU Complex Options
 - Dual DCS
 - Use Legacy DCS
 - Replace Legacy DCS
 - Integrate Legacy DCS

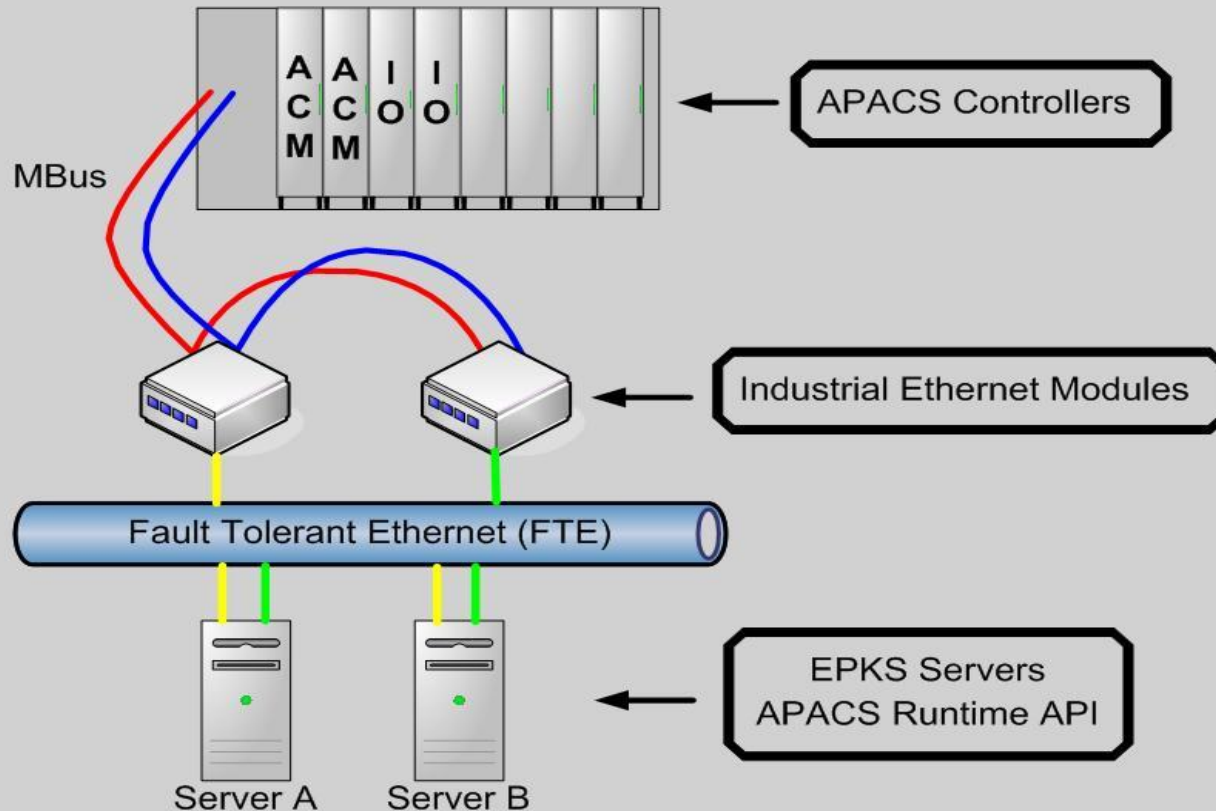
Project Overview

Integration Advantages

- APACS API solid with 10-year track record
- Very satisfied with APACS
- Very satisfied with HMIWeb and FTE
- Hot cutover with parallel HMI
- No field wiring changes
- Low cost - \$1,000,000 savings for SRU #2
- Low risk
- One operator workstation

Conceptual Design

APACS Interface Network Architecture



Conceptual Design

- Siemens network
 - APACS redundant controllers
 - Dual fault-tolerant proprietary M-Bus
 - Dual parallel NIM (Network Interface Module)
 - Simplex E-Net to FTE switches
- Honeywell network
 - Redundant EPKS servers
 - FTE networking
 - APACS runtime API

Technology Hurdles

- APACS interface not redundant
 - Option 1 – use OPC with RDM
 - Option 2 – rewrite APACS interface
- Honeywell DE – Australia
- Test facility
- Siemens support

