



# RFID JOURNAL LIVE!

**SEPTEMBER 26 - 28, 2021**  
PHOENIX CONVENTION CENTER | PHOENIX, AZ

# Using RFID for Efficiency Improvements in the Process Control Industries

The background image shows two industrial workers in a refinery at night. A man in a blue uniform and a woman in a light grey uniform, both wearing white hard hats and safety glasses, are standing on a yellow-railed platform. They are looking at each other. In the background, there are large white pipes and a prominent green industrial valve with a yellow handle. The scene is illuminated by artificial lights, and the sky is dark.

Shannon Jelken  
Research Specialist

# Emerson At-A-Glance

FOUNDED

**1890**

HEADQUARTERS IN  
**ST. LOUIS, MO**  
USA

RECOGNITION **2018**

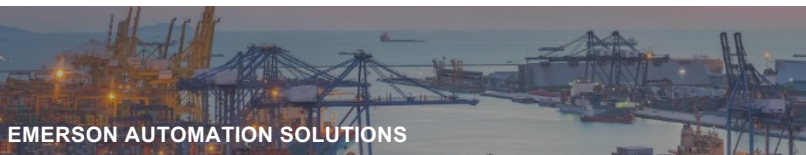
**#178**

**FORTUNE 500**  
AMERICA'S  
LARGEST  
CORPORATIONS  
BY REVENUE

**Top 50 Employers**  
WOMEN ENGINEERS  
MAGAZINE

**America's Best Employers**  
FORBES MAGAZINE

TWO BUSINESS PLATFORMS



INNOVATION  
EMERSON HAS **18,000** ACTIVE PATENTS

**\$17.4**  
**BILLION**

IN GLOBAL SALES  
FISCAL YEAR 2018



CONSECUTIVE  
YEARS OF  
INCREASED  
DIVIDENDS

**NYSE:**  
**EMR**



# Emerson Automation Solutions

## Industries Served include

Chemical  
Power  
Food and Beverage  
Metals and Mining  
Water and Wastewater  
Life Sciences  
Pulp and Paper  
Electronics  
Oil and Gas/Refining

## Core Expertise & Key Brands

Industrial Internet of Things

- Plantweb

Systems and Asset Management

- DeltaV
- Ovation

Measurement Instrumentation

- Rosemount
- Micro Motion

Solenoids and Pneumatics

- ASCO

Valves, Actuators and Regulators

- Bettis
- Keystone
- Crosby
- KTM
- Fisher
- Vanessa

Precision Welding

- Branson

Electrical and Lighting

- Appleton

Industry Services and Solutions

**Refining**



**Life Sciences**



**Food &  
Beverage**



**Oil & Gas**



**Chemical**

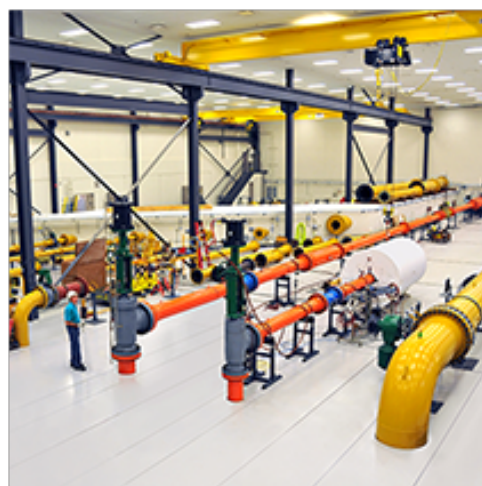
**Power**

**Metals &  
Mining**

**Pulp & Paper**

# FISHER™

Fisher valve and regulator technologies are born from Emerson's passion to **INCREASE CUSTOMER PROCESS SAFETY** and **EFFICIENCY**, by defining the industry with more than **135 YEARS** of trusted innovations **FORGING THE FUTURE** of flow control solutions.

