November 18, 2021

Taking Passive RFID to new levels with the addition of Temperature, Liquid Fill Level & Moisture Monitoring.

Omni-ID
part of HID

A X Z O N

Today's Presenters

David Owen – Marketing Manager, Omni-ID
Matt Behroozi – Product Manager, Omni-ID

Introducing Omni-ID

- True pioneer of RFID technology – created the foundational IP for on-metal UHF RFID Tags

- We are an agile technology company where the customer interests are always at the heart of everything we do

- We have a global presence with a strong reputation for quality and service

- We are known for best-in-class problem solving, product development and manufacturing excellence

- Our ambition is to simply be the most trusted supplier of RFID and IoT data capture hardware devices on which organizations can rely to build automated workflows

Company Firsts

- Developed the first
  - Small form factor on-metal tag (the 'Prox')
  - Global response on-metal tag (Dura 1500)
  - Long range passive UHF RFID tag (Ultra)
  - On-metal printable labels (Custom)
  - Hybrid rugged active/passive UHF device (Power 400)

- Now - Developing growing range of 'Sense' active IoT devices and middleware
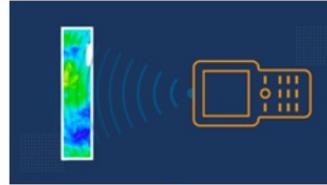
Original patent holder of on-metal RFID and visual tagging technology

Leading global market share for industrial asset tagging

Winners of numerous awards - an acclaimed industry innovator

Omni-ID at a glance

Unique Value Proposition

- Intelligent Tagging, Tracking, and Monitoring Hardware Solutions
- Custom Engineered, Application-Specific Solutions and Comprehensive Featured Product Range
- Agile Manufacturing and Fast Turn-Around

Broad Product Portfolio

- **Passive UHF RFID**
- **Active Technologies**
- **Custom Engineering & Design**

High-Value Applications / End Markets

Logistics	Manufacturing	Warehouse
Oil & Gas	Transportation	Power Distribution
Healthcare	IT Data Centers	Defense

Engineering Excellence Delivering Strategic Advantage to Market-Leaders

TOPGOLF

Automated Entertainment

Container Centralen

Container Authentication and Tracking in the Horticultural Industry

ocado

Smart Picking in the Logistics Industry

Omni-ID is now part of HID Global within ASSA ABLOY

ASSA ABLOY

- The global leader in access solutions
- Operates in 70+ countries
- >49,000 employees
- >$10 bn revenue

HID

- Top recognized brand for access control worldwide
- Headquarters in Austin, Texas
- >4,500 employees globally
- Billions of RFID products sold

- Identification Technologies (IDT) is a Business Area within HID Global
- Design & manufacturing of Smart Components
- Enabling identification solutions through services

Broad Range of Sophisticated IIoT Hardware

Passive Devices
Featured and Custom Design Products

NFC

RAIN RFID

−80C + 225C · UV Resistant · IP XX · Ex · MIL STD 810-G

• On Metal • Flexible Application • Rugged • Custom • Specialty •

Active Devices
SenseIoT Products

WIREPAS · Bluetooth · Quuppa · LoRaWAN

−20C +60C · UV Resistant · IP XX · Ex · MIL STD 810-G
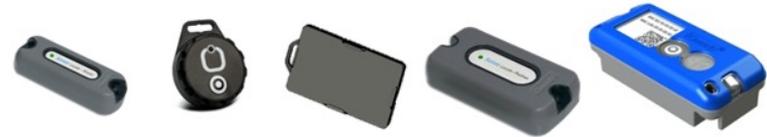
· Extends the Company's product portfolio and application areas
· Further reinforces Omni-ID's leading position as a leading IIoT hardware solutions provider

Communication distance

Temperature · Humidity · Water · Tamper · Movement · Light · GPS · Gas · Chemical

Sensor Options

Temperature and Moisture Monitoring via the Magic of Magnus®

- Powered by Axzon's Magnus® ICs
- Industry-standard RFID Gen 2v2 Protocol
- Single-chip, low cost, 'peel and stick' sensors
- Sensor outputs "Sensor Code" based on a change in impedance due to the presence of moisture

Accurate temperature monitoring
Normal Range (-40 to + 80°C): ±1°C
Extended Range (-80 to + 125°C): ±3°C

Monitors fill or dilution level within a vial or bottle

Sensitive monitoring of moisture within a given area or substrate

Huge range of use cases from time saving to life saving

Temperature monitoring of vaccine vials throughout cold chain transport and storage