Initial testing results:

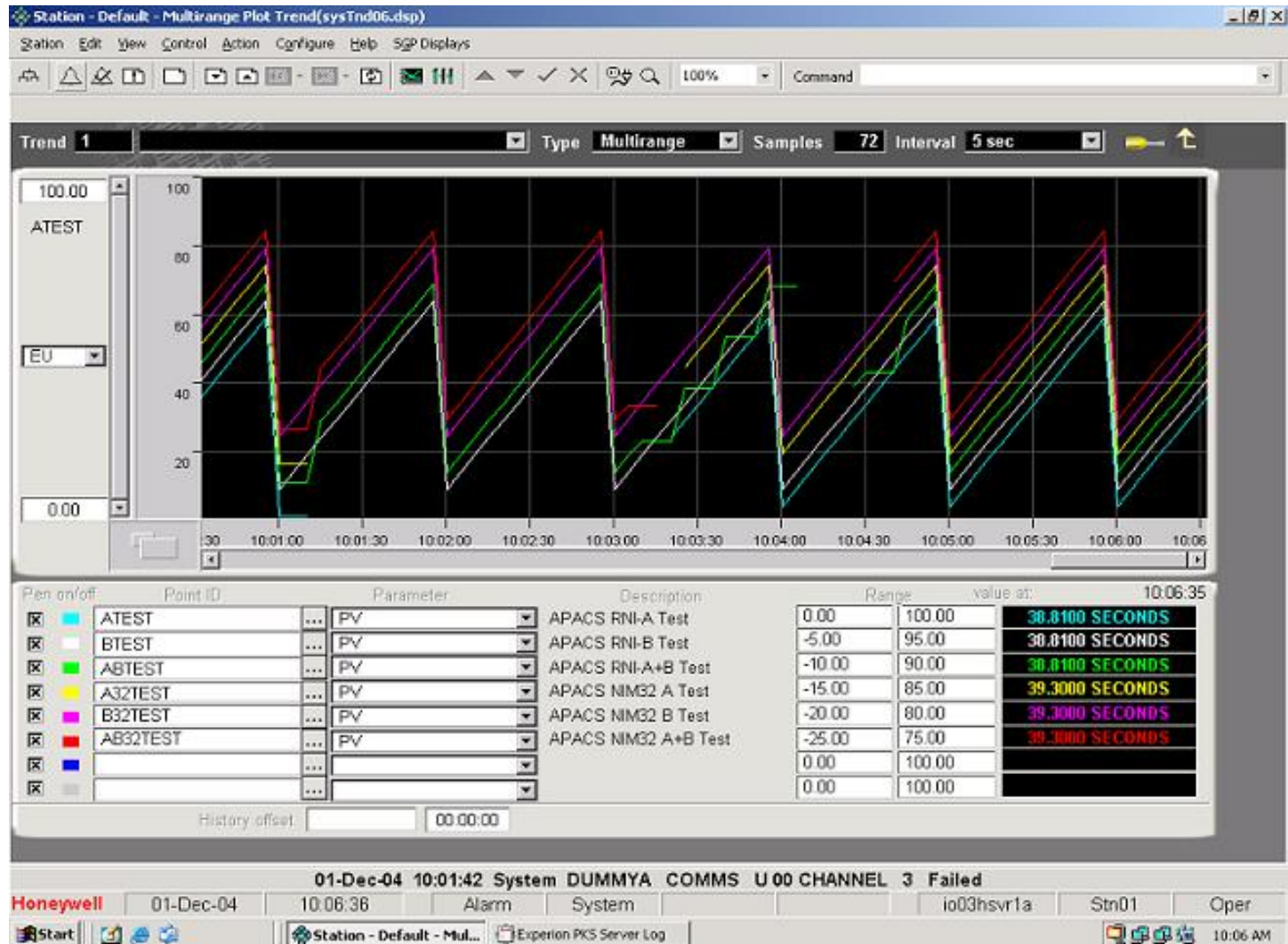
- Data communications – OK
- Diagnostics – FAILED
- Built in-house diagnostics

