2014 Honeywell Users Group Europe, Middle East and Africa

A Flexible Controller for Remote Solutions: RTU2020
Paul Vellacott, Honeywell
Experion’s SCADA Solutions History

**Innovation**

1982: GCOS on DPS6 Computer
1987: HVS6 on DPS6000 Computer
1990: UNIX on Personal Computer
1994: Windows 95
1998: Windows NT
2000: Windows 2000
2004: Windows XP
2006: Windows Vista
2008: Windows 7
2010: Win 2008 R2
2012: Windows 8
2014: VMWare

**Technology**

1982: Minicomputers with Character Graphics Terminals
1987: PC Operator Stations
1990: PC and Networking
1994: MS Windows Operator Stations
1998: Web Technology and DSA
2000: DVM
2004: HMIWeb
2006: Mobile
2008: Video Analytics
2010: Enterprise Model
2012: Unified CMS
2014: SoA

**Strong History Delivering SCADA & RTU**
RTUs and Oil & Gas

- Lots of Assets
- Production Loss
- Inefficient Install & Commission
- High Operating Cost
- HSE
- Constant Additions

Remote Operations with Perfect 20/20 Vision
Honeywell Onshore Upstream Solution Offering

- Instruments, Camera, Radio, ...
- RTU / EFM Controller & IO
- RTU2020 Ready-To-Use
- Integrated with Experion & Field Device Manager

End to End Solution
Honeywell RTU2020 Remote Terminal Unit

- Flexible Communications
- Flow Calculations
- Harsh Environment: 70° to 75°
- Modern Processor
- HART Enabled Onboard I/O
- Efficient Wiring
- Lowest Power Consumption: Min 1.6, Typical 1.8, Max 2.8

Perfect, 20/20 Vision with RTU2020
Honeywell RTU2020 Remote Terminal Unit

The Physical Detail...

1. 24 Vdc Power Input
2. RS485 Ports (qty 2)
3. RS232 Ports (qty 2)
4. Ethernet Ports (qty 2)
5. Onboard IO (qty 28)
6. SD Card Slot
7. Status LEDs

DIN Rail Mount
Harsh Environment Specifications

Perfect, 20/20 Vision with RTU2020
Harsh Environment Specifications

-40°C to 75°C  -40 to 167°F

• Conformal Coating – G3

• Hazardous Locations
  – FM/CSA Class I Div 2
  – ATEX Zone 2
HART enabled onboard I/O
## 28 Onboard Mix of Inputs and Outputs

<table>
<thead>
<tr>
<th><strong>Analog Inputs:</strong></th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog Outputs:</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Digital Inputs:</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>Digital Outputs:</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Pulse Inputs:</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

**Ready for Expansion I/O**
Why Have HART?

- Better Maintenance Decisions
  - Use HART diagnostics in RTU
  - Use FDM for device specific faults
  - More productive (& less) site trips

- Fast & Accurate Commissioning
  - Pre-built templates from FDM

To Help Manage 1,000’s of Dispersed Assets
Why Have HART Onboard?

More Cost Effective
- No extra I/O Modules for HART

Less Power Consumption
- No extra I/O Modules for HART

Save Cost, Save Power
RTU2020 and HART

All Onboard: No Special Modules or Extra Hardware
Efficient Wiring and Configuration

Perfect, 20/20 Vision with RTU2020
Efficient Field Wiring & Cabinet Assembly

To change an RTU on-site

Before

45 min

After

5 min

- Reduce exposure in hazardous environments
- Reduce production downtime

Less Errors – Saves Time
Efficient Configuration with RTU Builder

- IEC 61131-3 Programming
  - Ladder Program
  - Function block program
  - Structured text
  - Instruction List
  - Sequential Function Chart
- Simple Bulk Replication Of RTUs
- RTU Diagnostics
- Firmware Upgrades
  - In bulk, over slow networks
Lowest Power Consumption

Perfect, 20/20 Vision with RTU2020
Lowest Power Consumption

Compared to other RTUs:
- 3.8 W?
- 4.9 W? with HART

How does this help?
- Smaller Batteries = $$
- Smaller Solar Panels = Less infrastructure = $$

Lower Power = Lower Solution Cost
Less Component Stress

Less Power Consumption = Less Heat
Effective Thermal Paths = Less Heat
Less Heat = Less Component Stress
Less Component Stress = Higher Reliability

Example Reference: Influence of Temperature on Microelectronics and System Reliability> Pradeep Lall (Author), Michael Pecht (Author), Edward B. Hakim (Author)
Modern Processor

