



RFID in Harsh Environments

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10/10/2017



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Agenda

- Introduction: About Omni-ID
- Why Passive RFID?
- Where are we at with Passive RFID?
- Applications: RFID in Harsh Environments
 - Space- International Space Station
 - Earth – Yards, Chemical, High Temp., Explosive, Noisy Environments, High Impact, High Memory, etc.
- Omni-ID's New Solutions-Visual Tagging



Named Top 20 Solutions
Provider for Utilities, EAM
and Oil & Gas



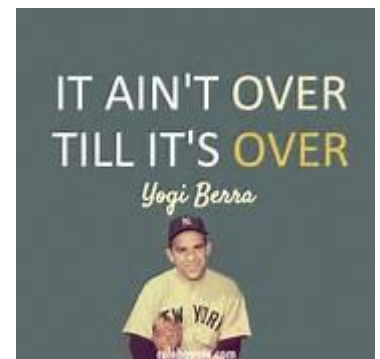
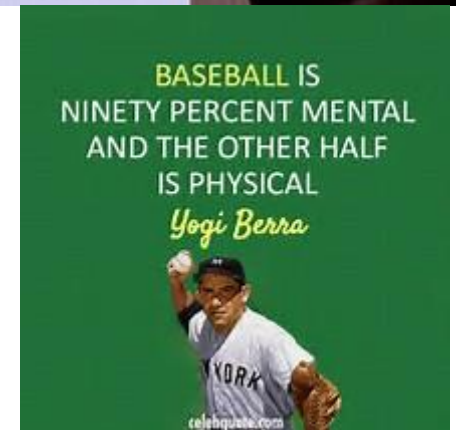
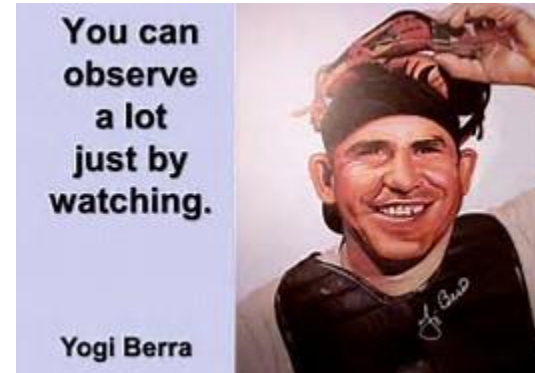
Most Outstanding in RFID
Solutions



RFID Trends



“DejaVu all over Again” Yogi Berra



RFID Trends



“RFID is like Seeing the Future in Real Time”

The Omni-ID Difference

- Omni-ID is the leader in specialty industrial applications for asset tracking
 - #1 manufacturer and supplier of industrial RFID tags globally
 - Specialty (and IP) in metal surface and harsh environment applications
- Many “first to market” innovations
 - original patent holder for on-metal RFID
 - first rugged 100’ readable passive RFID tag
 - first on-metal RFID printable label
 - first Global Frequency Response ceramic tag
 - world’s only industrial e-paper/visual tags



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**Most Outstanding in RFID
Solutions**



Specializing in Enterprise Asset & Material Flow Management Solutions

Enterprise Asset Management Solutions

- Largest selection industrial RFID tags & high performance labels
- Asset Tracking Software



Hardware Components
(Manufacturing, Logistics, Oil & Gas, IT Assets, Medical/Lab, Industrial Equipment, Government & DoD)

Manufacturing Solutions

- World's first dynamic, real-time, material flow optimization/management solution
- View Tags + ProVIEW Software



ProVIEW Solutions
(Automotive & Tier 1 Suppliers, Appliance, Tire)

Industrial IoT Solutions

Omni-ID Core Competencies

Omni-ID Strengths



Deep RF & Hardware Technical Expertise

- Firmware, Electronics, Mechanical, RF, and Materials Design
- Proven and Deployed at top Industrial Corporations Globally



High Volume / Low Cost Deployment

- World's Largest Manufacturer of Industrial Passive Tags
- In-house High Volume Asian & Western Manufacturing



World's Broadest Industrial Auto-ID Portfolio

- Passive RFID Labels, Hard Tags, Semi-Passive, Active Tags...
- Multiple patents included critical "On-Metal Antenna"



