

Eliminating False Alarms in Toxic Gas Detection



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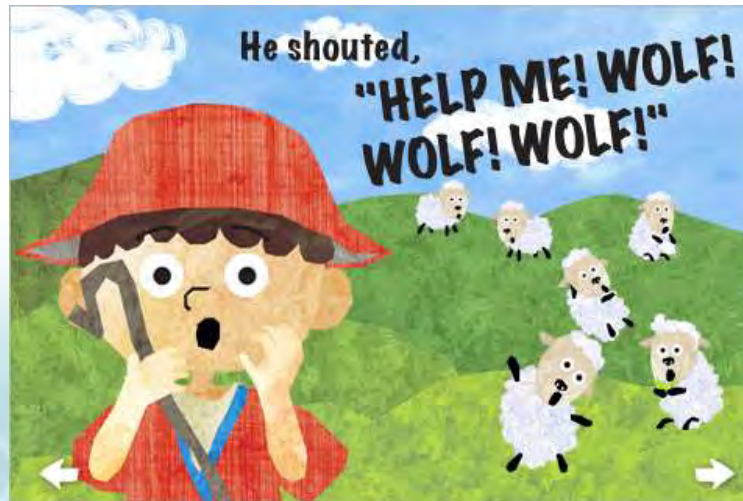
What Defines a False Alarm?

Wikipedia:

“the deceptive or erroneous report of an emergency, causing unnecessary panic and/or bringing resources (such as emergency services) to a place where they are not needed”

• **What does that really mean for toxic gas detectors?**

- An instrument alerts site personnel that a specific dangerous gas is measured, but that gas is not actually present.



Potential Effects of False Alarms

- **Production Losses, Interruption, Rework, etc.**
 - Financial Impact
- **Alarm Fatigue**
 - Occurs when someone is exposed to frequent alarms and becomes desensitized to them.
 - This is greatly accelerated & magnified by false alarms.
- **Dangerous to Behavioral Safety**
 - Lack of Urgency & Attention



What Causes False Alarms in Your System?

- **Conventional Detector - Electrochemical Sensor**

- Point Detector
- 30+ Year Old Technology
- Reacts with gas to produce an electrical signal
 - Cross-Sensitivities caused by chemical reaction
- Response Time: $T_{90} = 30$ to 90+ seconds
- Sensor Life: 6-24 months
- Frequent Calibration
- Temperature Sensitive

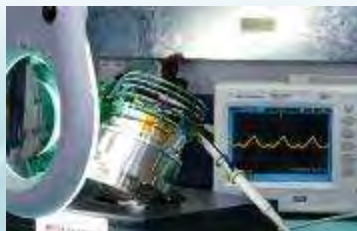


What's Another Detection Method?



