FIRE & GAS SOLUTIONS TO PROTECT PEOPLE, ASSETS AND ENVIRONMENT

Martin Huber
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Agenda

• Challenges in the Process Industry
• International codes and standards
• F&G in an industrial Facility
• Honeywell’s industrial F&G solutions
• Summary
Challenges in the Process Industry

- **Safety**: Preserve Operations. Avoid billions lost per year due to process incidents.
- **Reliability**: Increase Uptime. Maximize your asset availability.
- **Efficiency**: Reduce Cost. Reduce energy & operations costs while improving throughput.
- **Sustainability**: Sustained Performance. Maintain benefits throughout the lifecycle.
- **Flawless Startup**: On Time with Low Risk. Recover capital investment faster.
Process Safety

IEC 61511-1

Safety Layer(s)

Mitigation: e.g. Fire and Gas Safety system

Prevention: e.g. ESD Safety system

Preserve Operations
Avoid billions lost per year due to process incidents

Safety

Mitigation:
- e.g. Fire and Gas Safety system

Prevention:
- e.g. ESD Safety system
Facts Around Industrial F&G

In 2016 & 2017, the total value of the 4 largest losses in the hydrocarbon industry caused by fire exceed $1.7 Billion
- Marsh Report; 23rd Edition

Safety incidents cost the industry worldwide at least $10 Billion per year
- ARC Consortium

Fire and gas systems (F&G) are the second largest process safety application based upon revenue and typically have the most I/O points of all safety applications
- ARC Process Safety Systems
# Safety Challenges

## Why Do We Need A Fire & Gas System
Fire & Gas is a **Mitigation System** (ESD preventive) – Incident already happened (Reduce consequences of a hazardous event after it occurred); Main Objectives to protect Personnel, Environment, and Plant (Assets) Achieved by:

<table>
<thead>
<tr>
<th>Detection</th>
<th>Fire (Smoke, Heat, Flame)</th>
<th>Alert</th>
<th>Alarms</th>
<th>Evacuation</th>
</tr>
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<table>
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<tr>
<th>Mitigate Incident Impacts</th>
<th>Suppression</th>
<th>Shutdown</th>
</tr>
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</table>

## We Do Need A Reliable Fire & Gas System
To be Achieved by:

<table>
<thead>
<tr>
<th>Improve Plant Safety</th>
<th>Full Area Coverage and Early Detection</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Accurate Sensor Placement and Type Selection</td>
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<td>Automated Mitigation Actions</td>
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<table>
<thead>
<tr>
<th>Improve Plant Reliability</th>
<th>Reduce Down Time</th>
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<tbody>
<tr>
<td>No False Alarms</td>
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To be Achieved by:

Following **Codes & Standards** and **Proper Product and Solution** selection....
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### Prescriptive codes & standards

- NFPA 72 and EN 54 codes are Prescriptive Standards, primarily intended for fire protection in non-process areas.
- They cover product requirements as well as installation, location, testing, and maintenance requirements of fire alarm systems.
- Intended for **non-process areas** of industrial facilities.

### Performance based design process

- The fundamental approach is to examine the hazard and risk in order to establish required FGS performance, and then to specify a design that achieves that performance.
- Design and implementation of a FGS can be performed in a manner that is consistent with the underlying principles of IEC61508 / IEC61511 / ISA84.01.
- Intended for **process areas** of industrial facilities.
# International Codes and Standards

Following Codes and Standards is a legal obligation in many countries.

<table>
<thead>
<tr>
<th>Installation → Codes</th>
<th>Product → Standards</th>
</tr>
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<tbody>
<tr>
<td><strong>Codes</strong> are used to ensure the products are selected and used correctly based on installation, locations, design, commissioning &amp; maintenance guidelines.</td>
<td><strong>Product standards</strong> define performance requirements of fire detection products and systems</td>
</tr>
</tbody>
</table>
| **BS 5839**  
(UK code - British Code) | **EN 54 Standards**  
(European Union Standards) |
| **NFPA 72**  
(US code - National Fire Alarm Code) | **UL Standards**  
(Under writers laboratories – US Approvals) |
| **DIN 14675**  
(German code – German Institute for Standardization) | **GOST**  
(Russia Standards) |

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Following Codes and Standards is a legal obligation in many countries.
# International Codes and Standards

## Process Areas

<table>
<thead>
<tr>
<th>Prescriptive Standards like NFPA and BS do not cover Fire &amp; Gas detection in Process Areas</th>
</tr>
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### Safety Systems, Devices & Procedures

- **IEC 61508** – Functional Safety of Electrical/Electronic/Programmable safety-related systems
- **IEC 61511** – Functional Safety - Safety Instrumented Systems for the process industry sector
- **ISA S84.01** – Application of Safety Instrumented Systems for the Process Industries (Adapted the IEC 61511).