Visual Technologies

- World's only "Industrial eLabel/Visual Tags"
- Established partnerships with key suppliers of eInk displays











Software and Solutions

- Complete portfolio of software edge/middleware packages
- Established base of F100 Manufacturing Customers

Omni-ID's unique combination of competencies, customers, and products makes it a true leading innovator in the **IoT Space**

Broadest Array of Industrial RFID Tags

Tag Applications	Industrial RFID Tags							
	IQ Printable RFID labels ON/OFF METAL 	Fit Small, embeddable HIGH TEMP 	Exo/Dura Medium and HEAVY DUTY tags 		Adept Highly rugged, specialty tags for VERY HARSH ENVIRONMENTS 	Custom Customer & application specific 	Power INDOOR/ OUTDOOR active RFID for wide area location 	View E-paper for manufacturing 
IT Assets	●	●					●	
Returnable Containers	●		●	●	●			●
Yard Management				●	●		●	
Manufacturing /Plant Floor			●					●
Industrial Assets	●	●					●	
Tools		●	●	●	●			
Transportation				●	●		●	
Personnel					●		●	

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Why RFID ?

- ✓ **Simple** “overlay” to any individual existing process
- ✓ **Universal** and technology-agnostic
- ✓ **Easy** to use, no line of sight is required
- ✓ **Non-intrusive** to other systems
- ✓ **Minimal** maintenance
- ✓ **Scalable**
- ✓ **Secure**

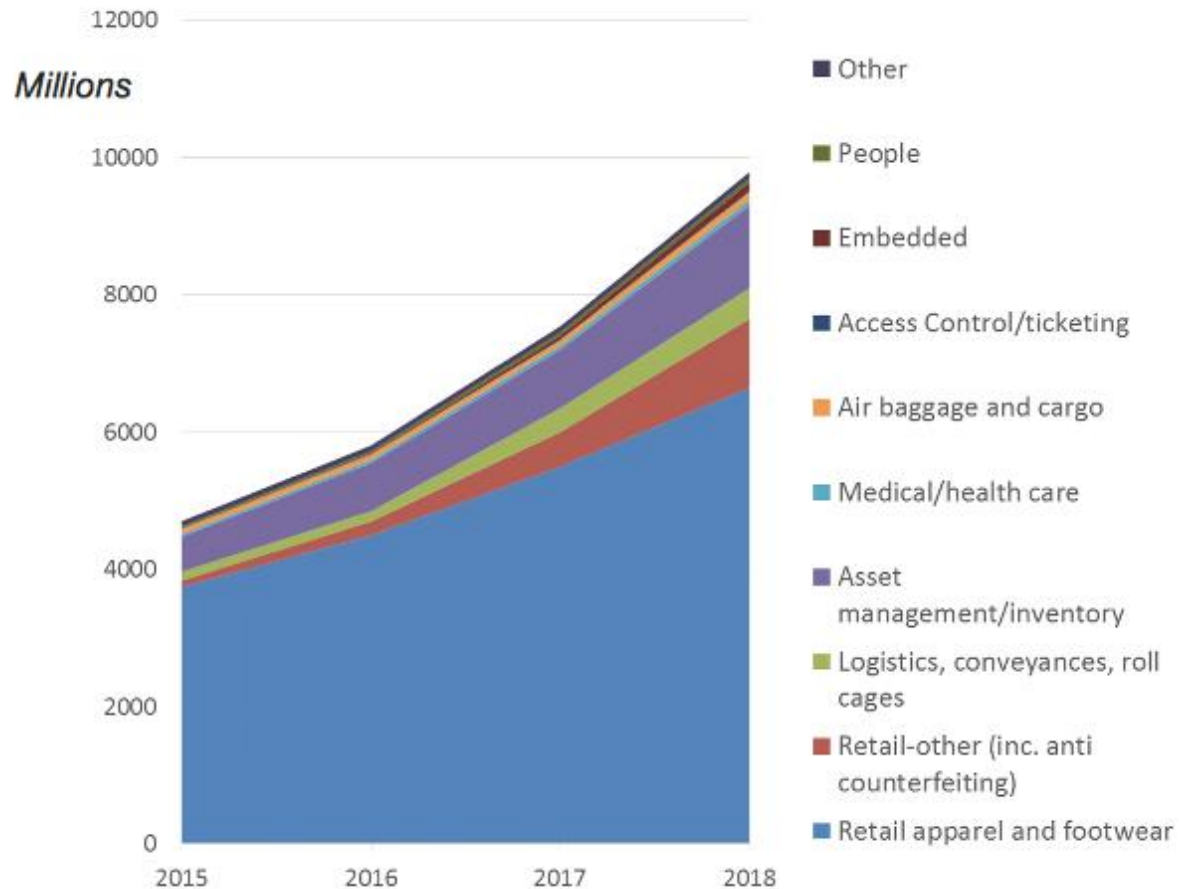
**The Bottom Line:
RFID asset tracking delivers
ROI impossible to achieve
with manual or barcode
methods!**