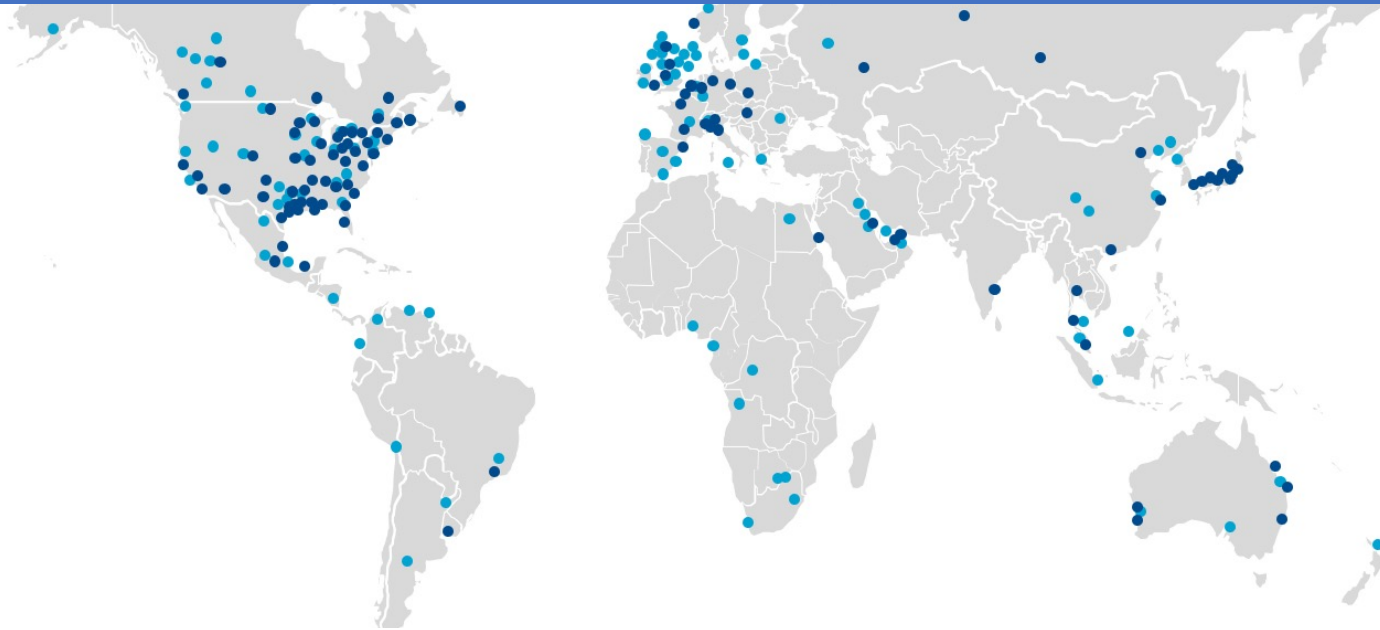


**RFID**  
JOURNAL  
**LIVE!**

**SEPTEMBER 26 - 28, 2021**

# Service Centers

The most extensive valve, actuator, and regulator service network globally to support customers.



**109**

Service Centers

**88**

Mobile Service Centers

**103**

Authorized Service Providers

**1,000+**

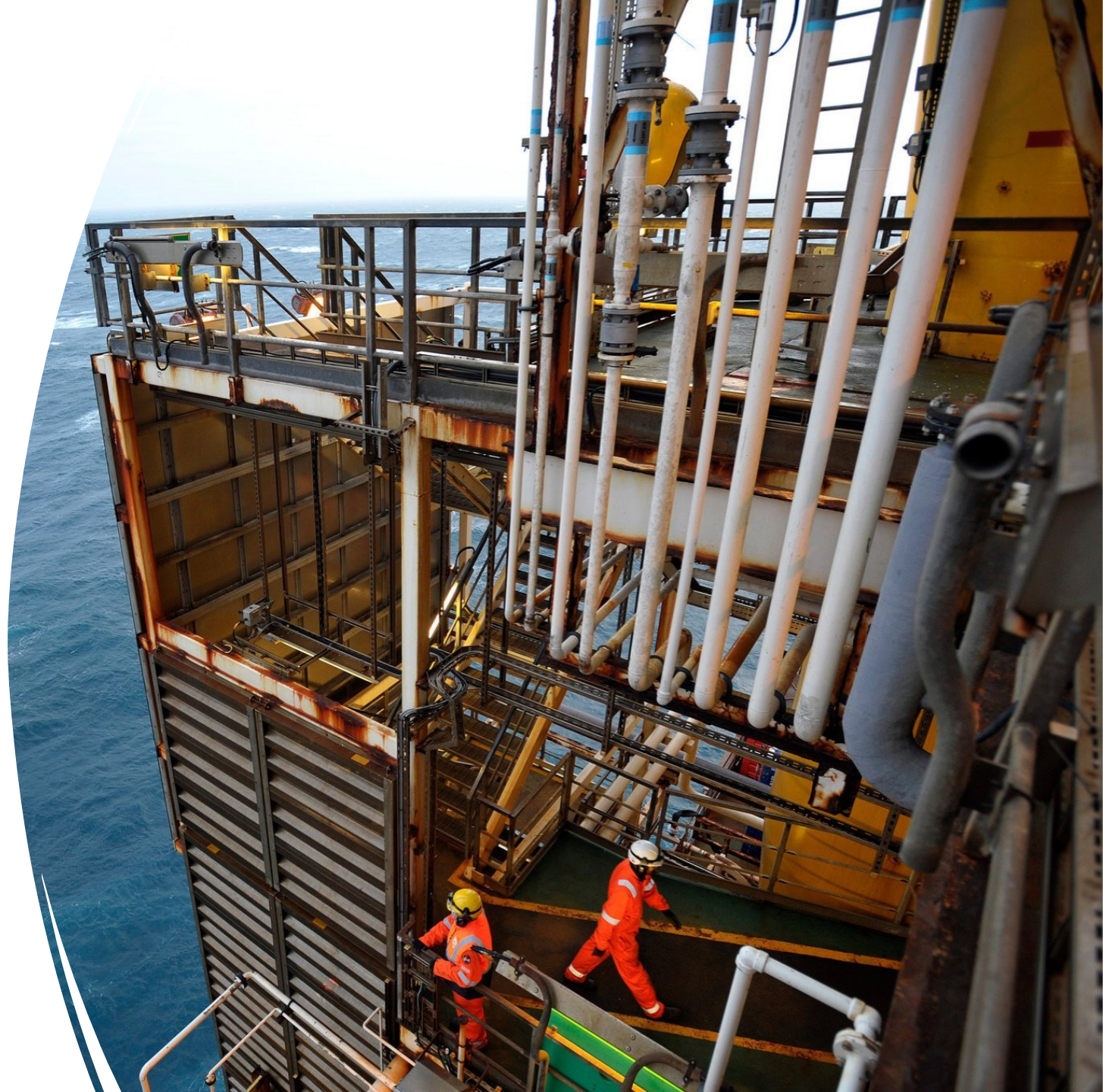
Service Technicians



# British Petroleum (BP) Operations

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- On Weather-battered offshore platforms in Britain's North Sea, for instance, technicians still walk around with "big pieces of paper in the rain, wind," said Claire Day, a BP operations engineer. "It is not an ideal way to work."