### Gas Detection

- **EN 60079-29-1** - Requirements for construction, testing and performance of detectors for flammable gases used in potentially explosive atmospheres
- **EN 60079-29-2** - Selection, installation, use and maintenance of detectors for flammable gases and oxygen

### Flame Detection

- **EN 54-10** - Requirements for construction, testing and performance of flame detectors
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1. Challenges in the Process Industry
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3. F&G in an industrial Facility
4. Honeywell’s industrial F&G solutions
5. Summary
Fire & Gas in an Industrial Facility

F&G components for the process area (1, 2, 3) - Performance based design

Detect
- Gas detectors
- Flame detectors
- Pull stations/Call points

Control
- Safety Manager, HS81
- Suppression & Releasing

Respond
- ESD system
- Visualization
- Annunciation devices
- Expansion foam

F&G components for the non-process area 4 Control room and Admin building – Prescriptive based design

Detect
- Smoke detectors
- Aspiration detectors
- Pull stations/Call points

Control
- XLS Fire Detection System
- Suppression & Releasing

Respond
- Visualization
- Internal/external alarm messaging
- Sprinkler
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Honeywell’s Industrial F&G Solutions
Detection – Gas and Flame

**Needs & requirements**

- Early detection and alarming of a gas leak or fire
- Safe operation for personnel and assets through real time gas monitoring and workers tracking
- Compliance to legal and company rules & regulations along with Codes (ATEX, like EN60079-29-1)

### HPS Solution

<table>
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<tr>
<th>Fixed Gas Detection</th>
<th>Fixed Flame Detection</th>
<th>Portable Gas Detection</th>
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</table>
| Universal platform for flammable & toxic gas sensors reduces installation and commissioning time  
  • HART functionality & SIL2 certified | Sensors that cover Hydrocarbon & various Non-Hydrocarbon fires with high immunity to nuisance alarms due to 3IR technology | Scalable wireless gas detection solutions - from small to enterprise wide (+2000 devices)  
  • Real-time monitoring - displaying and archiving of critical safety data, including gas concentrations and location information |
Honeywell’s Industrial F&G Solutions
Detection - Fire

Needs & requirements
• Early fire detection and alarming
• Safe operations for personnel and assets
• Compliance with fire codes & standards (NFPA72, EN54)

HPS Solution

Addressable Fire Detection Offering
• Up to 318 devices can be connected to a single loop (max. Loop length: 3810 m)
• Seamless integration with Experion PKS

High Sensitivity Smoke Detection Offering
• Cost effective - covers up to 28,000ft²
• Fast response time
• Seamlessly integrate with XLS fire alarm panel range
Honeywell´s Industrial F&G Solutions
Fire & Gas Controller

Needs & requirements

• Continuous F&G monitoring independently from the operating status of the plant ESD system
• Automatic activation of notification and fire extinguishing
• Safe operation for personnel and assets
• Compliance to fire (e.g. EN54) and functional safety standards & regulations (IEC61508, 61511)

HPS Solution

Safety Manager / Safety Manager SC

• SIL3 Safety system solutions for both centralized and decentralized system designs
• Universal IO technology drives flexibility and reduces engineering and maintenance costs
• Seamless integration with Experion PKS

HS81

• Hybrid F&G controller: One controller can handle:
  • Conventional SIL2/3 IOs
  • SIL2 & Non-SIL addressable smoke & heat detection and suppression/releasing function
Honeywell´s Industrial F&G Solutions
HS81 - Overview

- **Hybrid system** - One controller can handle: Conventional SIL2/3 IOs, SIL2 & Non-SIL addressable smoke & heat detection and suppression/releasing function

- **Centralized and decentralized system architectures** – Full-sized or compact central controllers

- **Redundancy (CPU, PS & Conventional IOs)** - Hardware on standby, with active-active redundant pairs that switch instantaneously, maintaining seamless operation.

