

GE Radio Frequency Sensing (RFS) Technology Overview

Class I – November 2010



imagination at work

What is it

GE RF Sensing technology is a battery-free, wireless technology which can measure volatile organic compounds (VOCs), temperature, solution conductivity, and pressure to meet the needs of a variety of industry applications



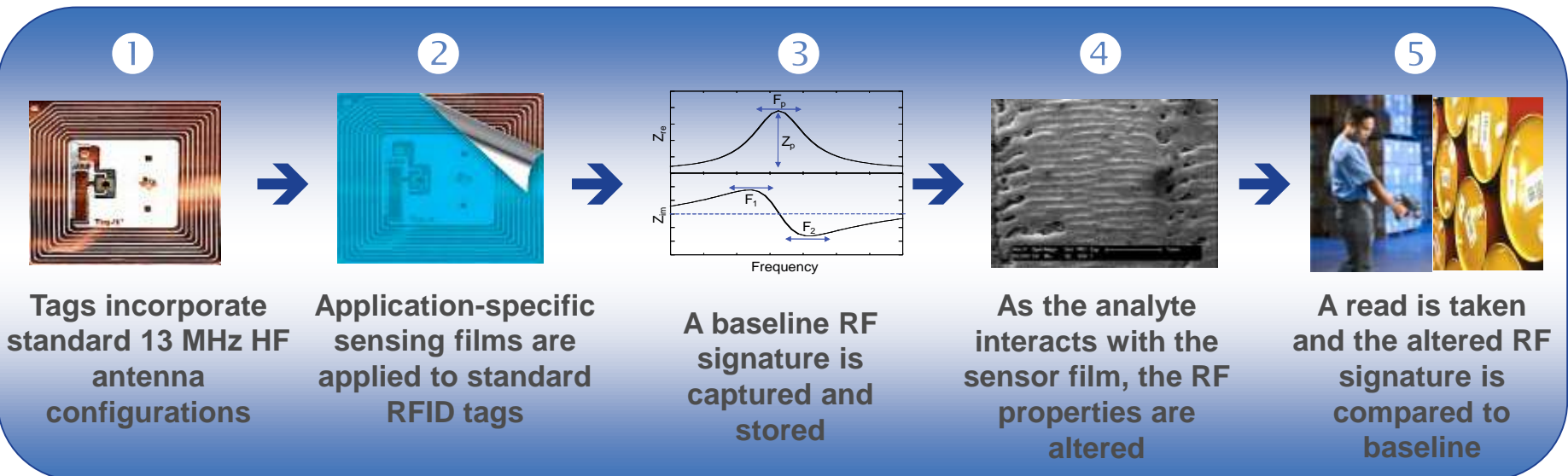
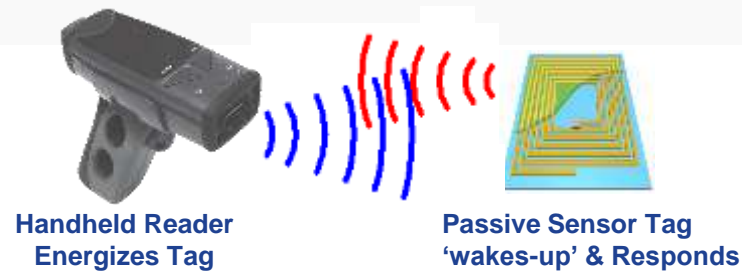
Example: Cold Chain Management

Is the milk in this carton *fresh?*
With traditional RFID, inventory is tracked but not monitored.

The attached sensor measures conductivity of the contents through the product packaging to determine freshness.

How it works

GE RF Sensing utilizes the complex waveform of an existing high-frequency (HF) RFID technology as a signal transport. The reader interrogates the sensor tags, interprets the waveform, and determines measurement value.