# Real Asset Management

# Why Hasn't RFID Been Adopted by the Process Industries?

- There is no company dedicated to RFID for use in industrial environments
- Off the shelf components can't be assembled into a solution
- RFID industry is primarily focused on retail or discrete manufacturing applications
- Business model for RFID manufacturers is high volume / low cost – competing with barcodes
- RFID is more than a tag and a reader
- RFID in the process industries is not a guaranteed win for established RFID manufactures

# Emerging Technologies in the Process Industry

## Commercial Applications:

NFC  
QR Codes  
Passive UHF  
Active UHF  
LF

## Commercially Funded University Research:

Cal Poly  
SAIT

**SPM® RFID Technology**  
Facilitating the efficient inventory management of assets while providing readily available inspection information

**WEIR**  
Oil & Gas

**Features and Benefits**

- Ability to verify asset inspection status quickly on site
- Expedites inventory control on site or at service facility
- Reduces misidentification during inspection
- Leverages Weir's Asset

**immer und überall verfügbar!**  
**available Anytime, Anywhere!**

is Problem ist so alt wie die gedruckte Betriebsanleitung – falls dringend nötig, sind die Unterlagen zum Projekt gerade nicht zur Hand. Gerade bei Großprojekten wird immer eine umfangreiche Dokumentation, bestehend aus Produkt-Datenblättern, Betriebsanleitungen, Schaltplänen, Zulassungen und Prüfzeugnissen, erstellt. Immer wiederkehrende Dokumentationsanfragen lassen sich Zweifel aufkommen, ob diese Dokumentation beim Endverwender ist. Insbesondere dem betroffenen Instand- und Wartungspersonal im Defizit zur Verfügung steht. ICA-ONSITE bietet eine einfache, aber effektive Lösung für dieses Problem. • Sollverteilung mit Auftragsanhang am 1.1.2017 werden mit einem Z...

The problem is as old as the printed operating manual – if urgently needed the technical documentation is not at hand. Especially with big projects an extensive documentation, consisting of product data sheets, operating instructions, schematics, approvals and test certificates, is often required and generated. Recurring documentation requests make us doubt, if it is in the end available to the end user and especially the operating and maintenance personnel when needed. ICA-ONSITE now offers a simple, but perfect solution for this problem. All control valves with incoming orders from 1.1.2017 will be equipped with a supplementary label which allows

**ARCA-ONSITE**

RFID TAG is the key to all relevant information

The RFID TAG (Radio Frequency Identification TAG) uses the established and robust NFC standard. It is a passive device, license free and available worldwide. The RFID TAG facilitates convenient and safe measuring point identification. Visual contact of the name plate is not required if the mobile device is equipped with NFC technology. The integration of this open standard ensures that

**psikick**

less on site

pp and the Field Xpert SFX370, the system parts available for any measuring point on life cycle. Costs may be particularly reduced the Endress+Hauser "Installed Base Audit" be equipped with TAGs but also the

measuring points of other manufacturers:

**OIL SANDS PROJECT REVOLUTIONIZES INSPECTION PROCESS WITH...**

**Jovix**  
Atlas RFID Solutions

A Canadian Oil Sands mining project located in Alberta, Canada's 1 process 110 million tonnes of oil sand per year, yielding an 100,000 tonnes per day at full production. Jovix has been deployed on the project and is the final area to be completed to the end of the project in the Spring of 2018.

**RFID Helps Fuel an Oil Boom**

Bantrel deployed a material-tracking solution to locate 70,000 parts construction of a multibillion-dollar tar-sands project in northern Canada.

By Michael Belfiore

Tags: Asset Tracking, Construction, Energy, Harsh Environments

**CAL POLY**

**United States Patent Application Publication**

(10) Pub. No.: US 2019/0017626 A1  
(43) Pub. Date: Jan. 17, 2019

(54) USING SHORT-RANGE WIRELESS CONNECTIVITY TO TRANSMIT DATA FROM A VALVE ASSEMBLY

(52) U.S. CL CPC ..... F16K 37/0083 (2013.01); H04W 4/008 (2013.01); G05B 23/02 (2013.01)

(71) Applicant: Dresser, LLC, Addison, TX (US)

(72) Inventors: Mark Edmund Hebert, North Attleborough, MA (US); Lei Lu, Westwood, MA (US); Anatoly Podpaly, Sharon, MA (US)

(21) Appl. No.: 15/649,748

(22) Filed: Jul. 14, 2017

**Publication Classification**

(51) Int. Cl. F16K 37/00 (2006.01); G05B 23/02 (2006.01); H04W 4/00 (2006.01)

**ABSTRACT**

A valve assembly that is configured to wire data using near-field communication protocols may include a passive, NFC-enabled controller (or "valve positioner") inside of a controller (or "valve positioner") enabled device can operate as a communication allow data exchange with a handheld computer a smartphone or tablet. This feature can allow (e.g., technicians) ready access to data on the via the handheld computing device.

