



## ISA100 WCI Webinar

Webinar date: March 10, 2021

The presentation will begin at 11:00 EST (UTC-5)

# Digital Transformation of your Steam System

Presenters:



**Philippe Moock**

[pmoock@armstronginternational.com](mailto:pmoock@armstronginternational.com)

**YOKOGAWA** 

**Satoshi Kanazawa**

[Satoshi.Kanazawa@yokogawa.com](mailto:Satoshi.Kanazawa@yokogawa.com)

# Agenda

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1. About the speakers
2. Introduction Industrial Wireless
3. ISA100 Wireless Industry Standard
4. What is the objective?
5. Steam System Issues
6. Wireless Monitoring Solutions
7. Achieving the objective
8. Conclusion



# About the Speaker



## Philippe Moock

Global Director Smart Services Group  
Armstrong International

Philippe started his career in factory automation before joining Armstrong in 2011. He currently leads the “Smart Services Group” focused on digital transformation of thermal utilities and providing insights to optimized them.

He hold a master in mechanical engineering from Belgium where he is from as well as an MBA from the US. Citizen of the world, he has lived and worked in Belgium, Florida, India, and China before moving to Michigan in 2017.

He has also frequently traveled for business, optimizing customers’ thermal utilities, in Middle East, Asia, and Africa.

His promise is to deliver intelligent system solutions that improve utility performance, lower energy consumption and reduce environmental emissions while providing an enjoyable experience.

# About the Speaker



## Satoshi Kanazawa

Product Specialist – ISA100 Wireless  
Yokogawa Electric Corporation

Satoshi started his carrier in 2004 as hardware developer of DCS components. Afterward, he participated Standardization of industrial wireless at ISA and IEC, and marketing activities of ISA100. His current role is international sales, technical support, and solution development of ISA100 Wireless.

According to YOKOGAWA Philosophy, to provide the wireless solution of Energy management, Measurement and Control, and safety, will be contributed directly for industry and society.

\* YOKOGAWA Philosophy: Our goal is to contribute to society through broad-ranging activities in the areas of measurement, control, and information.

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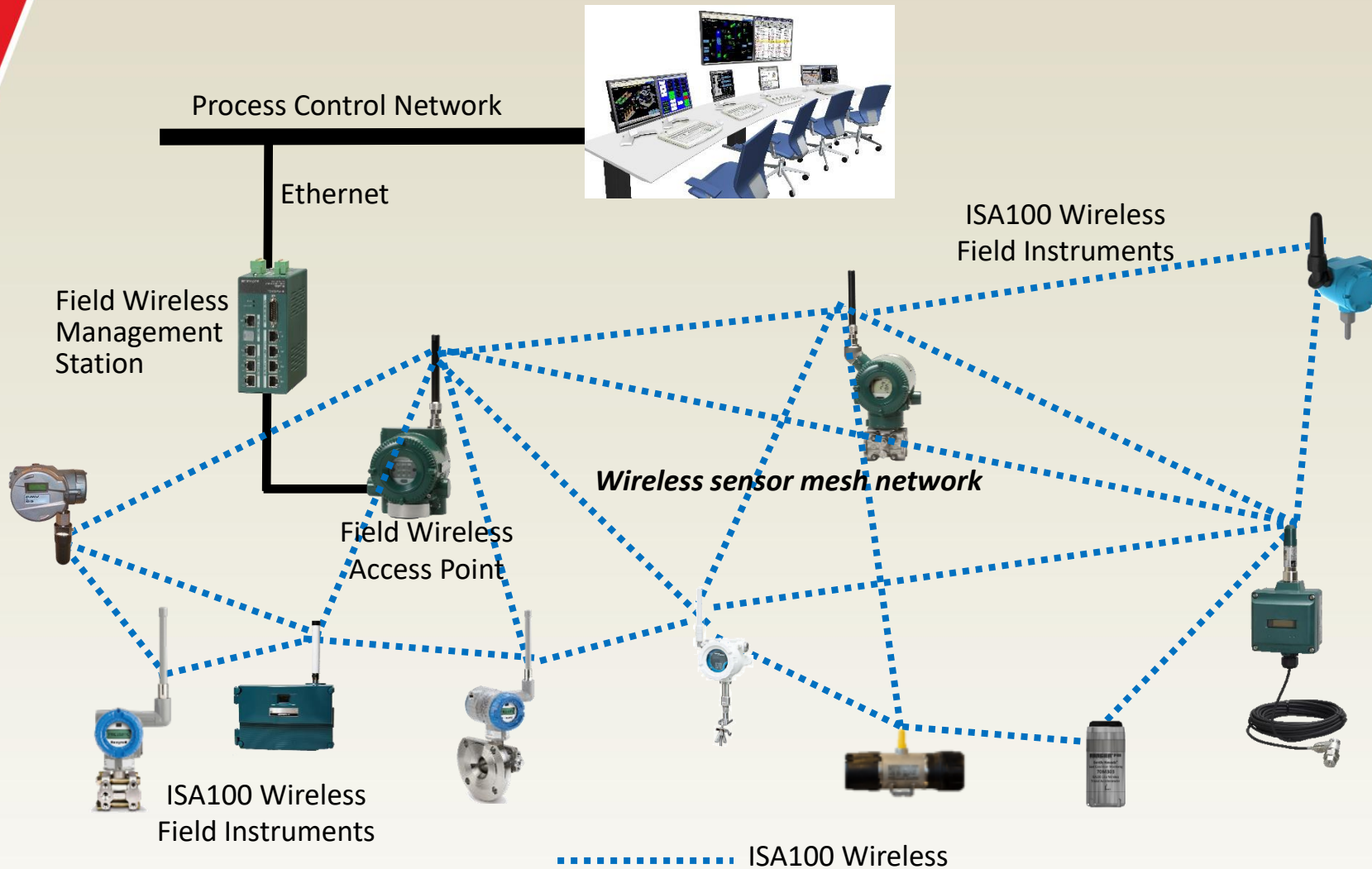
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# Introduction to Industrial Wireless



