Agenda

• Challenges facing Projects
• New, efficient approaches for Automation Projects
  - LEAP™ – Lean Execution of Automation Projects
  - Supporting technologies
  - Benefits
• Honeywell Advantage from HPS-UOP joint Solutions
Frequently seen Automation Project Scope
Experion PKS – A Complete Automation Platform

- **Orion Console & Collaboration Station**
- **DCS Network**
- **DCS FTE Network Extension**
- **FTE**
- **DCS Virtualization**
- **Operator Workstation**
- **Engineering Workstation**
- **Asset Management Server**
- **OPC Server**
- **History Server**
- **Engineering Server**
- **Alarm Management**
- **Cyber Security**
- **Training Simulators**

**Networks**

- **DCS IO Network**
- **IOLINK**
- **SafeNet**
- **SafeI/O**

**Safety Manager**

- **SIS and FGS**
- **ControlEdge PLC**
- **Experion C300 with Universal IO**
- **RTU2020**

**Platforms**

- **Experion PKS**
- **ControlEdge PLC with UNIVERSAL IO**
- **RTU2020**
Challenges Facing Projects

- Challenges Require Updated Approach
- Increasingly complex projects
- Process modularization
  - Drives earlier hardware delivery
- Iterative Approach to Engineering Design
  - Drives changes into system requirements
  - Ineffective work
- Compressed schedules
  - Drive later design inputs
  - Automation on Critical Path
- Late Process Changes
- Project Budgets Under Pressure
- Multiple Engineering Contractors
  - Different locations, standards, deliverables

Late DATA!  COST of Changes  COLLABORATION is a MUST
Ultimate need for any successful Plant Investment

Ensuring that resulting Plant performance can be captured, understood and improved; Business Results captured

Ensuring that Plant capability is actually usable AND used from DAY ONE.

Ensuring asset, mechanical completion, capability all available from Day ONE.
Traditional Project Workflows Overview

Modpack #1: Define 🟢 Design 🟡 Manuf 🟢

Modpack #2: Define 🟢 Design 🟡 Manuf 🟢 Config
**LEAP™ - Take Project Execution off the Critical Path**

- Cloud Engineering enabled by Controller and IO Simulators in Virtual Machines
  - Project team can be dispersed globally
  - Configuration Acceptance Test (CAT) can be done in a Cloud, VEP
  - Order production hardware late in the project and eliminate a hardware refresh
- Universal Channel Technology removes the requirement for marshalling
  - Standard cabinets, with Hazardous Location and Marine Certifications at the factory
  - Hardware becomes standard and all customization is in the software
  - Automatic Device Commissioning simplifies and self documents late changes

**Gain 25% flexibility in your schedule**
LEAP – Lean Execution

Enabling Technologies

Universal Cabinets
Make late additions and modifications to I/O type with only a soft configuration change with zero external hardware changes

Virtualization
Decouple functional automation engineering from physical design while reducing plant hardware requirements

Cloud Engineering
Optimize hardware lifecycle by ordering hardware late, and benefit from virtual factory acceptance testing (FAT)
Universal IO – enabling Design Independence

- Universal Channel Technology is soft configurable
  - You Can’t Make a Mistake
Consolidating with Virtualization

‘Late Binding’ hardware ordering
Simplified ordering

Space vs Reliability
- Traditional servers
- Essentials platform
- Premium platform

Saves on Power, Footprint, Weight and Cooling Requirement
Cloud Engineering

- Reduce Travel cost
- Virtual – Gradual FAT
- Can isolate by process area
- ‘Late Binding’ hardware ordering

Virtual Controller and IO Simulation

Work Remotely – Work in Parallel – Finish Early
UIO and EPKS Enables Automated Device Commissioning

Installation & Pre-commission Transmitters in 5 Minutes versus 2 Hours
LEAP Enabling Technologies – Benefits summary

Integrated solutions increase value of individual benefits!

- Keep Automation off of the critical path!
- Eliminate activities that generate rework!
- Be virtually free from hardware dependencies
- Reduce travel costs by 50%
- Gain 25% flexibility in your schedule
- Reduce your MAC capital by 30%

LEAP for Automation Projects
HPS- UOP joint Solutions
Performance Materials & Technologies

Honeywell is a global leader in designing and creating high-quality performance chemicals, materials and process automation technologies.

