Jose M Moyano
27 September 2017
ALL NEW GUIDED WAVE RADAR
Smarter at Every Level

Honeywell Users Group

The Power of Connected
Honeywell ENRAF Legacy

Winning Terminal Inventory Solutions with best offering for:
- Safety
- Compliance

Best in Class:
- Accuracy
- Full Operation Control
- Efficiency

Over 60 years of tradition

Inventory Management Functions
1. Ship Loading and Unloading
2. Retail Outlet
3. Access Control and Security
4. Loading Bay Automation
5. Control Building
6. Blending and Movement
7. Refinery
8. Tank Farm and Storage
9. Aircraft Terminal

End to End solution with Lowest Cost of Ownership
Honeywell Enraf Gauging

Over 20 years of experience in Precision Radar Gauging

Over 60 years of experience in Precision Servo Gauging

Unsurpassed technology to deliver precise measurement in the most challenging applications.

Full level gauging, communication, and control systems for refineries, tank terminals and petrochemical industries. Suitable for custody transfer as well as inventory control.
SmartLine Level SLG700

Process Level offering, based on the ENRAF level expertise in precision tank gauging.

Designed to take advantage of The SmartLine platform:
• User experience
• Sales and Support process
• Experion system compatibility

Extending Portfolio for Level Measurement and Control
SmartLine Level Overview - Portfolio

Process Level
- SmartLine GWR Level
- SLG726 HighTemperature High Pressure
- SLG720 Standard Temperature Standard Pressure

Custody Transfer
- SmartLine DP Level
- ST700/ST800
- RM series NCR Level
- RM70 Liquids
- RM60 Solids

Flexline Radar
- Honeywell ENRAF

Servo Gauge 854

Complete Portfolio for Level Measurement and Control
### Key SLG700 Specifications

**Functional:**
- **Power Supply:** 2wire, 24VDC
- **Digital Protocol:** HART, FF
- **Measurement Range:** 50m
- **Process Pressure:** -14.5psi to 5800psi
  
  \[ 1 \text{bar to 400bar} \]
- **Process Temperature:** -76°F to 842°F
  
  \[ -60°C \text{ to 450°C} \]

**Performance:**
- **Accuracy:** - +/- 3mm or 0.03% of Level
- **Repeatability:** +/- 1mm
- **Update time:** < 1s
- **Start up time:** < 1min

**Physical:**
- **Housing:** SmartLine Dual Compartment
- **Process Conn:** Threaded, Flange, Special
- **Probes:** Single Rod, Co-axial, Rope
- **Probe MOC:** SS 316, Hast-C
- **SmartLine Modularity**

### Process connections:
- **Threaded Connection**
  - NPT / BSP
- **Flange Connection Support**
  - ANSI B16.5 / DIN EN 1092
- **Special Flange Connections:**
  - Fisher 249B/259B / Fisher 249N / Masoneilan

**Primary Seal Options – (O-Ring)**
- VITON (-25°C to 200°C)
- KALREZ (-4°C to 200°C)
- EPDM (-54°C to 150°C)
- NITRILE [BUNA-N] (-40°C to 150°C)
- METALLIC
Key SLG700 Differentiators

Top Performance - Enhanced Guided Wave Radar Technology

• More reliable, accurate, and stable for dynamic process applications
• Efficient tank usage – small blocking distance
• Full variety of applications - outstanding process temperature / pressure range.

Lower Lifecycle Cost & Best User Experience

• Avoid errors, save time with Intuitive Software Tools
• Save on inventory with Modular Design

SmartLine Connection Advantage

• Transmitter Messaging
• Tamper Alerts
• Universal Terminals
• Health Dashboard
SmartLine GWR Level (SLG700) Construction

- **TOPWORKS**
  - DISPLAY/COMMUNICATION/TERRMINATION

- **ROOK**
  - POWER ACCUMULATION/SENSOR ELECTRONICS

- **PROCESS CONNECTOR**
  - PROCESS SEAL/ISOLATION

- **PROBE**
  - WAVEGUIDE (IN TANK)

**Modular Design Providing Wide Application Flexibility**
SmartLine GWR Level (SLG700) Correlation Algorithm

- Correlation Algorithm compares the shape of the measured echo curve with our reflection model. Objective function analysis finds the best level indication.
- Auto-amplitude tracking provides reliable measurement with changing liquid properties.
- Dynamic Background Functionality allows automatically reject false echoes.