## Applications examples

- Machine health monitoring
- Basic process control
- Monitoring of well heads
- Remote process monitoring
- Leak detection monitoring
- Diagnosis of field devices
- Condition monitoring of equipment
- Environmental monitoring
- Tank level monitoring
- Gas detection
- Fuel tank gauging
- Steam trap monitoring
- Open loop control
- Stranded data capture
- And more

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# ISA100 Wireless Fast Facts

- International standard IEC 62734 since 2014
- Complies with ETSI EN 300 320 v1.8.1 (LBT)
- End-User Driven Standard - meeting all current and future industrial needs
- Sensor routing or field routers for best performance – Freedom of choice
- Broad Multi-Vendor Portfolio of ISA100 Wireless Devices
- ISA100 Wireless enables SIL-2 Certification
- Ensured Interoperability - best-in-class solutions from best-in-class suppliers
- Readily available ISA100 Wireless Modules and Stacks
- Enable fast-track development and go to market







# Benefits of ISA100 Wireless Instrumentation


Cost Savings	<ul style="list-style-type: none"><li>• Up to 90% of installed costs of conventional measurement technology can be for cable conduit and related construction</li><li>• Typically: 1/2 the costs, 1/5 of the time</li><li>• New and scaled applications are now economically feasible</li></ul>
Improved Reliability	<ul style="list-style-type: none"><li>• Wired sensors may be prone to failure in difficult environment</li><li>• Wireless can add redundancy to a wired solution</li></ul>
Improved Visibility	<ul style="list-style-type: none"><li>• Condition monitoring of secondary and remote equipment</li><li>• Process monitoring, fast additional data for trouble shooting</li></ul>
Improved Control	<ul style="list-style-type: none"><li>• Add wireless to existing processes for more optimal control</li></ul>
Improved Safety	<ul style="list-style-type: none"><li>• Safety related alarms - end to end SIL2 certifiable</li></ul>


# ISA100 Wireless Product Portfolio



## Infrastructure

 **Independent Gateway**  
• Honeywell, Yokogawa 


 **Access Point (AP)**  
• Honeywell, Yokogawa 


 **Integrated Gateway/AP**  
• Honeywell, Yokogawa, CDS, Nexcom


 **GW/AP + Recorder**  
• Yokogawa



 **Adapter (HART, etc.)**  
• Honeywell, Yokogawa 

## Measurement & Control

 **Temperature**  
• Honeywell, Yokogawa 



 **Pressure / Flow**  
• Honeywell, Yokogawa



 **Level**  
• Honeywell, Yokogawa



 **DI/DO, AI**  
• Honeywell, Yokogawa 


 **Valve Position**  
• Eltav, Flowserve, Honeywell 


## HSE + Life cycle

 **Corrosion**  
• RCS, Honeywell 

 **Steam Trap**  
Armstrong, Bitherm, Spirax Sarco, TLV 

 **Vibration**  
• GE's Bently Nevada, Divigraph 

 **Gas**  
• GasSecure, Scott Safety, New Cosmos, Riken Keiki

 **pH**  
• Honeywell, Yokogawa

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# What is the objective?