Perfect, 20/20 Vision with RTU2020
Modern Processor

667 MHz Dual Core ARM® Cortex™-A9

Ready for
– Expansion I/O
– Other future features

Other popular RTUs:
– 32 MHz  Single core
– 256 MHz  Single core
– 33 MHz  Single core
– 150 MHz  Single core

Future Proof for Advanced Features
Flow Calculations

Perfect, 20/20 Vision with RTU2020
Gas & Liquid Flow Compensation Calculations

<table>
<thead>
<tr>
<th>AGA</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGA 3</td>
<td>Orifice Meter</td>
</tr>
<tr>
<td>AGA 5</td>
<td>Volume to Energy Calculation</td>
</tr>
<tr>
<td>AGA 7</td>
<td>Turbine Meter</td>
</tr>
<tr>
<td>AGA 9</td>
<td>Ultrasonic Meter</td>
</tr>
<tr>
<td>AGA 8</td>
<td>Gas Compressibility</td>
</tr>
<tr>
<td>AGA 11</td>
<td>Coriolis Metering</td>
</tr>
</tbody>
</table>

Support for:
- API 21.1 (gas)
- API 21.2 (liquids)
  - Custody Transfer
Communications Is the RTU Difference

Perfect, 20/20 Vision with RTU2020
An RTU Solution: Communications are Key

Production Management

FDM: Asset Management

Experion: SCADA

Local Sub-systems

Radio (optional)

Modus Master, Slave (Serial, Ethernet)

DNP3 Slave (Serial, Ethernet)

HART IP

RTU2020 Panel

Flexible Solutions to Customer Requirements
RTU2020 Ready-To-Use

Low Cost Complete Wellhead Solution
World Class High Volume Factory
ISO 9001 Quality
Easy to Deploy
Rapid Time to First Production
Ready-To-Use: At a Wellhead

- Solar Panel
- Radio Antenna
- Pump Set
- RTU Enclosure
- Surface instruments
- Sub-surface instruments
- Battery Enclosure
- Wellhead
- Separator
- (Diagram showing components at a wellhead)
Honeywell Onshore Upstream Solution Offering

- **Instruments, Camera, Radio,** ...
- **RTU / EFM Controller & IO**
- **RTU2020 Ready-To-Use**
- **Integrated with Experion & Field Device Manager**

**End to End Solution**
Experion SCADA
Purpose Built for the Oil & Gas Industry
What is a SCADA System?

The server is the backbone...

History, SCADA Engineering Repository, HMI, Alarm Management, Subsystem Connectivity: RTUs, PLCs
Scalable System Design

Experion can scale from a small system to …
… a very large system —

It will grow as you grow!

x 1000’s
Experion: SCADA ..... DCS ..... SIS/F&G

Simply add C300 DCS controllers
And Safety Manager controllers
Same Servers, same Operator Stations

SCADA Systems Must Meet Current and Future Needs
Equipment Based Configuration & HMI
A Better Operator Experience
Equipment Based Configuration & HMI

Radically simplified configuration
- Equipment can be configured with minimal effort
- Displays generated automatically
- Makes configuration possible by people with less training

Superior operator experience
- Standard Equipment display that focus operators attention on what’s important
- Efficiently manage thousands of assets
- Optimized operations
- Built in operational applications using same paradigm

And it looks great
- High end visual design
- State of the art user interaction such as pan & zoom displays
- Simple and effective dashboard style presentation

Domain Knowledge Embedded
Solution: Equipment Templates

Radically Simplified Configuration and Operational Efficiency
Repeated Equipment Configuration Workflow

**Task:** Design equipment | **Before:** 20 Hours | **After:** 4 Hours
- Build displays & linkages

**Task:** Bulk edit instances | **Before:** 2-6 Hours | **After:** 10 Mins
- Update displays & overviews
- Edit calculations
- Test displays & points
- Correct errors

**Task:** Tailor system template | **Before:** 20 Hours | **After:** 4 Hours
- Test

**Task:** Create instances of template | **Before:** 20 Hours | **After:** 4 Hours
- Load templates

Significantly simplified configuration workflow
HMI Solution: Out of the box operation

HMI Generated from the Equipment Template

- Equipment from all DSA servers in the system
- Auto-generated tables of equipment showing key parameters
- Filtering provides task based views of equipment
- Filter by Asset
Standardized Displays

HMI Generated from the Equipment Template
Standardized Displays

Alarm aggregation

Displays, Trends & Relationships

Key Parameters in Banner

HMI Generated from the Equipment Template
Honeywell Onshore Upstream Solution Offering

End to End Solution

Instruments, Camera, Radio, ....

RTU / EFM Controller & IO

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