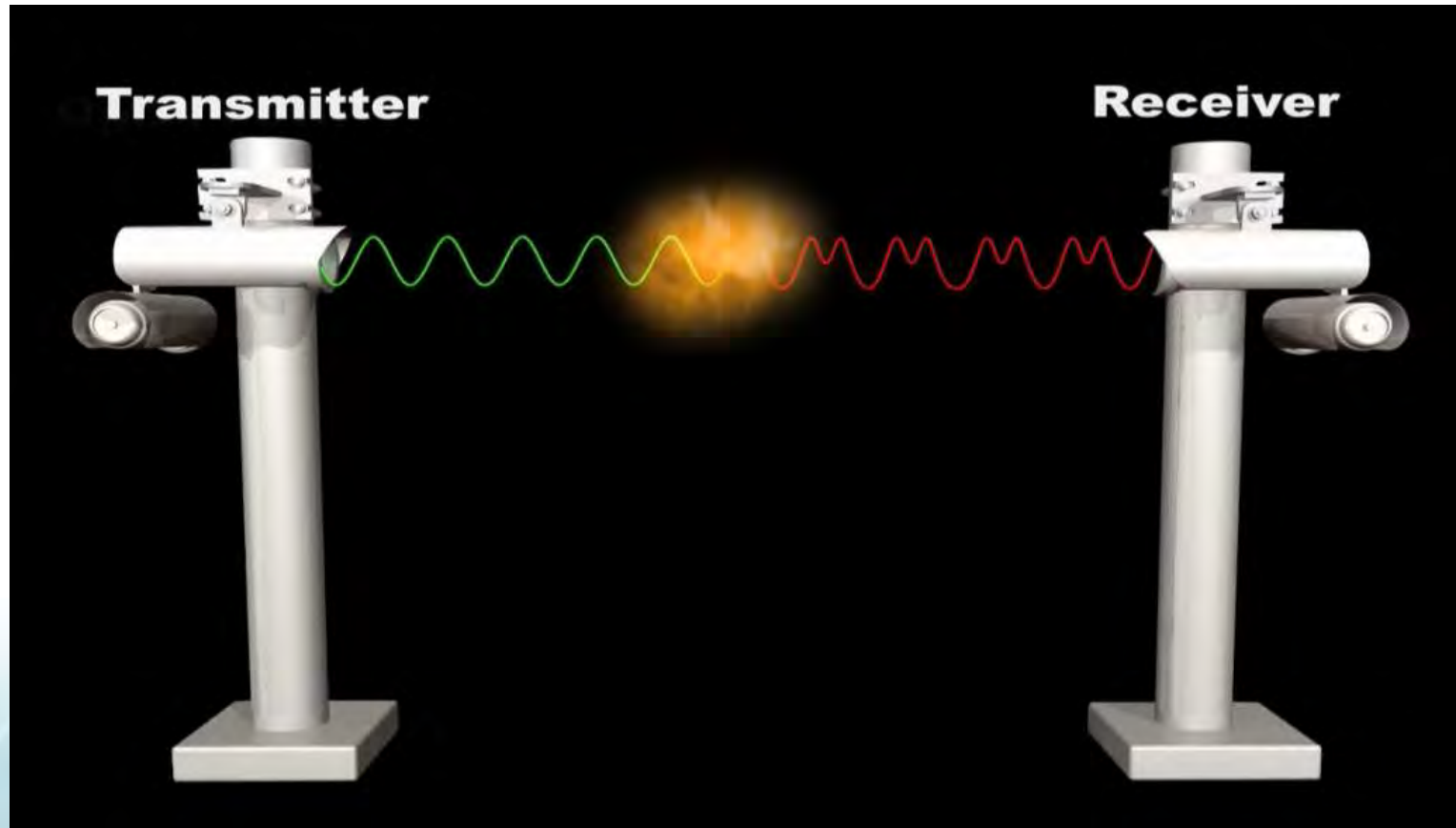


ELDS™ – 21st Century Gas Detection

