SmartPlant Instrumentation Technical User Forum P2C2 (Houston SPI TUF) Meeting				**February 13, 2018 8:00 am Emerson Process Management**	
Attendees	24 Members in attendance 18 Online Connections		**Copied To**	Houston SPI LTUF Website http://www.spi-ltuf.org	
Called By	John Dressel	**Prepared By**	John Dressel		

Item	Topic	Notes	Action/Due
1	Welcome 8:00	**Welcome & Safety Moment** • Welcome & Introduction Tom Powers, Emerson • Safety Moment Tom Powers, Emerson	
2	Chairman's Notes 8:05	**Announcements and Introductions John Dressel, Fluor** • Introductions – All attendees • Hexagon 2017 to be June 13-16 with the GTUF on June 12 at the Venetian Las Vegas, NV.	
3	Officers Election 8:10	**Election of Officers** • John Dressel, LTUF Chair • Telephone: +1.281.263.2764 • John.Dressel@fluor.com • Blake Biernacki, LTUF Vice-chair • Telephone: +1.832.540.8465 • Blake.Biernacki@ProLytX.com • Dee Dee Honea, LTUF Secretary • Telephone: +1.979.230.8613 • Denise.Honea@Eichleay.com	

4	Presentation
	8:10
		Hexagon API's Overview David Kaiser, Intergraph
		5-Phase Plan
		• Phase 0 - Windows 10 compatible .NET migration - June 2018
		• Phase 1 - SaaS Admin - June 2018 (1st release)
		• Phase 2 - SaaS Read-only (Web APIs) - 1H 2018 (1st release)
		• Phase 3 - SaaS Engineering Data Entry (Write Web APIs) In-progress
		• Phase 4 - SaaS Graphical Data Entry In-research
		SmartPlant Instrumentation – Roadmap
		• Intergraph SmartPlant Instrumentation: Q2 2018
		• New Backup/Restore platform
		• New and enhanced upgrade technology
		• New .NET ESR
		  ○ Same Explorers as in main app
		• WebAPIs
		  ○ First release: Q1 2018
		  ○ Baseline: SPI v2016
		  ○ Continuous releases	

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		Web API with Postman • Web API –Sample Using Postman a complete API development environment for Web API developers **Web API with Power BI** • Power BI - Sample display of an SPI API desktop display of Instrument Table Fields in real time • Power BI - Sample display of a SPI interactive dashboard for accessing data in real time	
5	Presentation 9:00	**SPI Blending Module** **Dennis Cooley, CooleyCore** COOLEYCORE – PROFILE HIGHLIGHTS Incorporated: January, 2008 Head Office: Calgary, Canada Products: software applications and services Industries: Oil & Gas, Chemicals, Plastics Partnerships: Hexagon CooleyCore software is certified by our Premier Partner, Hexagon. Website: http://smartstore.cooleycore.com/ SCENARIOS THAT LEAD TO MULTIPLE DATABASES MAJORITY OF COMPANIES HAVE MORE THAN ONE DATABASE Common reasons for multiple SPI databases include: • Multiple different sites – each with their own database • Multiple EPC's engineering large facilities; segregated scopes • Multi-phase facility expansions; executed with different SPI versions • Major project being executed in remote location; performance is key – centralized hosting is considered risky • Mix of above WHY BLEND DATABASES? REDUCES COSTS & CONFUSION • Reduce confusion; end users can locate and gather information with greater ease • Facilitates easier integration between applications • Take advantage of great designs and replicate across facilities that would otherwise not be possible • Standardizing design; improves the quality of the design, and deliverables; • Reduces time executing projects • Reduce User Management – fewer SPI accounts and user groups • Reduces IT costs & upgrade costs; prod and non prod environments are reduced BEACONSUITE BLENDING AUTOMATION – DELIVERS PROVEN – COST-EFFECTIVE SOLUTION • CooleyCore has developed blending automation that addresses several challenges. • Blend automation works with both Engineering mode and	