Monitoring of fill levels of therapeutics within vials or bottles

Alerting of the presence of moisture during production process

Livestock temperature monitoring

Moisture monitoring in roof structures

Temperature and moisture monitoring in data centres

Monitoring for moisture 'incidents' within smart diapers (adult & infant)

Monitoring of temperature of humans within a work environment

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GLOBAL FREQUENCY AS WELL AS US AND EU

Axzon is the World leader in passive sensing and 'Peel & Stick' logger technology

Magnus® IC Range

- World's first Passive Sensors, harvests energy, enables twin digital data, requires no battery
- Integrates multiple sensors, auto tunning, wireless transceiver, memory and encryption

Logger IC – Coming in 2022

- World's first, highly configurable, disposable, item level Peel& Stick logger, visual status indicator, anti tamper, designed to work without the need of any RF infrastructure
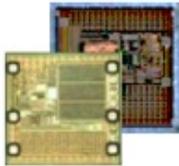

Passive Intelligent End Point single IC, includes

- Sensors sensing includes temperature, moisture, Auto Tunes to ensure consistent performance across any material and region of operation, memory, wireless transceiver, and visual status display indicator
- In volume production since 2013
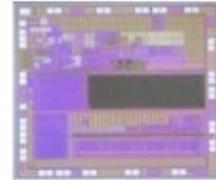
Active Intelligent End Point single IC, includes

- On chip temperature sensor, tamper detection, ambient light detector, encryption/authentication blockchain engine, Auto Tune engine and integrated real time clock
- In volume production Q3 2022

Use Cases – Condition Monitoring

Motors & Bearings Monitoring
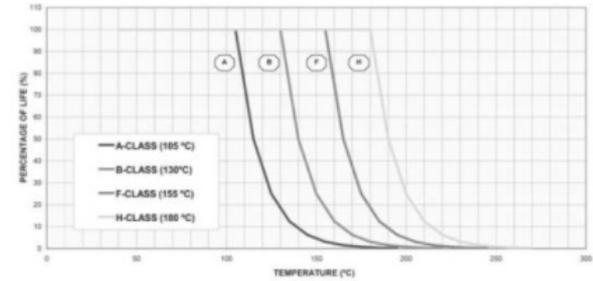
Aging Factor of Motor Insulation due to high temperatures

Insulation	27 %
Bearings	35 %
Mechanical/Other	38 %

62% of motor failures are heat related

Source: EPRI Study

Use Cases – Condition Monitoring

Sensor Locations

Motor Housing

Bearing Housing

Conveyor Belts

Pumps & Pipes

Use Cases – Condition Monitoring

Case Study

Client Profile
- Multi-national courier delivery services company

Products Installed
- AZN3250 – Rugged passive temperature sensor
- AZN5114 – Handheld RFID reader with Axzon Predictive Maintenance software

Scope of Work
- Monitor temperature of motors and bearings
- Motors and bearings are under a conveyor belt inside a protective metal cage
- Collect temperature trend along with timestamp.

Benefit
- Temperature trend alerts maintenance if bearing or motor temperature exceeds normal conditions.
- Minimized downtime reduces cost of ownership and improves efficiency.
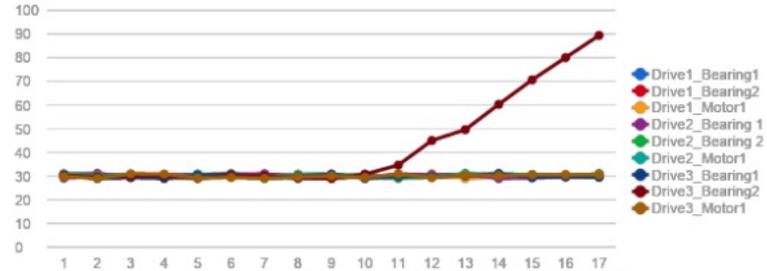
Use Cases – Switchgear

