



Seeing Through The Fog: *Collecting PWST Data In A Harsh Environment*

Jeffrey K. Brown, EVP
Radiant360

July 27, 2011



St. John's, Newfoundland & Labrador, Canada



About Radient360

- Established 2001 (IDBLUE sister company)
- Based in St. John's, NL, Canada
- Specialized in technology solutions for the Industrial, Aerospace, and Oil & Gas sectors
- Private Company with Institutional and private investors
- Customers world-wide



Agenda

1. Passive RFID: The Past 10 Years
2. Solution Considerations in a Harsh Environment
3. Case Study #1: Aircraft Engine Tracking
4. Case Study #2: Offshore Oil & Gas - Field Service Management
5. Aerospace and O&G Trends (*and how PWST supports them*)
6. Passive RFID: The Next 10 Years

Objective

To provide passive-RFID solution information that will fuel conversation further allowing the PWST workshop to meet it's overall objectives.

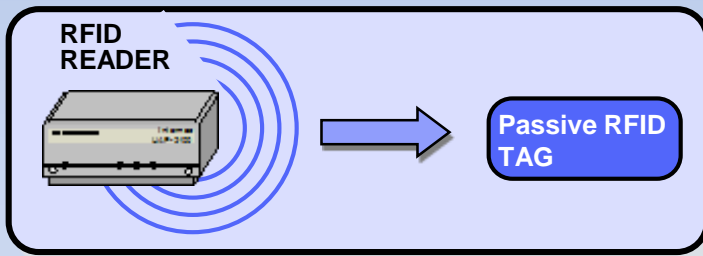
Inputs will come in three forms:

1. Solution considerations
2. Lessons learned (via Case Studies)
3. Sector initiatives (A&D, O&G)

What Is Radio Frequency Identification (RFID)?

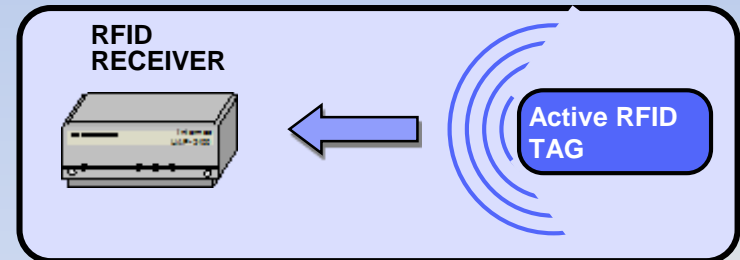
- A means to identify a unique object or person using radio frequency
- Tags store information and are affixed to objects
- Readers read/write information from/to tags
- Tags can be read remotely
- Readers can display the data or send it to a host application

Passive RFID



- The reader calls out with a radio wave that looks for a tag
- Common in supply chain applications
- Larger the antenna, the better the read range (1 - 30+ feet)

Active RFID



- The reader listens for a radio wave emitted from a tag
- Needed for locations tracking applications
- Read range up to 1000 feet

Passive RFID: The Past 10 Years

1. Missing the “Boat”

- Implement early during operation start-up versus mid-operations
- Attributed to technology maturity and value proposition

2. Open loop versus Closed loop

- The Wal-Mart effect

3. Inaccurate business case evaluations

- “Online calculators” and Google experts
- Economics of RFID unchanged

Passive RFID: The Past 10 Years

4. Service providers pushing “RFID” versus business solutions
5. Lack of business process transformation
 - I have the PWST data, now what?
 - Install new infrastructure, but don’t change my process
 - It’s not the value of the asset, it’s the value of the process
6. It’s more than tags, readers/interrogators, and software

Working in a Harsh Environment: Solution Considerations

- Jeopardizing field product integrity
- **Interference with equipment or operations**
- **Stabilizing infrastructure to work in harsh environments**
- **Maintain (*if not improve*) facility safety standards**
- Data synchronization
- Use of technology in non-intrinsically safe environment

Why passive-RFID?