- Improve **Reliability** of process
- Increase **Safety** of the system
- Reduce **Energy Losses**

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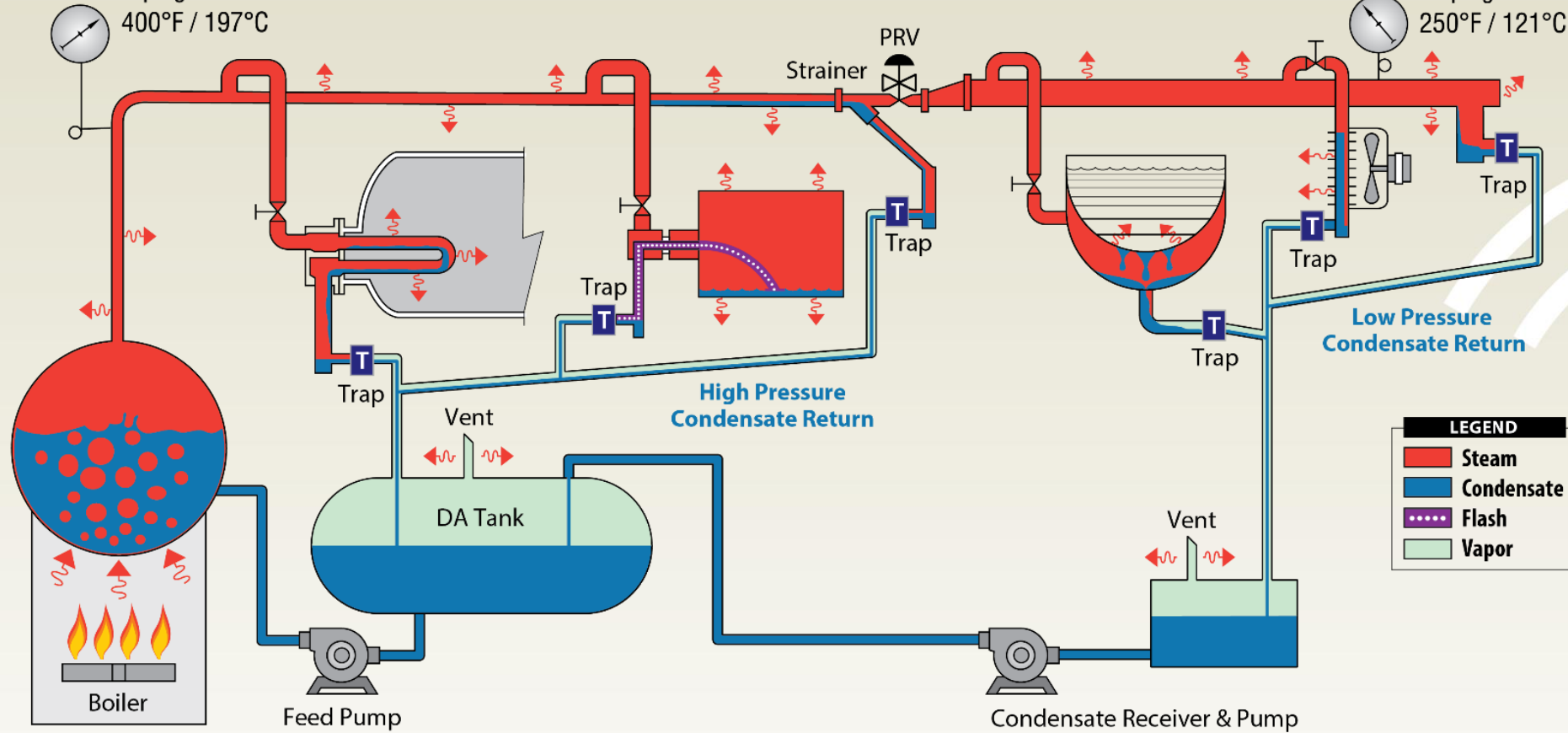
# Typical Steam and Condensate loop