Industry applications and capabilities

- Pharmaceutical
- Manufacturing
- Industrial Process Monitoring
- Cold Chain Management
- Warehousing
- Agriculture
- Oil & Gas

Measurement Class	Chemical Class	Molecule Example	Limit of Detection (ppm)*
Volatile Organic Compounds	Aromatics	Toluene	50
	Alcohols	Ethanol	20
	Ketones / Aldehyde	Formaldehyde	400
Toxic Industrial Chemicals	Inorganic	Ammonia	<1
Humidity	Inorganic	Water	50
* At signal-to-noise = 10			
Measurement Class	Measurement Range		Detection Sensitivity
Temperature	-20 ° to 100 ° C		± 1° C
Pressure	-5 to 35 psi		± 0.25 psi
Conductivity	0 to 230 mS/cm		± 0.5 mS/cm

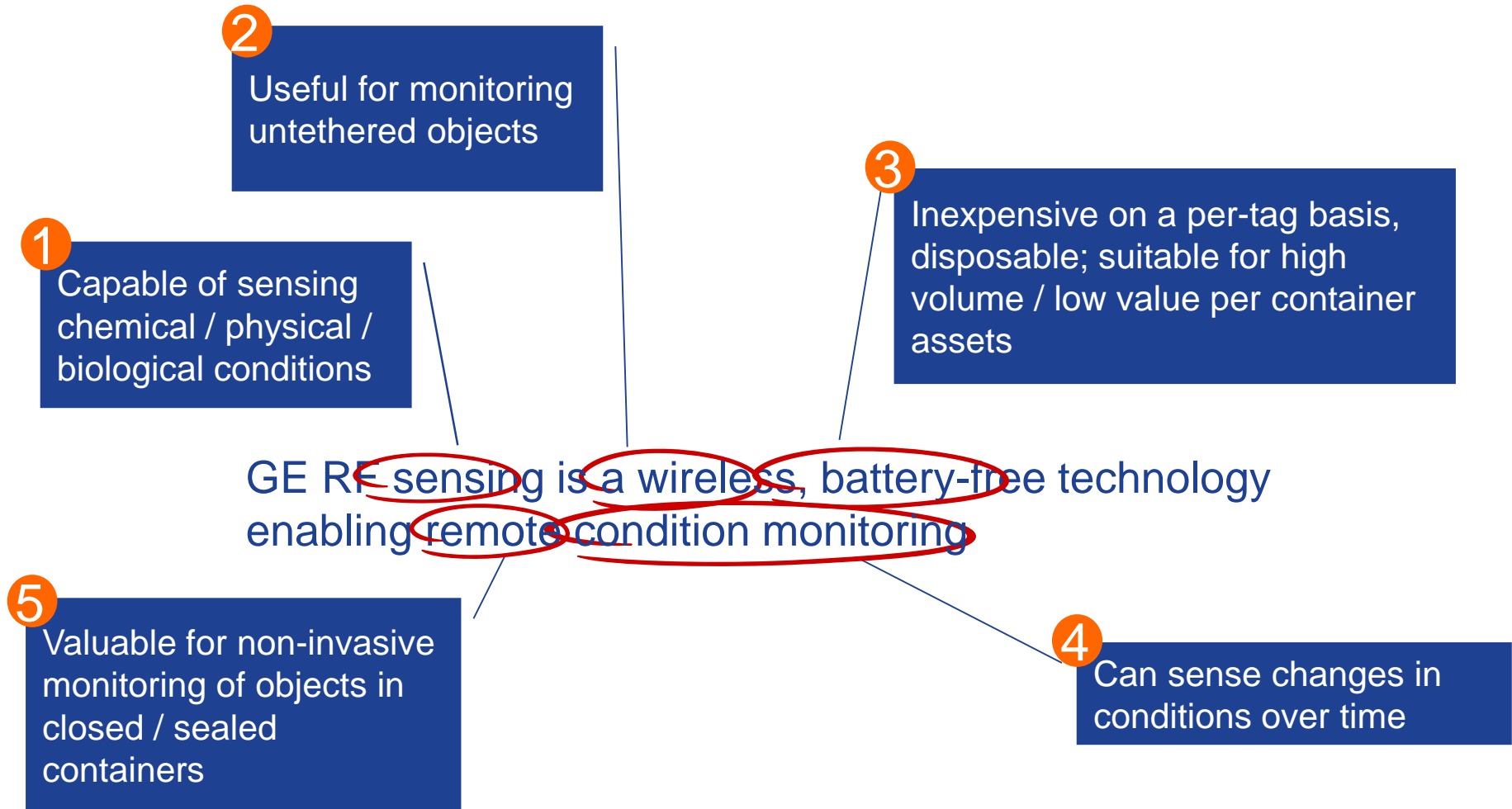
Why is it important

Utilizes existing building blocks to enable new sensing markets

- Combines RFID HF data capability with analog sensor measurement capability
- Rejects interfering noise
- Enables read-through and in-motion sensing