- Automated data collection capable of withstanding harsh environmental conditions
- Will not interfere with facility, facility equipment, and customer parts
- Scalable: Immediate closed loop benefits but scalable to enable customer and partner solutions
- Instant reporting: Part locations, dwell time, WIP data, scheduling, exception handling

Harsh Environment Adoption Methodology: Technology Readiness Levels

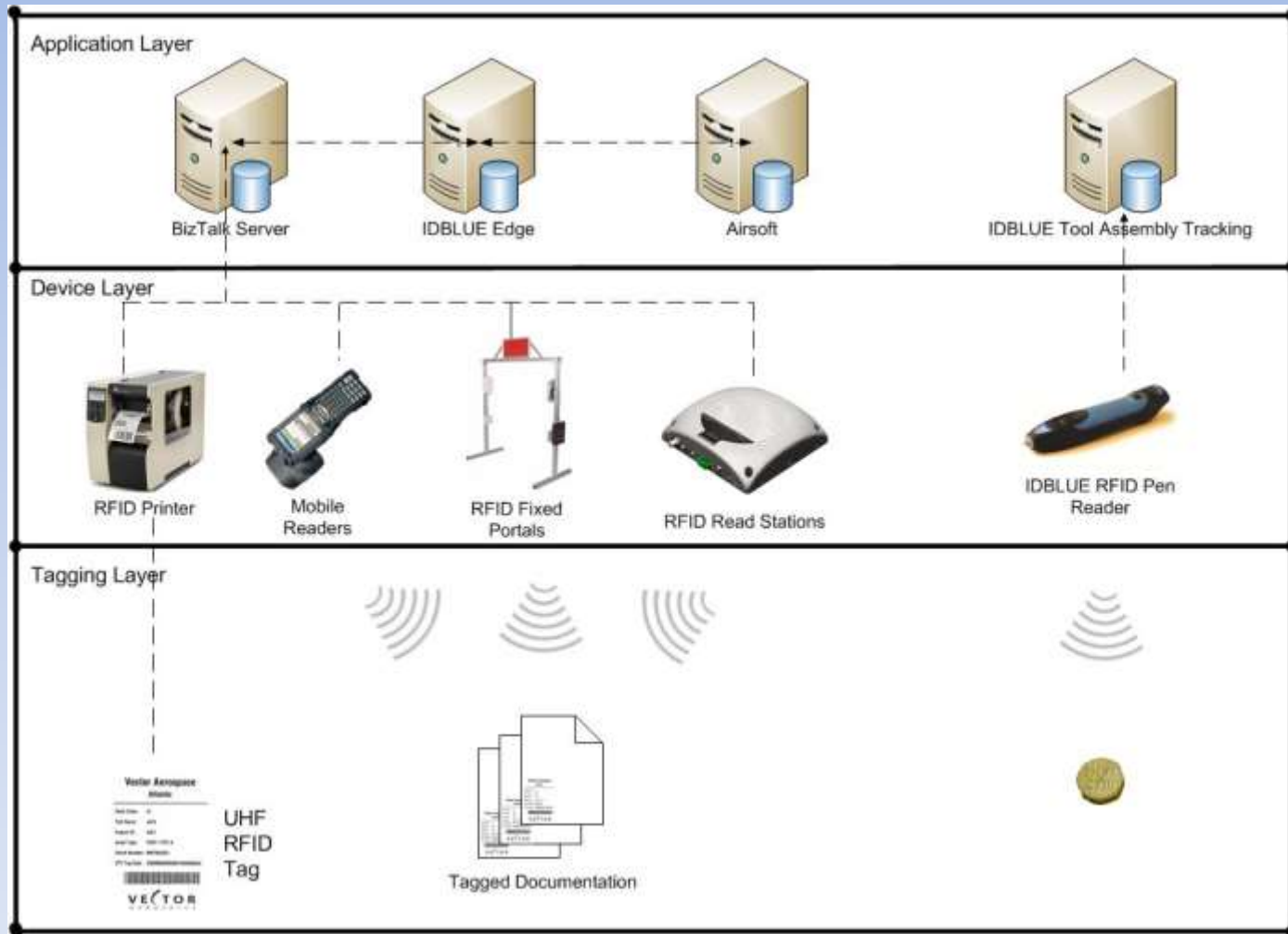
Project Phase	I	II	III	IV
Technology Readiness Level	0	1 & 2	3, 4 & 5	6 & 7
Scope	<ul style="list-style-type: none"> • Paper concept • R&D Vision and Roadmap • Determine solution and ROI potential • No design history 	<ul style="list-style-type: none"> • Tech concept / application formulated • Functionality proven by analysis • R&D experimentation / PoC • ROI determination 	<ul style="list-style-type: none"> • Standalone prototype against subset of assets • Functional and performance testing • Complete environmental testing • ROI verified 	<ul style="list-style-type: none"> • Production system installed • Integration complete (SAP) • Low risk, limited early life failures • TRL 7 requires 3-year reliability