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		Owner Operator mode Databases • Extract Seed & Blend just the Seed/Standards to a new Domain DATABASE / DOMAIN BLENDING – YOU CAN DO IT! • We Offer Services; if you would like we can execute the blends as a service • We Offer Training; CooleyCore offers training • Commercial Grade Solution; we have software that you can license, empowering you to do the blends with internal resources DATABASE BLEND – HIGH QUALITY RESULTS FEATURES: • Reports differences between standards used within the source and target databases. An intelligent auto mapping algorithm efficiently maps pick-list selections (e.g. Instrument Types) • Transforms the source database standards while blending the data into the target database • Leaves the source database untouched while blending its data into the target database • Identifies bad data prior to blending the databases and in some cases, fixes the bad data (e.g. Plant, Area, Unit assignments) ALIGN, TRANSFORM, BLEND STANDARDS STANDARDS EXIST IN EACH SPI MODULE Standards exist in the form of: • Pick-lists e.g. Instrument Types • Forms e.g. Instrument Specifications • Layouts e.g. Loop ESL Layouts DATABASE I DOMAIN BLENDING - SUCCESS SAFELY CLEAN UP INCORRECT PAU ASSIGNMENTS Blend Project Execution • Please contact us to help with your Blend project • CooleyCore's Beaconsuite software application contains 15 different modules • Each module can be licensed individually – users can license just what they need • Program Manager: Tim Anstett Email: Tim.Anstett@cooleycore.com Ph: 403 818 8276 • President: Dennis Cooley Email: Dennis.Cooley@cooleycore.com Ph: 403 975 9797 • Chief Innovation Officer: Zur Bar Email: Zur.Bar@cooleycore.com **BLENDING SPI DATABASES** - Questions	

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6	Presentation 9:20	**CR Ranking Website Presentation Dennis Cooley, CooleyCore** **SMARTPLANT IDEAS DELIVER INNOVATION PRESENTATION SUMMARY** • When Is Innovation Needed • Steward To Values • SmartPlant Idea Ranking Websites • SmartPlant Community • How The Ranking Websites Work • Shaping Change – Submit Your Ideas • Blog Your Opinion On The Ideas • Ranking Websites Deliver Innovation WHEN IS INNOVATION IS NEEDED SOMETIMES THE NEED IS CLEAR SOMETIMES THE SOLUTION IS CLEAR INNOVATION HELPS US STEWARD STEWARD TO CORE VALUES • Protect our data • Access to the right information • Good Performance • Revision Management / History Tracking SMARTPLANT WEBSITES OPEN TO MULTIPLE COMMUNITIES www.sptuf.com WEBSITE COVERAGE INCLUDES • Meeting Minutes • Idea Rankings • Community Idea Sharing INTERGRAPH BUILDS YOUR GREAT IDEAS • Submit / Add Your Idea ALL IDEAS ARE WELCOME • Fast and easy to fill in form RANKING TABULATION IS AUTOMATED • Quickly Understand Rankings PRIORITIZE YOUR RANKINGS • Fast and easy to rank ideas YOUR PARTICIPATION IS KEY • Make a difference RANKING WEBSITES DELIVER INNOVATION Shaping Change:	

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		• Great ideas result in job satisfaction • Great ideas deliver efficiencies • Great ideas enable you & your company to compete • Great ideas are implemented by Intergraph ® • Your ideas and rankings make a difference How can we get even more participation in this process? Email your ideas to: Dennis.Cooley@cooleycore.com **Questions?**	
7	Presentation 10:00	**WIRING CHARM I/O IN SPI** **Emeka Nwagbara, Fluor** Wiring CHARM I/O in SPI Introduction • The User Experience on a Project with over 50,000 I/O	

Item	Topic	Notes	Action/Due

		• While several wiring methods were used on the project, this presentation will focus on the use of Electronic marshalling
		• Reasons for using Electronic Marshalling on the Project:
		  ○ Emerson was the MIC and the MAC on the Project
		  ○ Emerson DeltaV DCS and SIS systems were used
		  ○ The DeltaV - SPI Interface was proposed for the Project
		  ○ Primary I/O was CHARacterization Module (CHARM) I/O
		  ○ Project Configuration of CHARM I/O employed:
		  ○ Standardized Remote CHARM Field Enclosures
		  ○ Redundant Fiber Optic Network to Control Centers
		  ○ Wiring and Loop Diagrams to be SPI Enhanced Reports
		