Echo Curve from SmartLine Field Setup Tool
Enhanced SmartLine GWR Level (SLG700) Algorithm

<table>
<thead>
<tr>
<th>SLG700 technology</th>
<th>So What?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Correlation Algorithm</td>
<td>Smooth and stable process, better product quality, and savings on maintenance.</td>
</tr>
<tr>
<td>Auto-Amplitude Tracking</td>
<td>Real world conditions are complex and varied.</td>
</tr>
<tr>
<td>Dynamic Background Functionality</td>
<td>Traditional pre-mapping for obstructions is not reliable due to changing conditions, and leads to potential error in level measurement in dynamic conditions.</td>
</tr>
<tr>
<td></td>
<td>Advanced level tracking algorithm of the SLG700, and additional automated functionality assure reliable level measurement even in difficult conditions in the tank.</td>
</tr>
</tbody>
</table>
SmartLine GWR Level (SLG700) Lower life cycle cost

Intuitive and easy to use Tools + Platform benefits

Application and Validation Tool - user and application centred tool
- Guidance on instrument selection
- Order code instantly verified
- Get your instrument preprogramed and ready to go out of the box.

Universal DTM
- Guided setup and online help
- Advanced diagnostics
- Intuitive dashboard.

SmartLine Platform benefits
- Universal terminals
- Modular design
- Advanced display and local configuration buttons.

Tools + Platform = Decreased Life Cycle Cost
Application and Validation Tool for SLG700

• Build your own tank and get guidance on instrument selection
• Collaborate with end user or expert
• Save up to 60% on instrument selection and setup

www.levelconfig.honeywellsmartline.com

AVT Videos:
AVT Features
AVT Workflow
AVT Training
## SmartLine Connection Advantage

### System Integration with Experion

<table>
<thead>
<tr>
<th>Function</th>
<th>HON SmartLine</th>
<th>So What?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter Messaging +</td>
<td>Send messages and status to the transmitter's local display from the Control Room</td>
<td>With the information on the field operators can take the right action, on the right device, the right way.</td>
</tr>
<tr>
<td>Auto Identification Task</td>
<td>Quickly identify problematic and unsafe conditions avoiding process shutdowns</td>
<td></td>
</tr>
<tr>
<td>assignment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Mode Setting</td>
<td>Local maintenance mode indication</td>
<td>You are 100% safe with SmartLine during field maintenance – Protect assets and people.</td>
</tr>
<tr>
<td>Tamper Alerts</td>
<td>World’s First Tamper Proof Transmitter</td>
<td>Your smart instrument stays smart – always.</td>
</tr>
</tbody>
</table>
SmartLine GWR Level (SLG700) NEW Blocking Distance

• Different blocking zones for different products

3 mm = 0.12 inch   30 mm = 1.2 inch

COMPETITIVE SPECS FOR FULL RANGE OF APPLICATIONS
The numbers are in cm

### Coax Probes

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Water (DC=80)</th>
<th>Oil (DC=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upper Zone</td>
<td>Lower Zone</td>
</tr>
<tr>
<td></td>
<td>Dead</td>
<td>Transition + Dead</td>
</tr>
<tr>
<td>Emerson 5300</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Honeywell SLG72X</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>E+H FMP51,52,54</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>VegaFlex 81, 65</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Krohne 1300C</td>
<td>3.5/8.5</td>
<td>1</td>
</tr>
</tbody>
</table>

### Wire Probes

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Water (DC=80)</th>
<th>Oil (DC=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upper Zone</td>
<td>Lower Zone</td>
</tr>
<tr>
<td></td>
<td>Dead</td>
<td>Transition + Dead</td>
</tr>
<tr>
<td>Emerson 5300</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Honeywell SLG72X</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>E+H FMP51,52,54</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>VegaFlex 81, 65</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>Krohne 1300C</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

The values start from the end of the nozzle, if nozzle is present.

Please note that each second column contains a sum of Transition and Dead Zone. This has been done to allow direct competition with values provided by other manufacturers.

Efficient Use of Tank Space
SmartLine Level (SLG700) Competitive Interface Measurement

Our benefits:

- Efficient separation control with minimal upper layer thickness
- High sensitivity allows to differentiate between similar products
- Accurate interface measurement - the same accuracy stated as for level measurement

<table>
<thead>
<tr>
<th></th>
<th>Minimum Upper Layer thickness (cm)</th>
<th>Minimum difference in dielectric constant between the upper and lower product</th>
<th>Maximum dielectric constant for upper product of rod and wire probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honeywell SLG700</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Emerson 5300¹</td>
<td>13</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Endress+Hauser FMPS1²</td>
<td>6</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Vega Vegaflex_8x³</td>
<td>5</td>
<td>10</td>
<td>not stated</td>
</tr>
</tbody>
</table>

¹ 00813-0100-4530, Rev HC; ² TI01001F/00/EN/16.12; ³ Document ID: 44640

* Value given for rod and wire probe
Target Applications for 2017 – Greenfield

Target Applications
- Storage Applications
- Distillation Columns
- Crude Processing
- Blending Operations
- Feed, Additive & Buffer Tanks

What is our differentiator?
- Reliable Measurement with advanced algorithms
- Dynamic background and auto-amplitude tracking
- Accurate interface measurement