Testing – Plan

- APACS system
 - ESP = Saw Tooth Wave (1 Minute Frequency)
 - 50 secondary loops
 - Tail to mouth simulation
 - 3 types of NIMs (RNI, NIM32, IEM)
- EPKS server (R201)
 - 7 addresses per loop (1-second scan)
 - 4 alarms per loop (8 events per minute)
 - 3 channels / 3 controllers
- Testing methodology
 - Hardware failures
 - Stress testing

Testing – Results

- Standard tests
 - Excellent data COMM
 - No data COMM diagnostics (no vendor support)
 - Data COMM non-deterministic
 - The 2nd hardware failure, 15-sec freeze
 - IEM > NIM32 > RNI
- Stress tests
 - Increased loading to 4320 PPS
 - Ran out of memory in controller
 - Server channel overload warning ~2880 PPS
 - Process constraint – 2500 PPS



Testing – Conclusions

- APACS API is robust and proficient
- User must build data COMM diagnostics – EPKS channels
- Honeywell must productize package
 - Documentation
 - Support – TAC

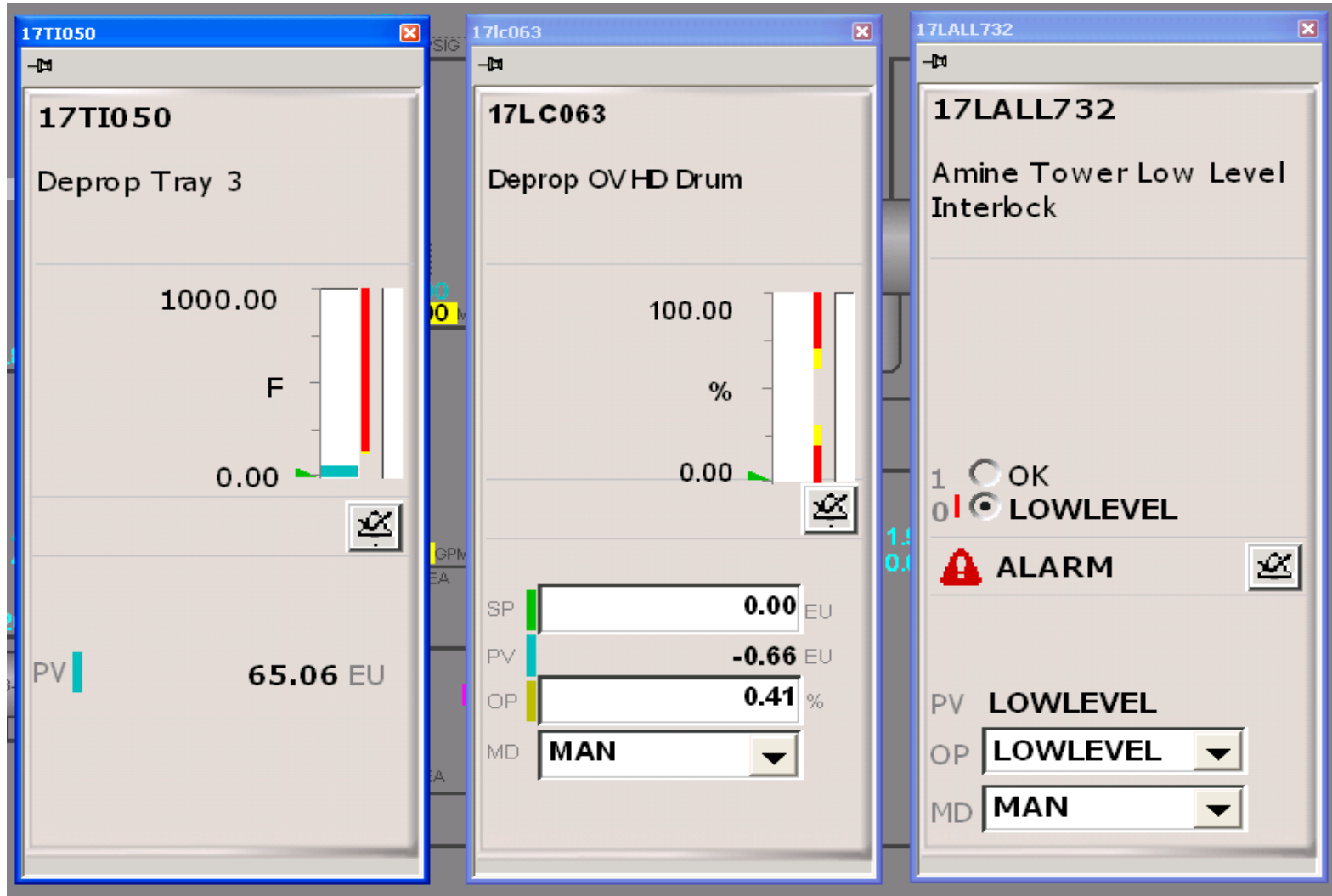
Applications – SCADA Hardware

- Channel = NIM (IP address, hosts)
- Controller = ACM (resource name)
- Process control channels – redundant
- Diagnostic channels – simplex
- LISSCN – rates, groups
- Alarms are server-based (limited)
- Read = SCAN, background
- Write = Immediate

Applications – SCADA Points

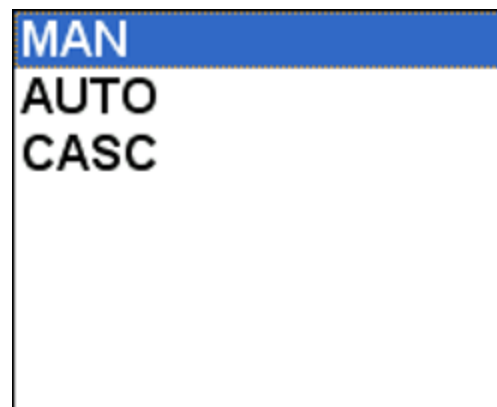
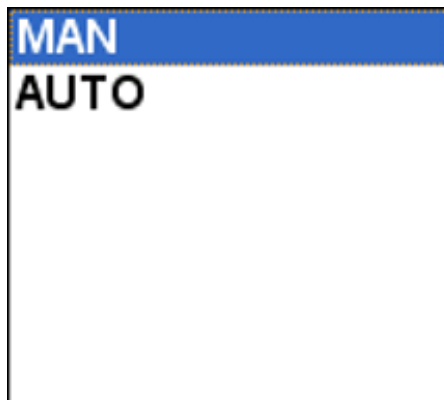
- Analog – PV,SP,OP,MD,A1,A2,A3,A4
 - A1 = standby synch
 - A2-A4 = tuning parameters
- Status – PV,OP,MD
 - PV = boolean or integer (8 states)
 - State alarming is a plus
- Custom faceplates and detail displays