Switchgear – System Overview

Axzon Sensors
- -40 to 85 ℃ sensing range
- Unique identifier tied to equipment
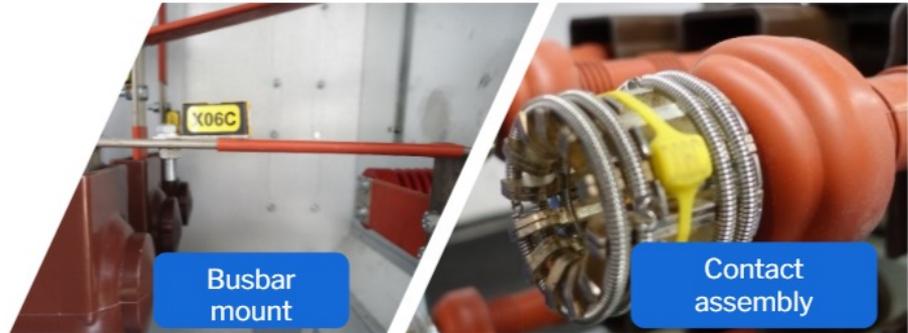- Battery-free operation

Partner Switchgear Reader
- Continuous monitoring
- Standard MODBUS/RS485 output
- Monitor up to 12 sensors per cabinet

Local Display
- Direct connection to Switchgear reader
- Display local alarms and status to operators
- Integrated with switchgear cabinet

Panel-mount display w/alarms

RMU and Cable Heads

Busbar mount

Contact assembly

Use Cases – Switchgear

Case Study

Monitoring

- Continuous monitoring of busbar joints and cable heads
- Collect temperature trend along with timestamp.
- Send local alarm when temperature exceeds threshold
- Monitor busway connections (AZN3240 long range sensor)

Products Installed

AZN3254 – Rugged passive temperature sensor

Partner – Fixed RFID reader with RS485/MODBUS interface

System Benefits

- Continuous, automated monitoring
- Battery-free sensors require zero maintenance interval
- Higher reliability than leading competitor
- Arc flash injury and damage prevention
- Resistant to false alarms

- System automatically alerted staff that the temperature of a tulip connector was rapidly rising.
- Emergency shutdown occurred before any catastrophic failures occurred.
- This system had just completed its inspection and was not due for another check for 6 months.
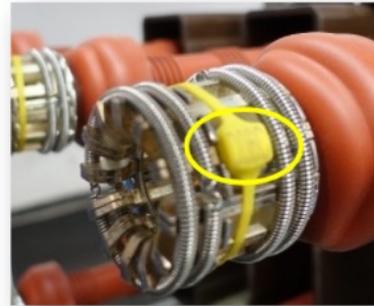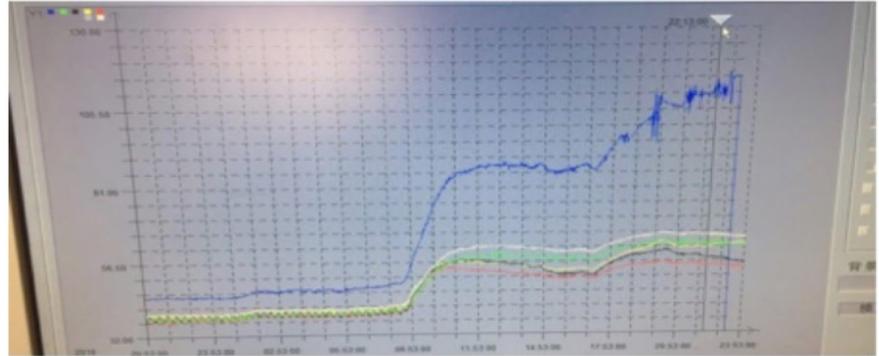
Use Cases – Medical
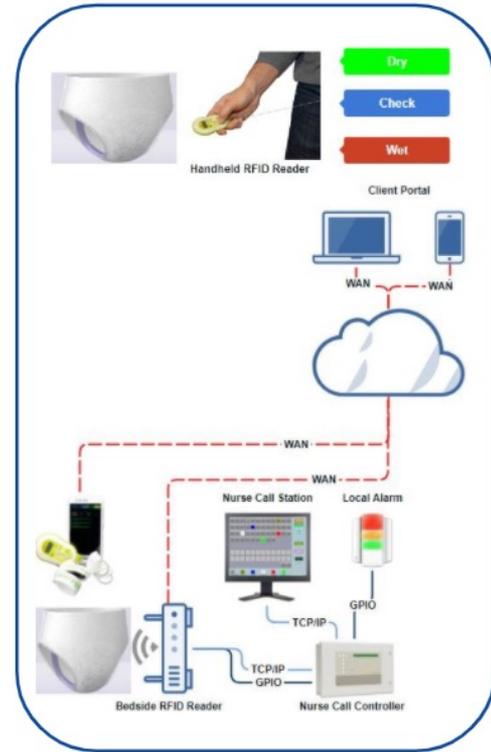
Incontinence Detection