<table>
<thead>
<tr>
<th>UOP</th>
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<tbody>
<tr>
<td>• 31 of 36 today’s refining technologies were developed by UOP</td>
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<tr>
<td>• UOP technology makes more than:</td>
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<tr>
<td>− 40% of the world’s LNG</td>
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<tr>
<td>− 60% of the world’s gasoline</td>
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<tr>
<td>− 70% of polyester</td>
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<tr>
<td>− 90% of biodegradable detergents</td>
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<td>• UOP technologies offer a high ROI</td>
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<tr>
<th>Process Solutions</th>
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<tr>
<td>• #1 in Refining &amp; Petrochemical Automation</td>
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<tr>
<td>• Honeywell Process Solutions are installed at nearly half of the</td>
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<tr>
<td>world’s refineries helping to refine nearly 40 million barrels</td>
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<td>of oil a day</td>
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<tr>
<td>• Awarded Frost &amp; Sullivan’s 2014 “Main Automation Contractor of</td>
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<td>the Year”</td>
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UOP and HPS together are an unmatched process technology provider.
Unique CAPEX and OPEX value

Constant innovation targeting improved returns.....

More Sustainable Value Throughout the Facility Life Cycle
Experion® Solution Suites for UOP

Experion Pre-Integration
for UOP critical control system packages

Operational Knowledge
Interaction requirements based operator displays and console workspaces, embedded operating procedures

Alarm Knowledge
Operator Alarm Help

Control Knowledge
Basic and complex loops, automated sequences

Solution Suites

Safety Knowledge
Cause and effect logic, startup / maintenance bypasses and shutdown logic displays

Unlocking Knowledge to Drive World Class Performance
“Honeywell Advantage” Solutions for the UOP Process Units

<table>
<thead>
<tr>
<th>Startup Your Facility Sooner</th>
<th>Reach Target Production Faster</th>
<th>Operate at Peak Performance</th>
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<tbody>
<tr>
<td>UOP Critical Control Applications</td>
<td>Experion® Process Solution Suites</td>
<td>Field Instrumentation/ Modular Design</td>
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<td>Profit® Process Solution Suites</td>
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<td></td>
<td>UniSim® Process Solution Suites</td>
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<tr>
<td></td>
<td>DynAMo® Process Solution Suites</td>
<td>Modular Automation</td>
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<td>Connected Performance Services (CPS)</td>
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</table>
Experion® Solution Suites for UOP

- Automated procedures
- Structured graphics
- Cause & Effect diagrams
- Alarm design
- Process-specific KPI’s

+ Critical control applications: e.g. DRCS, CSCS)
Orion Operator Workspace for UOP Units
UOP-HPS Solution for Supervisory Control

• Implementation of a Supervisory Control Layer:
  - Value Area: Reliability/Availability
  - Start-up, operate and shutdown the process consistently and reliably
  - Procedural Operations, Boundary Management to improve process reliability with links to appropriate SIS strategies
  - Automated procedures for infrequent operations to ensure consistent execution
DynAMo Solutions - Alarm Help Templates

- Data is collated for each alarm identified
- The alarm help is based on master tags that translate to customer named tags
Sequential Control & Safety Systems logic for process units

- Embedded with UOP Know-How
- Complex Functions Unique to UOP
- Developed in Collaboration with
  - UOP Technical Service
  - UOP Field Service
  - UOP Engineering
  - Honeywell Process Solutions
- Over 450 Control Systems Delivered
  - Oleflex
  - Linear Alkylbenzene (LAB)
  - Fluid Catalytic Cracking (FCC)
  - Methanol-to-Olefins (MTO)
  - Platforming
  - Sorbex
  - Penex/Butamer Drier
  - Adsorber Regeneration

Advantages of Implementing UOP PIC Applications In Honeywell C300 & Safety Manager
- Alarms and events are available natively on the Experion System without any need for cross database configuration and alignment
- Smooth co-ordination between the DCS, ESD and the PIC applications
  - Procedural Operations in Experion can trigger the logic in PIC as appropriate
- Common hardware platform for PIC Apps and DCS or ESD and Fire & Gas systems

UOP ‘PIC’ applications – Process Information & Control
CCR Platforming Toolkits for APC – HPS & UOP