- **Hot swappable** - Redundant CPU, PS's and IO cards that can be replaced while the system remains fully operational

- **3-in-1 system** - Smoke, flame/gas, & suppression / releasing in one controller; for ease of operations and standardized maintenance

- **Global approvals** – E.g. SIL2/3, EN, UL, ABS, GOST
Honeywell’s Industrial F&G Solutions

HS81 - Network capabilities
Honeywell´s Industrial F&G Solutions

HS81 Integration
Honeywell´s Industrial F&G Solutions
Digital Video Manager (DVM)

Needs & requirements

• Increased operators efficiency & situational awareness
  - Improved response time through better coordination
  - Automated tasks reduce operator work and present required information on alarm
  - Quick access to alarm videos from Experion PKS
  - Faster forensic with synchronized playback

HPS Solution

Local Area Network

- EBI or Experion Stations
- EIS or Experion Server
- Fire & Gas System

Video Network

- DVM Clients
- DVM Database and Camera Server
- Camera Streamers
- Analog Cameras
- Digital Cameras
- Fixed or Pan, Tilt, Zoom Cameras Supported

Video Network
Honeywell´s Industrial F&G Solutions
Public Address Voice Alarm (PAVA)

Needs & requirements
• Inform people that an incident happened
• Evacuate people safely and in the shortest possible time during emergency situations
• Compliance to legal and corporate rules, regulations and fire codes (EN54-16, UL60950)

HPS Solution
• Scalable, centralized or de-centralized system with redundant configuration possibilities
• Seamless integration with Experion PKS
Honeywell’s Industrial F&G Solutions

The Honeywell Difference

Honeywell’s Holistic approach
Integrated solution, single view

- Single solution view
- Common design philosophy
- Integrated “out of the box”
- Less expensive to implement and manage

Non-Integrated Approach
Each supplier has a different view

- Multiple solution providers
- Only focus on subsystem
- Plant staff become the integrators
- More expensive to implement and manage
**Honeywell´s Industrial F&G Solutions**

**The Honeywell Difference**

<table>
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<tr>
<th>Human Interface</th>
<th>Field Equipment</th>
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<tr>
<td>• Experion Orion</td>
<td>• Gas &amp; Flame Detectors</td>
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<td>• Command and Controls suite</td>
<td>• Addressable Fire Sensors &amp; Devices</td>
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<td>• Digital video manager</td>
<td>• Notification Devices</td>
</tr>
<tr>
<td>• Other advance applications like Alarm manager, PHD, eServer, Experion collaboration station</td>
<td>• HSSD point type or Aspirating early fire detection</td>
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<tr>
<td>• First responder interface</td>
<td>• Process monitoring video systems</td>
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<td>• Suppression Control Systems</td>
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<th>Logic Solver &amp; Networking Technologies</th>
<th>Services</th>
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<td>• Up to SIL3 Safety System Solutions</td>
<td>• Safety consulting services including Safety audits, Hazop and SIL verification &amp; validation</td>
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<td>• Fire alarm panels</td>
<td>• Fire &amp; Gas Consultancy Services</td>
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<tr>
<td>• Public address/voice alarm systems</td>
<td>• Project services including Design, Engineering &amp; Commissioning</td>
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<tr>
<td>• Fire Networks, Bus &amp; Ring Topologies</td>
<td>• Lifecycle support services &amp; training</td>
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<tr>
<td>• Wireless infrastructure</td>
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<td>Agenda Item</td>
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<td>Honeywell’s industrial F&amp;G solutions</td>
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**Summary**
Summary

Honeywell’s Industrial F&G Solutions Provide…

<table>
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<th>System Integration</th>
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<tr>
<td>• Full integration between Process and Non-Process areas – Full Visibility</td>
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<tr>
<td>• Full integration of the Automation platform (DCS, ESD &amp; FGS)</td>
</tr>
<tr>
<td>• Full integrated Gas &amp; Flame detection</td>
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<tr>
<td>• Full integrated Fire Alarm System (Fire Network) - Honeywell Fire Alarm system is an integrated part of the complete Automation platform (DCS and Safety system, etc.)</td>
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<tr>
<td>• Allow all data and information to be available to the entire system</td>
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Summary
Honeywell’s Industrial F&G Solutions Improve…

<table>
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<tr>
<th>Safety</th>
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<tr>
<td>• Compliance with Safety and F&amp;G codes, standards and local regulations</td>
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<td>• Long-time experience in executing large Safety &amp; F&amp;G projects</td>
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<tr>
<td>• Identifying and selecting the optimal number and types of Gas &amp; Flame detectors through our new F&amp;G consultancy services</td>
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<th>Efficiency &amp; Productivity</th>
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<td>• Detection and alarming of a potential incident at the earliest to avoid financial losses</td>
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<tr>
<td>• Easier Coordination During All Phases of a project as well as reduced engineering, testing, installation and maintenance costs with Honeywell’s One Stop Shop capability in F&amp;G – One Partner to talk to</td>
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<tr>
<td>• Reduce compatibility and integrations risks due to network design and selection of network components.</td>
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Honeywell is building a smarter, safer, and more sustainable world

THAT’S THE POWER OF CONNECTED
THAT’S THE POWER OF HONEYWELL

Connected Aircraft · Connected Automobile · Connected Home · Connected Building
Connected Plant · Connected Supply Chain · Connected Worker