- Intelligence in reader, rather than tag

	Feature	Potential Benefit
☑	Wireless	Read-through and In-motion sensing
☑	Battery- free	Lower cost. Tags can be read indefinitely
☑	Miniature	Integrated with product packaging
☑	Rugged	Durability in harsh environments
☑	Industry Standard	Low cost, readily available RFID technology
☑	Sensitivity	Performance \gg existing sensor capabilities
☑	Selectivity	High rejection of environmental interferences – i.e. water vapor

Value Proposition Construction

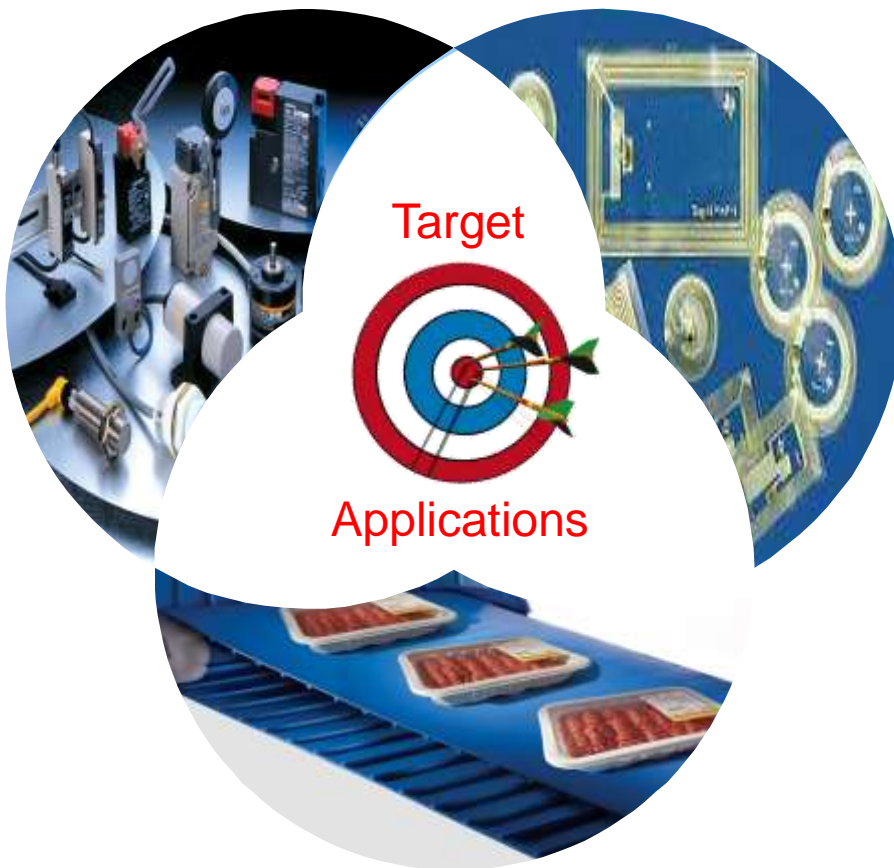


Alternate tech offer different combinations of features...
... GE's most valuable in applications with all these needs

Target Application Space...

Intersection of enabling technologies and application needs

**Sensing
Technologies**



**RFID
Asset Tracking
Technology**

**Need Motion or
Read-Thru Capability**

GE RF Sensing Technology