**SAIT**

# RFID Value Proposition in the Process Industries

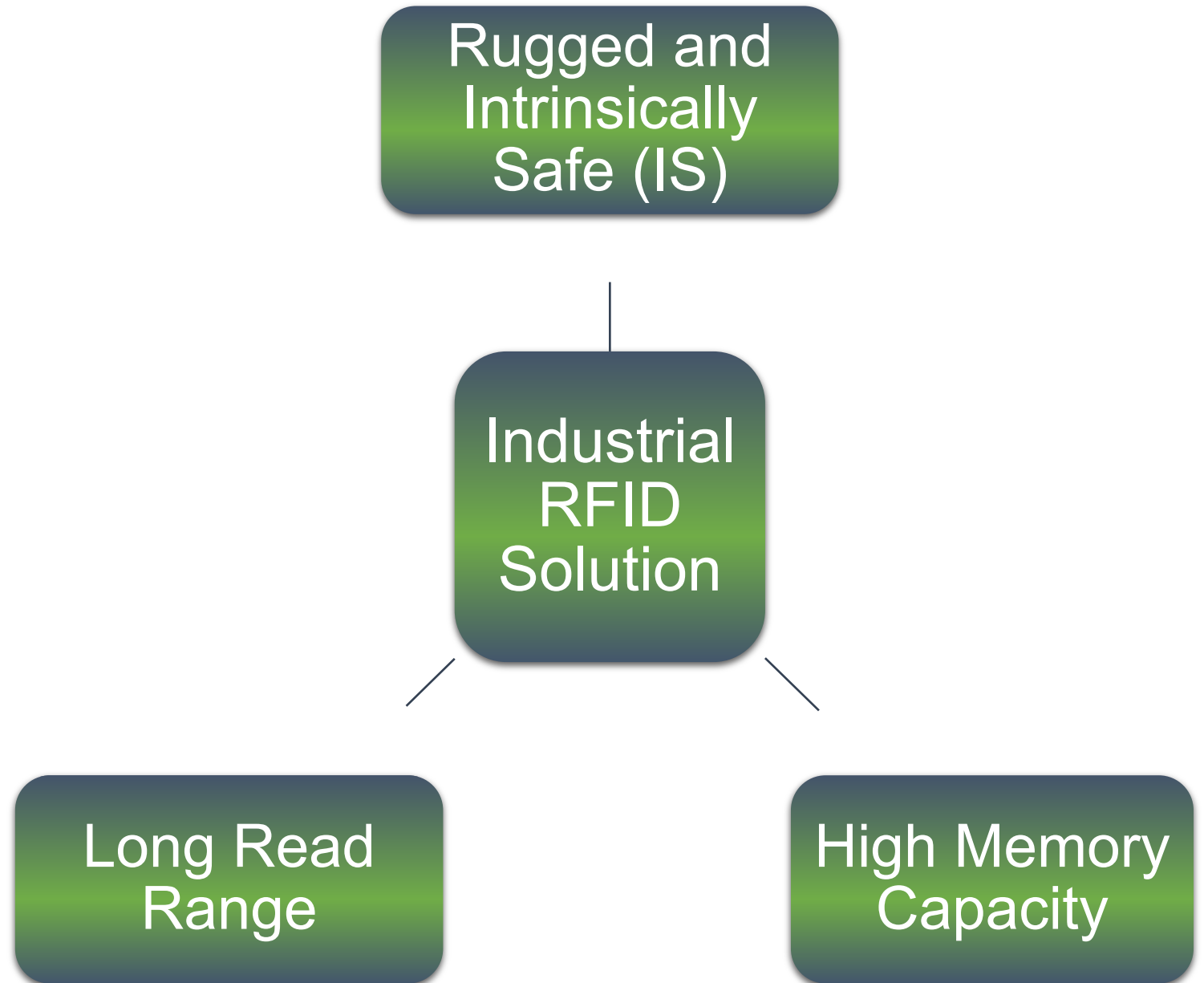
## Asset Management

- Automated field maintenance tracking and updates
- Predictive spare parts ordering
- Cross facility parts inventory
- Asset location / status
- Asset performance / reliability tracking

## Maintenance Automation

- Work order automation
- Inspection validation
- Contractor access control
- Automated asset / equipment check out / in
- Real time equipment location and mobilization

# Process Industry Requirements for an RFID Tag



# Process Industry Requirements for an RFID Tag

Environmental  
resistance

Rugged and  
Intrinsically  
Safe (IS)

Hazardous Area  
Certifications

Industrial  
RFID  
Solution

Long Read  
Range

High Memory  
Capacity

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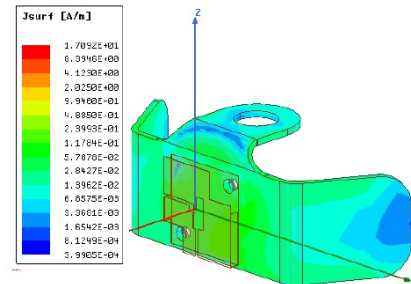
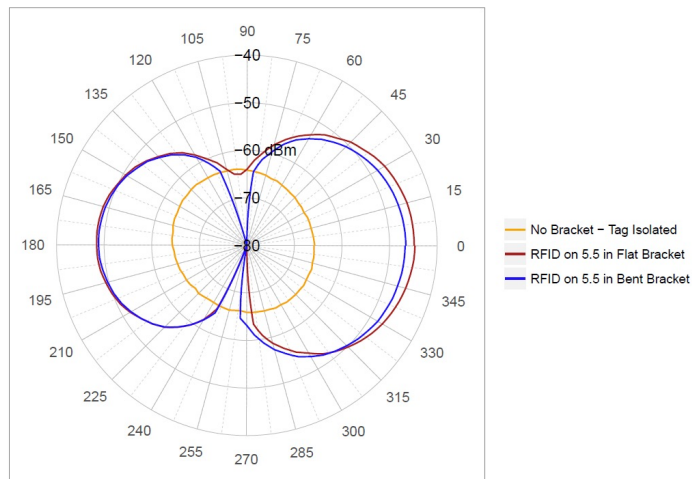
Minimum 10 ft, high  
metal environment,  
passive UHF