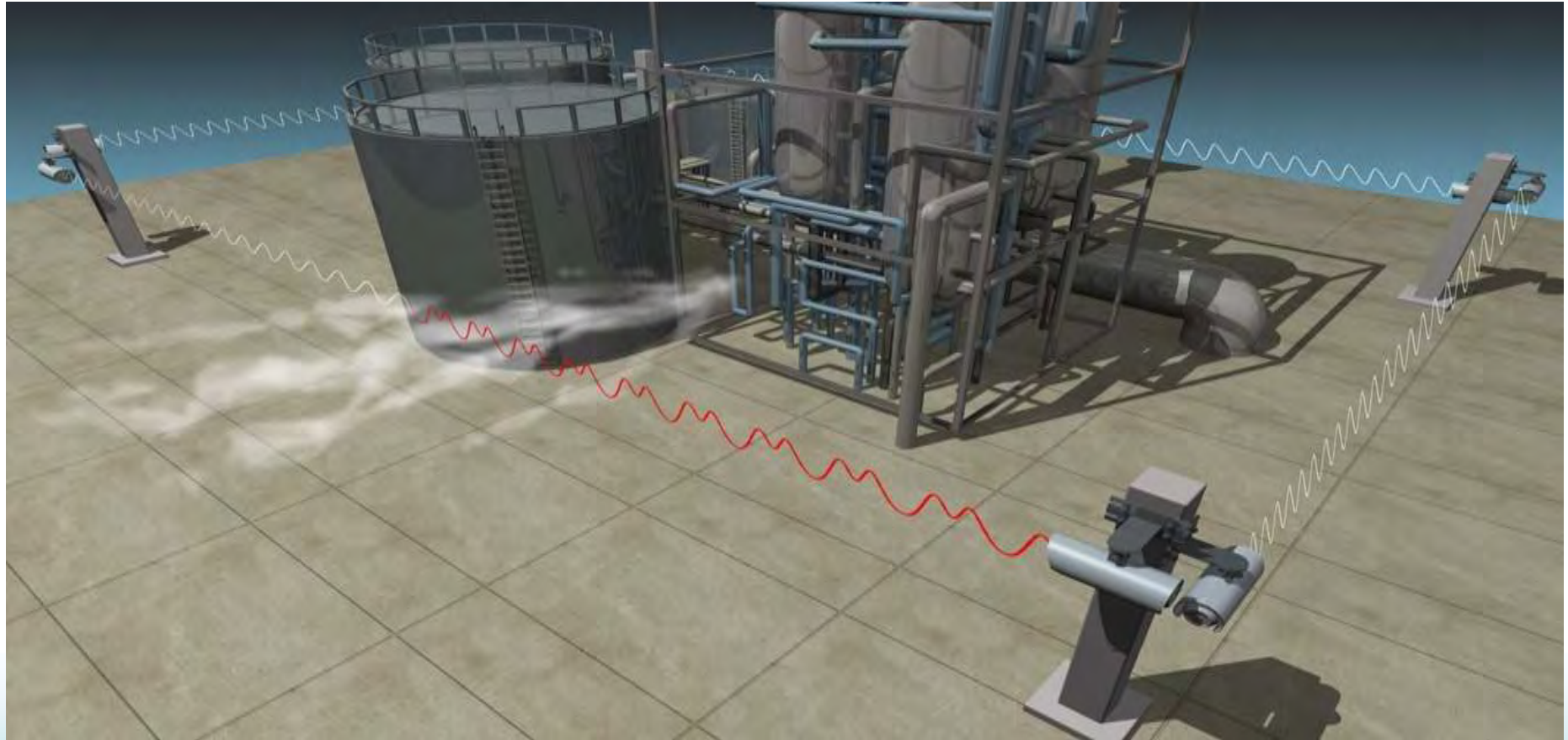


What is ELDS™?

