Wireless Gas Detection Systems in the Context of Safety Critical Applications

John Wilson, Vice President Dräger North America
End User Reasons for Wireless Gas Detection Solutions

**Upgrades Revamps Expansions Additions**
- Install alongside existing wired system
- Fill gaps in detection coverage

**Resource Limited Upgrades**
- Time, space and/or weight constraints

**Limited Access / Limited Utilities**
- Hard to wire areas (FPSO turrets, cranes, confined areas)

**Temporary Cover / Work Habitats**
- Cover during site maintenance activity

**Reduced Costs**
- Project costs reductions of 60~80% possible

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*Image: GasSecure GS01, Comparing wired vs. wireless detector project costs.*

*Text: "Total cost saving is estimated to be 80% compared to a wired solution."* - Jens-Erik Tanke, Statoil
Wireless Detectors Increase Safety with Higher Coverage and Reduce System Costs by 60-80%

Easy installation, increased flexibility… …and reduced system costs

![Gateway](Photo: Statoil)

![GS01](GS01)

![GS01](GS01)

![GS01](GS01)

![GS01](GS01)

![GS01](GS0x)

![GS01](3)

- Installation & engineering
- Other HW (cables)
- Detectors
SIL2 Compliant Systems on Top of Standard Wireless Protocols

Non-SIL

Regular ISA100 Wireless

Any ISA100 Wireless compliant gateway

Modbus

GW

SIL2

SIL2 controller with PPROFINET

Any ISA100 Wireless compliant gateway with PPROFINET

PROFIsafe over ISA100 Wireless

PPROFINET

Ethernet/Modbus

Wired PPROFINET
Remote Tank Farm Gas Monitoring System

**Project Overview**
- 7 Detectors
- 1 Gateway
- Integration to Honeywell TDC 3000
- Simple HMI for alarm and status display

**Highlights**
- Remote area, open field around the tanks, no radio signal reflections that could “carry the signal around”
  - Several detectors used as routers (3 hops allowed)
- Simple and fast installation (half day)
Offshore Gas Detection with Executive Actions and Integration into Safety System

• Project Overview
  – Replace wired combustible detectors
  – 73 units GasSecure GS01
  – Integrated into Siemens S7 control system
  – Sixteen fire zones

• Highlights
  ▪ 90-95% reduction in installation time
  ▪ 80% cost saving compared to wired
Offshore Gas Detection with Executive Actions and Integration into Safety System

Operations and Execution Highlights:

Operations:
• Flexible system—easy to expand
• Easy to install additional layers of detectors if needed
• Easy to replace catalytic detectors that fail
• Easy to relocate detectors if process requires
• Platform operational staff can easily add detectors

Project execution:
• Less installation, shorter installation period
• Less disturbance of operations
• Less work inside FTC (Field Termination Cabinet)
• Less loop testing with fewer field cables
• No new multicore cables

<table>
<thead>
<tr>
<th>Description</th>
<th>Conventional solution</th>
<th>Wireless solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector, IR line</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Detector, IR point</td>
<td>45</td>
<td>8</td>
</tr>
<tr>
<td>Detector, IR point wireless</td>
<td>0</td>
<td>67</td>
</tr>
<tr>
<td>Wireless router</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Removal catalytic</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Multicore new (16)</td>
<td>515</td>
<td>0</td>
</tr>
<tr>
<td>Multicore new (8)</td>
<td>1205</td>
<td>0</td>
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<tr>
<td>Field cable new</td>
<td>3545</td>
<td>1370</td>
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<tr>
<td>Field cable removal</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>6mm Tubing</td>
<td>360</td>
<td>672</td>
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<tr>
<td>Removal tubing</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Junction box new</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Cable tray 100mm</td>
<td>611</td>
<td>164</td>
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<tr>
<td>Cable tray 300mm</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Cables through MCT</td>
<td>31</td>
<td>2</td>
</tr>
</tbody>
</table>
Major O&G terminals / tank farm monitoring

- **Project Overview**
  - 144 GasSecure GS01 installed in 2014 and 2015.
  - Integrated system for standalone site alarms.
  - Access Points connected on existing Ethernet

- **Highlights**
  - Detectors mounted in hard-to-wire tank bund area
  - Variety of high temperature arid & humid environments
  - Minimised project cost made project viable and enhanced detector coverage.
  - SAT pre-completed in factory before installation.
### Summary User Benefits

<table>
<thead>
<tr>
<th><strong>Performance</strong></th>
<th>Faster sensor response time, stability, harsh weather capability with same or better performance as wired infra red combustible gas detection systems.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation time</strong></td>
<td>90~95% reduction in installation time compared to wired systems. Pre configuration / Pre SAT provides less onsite engineering time.</td>
</tr>
<tr>
<td><strong>Weight and footprint</strong></td>
<td>Reduced cable / trays / junction box weight. No cables or trays. Smaller junction boxes and cabinets.</td>
</tr>
<tr>
<td><strong>Easier engineering</strong></td>
<td>Detector placement is flexible at site Easier to upgrade with more detector points. Option to reuse existing cable runs and installation.</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>No recalibration costs Full diagnostics and 2 year battery life</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td>60~80% reduction in total system costs (<em>ref: Statoil</em>) without compromising safety performance.</td>
</tr>
</tbody>
</table>
Thank you for your attention.