Handheld Deployment
- Portable reader enables diaper check at any location
- Minimizes patient impact during check time
- Requires staff to operate reader

Bedside Fixed Reader Deployment
- Continuous monitoring anywhere there is RF coverage
- Automated alerting to nurse call system with response history
- Trend analysis for dehydration, UTI, quality of life monitoring
- Requires reader infrastructure at bed and gathering areas

Consumer Deployment
- Portable "fixed" reader with WiFi/BLE for iOS/Android connection
- Reader hung on crib, placed in diaper bag, next to car seat, etc.
- Extremely price sensitive market
- Requires very low-cost, easy to use reader

Use Cases – Medical

Cold Chain Medicine Monitoring and Logging

Use Cases – Medical

Videos

Explainer Video- https://vimeo.com/534810863/8dcefe886b

Demonstration Video – https://vimeo.com/518990291/1015f60409
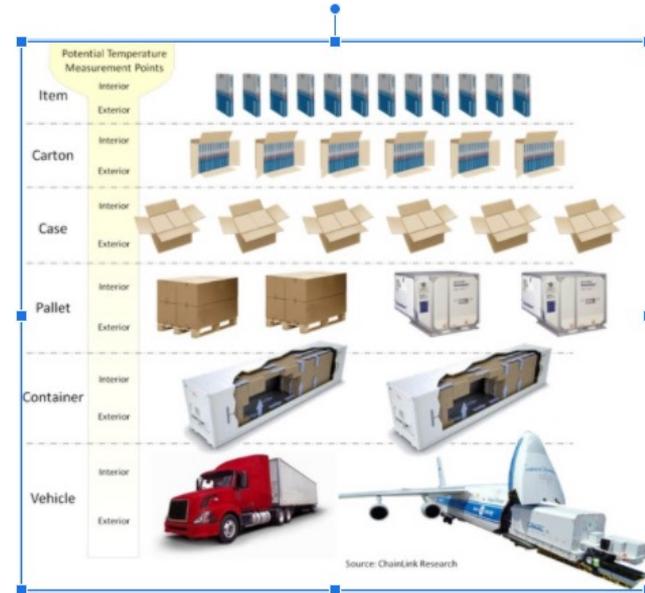
Use Cases – Cold Chain Logistics

Tracking Hierarchy

Axzon Passive Sensor
- Battery-free
- Peel and stick or integrated with product labeling
- Stays with item throughout shipment
- Inventory tracking
- Check temperature without opening package

Legacy Data Logger
- Limited battery life
- High unit cost
- No inventory tracking
- May require opening box for temp data

ChainLink Research diagram showing Potential Temperature Measurement Points (Interior/Exterior) across hierarchy: Item, Carton, Case, Pallet, Container, Vehicle. Source: ChainLink Research
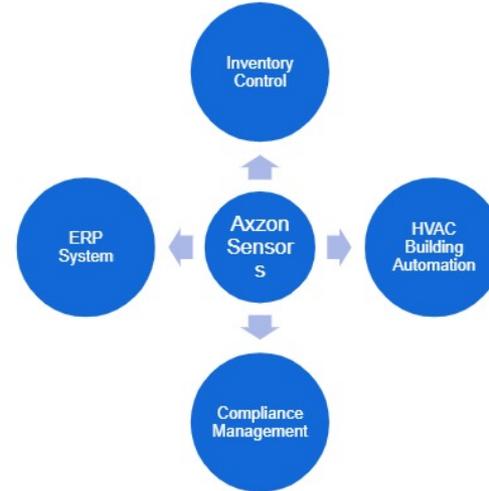
ITEM-LEVEL TEMPERATURE VISIBILITY

Use Cases – Cold Chain Logistics

Food Products

- Integrated into carton or label
- Automated inventory tracking
- Item vs. environment temperature
- Freshness indication
- Stock rotation optimization
- Sub-pallet temperature measurement
- Refrigeration optimization

Use Cases – Automotive

Quality Control Leak Detection

Leaks are an unfortunate reality

Best efforts leave 3% undetected
Cost to repair: $5,700
90 Million vehicles built per year
$15 Billion industry-wide exposure
$171 Hidden cost per vehicle