- Enhanced Laser Diode Spectroscopy

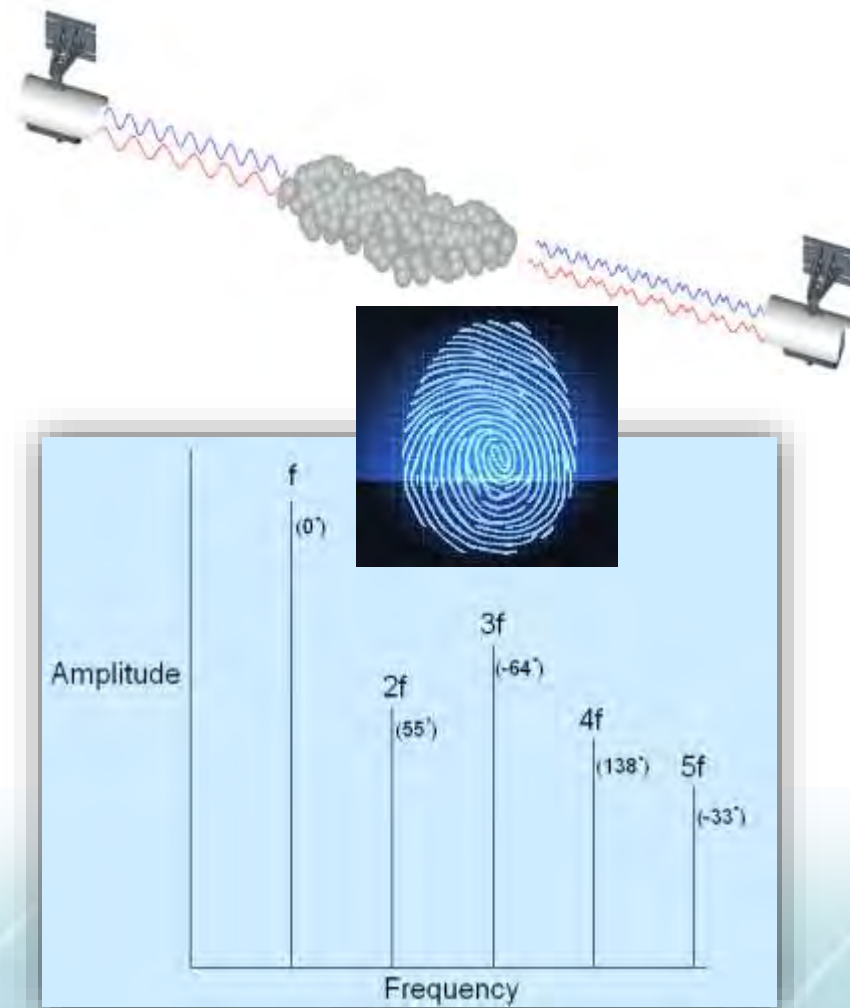


How does ELDS™ work?



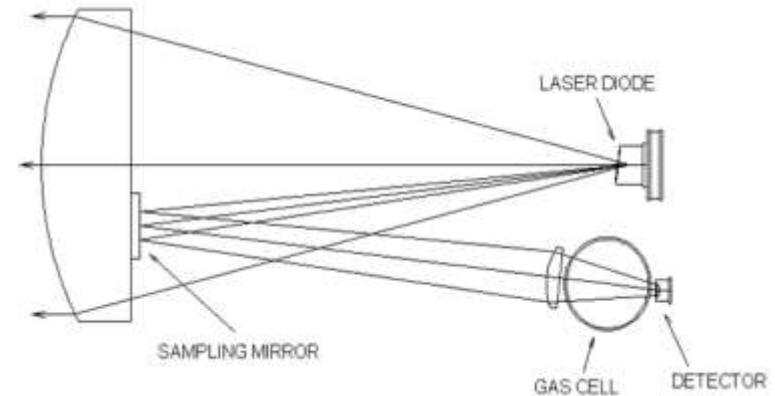
How does ELDS™ work?

- Laser light at gas specific wavelength(s) is generated and transmitted along an open path to a receiver
- Target gas absorbs the narrowband laser radiation, which absorption generates a 'Harmonic Fingerprint'
- The Harmonic Fingerprint is target gas specific, and its size is proportional to the total quantity of gas in the beam path



Laser Gas Detectors – Target Gas Reference Cells

- The gas reference cell is continuously used to check and maintain Harmonic Fingerprint lock (continuous calibration)
- Target gas reference cells are hermetically sealed for life and extremely reliable
- The target gas in a reference cell can provide the basis for detector verification testing



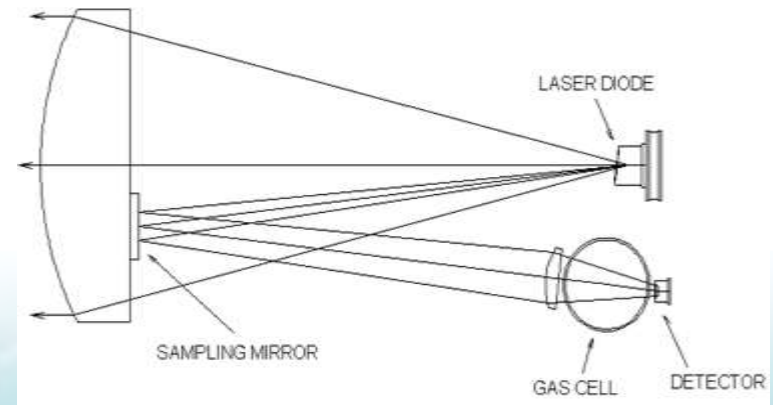
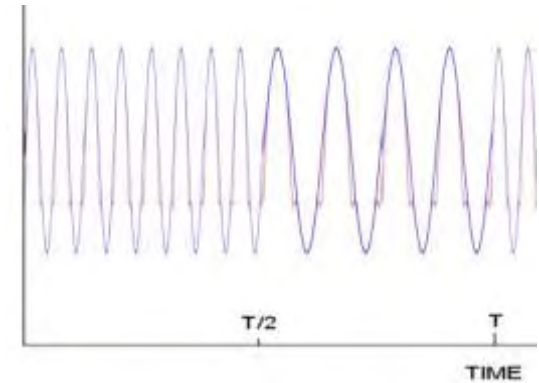
ELDS TX Optics with Gas Reference Cell