Store critical  
information with the  
asset in the field

Long Read  
Range

High Memory  
Capacity

# Emerson Asset Management Tag / Bracket Assembly



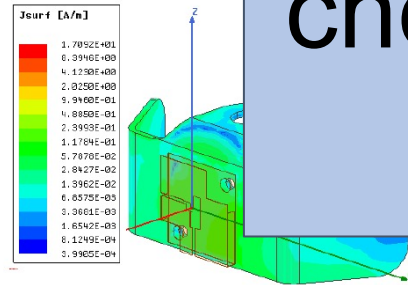
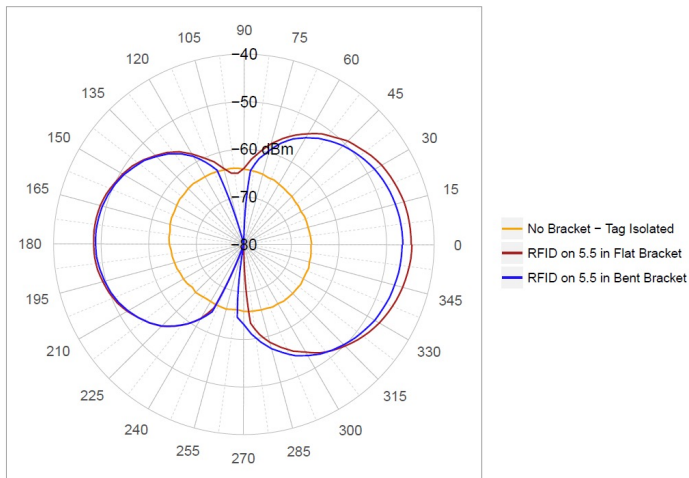
- Originally based on the HID IronTag 206 **Passive**, UHF RFID tag
- **Global** antenna (860 – 960 MHz)
- **8192 bit** user memory
- **FM, CSA, ATEX** certification
- **IP68, IP69K** ingress protection
- **Polyphenylene sulfide (PPS)**
- -40 to +85 C operating temperature
- Coupled to bracket that amplifies RF signal  
**Read range up to 25ft** line of sight

# Emerson Asset Management Tag / Bracket Assembly



- Originally based on the HID IronTag 206  
**Passive**, UHF RFID tag

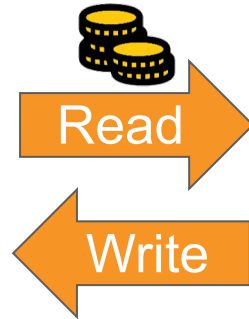
This is the only tag on the market that checks all the boxes for our industry



- Coupled to bracket that amplifies RF signal  
**Read range up to 25ft** line of sight