Applications – Faceplates

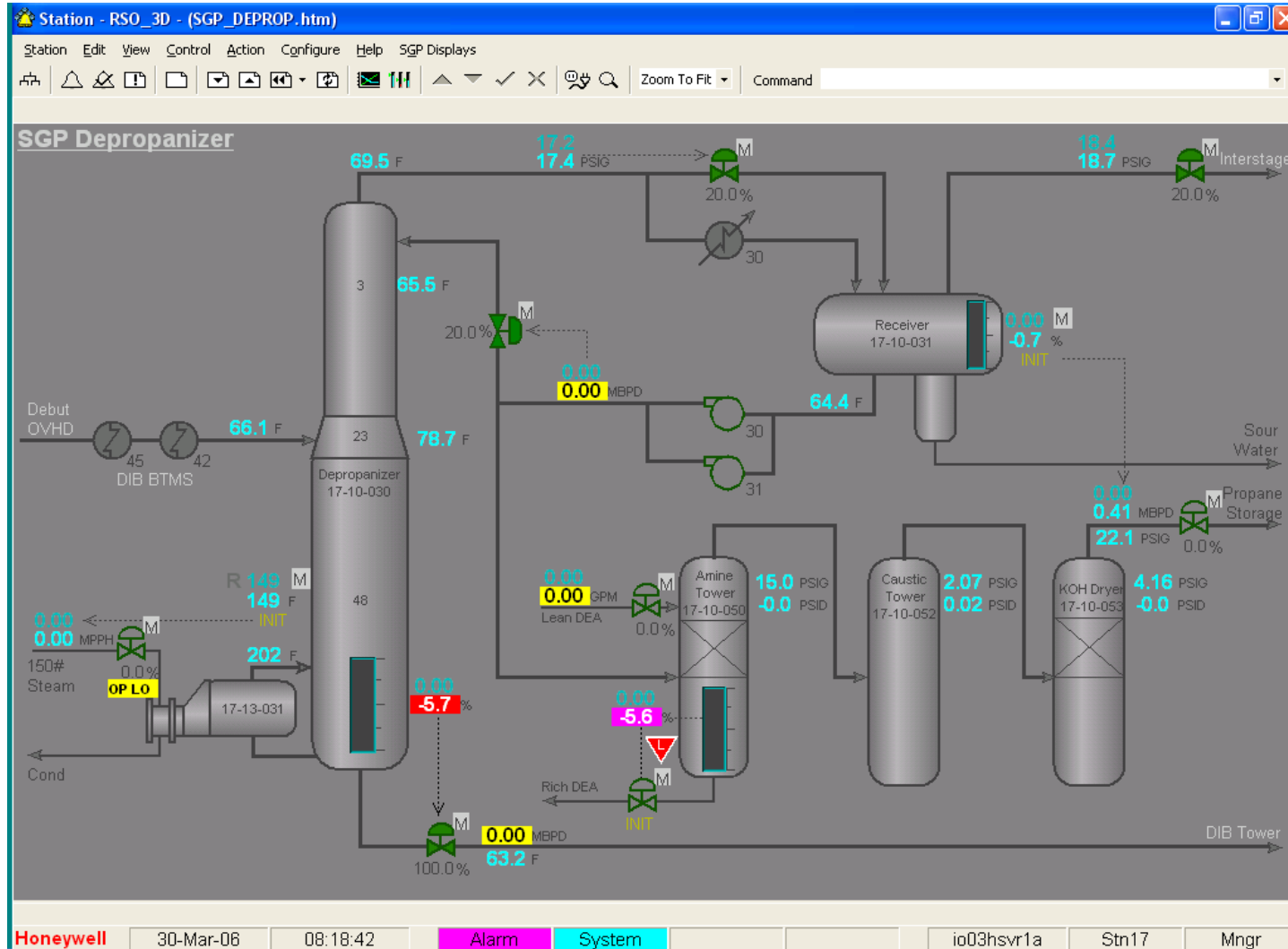


Applications – Graphics

- Mimic C200 project
- Develop SCADA shape library
- Utilize identical standards
- Customize faceplates
- Customize mode acronyms



Applications – Schematic



Applications – Detail General

Analog Point Detail

17TC041

Debutanizer Tray 34

400.00
F
0.00

SP █ EU

PV █ EU

OP █ %

MD ▼

/Areas/SGP/17TC041

General | Scanning | Alarms | History | Auxiliary

Range

Units

100%

0%

Services

Scanning and Control enabled

Alarms enabled

Displays

Associated Display

Algorithms

PV Algorithm *Performing Detail (or double clicking) on the Algorithm No.*

Action Algorithm *will callup the Algorithm Configuration Page*

Performing Detail (or double clicking) on the PV, SP, OP or MD will callup details from the controller (where the controller interface supports this)

Applications – Detail Scanning

17TC041
Debutanizer Tray 34

400.00
F
0.00

SP EU
PV EU
OP %
MD

Parameter	Period	Cntrl	Source Address	Destination Address
SP	5 Sec	1	DEBUT._17TC041.SP	DEBUT._17TC041.SETPOINT.CSP
PV	2 Sec	1	DEBUT._17TC041.PV	<i>not applicable</i>
OP	5 Sec	1	DEBUT._17TC041.OUT	DEBUT._17TC041.AUTO_MANUAL.COUT
MD	30 Sec	1	DEBUT._17TC041.AUTO	DEBUT._17TC041.AUTO
A1	5 Sec	1	DEBUT._17TC041.SS	
A2	5 Min	1	DEBUT._17TC041.CONTROLLER.PG	DEBUT._17TC041.CONTROLLER.PG
A3	5 Min	1	DEBUT._17TC041.CONTROLLER.TI	DEBUT._17TC041.CONTROLLER.TI
A4	5 Min	1	DEBUT._17TC041.CONTROLLER.TD	DEBUT._17TC041.CONTROLLER.TD