## High Pressure Steam

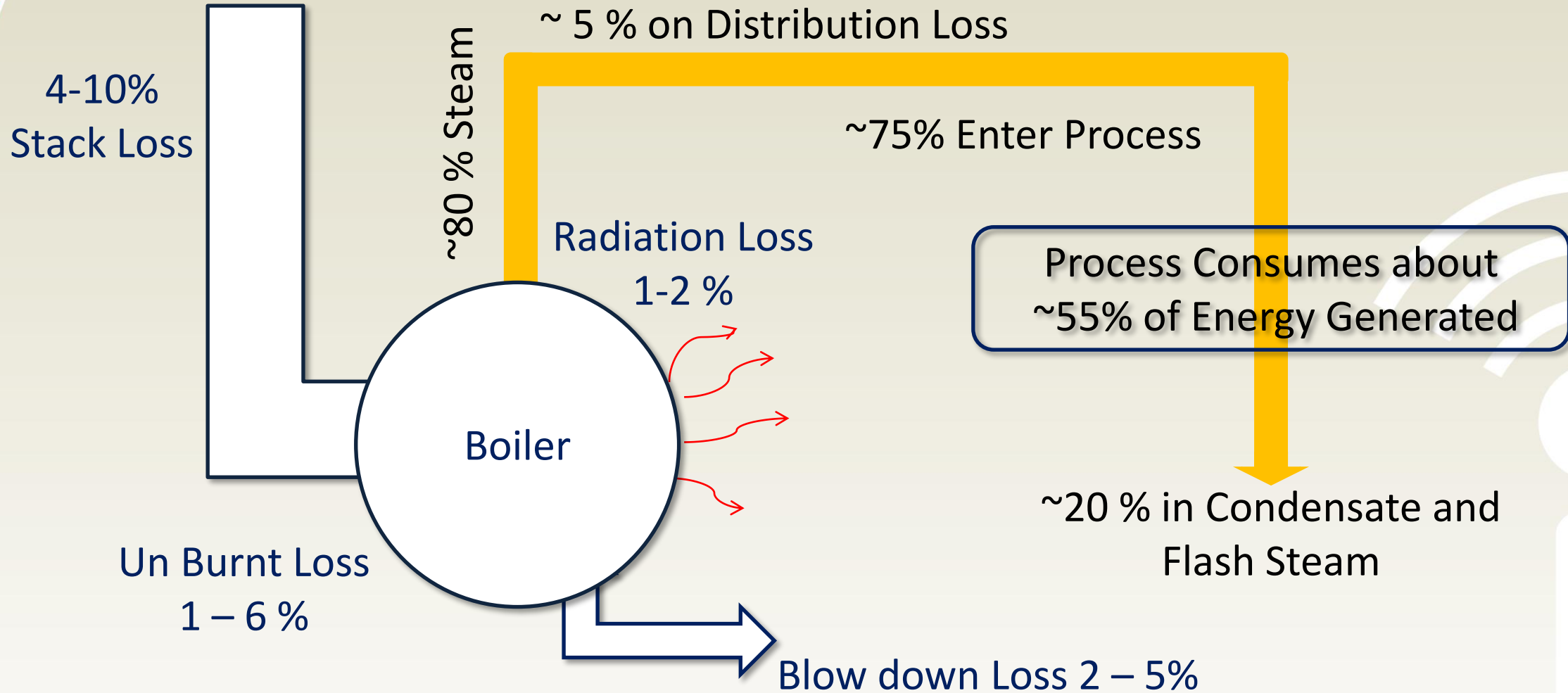
200 psig / 13.8 bar  
400°F / 197°C

## Low Pressure Steam

15 psig / 1 bar  
250°F / 121°C



# Typical Steam and Condensate loop



# Steam Losses [lb/day]

Orifice	psig							
	15	30	60	100	150	250	400	600
#60	31	46	77	118	169	272	427	632
3/64"	42	63	106	162	233	374	586	869
1/16"	75	112	188	288	414	665	1,042	1,544
5/64"	117	175	293	450	646	1,039	1,628	2,413
3/32"	168	253	422	648	931	1,496	2,344	3,474
#38	197	296	495	760	1,091	1,754	2,747	4,072
7/64"	228	344	575	882	1,267	2,036	3,190	4,729
1/8"	298	449	751	1,153	1,655	2,660	4,167	6,177
9/64"	378	568	950	1,459	2,095	3,366	5,274	7,817
5/32"	466	702	1,173	1,801	2,586	4,156	6,511	9,651
11/64"	564	849	1,419	2,179	3,129	5,029	7,878	11,678
3/16"	671	1,011	1,689	2,593	3,724	5,984	9,376	13,897
7/32"	914	1,376	2,299	3,530	5,068	8,145	12,761	18,916
1/4"	1,194	1,797	3,002	4,610	6,620	10,639	16,668	24,706
9/32"	1,511	2,274	3,800	5,835	8,378	13,465	21,095	31,269
5/16"	1,865	2,807	4,691	7,203	10,343	16,623	26,043	38,603



\$10/1,000lbs

↓

\$ 6,000/year

Blow-Thru steam trap, Outlet Pressure < (Inlet Pressure/2) - Source: AM0017 <http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>



# Steam Trap Failure

If the steam trap **fails open** (Leaking or Blow-Thru):

- Increased back pressure.
  - Reduced flow for surrounding steam traps.
- Steam losses (monetary losses).
- Safety issue.
- Environmental issue...

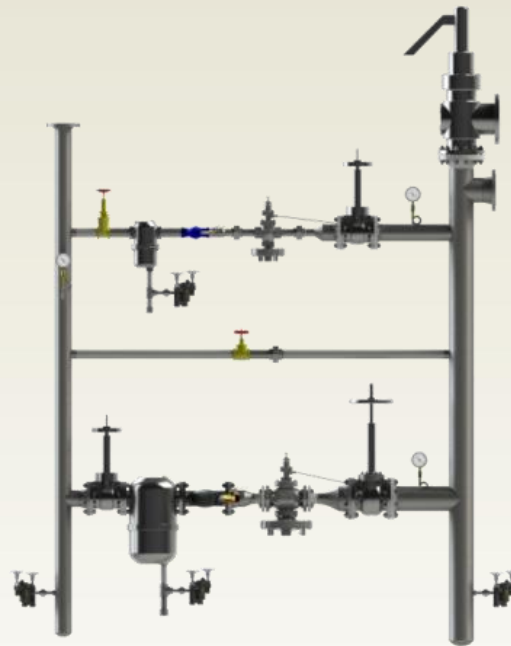
If the steam trap **fails closed** (Cold):

- Wet steam.
  - Water hammering.
  - Damaged turbine LP saturated steam stage.
  - Piping corrosion.
  - Erosion on valves, reducers ...
- “Stalling” or flooded heat exchanger.
  - Decrease in production.
  - Reduced heat transfer.
  - Batch process losses.
  - Thermal stress...