Risk Management

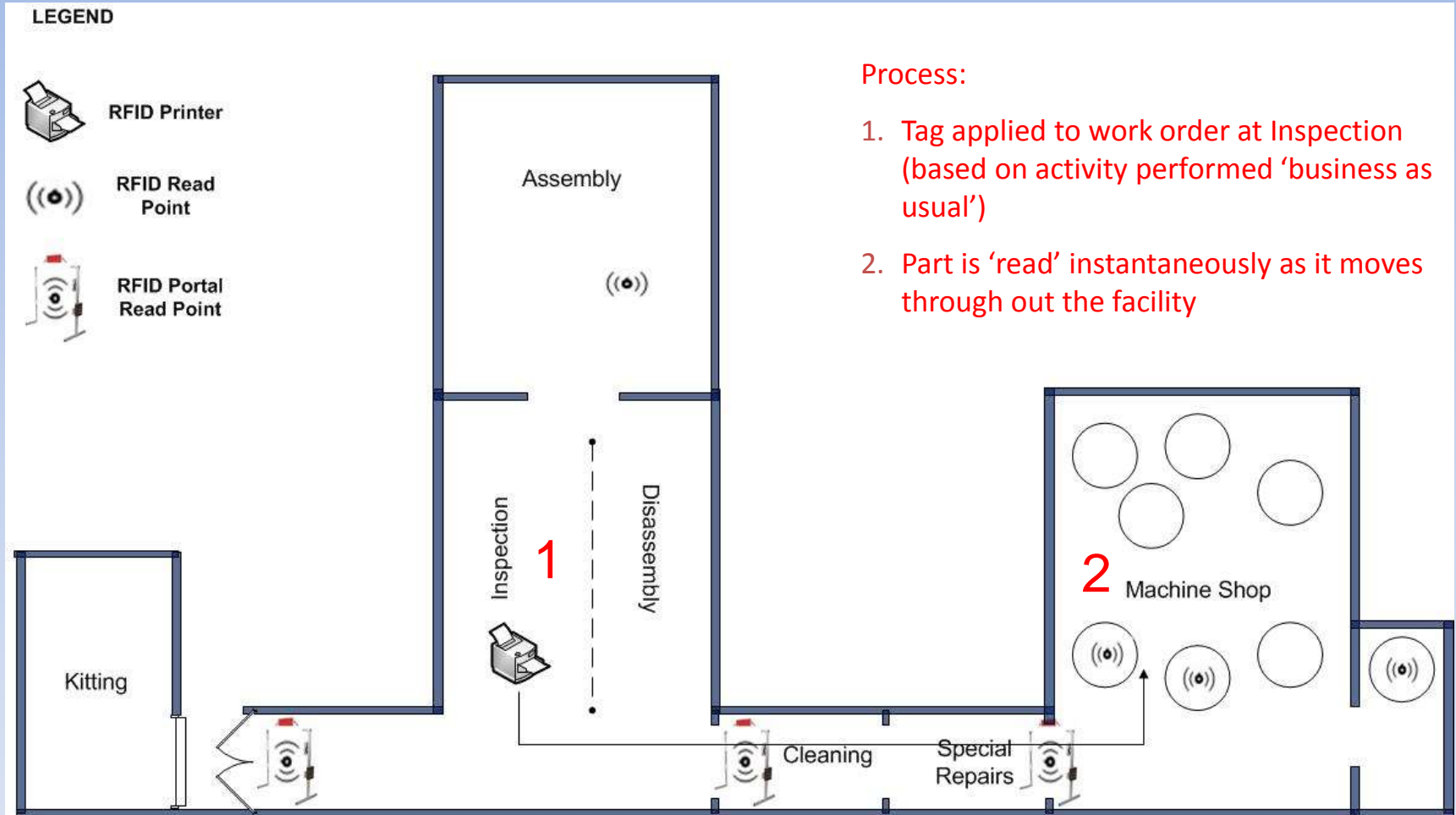
Case Study #1: Tracking Aircraft Engine Parts