Processing Options

PV clamp

OP Reverse

Drift Deadband %

Control Safeguards

Control Level

Normal Mode

Mode Check Disabled

Control Limits

	SP	OP
Upper Limit	<input type="text" value="500.00"/> EU	<input type="text" value="28.00"/> %
Lower Limit	<input type="text" value="10.00"/> EU	<input type="text" value="0.00"/> %

PV Last Processed
3/30/2006 8:12:10



Applications – SCADA Tuning

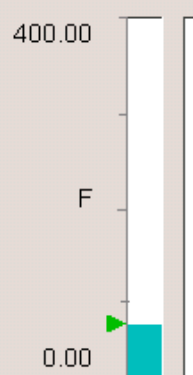
- Use auxiliary parameters A2, A3, A4
- Trend comes standard with AUX
- R/W with SUPV permission – custom AUX
- A2 = PG, A3 = TI, A4 = TD
- Scan = 5 minutes

Applications – Detail Auxiliary

Analog Point Detail
/Areas/SGP17TC041

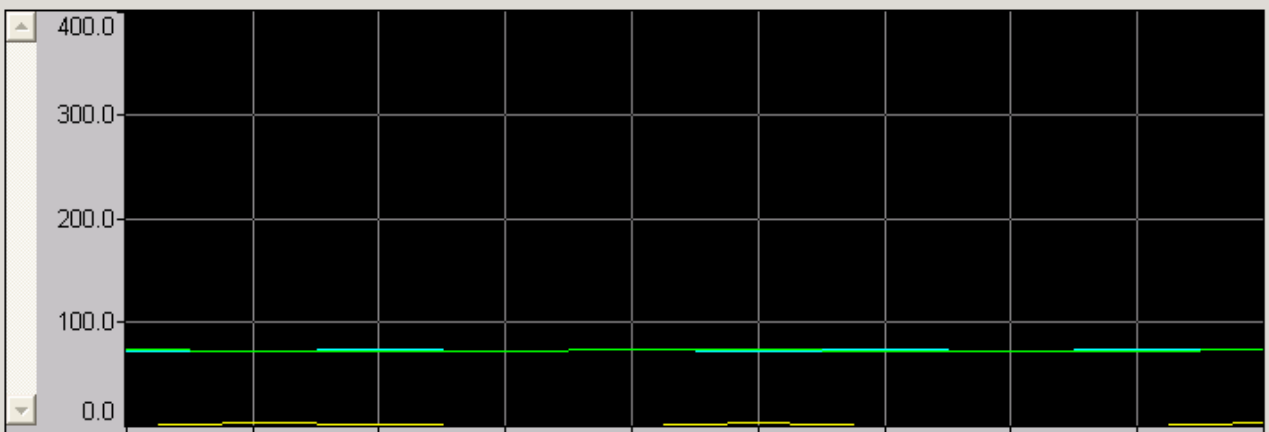
17TC041

Debutanizer Tray 34



F

Time Period **5 Minutes** ▼



SP	73.47	EU
PV	74.30	EU
OP	1.87	%
MD	MAN	▼

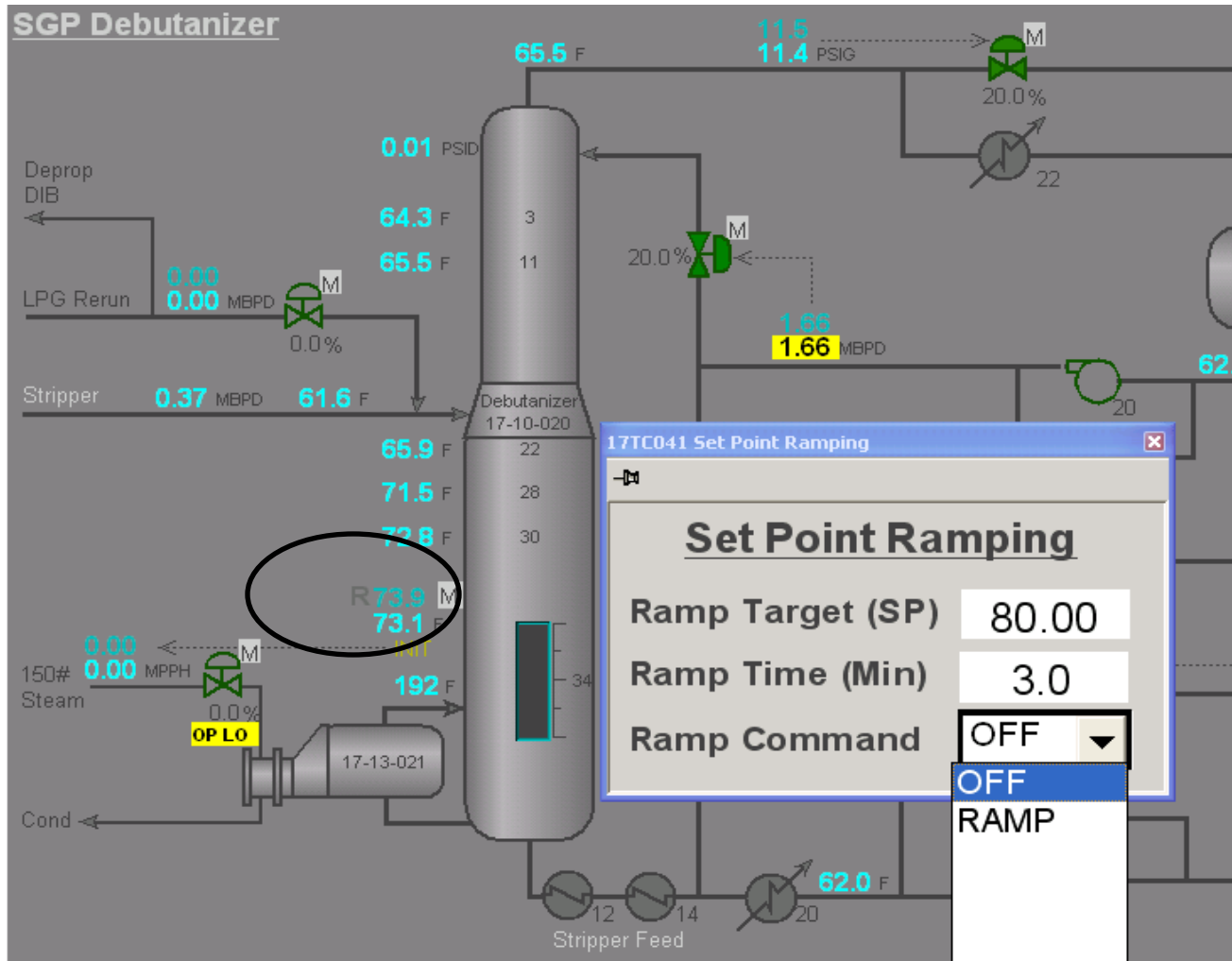
Auxiliary Parameters

Name	Value
A1	SS
A2	PG
A3	TI
A4	TD

Applications – SP Ramping

- Use second analog point, “tag”_rmp
- Map using auxiliary parameters
- Target, time, command
- Shape calls popup

Applications – SP Ramping



Lessons Learned

- APACS interface is functional and solid
 - Channel - 4320 PPS, OVLD @ 2880
 - Controller – 750 addresses maximum (tested 6 controllers / channel)
 - Maximum recommended – 2000 PPS
- SGP application
 - Compressor and 5 towers
 - 50 loops, 200 points, 1000 addresses
 - 220 PPS

Lessons Learned

Points

- SCADA points are NOT C200 points
- Custom faceplates
- Free form alarm handling
- Multi-state status points
- Parameter addressing read .vs. write
- SCADA trend data

Graphics

- Develop SCADA library
- HMIWeb integrates SCADA and C200
- Nothing preconfigured

Lessons Learned – Other

- Develop project standards
- Third party controller configuration tool (not FTE qualified)
- Maintain a non-integrated HMI database (quick builder)
- Build and maintain custom diagnostics
- Segregate control networks
- Troubleshooting support from multiple vendors
- Spare parts
- Service agreement

Closing Remarks

- APACS integration worth \$1 million in savings for SRU Complex
- Short-term strategy is to integrate legacy DCS and C200 platforms
- Long-term strategy is to replace legacy DCS with C300 when economics dictate

- APACS Interface (SGP, SR1, WT, ECU, NS, SF)
- 2006 - WCU, CRYO
- Future - ALKY, CCR, Blender

Questions

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