# Steam Valves

- Notification of release to flare to significantly mitigate emission losses
- Identification of occurrence location for quick response to process upset
- Ability to detect “sizzling” of relief valve for proactive maintenance scheduling
- Pre-emptive warning of hazardous vapor releases
- Bypass valve left open
- Control valve leaking



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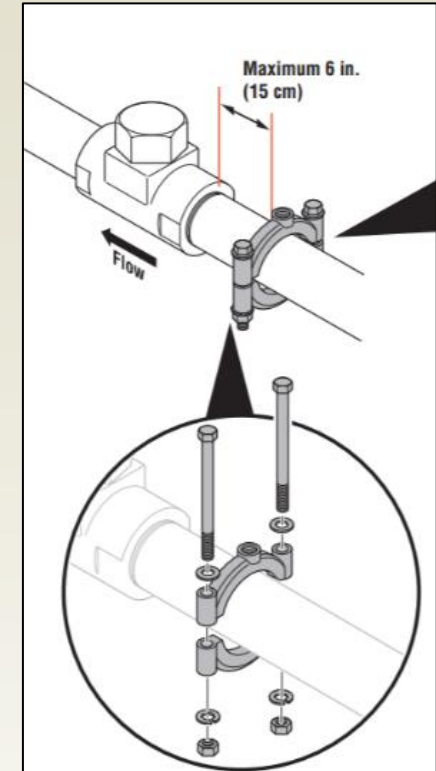


# Armstrong Intelligent Monitoring (ATM®)



- ST6700 model
- Launched in 2016
- NAMUR NE107 compliant
- 5-year battery life
- Non-intrusive installation
- Class I, Division 1, Zone 0

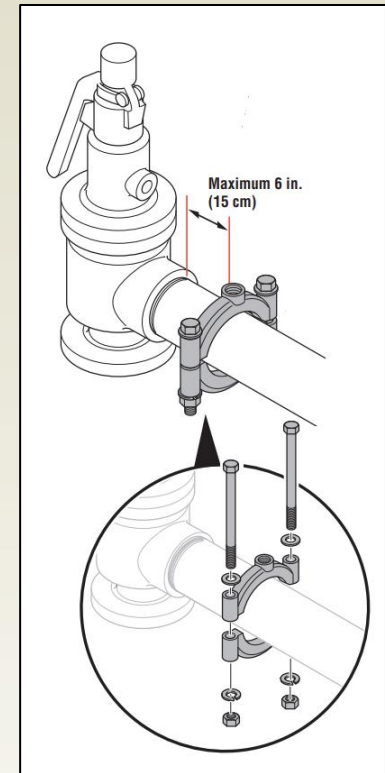
Channel	Description
#9	Steam Trap Condition: 1=OK, 2=COLD, 3=BLOW-THRU
#10	Current Temperature (°C or °F)
#11	Temperature (°C or °F)
100+ NAMUR NE107 diagnostics available	



# Armstrong Intelligent Monitoring (ATM®)



- AD6000 model
- Launched in 2021
- NAMUR NE107 compliant
- 5-year battery life
- Non-intrusive installation
- Class I, Division 1, Zone 0



Channel	Description
#9	Acoustic Level Counts
#10	Stem Temperature (°C or °F)
#11	Occurrence Counter
#12	Occurrence Duration
100+ NAMUR NE107 diagnostics available	