		Benefits of using Electronic Marshalling
		• Redundant Ethernet topology
		• Elimination of homerun wiring
		• Reduced overall System Costs
		• Flexibility:
		  ○ Any type of I/O at any location
		  ○ Reconfigurable at any time
		  ○ Standard Ethernet hardware
		  ○ Remote I/O Eliminate Wiring
		  ○ Plug and Play Configuration
		  ○ Single Channel Granularity
		  ○ Each I/O Card can serve 4 controllers
		
		DeltaV SPI Interface Workflow:
		• Diagram of an overview of the workflow that is supported by the interface
		
		Download I/O Definitions Into SPI
		• The DeltaV I/O definitions are maintained by Emerson but downloaded using a link from Intergraph: http://forms.intergraph.com/Download_DeltaV_Definition_Files
		• This assures the definitions are the latest and provide information to improve the data transfer process
		• The downloaded definitions appear in the Reference Explorer as SPI Objects
		What is Downloaded?
		• DeltaV Conventional I/O Definitions
		• DeltaV S Series I/O Definitions
		• Types CHARM Card Definitions:
		  ○ AI 4-20 mA HART
		  ○ RTD
		  ○ Thermocouple / mV
		  ○ AI 0-10V DC Isolated
		  ○ AO 4-20 mA HART
		  ○ DI NAMUR
		  ○ DI 24V DC low-side sense
		  ○ DI 24V DC Isolated
		  ○ DO 24V DC High Side
		  ○ DO 100mA Energy Limited
		  ○ DO 24V DC Isolated
		  ○ 24V DC Power	

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		○ DI 120V AC Isolated ○ DI 120V AC Isolated Plus ○ DI 230V AC Isolated ○ DO V AC Isolated Reference I/O Definitions • Reference I/O Definitions include: ○ Wiring Equipment ▪ Name ▪ Description ▪ Manufacturer ○ Terminal Strip ▪ Name ▪ Panel Name ▪ Manufacturer ○ Terminals ▪ 2 or 4 Terminals for connections • Note: We eliminated unused CHARM cards from Reference Explorer • Reference I/O can be used to build CHARM I/O Card (CIOC) Panels in the Wiring Module CHARM I/O Card (CIOC) Configuration • Each Field Panel has a redundant CIOC Carrier ; I/O Cards with redundant Ethernet Communications Module and 24VDC Power Supply • CHARM Base Plate; DIN rail-mounted with power, bus connectors, and Supports 12 CHARMs per Base Plate • CHARM Terminal Block - removable terminal block providing connections to field wiring and physical latch for CHARM • CHARMs - Characterization Module for each field signal - Provides basic analog to digital conversion and signal isolation to the redundant communication bus • DIN rail mount for all CIOC components CHARM I/O Card (CIOC) FIE/RIE Wiring Issue • Shown below is the proposed DCS FIE/RIE Hierarchy per Emerson CHARM white paper ○ Panel ○ Rack ○ **Slot (Branch)** ▪ CHARM ▪ Terminal Strip ▪ Channel ▪ Terminals • However this hierarchy resulted in the SPI Terminal Strip wiring report with adjacent connections having only one signal per drawing CHARM I/O Card (CIOC) FIE/RIE Wiring Answer • Actual Project DCS FIE Hierarchy ○ Panel ○ Rack ○ Slot ○ CHARM ○ **Terminal Strip (Branch)**	

