LEAP into the New Project Paradigm
New Technologies to Reduce Risk
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Lean Execution of Automation Projects
Project Execution in the 21st Century

What is different today?

– Over the last 7 to 10 years, projects have gotten larger
– No one EPC, often no one owner will take full ownership
– Scarcity of skilled people

Implications

– Work is often done by multiple EPC’s or multiple offices
– Work can be done under multiple owner guidelines
– Some project deliverables impacted more severely

DATA will be late!
COST will be an issue!
PROCESSES will change!
The Challenge of a Traditional Project

Start

- Define
- Design
- Manuf
- Config
- Test
- Install

Finish

**PHYSICAL**
- Define
- Design
- Manuf
- Config
- Test
- Install

**FUNCTIONAL**
- System Config
- System FAT
- Control Configuration
- Configuration FAT
- Site Commission
- Alarm Configuration
- Alarm Studies, Set Points
- P&IDs, Narratives
- HMI Configuration
- Cable Designs
- Marshalling Design
- Hardware Definition
- IO Assignment
- Instrument Index
- I/O Counts, Locations
Traditional Project

Backend Loaded Managing Late Changes
What If?

**What if** you could reduce avoidable schedule delays by 90%?

*Keep Automation off of the critical path!*

**What if** you could reduce unwanted productivity costs by 80%?

*Eliminate activities that generate rework!*

**What if** you could be virtually free from hardware dependencies?

*Delay software freeze dates by 1 to 3 months!*

**What if** you could reduce travel costs by 50%?

*Bring the project to the engineer!*

**What if?**
Lean Execution Eliminates Waste

Non-value Add Processes are Considered “Waste”

**Repetitive Tasks**
- **Entering** the same data over and over again

**Rework**
- **Editing** the same data over and over again

**Redundant Tasks**
- **Validating** the same data over and over again

If “Time is Money”, Then “Wasting Time is Wasting Money?”
Drive Effectiveness not Efficiency

Reduce Hardware Footprint
Remove Early Hardware Order
Reduce Risk
Reduce Travel
Reduce System FAT
Reduce Cost
Reduce Schedule
Remove Custom Designs
Reduce Complexity

To Efficiently Do What is Not Required is NOT Effective!
Integrated solutions increase value of individual benefits!
Universal Channel Technology

Traditional Cabinets
Wait for final definition of instruments and then build custom cabinets

Universal Cabinets
Standard cabinet that can adapt to late wiring changes

Eliminate Complexity & Build Standard Cabinets Based on IO Count Not Mix
Design Independence with Universal IO

With traditional marshalling, each loop can have over 15 terminations between device and IO Module

15+ opportunities to make a mistake with each signal!

Universal Channel Technology is soft configurable for IO type

You can’t make a mistake!
Virtualization

Saves on Power, Weight and Cooling
Design Independence with Virtualization

Virtualized Controller IO Simulators

Delay deployment to hardware

Standardize supervisory designs

Variable capacity

1 → 40+
Cloud Engineering

Virtual Engineering Platform

Virtual Engineering Platform
<table>
<thead>
<tr>
<th>Current Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VM Online Capacity: 11,200</td>
</tr>
<tr>
<td>Total VMs Currently in Use: 3,000</td>
</tr>
<tr>
<td>Total Customer Projects Executed using VEP: 219</td>
</tr>
<tr>
<td>Total Internal Projects &amp; Demo systems: 87</td>
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</tbody>
</table>
Design Independence with Cloud Engineering

**Traditional**
People and target equipment staged early in project in a single location

Configuration checkout & FATs done on large grained scope with travel of critical resources for long periods

**Honeywell Hosted Project**
Project staged in data center; people distributed; equipment not required until late in project

Customer, EPCs, HON all have secure remote access to validate modular increments – less travel & rework

Start Up New Pcs With the Longest Lifecycle!
Global Project Delivery Model

GPM (Global Project Methodology)

Technical Standards + Project Methodology
Lean Execution of Automation Projects (LEAP)

- Cloud Engineering enabled by Controller and IO Simulators in Virtual Machines
- Control Strategy Adaptability when you need it, during project execution
  - No IO Module ID required for configuration
  - No IO Channel ID required for configuration
  - Functional configuration independent of physical design
- Late Binding matches the functional configuration to the physical design
Lean Execution of Automation Projects

- **Marshalling Design**
- **Hardware Definition**
- **IO Assignment**
- **System Configuration**
- **System FAT**
- **Site Commission**

- **Cable Designs**
- **Late Binding**
- **Alarm Configuration**
- **Control Configuration**
- **Configuration FAT**
- **HMI Configuration**

- **Instrument Index**
- **Alarm Studies, Set points**
- **P&IDs, Narratives**

- **I/O Counts, Locations**
What is Late Binding?