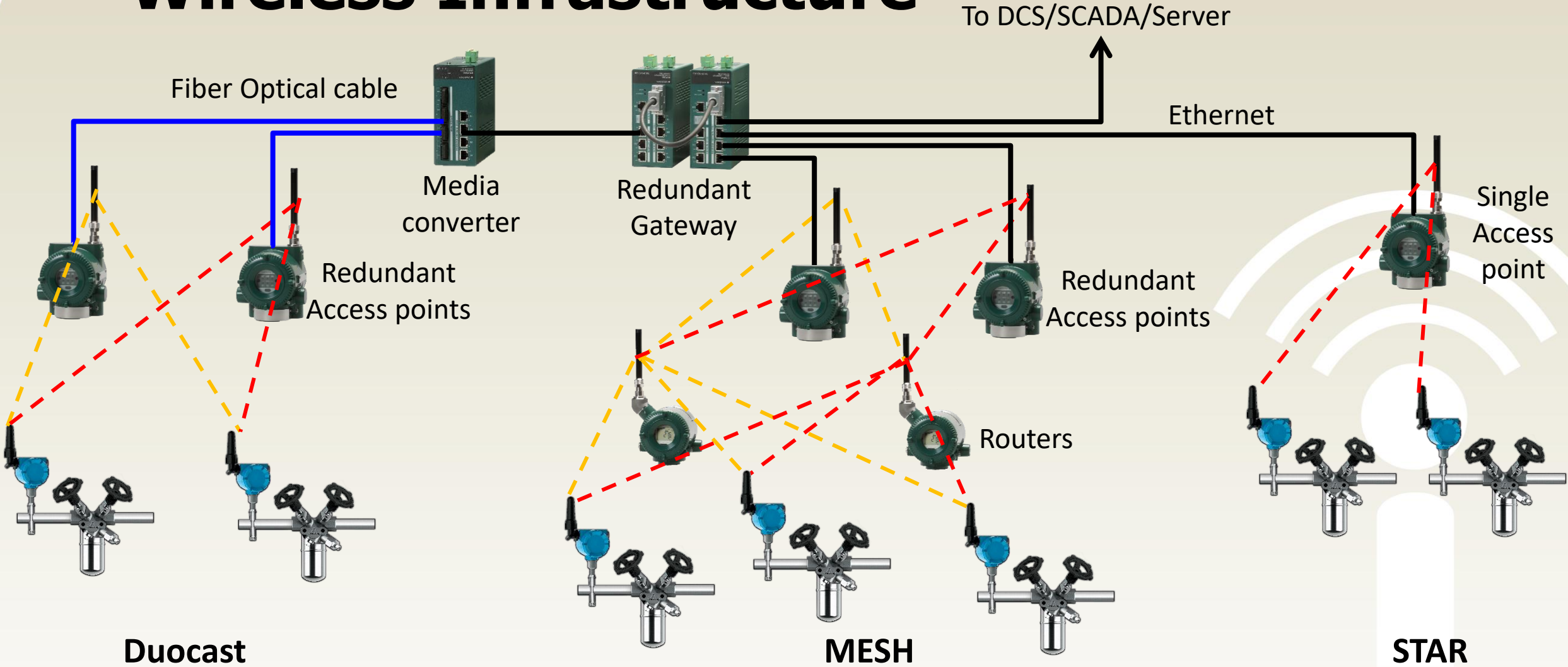
# YOKOGAWA's wireless transmitters



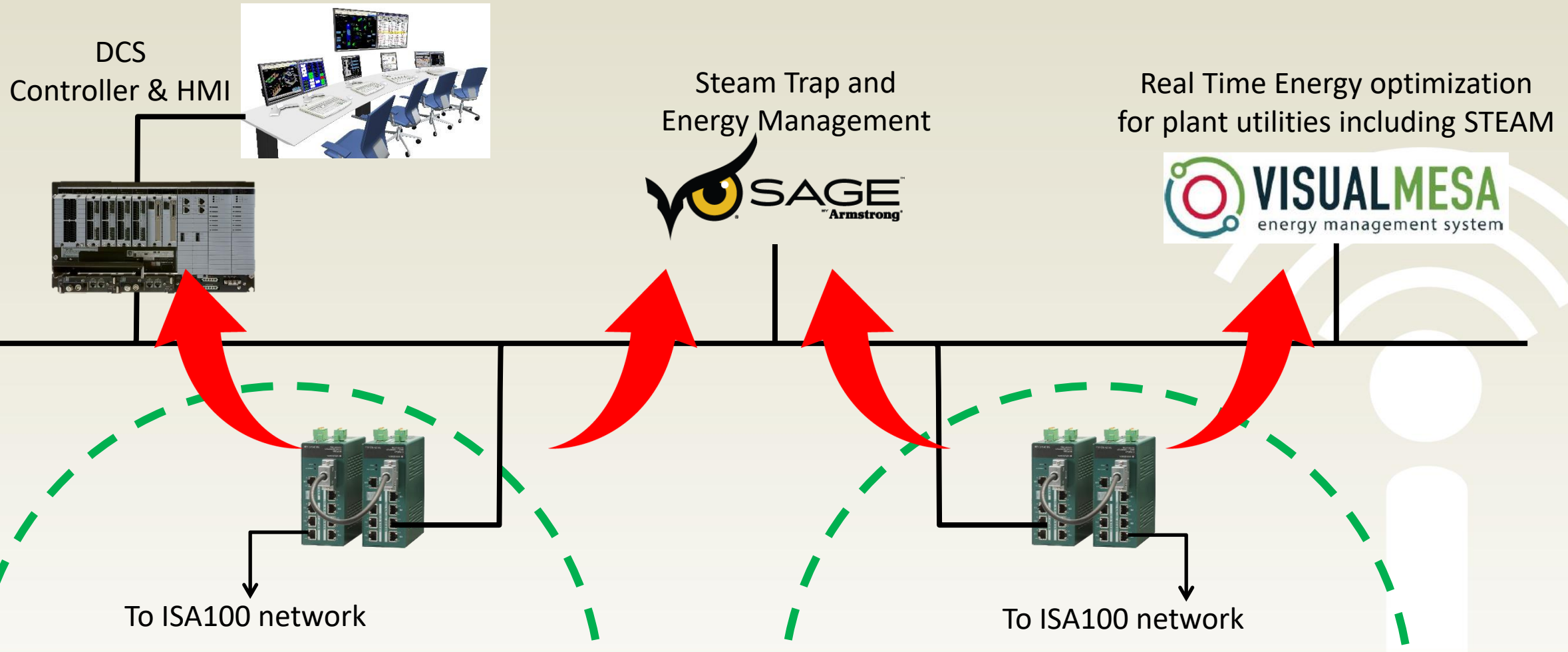
- EJX-B series Wireless Differential Pressure/pressure Transmitter
  - YTA510 Wireless Temperature Transmitter
  - YTMX580 Multi-Input Temperature Transmitter
  - FN series wireless adaptor
- 
- Utilizing Wireless Infrastructure of Steam Trap Monitoring, it is easier to add more sensors to expand monitoring points