# Emerson's Value Add

## Asset Management Tags



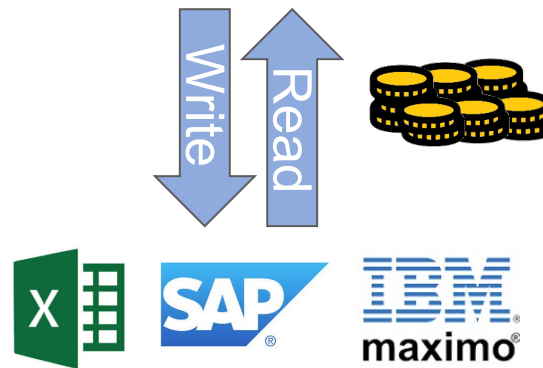
## Mobile Solutions



## Installed Base Portal / Oracle Service Cloud



**ORACLE®**  
SERVICE CLOUD



## Integrations with Customer Enterprise Systems

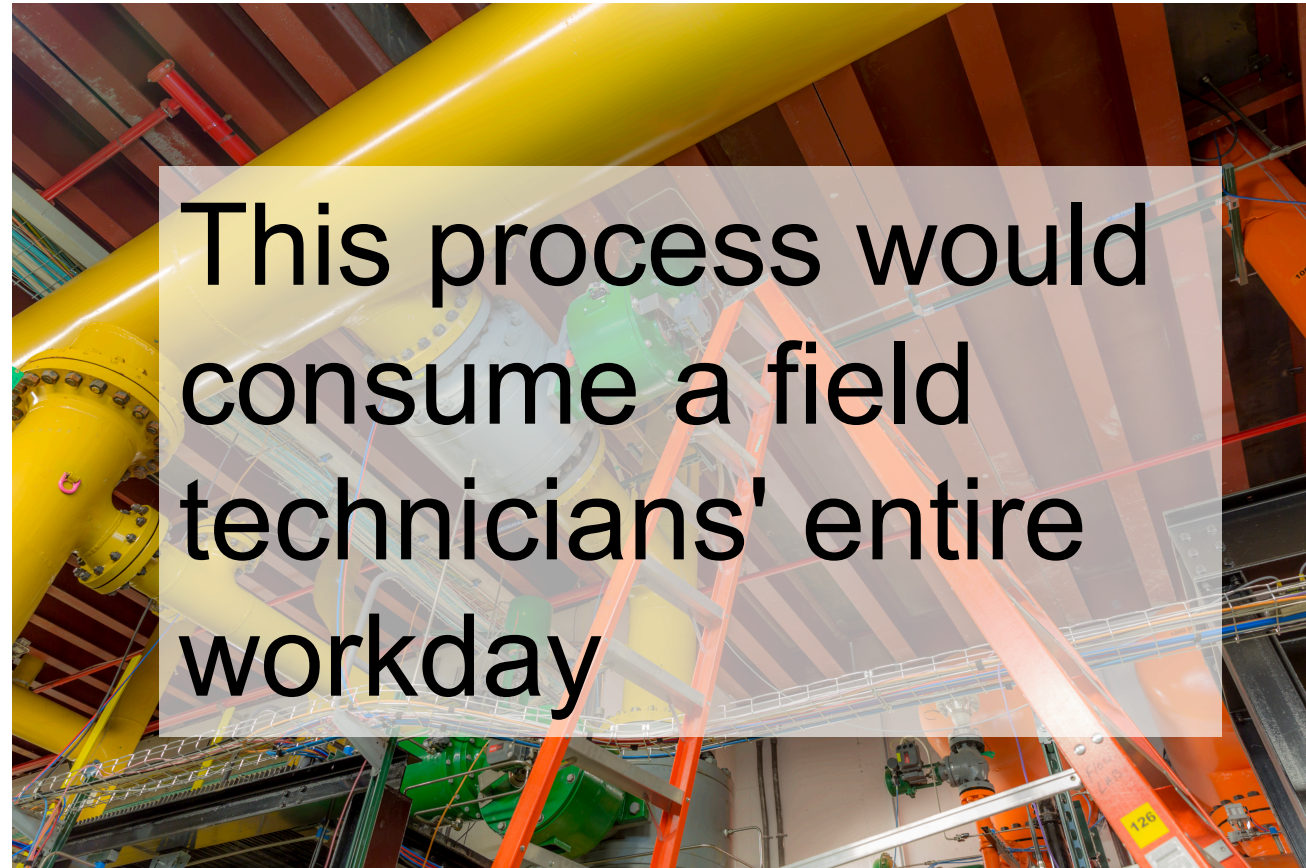
# Improved Efficiency Example – SOV Accessory Maintenance (without RFID)

- Obtaining a permit for scaffolding
- Scaffolding erection
- Locating the assembly nameplate and/or SOV nameplate if available
- Manual note taking with pen and paper – possible human error
- Manually locate the serial card and discovery process for the SOV part number.
- Scaffold dis-assembly



# Improved Efficiency Example – SOV Accessory Maintenance (without RFID)

- Obtaining a permit for scaffolding
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- Locating the assembly nameplate and/or SOV nameplate if available
- Manual note taking with pen and paper – possible human error
- Manually locate the serial card and discovery process for the SOV part number
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# Improved Efficiency Example Continued (with RFID)



- Technician scans the asset
- Automated retrieval of the SOV model/part number information
- Link to customers storeroom database
  - If parts available, submit requisition
  - If not, link to automated parts ordering and order the part

# Improved Efficiency Example Continued (with RFID)



Done in approximately 5 minutes from a safe location on the ground

- Technician scans the asset
- Automated retrieval of the SOV model/part number information
- Link to customers storeroom database
  - If parts available, submit requisition
  - If not, link to automated parts ordering and order the part

# Data Management



Asset Management Tag



RFID Reader



Asset Connect App

# User Memory Data Structuring Schema

User Memory Block Name	User Memory Bit Address	Bits	Bytes	Type	Description
<b>Customer Scratchpad</b>					
Scratchpad	1880h - 1FFFh	1152	144	UTF-8	Scratchpad (short term)
<b>Class Specific Data</b>					
Other_Documentation	14E0h - 1B7Fh	1696	212	UTF-8	Other documentation (long term)
Asset_18	14B0h - 14BFh	96	12	UTF-8	Device Criticality
Asset_17	1380h - 147Fh	256	32	UTF-8	Life Cycle Services job number
Asset_16	1280h - 137Fh	256	32	UTF-8	Accessory 3 description
Asset_15	1180h - 127Fh	256	32	UTF-8	Accessory 2 description
Asset_14	1080h - 117Fh	256	32	UTF-8	Accessory 1 description
Asset_13	F80h - 107Fh	256	32	UTF-8	Accessory 0 description
Asset_12	E80h - F7Fh	256	32	UTF-8	Positioner model
Asset_11	D80h - E7Fh	256	32	UTF-8	Actuator model
Asset_10	C80h - D7Fh	256	32	UTF-8	Valve model
Asset_9	BC0h - C7Fh	192	24	UTF-8	Accessory 3 model
Asset_8	8C0h - B7Fh	192	24	UTF-8	Accessory 2 model
Asset_7	A40h - A7Fh	192	24	UTF-8	Accessory 1 model
Asset_6	9C0h - A3Fh	192	24	UTF-8	Accessory 0 model
Asset_5	8C0h - 97Fh	192	24	UTF-8	Positioner Manufacturer
Asset_4	8C0h - 8BFh	192	24	UTF-8	Actuator Manufacturer
Asset_3	740h - 77Fh	192	24	UTF-8	Valve Manufacturer
Asset_2	680h - 73Fh	192	24	UTF-8	Positioner serial number
Asset_1	5C0h - 67Fh	192	24	UTF-8	Actuator serial number
Asset_0	5C0h - 5BFh	192	24	UTF-8	Valve serial number
<b>Common Practice Data</b>					
Duration_1	4F0h - 4FFh	16	2	uint16	RFU
Duration_0	4E0h - 4EFh	16	2	uint16	RFU
Date_9	4D0h - 4DFh	16	2	date code	RFU
Date_8	4C0h - 4CFh	16	2	date code	RFU
Date_7	4B0h - 4BFh	16	2	date code	Inspection due date
Date_6	4A0h - 4AFh	16	2	date code	Last inspection date
Date_5	490h - 48Fh	16	2	date code	Service due date
Date_4	480h - 47Fh	16	2	date code	Last service date
Date_3	470h - 46Fh	16	2	date code	Calibration due date
Date_2	460h - 45Fh	16	2	date code	Last calibration date
Date_1	450h - 44Fh	16	2	date code	Install date
Date_0	440h - 43Fh	16	2	date code	Ship date
<b>Universal</b>					
User_Defined_EPC	340h - 43Fh	256	32	UTF-8	User Defined Number / EPC storage
PID_EPC	240h - 33Fh	256	32	UTF-8	P&ID tag / EPC storage
PO_EPC	140h - 23Fh	256	32	UTF-8	PO Number / EPC storage
Serial_EPC	40h - 13Fh	256	32	UTF-8	Serial Number / EPC storage
RFU	20h - 3Fh	32	4	RFU	RFU
Content Revision	18h - 1Fh	8	1	uint8	Content revision, 0 denotes unpopulated tag
Database Type	0Ch - 17h	24	3	uint8	0 - Database Type 0