Barcode vs Passive vs Active RFID

	Unit Cost	Read Range	Line of Sight	Sensors	Inventory Speed	Life of Product	Reader Costs	Tag Size
Barcode	\$0.01	< 1 m	Y	N	Slow	Months	\$3-5,000	Small
Passive Label	\$0.10	1-6 m	N	N	Fast	Months – 1 yr	\$3-5,000	Small
Passive Tag	\$0.75	3-15 m	N	N	Fast	3-5 yr	\$3-5,000	Small – Med
Active Tag	\$15.00	90+ m	N	Y	Constant	5+ yr	\$3-5,000	Med - Large

RAIN RFID Forecast

RAIN RFID Tags Forecast



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International Space Station

ISS is Huge

- (Cargo ships the size of freight cars)
- 440,000 kg core station – 100m x70 m – 4-m diameter tubular living areas
- Six “permanent” crew – in 6-month overlapped shifts
- 6 partner agencies
- 30-year station life possible



Picture courtesy of NASA

International Space Station

- The inventory onboard is:
 - –vast
 - –densely-packed
 - –packed by other people
 - –often behind metal
 - –mobile
 - –diverse
 - –and often small, unique, and irreplaceable ...
 - and it costs ~\$30 USD per gram to launch



Picture courtesy of NASA



Certified RFID Tags

Omni-ID Tags for Metal / Liquid-Filled Items



OMNI-ID 2-part
RFID Labels

Assembled Product



RFID Label Drawing Numbers:

•OMNI-ID RFID label: SEG32111601
SEG32111601-301,-302,-303

Pros:

- Can be produced using RFID printer
 - Easy to print IMS barcode on top
 - Easy to encode RFID label
 - Allows high volume production
- Can be used on metal and fluid-filled items

Cons:

- Barcode label is a separate sticker from RFID label
- Not very durable
- Short read range. Not good for locating lost items
- Tag is thick





RFID Tags

Current Tagging Techniques

Challenge:

Applying RFID labels to Food BOBs (Bulk Overwrap Bag) that are full of metal foil pouches and liquid filled items.

Solution:

An OMNI-ID tag is adhered to a 3.5" x 3.5", thin metal plate (OMNI's work better on metal). Each of these tags are placed at each end of BOB. They are placed on the inside of bag to reduce opportunities for FOD.

Note: A separate barcode label is also adhered to the outside of bag.





RFID Tags

Current Tagging Techniques



Challenge:

Applying RFID labels to individual X-static shirts and pairs of socks, which contain metal (silver) fibers.

Solution:

An OMNI-ID tag is adhered to a bendable sheet of Lexan (OMNI-ID tag adheres well to Lexan). Each tag w/ Lexan is placed at end of each rolled-up shirt or pair of socks. Several shirts or socks are placed in a zip-lock bag. When these are packed into CTB's, the ends w/ tags are faced to outside of CTB to allow more reliable scanning.



Photo credit: NASA



Class III X-static Socks with flight-like tags
X-Static Clothing has metal (silver) fibers

← SEG32111601-303
(OMNI-ID w/ Lexan)

Mobile IT Assets

Requirements:

- Accurately track critical laboratory assets that travel to and from multiple field locations
- 12 sites including space centers and research centers – over 50K items at one site alone
- Improve speed by at least 50% for completing a data center asset inventory



Results:

- Mobile lab assets inventory is now properly tracked and accurate
- Over 250K items inventoried
- ROI: less than 18 months!