# Wireless Infrastructure



# System Architecture

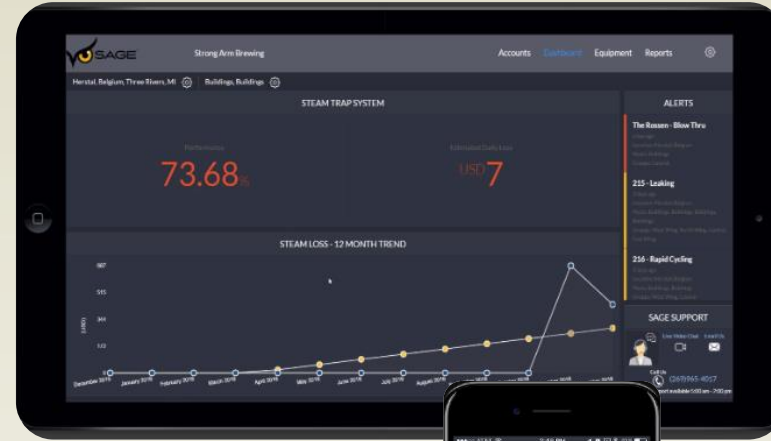






# Armstrong SAGE<sup>®</sup> Software

- Energy Loss Measurements
- Emission Loss Measurements
- Historical Reporting
- Trend Analysis
- Maintenance Work Order Reports
- Performance
- Monetary losses
- Testing methods
- Multiple inputs (manual, UMT, wireless monitoring)
- Global facility integration (benchmarking)
- ...



Tag ID	Status	Latest Test
213	BT	Nov. 10, 2016
214	OK	Nov. 10, 2016
215	PL	Nov. 10, 2016
216	OK	Nov. 10, 2016
987	UNK	Nov. 10, 2016