No physical channel assignments required

Central Control Room

Control Configuration

Configuration FAT

Alarm Configuration

HMI Configuration

Field Mounted I/O

Universal Cabinet

SIMC300

SIMACE

Control System

No physical channel assignments required

Universal Cabinet

Field Mounted I/O

Control System

SIMC300

SIMACE

HMI Configuration

Alarm Configuration

Control Configuration

Configuration FAT
Late Binding Advances – Future

No physical channel assignments required

Central Control Room

Detect
Interrogate
Configure
Enable
Document

Tagname 1
Tagname 2
Tagname 3
Tagname 4
Tagname n
FI101

FI101

Universal Cabinet

32 character tagname for HART 6/7

FI101

HMI Configuration

Configuration FAT

Alarm Configuration

Control Configuration

SIMC300

SIMACE

Field Mounted I/O

Control System

Universal Cabinet

FI101
LEAP Project Workflow

Functional
Honeywell Virtual Engineering Platform
- Honeywell
- Customer
- EPC

Physical
- Servers
- Standard Cabinets

Direct to Site!
Minimal Checkout
Eliminates big bang testing with virtual FAT

Work in Parallel, Virtual FAT, Ship to Site Earlier
A Universal Opportunity!

LEAP delivers **a step change** for Automation Projects!

- Change Management
- Resource Management
- Schedule Management
The Universal Remote Modular Cabinet
Case Study

Case Studies – Actual Projects; Normalized to $50M MAC Scope

Remove 125 Marshalling Cabinets!

~30 Documents edited for each loop

No Documents edited for LEAP

Remove 4 Remote Instrument Enclosures!

3 Remote Instrument Enclosures
Case Study

With Virtualization and Universal IO

- Reduce the MAC cabinets by 50%
- Reduce Marshalling cabinets by 90%
  - $10K per cabinet is over $1M
- Reduce cabinet engineering, drawings and documentation
  - ~40 hrs per cabinet means 5000 hours of work eliminated
  - Depending on where that is done, saving from $500K to $1M
  - 4 drawings per cabinet, typical, this eliminates 500 drawings
    - This represents 1000s of hours for the EPC to review, approve and cycle to end user
- Reduce opportunities for marshalling mistakes by 66%
  - Each loop can have up to 15 terminations between device and IO Module
    - With Universal IO, there are 5
- Reduce capital cost by $16M
  - In a normalized $50M MAC scope
**EPC Opportunities**

**Potential EPC Benefits**

- **RIE Foundations and transport**
  - Engineering, Material and labor
- **Home run cables and trays**
  - Engineering, Material and Labor
- **Engineering drawings**
  - Junction Box, wiring drawings, reports, routing plans, etc..
- **Procurement Activity Reduction**
  - Supply chain reduction
- **EPC FAT**
  - Time and Travel
- **Commissioning savings**
  - Labor and travel
- **Reduced Control Room and Equipment room**
  - Less footprint, power, HVAC, and weight
End User Opportunities

- Reduced spares
  - Universal Channel Technology adapting to signal mix
- Reduced OpEx
  - RIE infrastructure, HVAC, Power, Fire and Gas, etc.
- Startup and Commissioning
  - Reduced commissioning time and simplification
- Lifecycle cost reduction
  - Tech refresh avoided
- Operations lifecycle simplicity
  - Reduced marshalling, loop drawings made simple, trouble-shooting and diagnostics simplified
- Reduced project risk
  - Reduced Cost and flexible schedule
  - Keep automation off the critical path
A Revolutionary New Schedule

Traditional Waterfall Schedule

LEAP Can Generate 25% of Schedule Flexibility or Compression!
LEAP Project vs. Traditional

Traditional approach is often back end-loaded

Modular, Incremental Design – Avoid Backend Loading
WHY LEAP?

- Simplification
- Standardization
- Reduced Customization
- Capital Efficiency
- Minimal Facility
- Critical Thinking
- Differentiation
You can reduce avoidable schedule delays by 90%
Keep Automation off of the critical path!

You can reduce unwanted productivity costs by 80%
Eliminate activities that generate rework!

You can be virtually free from hardware dependencies
Delay software freeze dates by 1 to 3 months!

You can reduce travel costs by 50%
Bring the project to the engineer!

You can gain 25% flexibility in your schedule
Adaptive schedule to late changes!

You can reduce your MAC capital by 30%
Remove marshalling, RIEs and improved project effectiveness!
The question shouldn’t be “What If?”

The question should be “Why Not?”