"We have seen a significant improvement in our Directorate's ability to conduct fast and efficient inventories by approximately 80% using RFID and now have an accurate record of key testing and technical equipment being sent to and from field deployments"

- Steve Mercier – Senior Systems Engineer, NASA

- Steve Mercier – Senior Systems Engineer, NASA

Yard Management

Identify and locate unique, individual assets within a several square mile area, containing 100,000 + assets!

- **Environment:** Subzero temperatures, excessive heat and/or exposure to sea water
 - ATEX Certified
- **Global:** Where are your products going and where have they been
- **Distance:** Count the many – locate the one...long read ranges are essential
 - Yard safety for employees
 - Inventory visibility and control (conduct more often and in less time)
 - Accuracy; inventory location for better efficiency and retrieval of inventory
- **Data:** Forecast maintenance & replacement schedules (compliance)



High Impact

Identify a variety of assets, of different shapes and sizes in a rugged environment (ie: construction, yard).

- **“Sledgehammer proof”**: Compression, torque and crush tested
- **Survive & Thrive**: Survive read through pipe or equipment stacking
 - On-Metal environment
 - Rugged w/ long read ranges for employee safety
- **Environmental Flexibility**: Weather, chemical resistance
- **Form Factor**: Fit to multiple asset types or customize
- **Data**: Accurate records for location, compliance

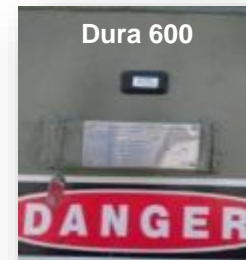




Explosive

Safely and accurately identify assets in an explosive environment; chemical, combustible or munitions.

- **Certified:** ATEX, C1D1, C1D2, IECEx
- **Environmentals:** All are critical in this sensitive environment
- **Mobility & Compliance:** Global or regional
- **Form Factor:** Location and placement
 - Customize to application
- **Passive or Active RFID:** Static discharge coatings & materials





High Temperature

Track assets through high temperature processes; sterilization in health care, paint process in manufacturing, or downhole drilling.

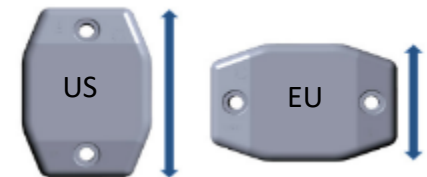
- **Read range:** Process dependent (human or automated)
- **Exposure Type:** Dry or wet heat
 - IP Rating
- **Use:** One time or long term
 - Type of tag (custom needs)
 - Global or regional reads
 - Adhesives



High Memory Required

Track assets through a process and collect data for process validation, compliance/QA or maintenance.

- **Form factor:** On/off metal, Impact
- **Read range:** Avoid process interference (HF vs UHF)
- **Process requirements:** Global or regional
- **Environmentals/exposure:** Indoor/outdoor, IP rating



Adept 850

Interference/“Noisy” Environment

Track assets in a heavy metal environment or with other RF interference

- **Environment:** What's going on?
 - Understand your environment (pick a partner with expertise)
- **Options:**
 - Consider a variety of solutions (don't rule anything out)
 - You may be surprised!



Chemical Exposure

Track assets that may be exposed to chemicals during an industrial process or medical cleaning/sterilization

- **Durability:** Short term or long term tracking
 - Heavy or light duty (durability)
- **Read distance:** Human or automated (lab or laydown yard?)
- **Compliance:** Maintenance records
- **Form Factor:** Variety of industrial tags and labels
 - Variety of cost points
 - Specialty materials & adhesives



View : Visual Tagging

E-Paper Display (image is persistent without power)

Active Radio
(433 MHz or Wi-Fi)

Button and LED
(fully configurable)

V4

Rugged Case
(IP65, MIL 850)



V3

Multiple Triggers
(Passive RFID or
Infrared Triggers)

Industrial Strength Battery
(5 year life or Wireless rechargeable)



Power : Active Tags

True Hybrid Active and Passive Tag

Industry's best price / performance

433MHz Active
Radio

(with Omni-ID Enhanced Read-
Rate and Extended Read-Range
Technology)

Rugged Case

(IP65, MIL 850)

Options for ATEX/C1D1 available)



Industrial Strength Battery

(5 year life, wide temperature ranges)