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		▪ Channel ▪ Terminals • The Terminal Strip report now showed all 12 CHARM channels • Con: The CHARM was above the branch now and lost unique CHARM data per channel CHARM Field Enclosures • Benefits of using Field Enclosures: o Allows for Electronic Marshalling and Remote I/O in one Cabinet o Optimizes use of CHARM I/O Technology o Reduce Overall System Footprint o Eliminates I/O Home Run Cables o Reduce design engineering workhours o Safe for Hazardous Areas o Fully Vendor Tested and Documented Enclosures • Field Enclosures Equipped as Follows: o Power distribution and isolation components for primary and secondary 24V DC Power to CHARM I/O Cards. o AC power feeds with redundant AC/DC 24V DC bulk power supplies. o Grounding bars for CG (Chassis Ground) and DC Reference Ground o Wire Ducts and Name Plates o CIOC Carriers, Base Plates and Terminals. CHARM Cards • Analog Input 4-20 mA HART CHARM Characteristics o 2 wire Loop Powered o Signal - 4-20 mA with or without HART o Impedance - 250 Ω ±1% o Accuracy - 0.1% of span (0-60°C) o Repeatability - 0.05% of span o Resolution - 16 bit A/D converter o Calibration - None required o Loop Power - 15 V at 20 mA @ 24V DC • Analog Input 4-20 mA HART CHARM Characteristics o 2 wire Field Powered o Signal - 4-20 mA with or without HART o Impedance - 250 Ω ±1% o Accuracy - 0.1% of span (0-60°C) o Repeatability - 0.05% of span o Resolution - 16 bit A/D converter o Calibration - None required o Field Powered • Analog Input 4-20 mA HART CHARM Characteristics o 3 wire CHARM Powered o 24V DC Power CHARM o Max Power 24V DC at 20mA o Signal - 4-20 mA with or without HART o Impedance - 250 Ω ±1% o Accuracy - 0.1% of span (0-60°C)	

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		○ Repeatability - 0.05% of span ○ Resolution - 16 bit A/D converter ○ Calibration - None required • Analog Output 4-20 mA HART CHARM ○ Signal Range: 4 to 20 mA ○ Full Signal Range: 0 to 24 mA ○ Accuracy - 0.25% of span (0 to 60°C) ○ Accuracy - 0.5% of span (-40 to 70°C) ○ Resolution 16-bit D/A converter ○ Calibration None required ○ Available Field Power 20 mA at 15V DC supply into 750 Ω load • RTD Input CHARM ○ 2 wire RTD ○ Operating Range - -200 to 850°C ○ Temperature drift - ± 0.02°C/°C ○ Accuracy - ± 0.25°C ○ Repeatability - 0.05% of span ○ Resolution - 24 bit A/D converter ○ Calibration - None required ○ Common Mode Rejection - 90dB typical ○ Open Sensor Detection • RTD Input CHARM ○ 3 wire RTD ○ Operating Range - -200 to 850°C ○ Temperature drift - ± 0.02°C/°C ○ Accuracy - ± 0.25°C ○ Repeatability - 0.05% of span ○ Resolution - 24 bit A/D converter ○ Calibration - None required ○ Common Mode Rejection - 90dB typical ○ Includes Open Sensor Detection • RTD Input CHARM ○ 4 wire RTD ○ Operating Range - -200 to 850°C ○ Temperature drift - ± 0.02°C/°C ○ Accuracy - ± 0.25°C ○ Repeatability - 0.05% of span ○ Resolution - 24 bit A/D converter ○ Calibration - None required ○ Common Mode Rejection - 90dB typical ○ Includes Open Sensor Detection • Discrete Input 24 V DC low-side sense (dry contact) CHARM ○ Sensor Types 24V DC - Dry Contacts ○ On Detection Level - >2.25 mA ○ Off Detection Level - <1.75 mA ○ Channel Impedance - 4.8 KΩ ○ Wetting Voltage - 22.5Volts ○ Configurable Channel Types - Discrete Input or Pulse Co	

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		• Discrete Output 24V DC High-Side CHARM
		  ○ On State Rating - 100 mA @ 24V DC
		  ○ Off State Leakage Current - 1 mA Line Fault Detection „ „
		  ○ Short circuit: <50 Ω load
		  ○ Good status: 240 Ω to 10 kΩ load
		  ○ Open circuit: >20 kΩ load
		  ○ Configurable Output Behavior „ „
		  ○ Momentary Output
		  ○ Continuous Pulse Output
		