$15 Billion
INDUSTRY EXPOSURE
TO LEAK REPAIR COSTS

Use Cases – Data Centers

Data centers are more than just rows of servers

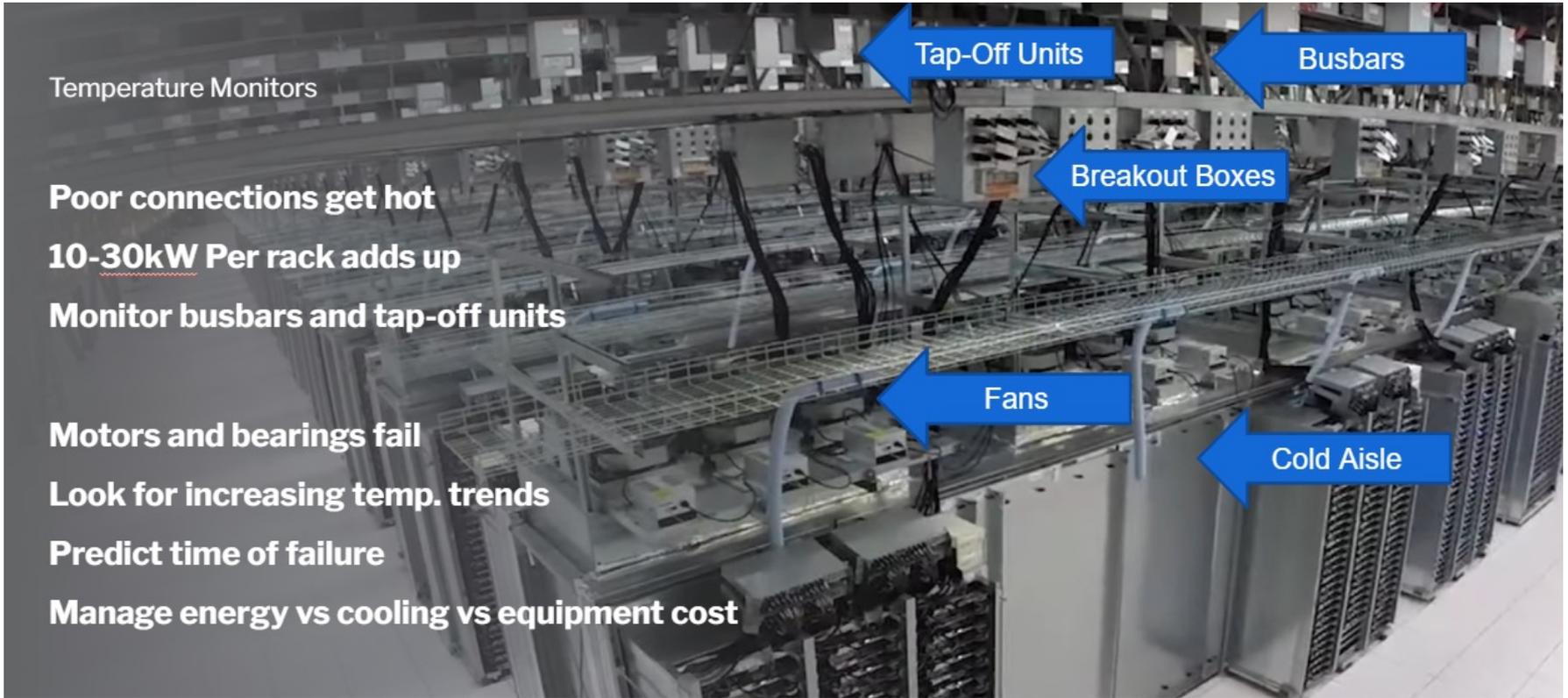Switchgear   MW Diesel   UPS Backup   Busbars   Pumps   Fans

Use Cases – Data Centers

Temperature Monitors

Tap-Off Units

Busbars

Breakout Boxes

Fans

Cold Aisle

Poor connections get hot

10-30kW Per rack adds up

Monitor busbars and tap-off units

Motors and bearings fail

Look for increasing temp. trends

Predict time of failure

Manage energy vs cooling vs equipment cost

Use Cases – Data Centers

Heat exchangers

Pumps and piping

Chiller plants

- **Fans and pumps are motor driven**
- **Motor failures are dominated by heat**
- **Bearing failures are also identifiable by heat**
- **Failing equipment leads to over-chilling**
- **Predictive maintenance finds energy losses**
- **Improves OpEx by increasing wrench-time**
- **Battery-free sensors**
- **Maintenance-free sensing**

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THANK YOU

Omni-id.com/magnus

Contact information

Name: David Owen
Title: Marketing Manager
Email: david.owen@omni-id.com

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