True Multi-Vendor
Open Standard
Protocols

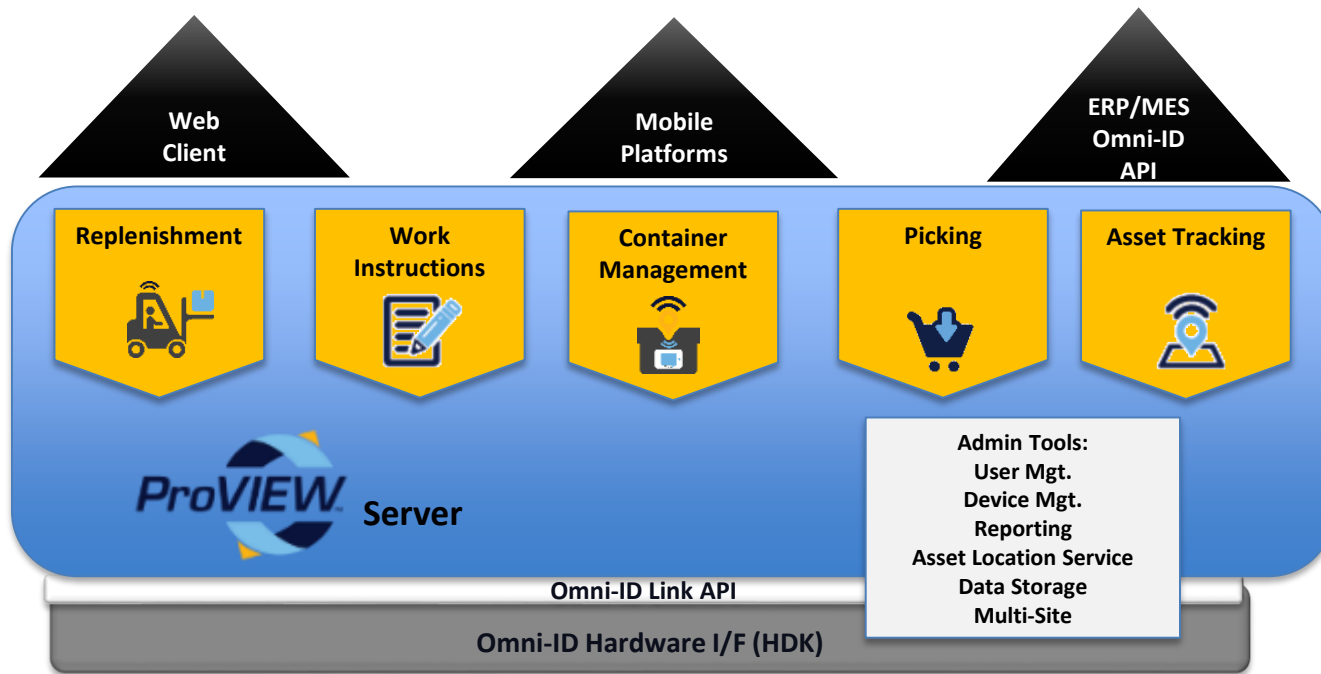
(IEEE 802.15.4f)

Dual Operation:
Passive/Active

(UHF EPC Gen2 passive and
433MHz active)

ProVIEW

Simple. Flexible. Configurable

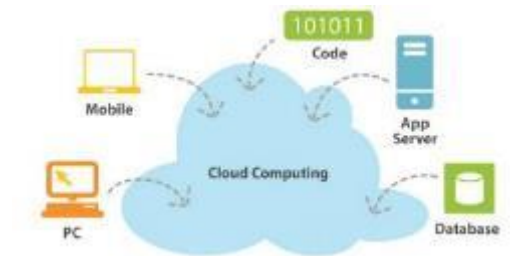


- Flexible to fit your process: Standard set of configurable applications
- Extensible to fit your current systems: Standard set of web-based APIs
- Configurable to fit your environment: Hosted or Premise-based; Standalone or connected/slaved to your ERP/MES workflows
- Mobility & Mobile Applications
- Custom reporting and UI
- Standards based: Microsoft .NET/RESTful APIs/HTML5 Web Clients/Open SQL DB

Readers



Software

[illegible]

Global Customer Snapshot



MANUFACTURING



IT ASSETS



HEALTHCARE/PHARMA



INDUSTRIAL EQUIPMENT



ENERGY/YARD MGMT.



Thank You!

- Visit our website : www.omni-id.com
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