Market Size
- Chemical – 79M$
- Refining – 41M$
- Oil and Gas – 68M$
- Target Applications constitute ~ 60% of requirements in target verticals.
- Target Applications Market – 112M$

Vertical Size Per ARC 2015 report

How to win?
- Position Technology differentiation
- Position SCA* in strong Experion Installed Base
- Position LEAN execution benefits with Level AVT

SCA* – SmartLine Connection Advantage
Target Applications for 2017 – Brown field

Target Applications
• Displacer Replacement
• Upgrade Overfill Protection
• MRO in Harsh Environment Applications
• Changing Product Applications

What is our differentiator?
• Cloud design tool for accurate instrument selection and fully pre-configured instrument for faster upgrade / replacement
• Innovative level tracking technology to decrease maintenance
• Comprehensive set of configuration options

Market Size
• Displacer Replacement – 20 M$
• Overfill Protection – 10 M$
• MRO in Harsh Env.– 30 M$
• Target Applications constitute ~ 30% of requirements in BF
• Target Applications Market – 60 M$

How to win?
• Position Technology differentiation
• Position SCA* in strong Experion Installed Base
• Position LEAN execution benefits with Level AVT

SCA* – SmartLine Connection Advantage

Vertical Size Per ARC 2015 report
# Certifications Update – SLG700

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Type</th>
<th>Region/Country</th>
<th>Comments</th>
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<tbody>
<tr>
<td>ATEX</td>
<td>Ex/IS</td>
<td>EU</td>
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<tr>
<td>CSA</td>
<td>Ex/IS</td>
<td>Can</td>
<td>Approved</td>
</tr>
<tr>
<td>CSA-us</td>
<td>Ex/IS</td>
<td>US</td>
<td>Approved</td>
</tr>
<tr>
<td>IEC-Ex</td>
<td>Ex/IS</td>
<td>APAC</td>
<td>Approved</td>
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<tr>
<td>CE</td>
<td>EMC</td>
<td>EMEA</td>
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<tr>
<td>CRN</td>
<td>P</td>
<td>Canada</td>
<td>Approved</td>
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<tr>
<td>PED</td>
<td>P</td>
<td>EU</td>
<td>Approved. Includes Dual Seal</td>
</tr>
<tr>
<td>HART</td>
<td>Protocol</td>
<td>World</td>
<td>Approved</td>
</tr>
<tr>
<td>FF</td>
<td>Protocol</td>
<td>World</td>
<td>Approved</td>
</tr>
<tr>
<td>CCoE</td>
<td>Ex/IS</td>
<td>India</td>
<td>Approved</td>
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<tr>
<td>SAEx</td>
<td>Ex/IS</td>
<td>S. Africa</td>
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<tr>
<td>NEPSI</td>
<td>Ex/IS</td>
<td>China</td>
<td>Approved</td>
</tr>
<tr>
<td>SIL2/3</td>
<td>Safety</td>
<td>World</td>
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<tr>
<td>FM</td>
<td>Ex/IS</td>
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<td>Overfill (WHG)</td>
<td>Safety</td>
<td>EU</td>
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<tr>
<td>KOSHA</td>
<td>Ex/IS</td>
<td>Korea</td>
<td>Approved</td>
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<tr>
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<tr>
<td>InMetro</td>
<td>Ex/IS</td>
<td>Brazil</td>
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<tr>
<td>China Pattern Approval</td>
<td>CPA</td>
<td>China</td>
<td>Approved</td>
</tr>
</tbody>
</table>
Summary

SmartLine level transmitters bring differentiated technology, intuitive design tools & advance Experion integration capabilities for reliable measurement, reduced cost & faster commissioning.

We do this by:
- Enhanced correlation algorithm increase measurement reliability and lower maintenance.
- Small blocking distance and sensitive interface measurement allow efficient tank usage and precision control.
- Cloud based tool (AVT) allows online collaboration to expedite design engineering and save commissioning time.
- SmartLine's unique platform features and integration with Experion improves troubleshooting, operation & maintenance.

Call to action:
- Familiarize yourself with the latest commercial updates.
SmartLine Level Collaterals

Best-in-class performance
• Whitepaper on the SmartLine Level algorithm: Bulletin Board
• Video on the SLG700 instrument: Mediaspace, YouTube
• SLG700 technical specification: Honeywellprocess.com
• Application Guide: Vault Link
• Application Sales Presentation Condensed: Vault Link
• Webinar: SLG700 in Demanding Applications: Webinar Link

Lowest Lifecycle Cost:
• 3 Videos on Application and Validation Tool: Overview, Features, Workflow
• Service training video: Mediaspace, YouTube

Best integration with Experion via SmartLine Connection Advantage and integration testing
• Video on SmartLine Connection Advantage: Mediaspace, YouTube