Solution Architecture



Repair Parts Process



Solution Capabilities

1 / 1 100% Business Objects

VECTOR
AEROSPACE

Vector Aerospace
Repair Part History

IDBLUE
MOBILE | RFID | SOLUTIONS

Part Number	Work Order	Engine Number	Asset Type	Location	Time
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Inspection	7/28/2010 4:04:21PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Kitting	7/28/2010 4:10:23PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	NDT and Cleaning	7/28/2010 4:13:45PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Machine Shop	7/28/2010 4:14:52PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	CMM-Machine Sho	7/28/2010 4:19:18PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Machine Shop	7/28/2010 4:22:46PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	NDT and Cleaning	7/28/2010 4:23:32PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Machine Shop	7/28/2010 4:25:19PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	NDT and Cleaning	7/28/2010 4:28:50PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Kitting	7/28/2010 4:29:20PM
000000	TEST TAG 28July10	000000	PT6 - Exhaust Duct	Assembly	7/28/2010 4:41:20PM

Subject: Shop Alert: 004 - Water Jet

System Alert:

Part Number	Work Order	Parent Part Number	Part Type
3210023	A20543123	G45-16	Exhaust Duct

Reason Code:

004 - Dwell Time

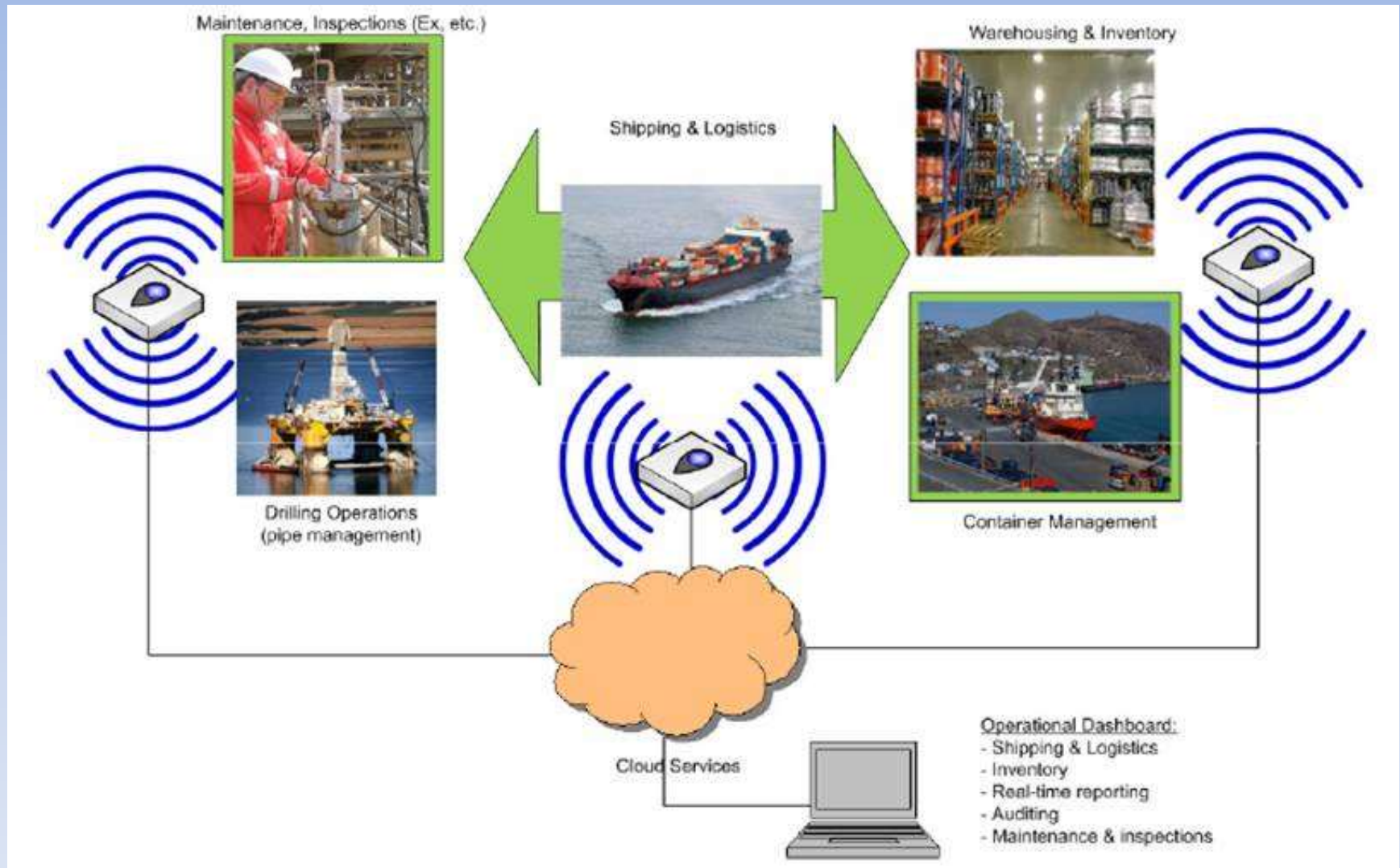
Note:

The Repair Part has exceeded the allowable time in Water Jet

Case Study #2: Offshore O&G



Overall O&G High-Level Solution Model



Offshore Mobile Field Inspection

Today's Challenge

1. Ensuring **regulatory compliance**: Manual data capture, reporting, inconsistent inspections
2. Safety: Reduce overall **safety risk** for maintenance personnel (reduce time spent locating assets)
3. Asset inventory: **Resolve data discrepancy** between Ex equipment currently accounted for
4. Known **human errors** made capturing and reporting inspection data
5. **Labor costs** locating, inspecting, and reporting on Ex equipment

Solution Overview

1. Passive RFID tags affixed to 20,000+ offshore assets identified under the 'Ex Campaign'
2. Mobile RFID readers reading and associating asset-specific data to tags
3. Complete asset identification, inspection, and maintenance history digitized and reported in real-time.

Value Proposition

1. **Positive improvement** reconciling actual inventory versus recorded inventory (target 100%)
2. **Electronic inspections**; instantaneous updates on relevant inspection categories
3. **Reduce and redirect personnel** required to complete and report-on inspections
4. **Decrease in labor spent** locating assets, generating reports, and auditing inspections

Mobile Inspection Raw Data Reports

Sample Raw Data (collected in real time):

TagNumber	Description	VesselLocation	RfidTagID	AccessibilityType	InspectionResult	TransactionDate	TransactionType
75DP9301-03-JB01	HEAT TRACING	TUR, L-2, AFT WALKWAY	E007804006422F76	NA	FAIL	2011-02-23 16:24:00.0	Inspection
64-JJB-9031-Z	JUNCTION BOX	TUR, L-2, STB SIDE WALKWAY	E00780400642102E	NA	FAIL	2011-02-23 16:26:00.0	Inspection
65-AE-5810-14	ANTENA	TUR, L-2, OUTSIDE TUR NEXT TO STB STAIRS	E007804006416C6E	RAT	INCOMPLETE	2011-02-24 13:47:00.0	Inspection
72-EJB-9100	NORMAL PWR	TUR, L-2, BEHIND LIGHTING PANNEL	E00700001F349D9E	NA	FAIL	2011-02-24 13:50:00.0	Inspection
72-EJB-9200	EMERGENCY PWR	TUR, L-2, BEHIND LIGHTING PANNEL	E00780400641657A	NA	FAIL	2011-02-24 13:52:00.0	Inspection
73-DP-9301	NORMAL LIGHTING PANNEL	TUR, L-2, STB LANDING	E00700001F349E11	NA	FAIL	2011-02-24 13:54:00.0	Inspection
73DP9301-05S-JB01	JUNCTION BOX	TUR, L-2, IN HYDRALIC CABINET	E00780400641364E	NA	PASS	2011-02-24 13:58:00.0	Inspection
75-DP-9301	HEAT TRACE PANEL	TUR, L-2, STB LANDING	E00700001F349C2F	NA	FAIL	2011-02-24 14:01:00.0	Inspection
75DP9301-09-JB22	JUNCTION BOX	TUR, L-2, BEHIND HYDRALIC CABINET	E007804006421375	S2	PASS	2011-02-24 14:03:00.0	Inspection
75DP9301-18-JB02	JUNCTION BOX	TUR, L-2, BEHIND LIGHTING PANEL	E007804006421E3C	NA	FAIL	2011-02-24 14:05:00.0	Inspection
91-HC-9250	HEATER	TUR, L-2, IN HYDRALIC CABINET	E007804006417A7C	NA	FAIL	2011-02-24 14:07:00.0	Inspection
91-HC-9260	HEATER	TUR, L-2, IN HYDRALIC CABINET	E00780400642164F	NA	FAIL	2011-02-24 14:09:00.0	Inspection
91-JCP-5000	PURGE CABINET	TUR, L-2, BEHIND LIGHTING PANEL	E00700001F34A29F	NA	PASS	2011-02-24 14:11:00.0	Inspection
91-JJB-9250-Z	JUNCTION BOX	TUR, L-2, IN HYDRALIC CABINET	E007804006415008	NA	FAIL	2011-02-24 14:13:00.0	Inspection
91-LIT-9250	LEVEL TRANSMITTER DP	TUR, L-2, IN HYDRALIC CABINET	E007804006421429	NA	PASS	2011-02-24 14:15:00.0	Inspection
91-PIT-9251	PRESSURE TRANSMITTER	TUR, L-2, IN HYDRALIC CABINET	E007804006421167	NA	PASS	2011-02-24 14:16:00.0	Inspection
91-SOV-9261	SOLENOID 3/2 WAY	TUR, L-2, IN HYDRALIC CABINET	E007804006413742	NA	PASS	2011-02-24 14:18:00.0	Inspection