		• 24V DC Power CHARM
		  ○ Device Type 24V DC Power output
		  ○ Status for Power Good >10V DC
		  ○ Status for Power Bad <5V DC
		  ○ Isolation - Status read back circuitry is optically isolated and factory tested to 1000V DC.
		  ○ Field Circuit Protection „ 2 Amp fuse
		  ○ CHARM Power - 12 mA max
		  ○ Available Power - 1.01 Amps max
		
		CIOC Strip with Adjacent Terminals Report
		• Enhanced CIOC Strip Report with adjacent Terminals shows:
		  ○ Field Wiring from the instrument to the CIOC
		  ○ Two Page report with 9 I/O on first and 3 on the second
		  ○ Cable Names
		  ○ Wire Colors
		  ○ Panel Number
		  ○ Strip Number
		  ○ Channel Numbers
		  ○ Terminal Numbers
		  ○ CS Tag Numbers
		Displays per set Preferences
		
		CIOC Loop Diagram Example
		• Due to lack of Marshalling Strip, Enhanced SPI Loop Diagram typically only shows the Device Panels Instrument and COIC Terminations (Loops may not be needed)
		
		Using Electronic Marshalling Conclusion
		• CIOC is Configurable for:
		  ○ Basic Process Control Systems (BPCS)
		  ○ Safety Instrumented Systems (SIS)
		  ○ Intrinsically Safe (IS) Systems
		• CIOC Can be RIE or Field Mounted
		• Instrument Wiring to CIOC can be Direct or by Junction Boxes and Homerun Cables
		• Eliminates Marshalling Cabinets
		• Eliminates need for Loop Diagrams
		• Potential to replace other wiring methods
		
		Questions	

8	Presentation	**PIP DMDIM001 SPI SIG** **Gene Haney, CB&I**	

Item	Topic	Notes	Action/Due
	10:30	**PIP DMDIM001 Instrument Metadata Requirements** Instrument Design Tool Configuration (IDTC) • Purpose and Method: • Facilitate Data Sharing • Create Generic Practice • Define a 'Harmonized' Mapping • Provide Autonomy to Each Data Contributor • Review industry standards (e.g., SPI, ISA, OSI, ISO, NE-100 Etc...) and incorporate instrument datasheets. • PIP IDTC Task Team has identified 500+ data elements associated with instrument specification data for instruments of the Flow, Level, Pressure and Temperature process functions • They are just now adding Control Valve data elements to the specification • Only 20% of these data elements have a defined data field in the SPI schema. • Houston SPI LTUF is conducting a IDTC Special Interest Group with the following plan of action: o Identify data elements from list that exist in SPI o Review, consolidate, expand list of data elements not in SPI o Assist in developing the Control Valve data elements to the IDTC o Provide feedback to the PIP DMDIM001 IDTC committee o Provide recommended schema changes to Intergraph • The Special Interest Group (SIG) was formed to review the 'missing' fields and make a recommendation to Intergraph pending rebuild of the Spec Module in SPI • The SPI was introduced to Hexagon PPM at HxGN 2017 in Las Vegas and received with much interest: o The SmartPlant Instrumentation Spec Module is undergoing a major update to eliminate the need for Infomaker o Hexagon is driving an initiative to include WEB API's for external integration in all the tools and this requires a structured Data Dictionary as the bases of all Spec Sheets **Current Houston SPI LTUF SIG Members:** Gene Haney, CB&I (SIG Chair) Bob Zerda, PIP Alex Koifman, F.I.R.S.T. CONVAL Betty Alexander, JGC Chris Cordes, Covestro Guillermo Vigna, Endress+Hauser John Dressel, Fluor Kory Johnson, Marathon Nezar Faitouri, Mangan, Inc. • The efforts of this SIG are ongoing and intended to bring more consistency to the SPI Spec Data Dictionary and PIP DMDIM001 • Gene Haney is seeking more members and participation in	

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		the SIG	
9	LTUF Forum 10:55	**Forum Discussion Topics** **All Attendees** • Data Centric Engineering • SPI Integration Issues • SPI 2016 Upgrades • SPI 2016 EDE Tips and Tricks	
10	Close 11:00	• The next meeting is scheduled for May 15, 2018 at Jacobs • John Dressel closed Meeting and we adjourned to Emerson Equipment Display Area	