- Universal Data
  - Primarily Asset Identification
- Common Practice
  - Primarily Dates and Duration Fields
- Asset Class Specific Data
  - Variable data based on asset class
- Scratchpad
  - Simple notes section
  - Not revision controlled

The screenshot displays the Emerson Asset Connect - (Read/Write) interface. It features a sidebar on the right with navigation options: CONNECTED, Tag Operations, INVENTORY, READ / WRITE, LOCATE, ADVANCED, SETTINGS, and EXIT. The main area is divided into several sections:

- Valve Components:** Includes fields for Valve (Manufacturer: FISHER, Model: EAT 30x36 CLASS 300, Serial Number: F001164761) and Actuator (Manufacturer: FISHER, Model: 685 14 CYL, Actuator Serial Number: F001164761).
- Accessories:** Lists four accessories with their respective models and descriptions, such as ASCO EBB316G3B4MB and ASCO B290B071.
- Other Documentation:** Contains a URL to a manual and a Device Criticality field.
- Service Details:** Includes fields for Job Number, Install Date, Last Calibration Date, Calibration Due Date, Last Service Date, Service Due Date, Last Inspection Date, and Inspection Due Date.

At the bottom, there are buttons for Read, Write, Clear Field, and Save Data, along with a status bar indicating the current reading block.

# User Memory Data Visualization

Valve Components			
<b>Valve</b>		<b>Actuator</b>	
Manufacturer	<input type="text"/>	Manufacturer	<input type="text"/>
Model	<input type="text"/>	Model	<input type="text"/>
Serial Number	<input type="text"/>	Serial Number	<input type="text"/>
<b>Positioner</b>			
Manufacturer	<input type="text"/>		
Model	<input type="text"/>		
Serial Number	<input type="text"/>		
Accessories			
<b>Accessory 1</b>		<b>Accessory 2</b>	
Model	<input type="text"/>	Model	<input type="text"/>
Description	<input type="text"/>	Description	<input type="text"/>
<b>Accessory 3</b>		<b>Accessory 4</b>	
Model	<input type="text"/>	Model	<input type="text"/>
Description	<input type="text"/>	Description	<input type="text"/>
Other Documentation			
<div><div></div></div>		Device Criticality	<input type="text"/>
		Ship Date	<input type="text" value="MM/DD/YYYY"/> 
Service Details			
Job Number	<input type="text"/>	Install Date	<input type="text" value="MM/DD/YYYY"/> 
Scratchpad	<div><div></div></div>	Last Calibration Date	<input type="text" value="MM/DD/YYYY"/> 
		Calibration By	<input type="text" value="MM/DD/YYYY"/> 
		Last Service Date	<input type="text" value="MM/DD/YYYY"/> 
		Service By Date	<input type="text" value="MM/DD/YYYY"/> 
		Last Inspection Date	<input type="text" value="MM/DD/YYYY"/> 
		Inspection Due Date	<input type="text" value="MM/DD/YYYY"/> 

Valve Components		Actuator	
Valve Manufacturer	<input type="text"/>	Actuator Manufacturer	<input type="text"/>
Model/Figure#	<input type="text"/>	Model/Figure#	<input type="text"/>
Serial Number	<input type="text"/>	Size	<input type="text"/>
Size	<input type="text"/>	Serial Number	<input type="text"/>
Class	<input type="text"/>	<input type="radio"/> Closed <input type="radio"/> Open <input type="radio"/> Lock in Last <input type="radio"/> None <input checked="" type="radio"/> Unknown	
Type	<input type="radio"/> Ball <input type="radio"/> Butterfly - Standard <input type="radio"/> Butterfly - TOV <input type="radio"/> Plug <input type="radio"/> Gate <input type="radio"/> Globe <input type="radio"/> Diaphragm <input type="radio"/> Pinch <input type="radio"/> Choke <input type="radio"/> Other <input checked="" type="radio"/> Unknown	Fail Action	<input type="radio"/> Pneumatic <input type="radio"/> Electric <input type="radio"/> Hydraulic <input type="radio"/> Manual <input type="radio"/> Other <input checked="" type="radio"/> Unknown
Type		Type	

Material Specifications	
Valve Materials	
Body	<input type="text"/>
Seat	<input type="text"/>
Stem/Shaft	<input type="text"/>
Plug/Disc	<input type="text"/>