Honeywell Profit Suite
- Soft sensor
- Feed prep. APC
- Reactor APC
- Regenerator APC
- Depentanizer APC

UOP toolkits
- PINPLT
- TWTPLT
- CATGREG
- AROCON/OCTCON
- COKCON

CCR Platforming Toolkit
- AROCON: Reformate % aromatics
- OCTCON: Reformate octane number
- TWTPLT: Heaters tube wall temperature
- PINPLT: Catalyst Pinning Calculations
- COKCON: Coke on catalyst
- CATREG: Catalyst regeneration

Proprietary UOP Calculations and Models Built into APC
Refining Training Simulators: UniSim Operate OTS
UOP Units & other licensor units and open art units

- Simulators for single or multiple units, e.g. CDU/VDU + DC4 etc.
  - All open art and conversion units available
- For UOP units:
  - Pre-configured Simulator Based on Typical UOP Design
    - Uses HPS UniSim Dynamic Simulation Tool
    - Rapid deployment - can be combined with UOP Training courses
  - Complete training tool
    - Built in training curriculum
      - General process operations
      - Control strategies
      - Normal operating procedures
      - Incident avoidance and recovery
    - Advanced Features
      - Interactive cause & effect diagrams
      - 20 configured scenarios & exercises to mimic alarm situations
      - Assessment tools to track competency
      - Instructor panels to customise exercises
      - Workbooks to allow independent training

Simulators Available for
- Platforming™ Process
- CycleMax™ CCR™ Process
- Fluid Catalytic Cracking Process
- Unionfining™ Process
- Unicracking™ Process
- C3 Oleflex™ Reactor and Fractionation Sections
- Oleflex™ CCR™ Regeneration – Single Burn Zone
- Oleflex™ CCR™ Regeneration – Dual Burn Zone
# HPS-UOP Solutions Delivering Enhanced Value

<table>
<thead>
<tr>
<th>Solution</th>
<th>How It Helps the Customer</th>
<th>Value Area</th>
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<tbody>
<tr>
<td>Pre-built Standard control points, Operator Graphics and Alarms</td>
<td>Reduce risk and take automation out of critical path for start-up</td>
<td>Reduce Project Risk/Operational Readiness</td>
</tr>
<tr>
<td>Pre-built Safety System for the Process</td>
<td>Avoid spurious trips; Shutdown the process in a controlled manner, avoiding damage to equipment or catalyst, consistently and reliably</td>
<td>Reliability/Availability</td>
</tr>
<tr>
<td>UOP Critical Control Applications (CRCS/DRCS and PSA logic) on Honeywell Platforms</td>
<td>Elimination of black boxes, Better visibility, Alarms, SOE in DCS, Lower maintenance cost</td>
<td>Reliability/Availability</td>
</tr>
<tr>
<td>UOP and Custom Training Simulators</td>
<td>Train engineers and operators early in a safe environment</td>
<td>Operational Readiness/Reliability/Availability</td>
</tr>
<tr>
<td>Pre-built Supervisory Control System for the Process</td>
<td>Start-up, operate and shutdown the process consistently and reliably</td>
<td>Reliability/Availability</td>
</tr>
<tr>
<td>Advanced Process Control for the Process</td>
<td>Improve process efficiency (increase throughput, lower energy usage)</td>
<td>Efficiency/Optimization</td>
</tr>
<tr>
<td>Connected Performance Services (CPS)</td>
<td>Remote Monitoring with advanced diagnostics; KPIs and Integrity Windows to make sure process stays within recommended parameters; Open loop optimization</td>
<td>Reliability/Availability/Optimization</td>
</tr>
</tbody>
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**Increased profitability by bringing unit on-line faster & minimizing plant downtime**
Focused on Developing Solutions for 4 UOP Complexes

**Naphtha Complex**
A process to create jet fuel, diesel and liquefied petroleum gas, and feedstocks for Aromatics (8 Units)

**Gas Processing**
Preparing natural gas for heating & appliances, propane and other fuels and feedstocks (5 Units)

**Oleflex Complex**
A process that creates the ingredients for plastics, synthetic rubber and fuel additives (6 Units)

**Aromatics**
Creating cleaner, higher octane fuels and feedstocks that can be applied to the plastics and pharmaceutical industries (7 Units)
Thank You