ELDS Target Gas Reference Cells

SimuGas Auto - Daily Gas Test

- Automatically, each day, ELDS TX unit simulates a predefined quantity of target gas (SimuGas) using retained gas sample
- Test duration 45-50 seconds
- On demand testing capability
 - *SimuGas Live*
- Eliminates Manual “Bump Testing”



ELDS TX Optics with Gas Reference Cell

Differences between ELDS™ & conventional detectors

- **Open Path Detection of Toxic Gases**

- Brings the proven benefits of open path configuration to toxic gas detection applications

- **Response Time**

- T90 less than 3-5 seconds
- Earlier warning for preventive or remedial actions



- **Gas Species Specific (Harmonic Fingerprint)**

- No false alarms from other gases
- No false alarms from rain, fog or snow
- No false alarms from oil mist or plastic bags



Differences between ELDS™ & conventional detectors

- **Automated, Daily Testing (*SimuGas*)**

- Improved Safety integrity level, No hidden failures
- Reduced Operating Costs: no cal/test gas, no sensor replacement, no manual calibration
- No need for optical filters

- **Bluetooth connectivity***



- Cost savings: no need for scaffolding / ladders
- Cost savings: no need for hot work permit or make physical connections



ELDS™ Available Gases & Ranges:



Gas/es	Detection ranges	Path length (metres)				T90 =/ < (sec)
		5-40	5-60	40-120	120-200	
CH ₄	0-1000 ppm.m, 0-1, 0-5 LEL.m	✓		✓	✓	3
→ CH ₄ & H ₂ S	0-1 LELm 0-250,500,15000ppm.m		✓			3 5
MHC	0-5 LEL.m		✓			5
→ MHC + H ₂ S	0-5 LEL.m + 0-500ppm.m		✓			5
Ethylene	0-1 LELm	✓		✓	✓	3
CO ₂	0-300,000 ppm.m	✓		✓		3
H ₂ S	0-250, 1000, 1500, 5000, 15000 ppm.m		✓			5
HCl	0-50 ppm.m		✓			3
HF	0-25, 50, 200, 1000ppm.m		✓	✓		3
NH ₃	0-1000ppm.m	✓		✓		3

ELDS™ Environmental specs

- **Ingress protection**
 - IP66/67 NEMA 4X/6
- **Operating temperature range**
 - -55 to +60°C *c/w Sunshade / deluge cover fitted as standard*
- **Humidity range**
 - 0-100% RH (non-condensing)
- **Heated optical surfaces**
 - Reduces moisture & dirt build-up
- **Vibration resilience**
 - 10~150Hz, 2g



Hazardous Area Approvals

- International: IECEx
- Europe: ATEX
- North America: UL
 - C1D1 B,C,D
- Canada: CSA
- Kazakhstan: GOST K
- Russia: GOST R
- South America: InMetro



ELDS™ Output & Interface

- **4-20mA Output**

- Isolated, Sink, or Source options
- HART
- Configurable sub 4mA:
 - low signal 3.0mA (0-4mA)
 - Beam block 2.5mA (0-3.5mA)
 - Inhibit 2.0mA (1-4mA)
 - Fault 0.5mA (0-4mA)

- **Serial Output**

- RS485 (isolated)
- Modbus

- **Bluetooth Interface**

- Commissioning
- Event Log Retrieval
- Fault Diagnostics



Who's Benefiting from ELDS™ Technology?





Ethanol (NH_3), USA



Refinery (CO_2 test), Canada



Gas sweetening (H_2S), NL



Oil Well (H_2S), Iraq

Summary of ELDS Benefits:

Increased Safety

- 5x-20x Faster Response – Toxics
- 2x Faster Response – Hydrocarbon
- High Reliability (SIL2)
- Always in Calibration
- Trust of Personnel
 - No False Alarms or Cross-Sensitivity
 - Robust to Environmental Conditions (fog/rain/steam/etc.)

Lowering Costs

- Replaces multiple point detectors
- Automatic self-test – SimuGas
 - No calibration gas/technician expenses
- No 6-12 month sensor replacement
- Can detect multiple gases (HC/H₂S)
- Cheaper to install and maintain



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