Accessories	
Accessory 1	
Manufacturer	<input type="text"/>
Model	<input type="text"/>
Description	<input type="text"/>
Accessory 2	
Manufacturer	<input type="text"/>
Model	<input type="text"/>
Description	<input type="text"/>
Accessory 3	
Manufacturer	<input type="text"/>
Model	<input type="text"/>
Description	<input type="text"/>
Accessory 4	
Manufacturer	<input type="text"/>
Model	<input type="text"/>
Description	<input type="text"/>

Other Information	
Other Documentation / Certifications	Process / Application Details
<input type="text"/>	<input type="text"/>

Service Details	
Service Interval	<input type="text"/> Mos.
SIS/SIL Rated	<input type="radio"/> YES <input checked="" type="radio"/> NO
PST Interval	<input type="text"/> Mos.
FST Interval	<input type="text"/> Mos.
Scratchpad	<input type="text"/>
Ship Date	MM/DD/YYYY
Install Date	MM/DD/YYYY
Last Inspection Date	MM/DD/YYYY
Last Service Date	MM/DD/YYYY
PST Due Date	MM/DD/YYYY
FST Due Date	MM/DD/YYYY

Identification			
Owner	<input type="text"/>	Inlet Size	<input type="text"/>
Site	<input type="text"/>	Inlet Class	<input type="text"/>
Unit	<input type="text"/>	Inlet Type	<input type="text"/>
Manufacturer	<input type="text"/>	Outlet Size	<input type="text"/>
Current Model	<input type="text"/>	Outlet Class	<input type="text"/>
Orifice	<input type="text"/>	Outlet Type	<input type="text"/>
Service <input type="text"/>			
Restricted Lift <input type="checkbox"/>		Bellows <input type="checkbox"/>	Pilot Valve <input type="checkbox"/>

Assembly Nameplate			
Original Model	<input type="text"/>	Set Pressure	<input type="text"/>
Serial Number	<input type="text"/>	CDTP	<input type="text"/>
ASME Code	<input type="text"/>	Back Pressure	<input type="text"/>
Assembled By	<input type="text"/>	Temp. Correction	<input type="text"/> %
Assy. Location	<input type="text"/>	Capacity	<input type="text"/>
Assembly Date	MM/DD/YYYY <input type="text"/>	Over Pressure	<input type="text"/> %
User Defined	<input type="text"/>	Operating Pressu	<input type="text"/>

Certifications			
NB Marking <input type="checkbox"/>	PED <input type="checkbox"/>	CRN <input type="checkbox"/>	
TPED <input type="checkbox"/>	UL <input type="checkbox"/>	TS <input type="checkbox"/>	
CUTR <input type="checkbox"/>	FM <input type="checkbox"/>	NORSOK <input type="checkbox"/>	
Other Certification <input type="text"/>			

Material Specifications			
Spring Valve Assembly			
Valve Body	<input type="text"/>	Bonnet	<input type="text"/>
Seat	<input type="text"/>	Nozzle	<input type="text"/>
Gasket	<input type="text"/>	Spring	<input type="text"/>
		Bellows	<input type="text"/>

Service Details			
Repaired By	<input type="text"/>	VR <input type="checkbox"/>	Set Pressure <input type="text"/>
Repair Location	<input type="text"/>		CDTP <input type="text"/>
Last Repair ID#	<input type="text"/>		Back Pressure <input type="text"/>
Service Interval	<input type="text"/>	Mos. <input type="text"/>	Orifice <input type="text"/>
Last Service Date	MM/DD/YYYY <input type="text"/>		Capacity <input type="text"/>
Last Test Date	MM/DD/YYYY <input type="text"/>		
Service Due Date	MM/DD/YYYY <input type="text"/>	New Model <input type="text"/>	
Service Life	<input type="text"/>	Original Date	<input type="text"/>

Other Documentation	
Scraphpad	<input type="text"/>
Ship Date	MM/DD/YYYY <input type="text"/>
Install Date	MM/DD/YYYY <input type="text"/>

# PRV Adoption – Improving Offshore Safety Compliance

## Operational Challenges

PRVs must be tested annually. BSEE authorities **require proof of testing** during inspections. **Nameplates** and **repair tags** maybe **missing** & service records not updated at platforms.



## Emerson Solution

Customer Facility **standardized on Asset Management Tags (RFID)** for **PRV Spare Pool** on **all Gulf Platforms**:

- 400 PRVs with AMTs/year
- 2,000 PRVs with AMTs total

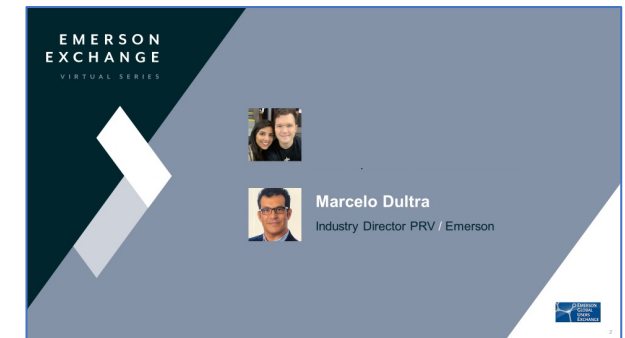


## Impact on Operations

AMTs provide **easy identification** and **store PRV service record**, ensuring **safety compliance** while **improving maintenance** and **reducing costs**.

## Value to Emerson

- Over 600 tags installed off-shore
- Opportunities at other sites
- Presented at EGUE 2020



Questions ?



# Special Thanks

- RFID4U
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# THANK YOU

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