Key Messages:

- This data is captured in real time, sent onshore on a nightly basis with alerts sent if file does not arrive; data is stored on mobile device and backed up on server offshore
- Data collected includes location, accessibility, inspection result, failure reason codes if applicable
- Exact date and time of inspection captured for traceability purposes
- Data can be extracted and made SAP-ready (ERP)

Hybrid: Active and Passive RFID & GPS



Harsh Environment: Lessons Learned

1. Mounting and installing passive-RFID tags

- Galvanized cables – 304 versus 316 steel (zinc-alloy failed completely)
- Nylon ties
- Epoxy
- Abrasion

2. Freeze and thaw cycles

3. Corrosion from salt water, hydrocarbons, deluge

Harsh Environment: Lessons Learned

4. Hardware Considerations

- Ingress Protection methods, ruggedized (dropping), Ergonomics (gloves), Battery life, visuals (screen size)

5. Data synchronization over broadband communication links have shown effective with synchronization frameworks

- Implementing exception handling

6. Using software to address complacency

Sector Trends & Initiatives

Aerospace

1. Expansion in MRO and DPHM to extend longevity of fleet
2. Global supply chain expansion
3. Future Major Platforms (FMP - Canada)
4. Lean manufacturing and maintenance initiatives
 - Spec 2000

Oil & Gas

1. Unprecedented focus on worker safety
2. The Digital Oil Field
3. Remote location exploration
4. A volatile market

Passive RFID: The Next 10 Years

1. Changing RFID economics

- An increase in small-medium enterprise adoption
- Value driven versus mandated

2. Closed loop, scaling towards open loop

- four walls → supply chain

3. Improved interoperability across the supply chain

- Not only HW, but software standards
- Spec2000, MilSpec

Passive RFID: The Next 10 Years

4. Increased focus on process transformation versus technology injection
5. The technology has been proven; technology readiness levels will continue to increase (TRL 7 in many cases)
6. Further upstream (i.e. manufacturing) PWST installation

Thank You!

Contact Information

Jeff Brown

Executive Vice President

Phone: 709.699.9021

jeff.brown@radient360.com

Corporate Office

100 Signal Hill Rd, Lower Tower

St. John's, NL, Canada

www.radient360.com

Speaker Bio

Jeffrey K. Brown

Jeff joined the management team at IDBLUE in 2007 to launch and lead IDBLUE Consulting Services (ICS), a solution-services practice at IDBLUE focused on enhanced supply chain solutions for the oil and gas, aerospace, and industrial markets. Jeff played a key role in the growth of ICS to the point it became its own entity in 2011, Radient360. As a member of the senior management team, Jeff is responsible for the development and execution of corporate strategy and operating plans, the development and execution of product and solution roadmaps, and for holding relationships with senior personnel across various accounts. Jeff is a PMI certified Project Manager Professional (PMP) with over 14 years experience in various technology Management and Business Consulting roles.

Prior to joining Radient360, Jeff spent over 10 years at IBM as a senior Project Manager and Practice Lead. Jeff has spent the past seven years managing Radio Frequency Identification (RFID) related projects with a special focus on traceability and asset management, including roles on various standards committees and industry working groups. Jeff spent four years leading the RFID practice at IBM Canada. Jeff brings with him an extensive background in business strategy, technology adoption methodologies, and portfolio project management.