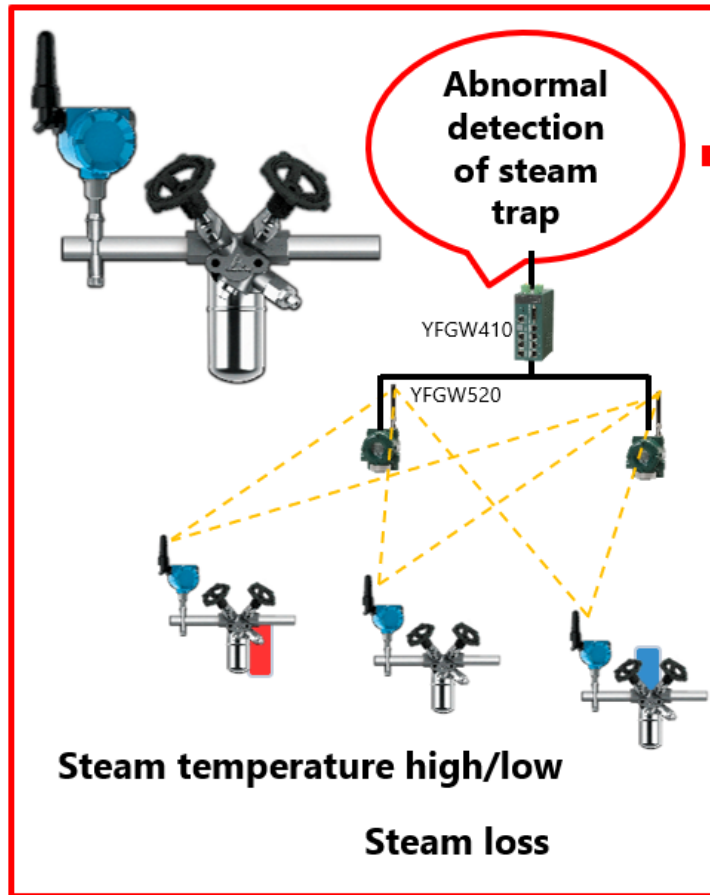
# Armstrong SAGE® Software





# KBC's Visual MESA

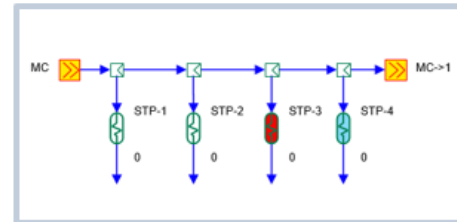
## Steam Trap Monitoring



## Visual MESA-EM



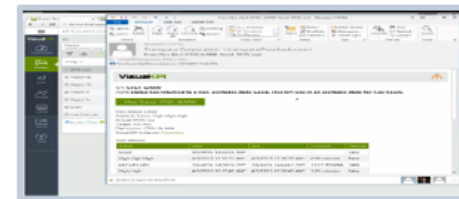
### Alert location display



### Steam leakage cost report

Service	Load	Demand		
Power Plant Export	100.00	0.00	1.12	100.00
Fired HP Steam	85.00	600.00	369.40	85.00
Waste Heat HP Steam	85.00	0.00	160.15	85.00
Waste Heat MP Steam	100.00	150.00	147.00	100.00
Waste Heat LP Steam	100.00	50.00	0.01	100.00

### e-mail alert (option)



\*KBC a Yokogawa Company

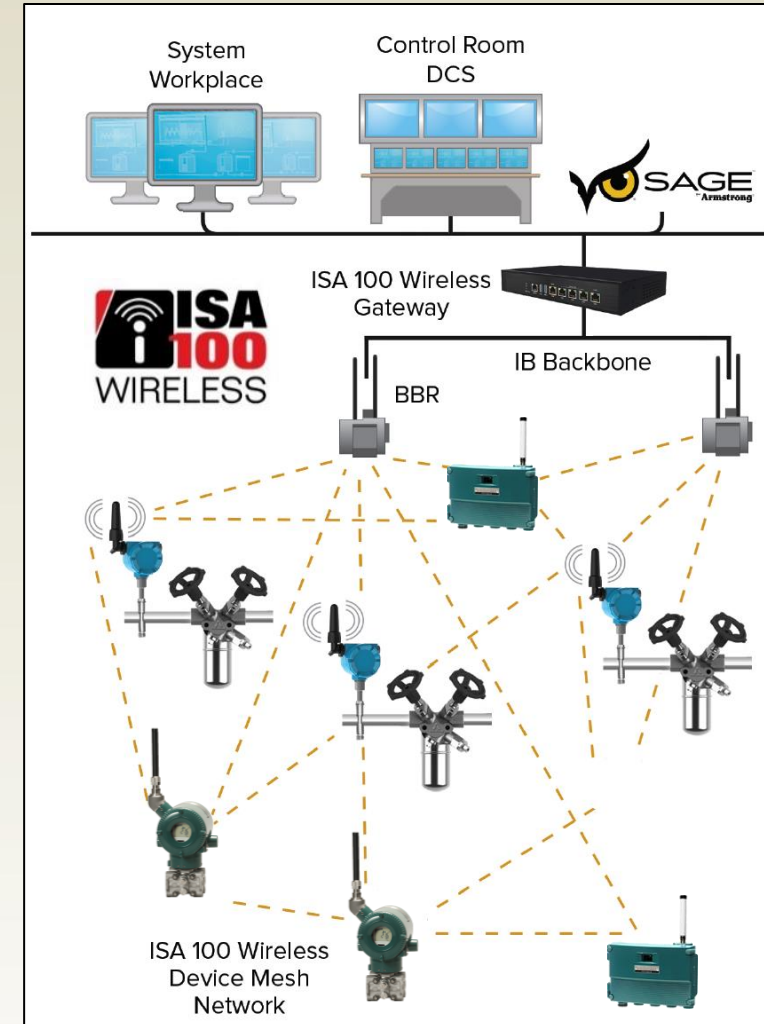
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# ISA100 Network

- Ability to do both Mesh and Star network
- Duocast network for redundant communication
- Scalability of the steam system monitoring
- 24/7 monitoring vs. point of time
- Quickly identify a failure (what, when, and where)
- Avoid unplanned downtime
- Cut labor cost and free up maintenance resources
- Increase efficiency
- Reduce energy consumption
- Short payback due to high cost of steam
- Additional devices will strengthen any existing network



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# ISA100 Wireless Adoption Development Eco-system

## WCI ISA100 Wireless Rapid Development Kit

- Everything you need to develop an ISA100 Wireless (IEC 62734) connected field instrument
- Develop ISA100 Wireless (IEC 62734) compliant and certifiable field instruments with minimal effort using application layer code provided
- Includes reference hardware design for ISA100 Wireless (IEC 62734) field instrument implementation
- Certified WISA modules run ISA100 Wireless communication stack
- User friendly SPiN development board includes OLED display and a large variety of sensors



<https://centerotech.com/product/wci-isa100-rapid-development-kit/>



# Online Resources

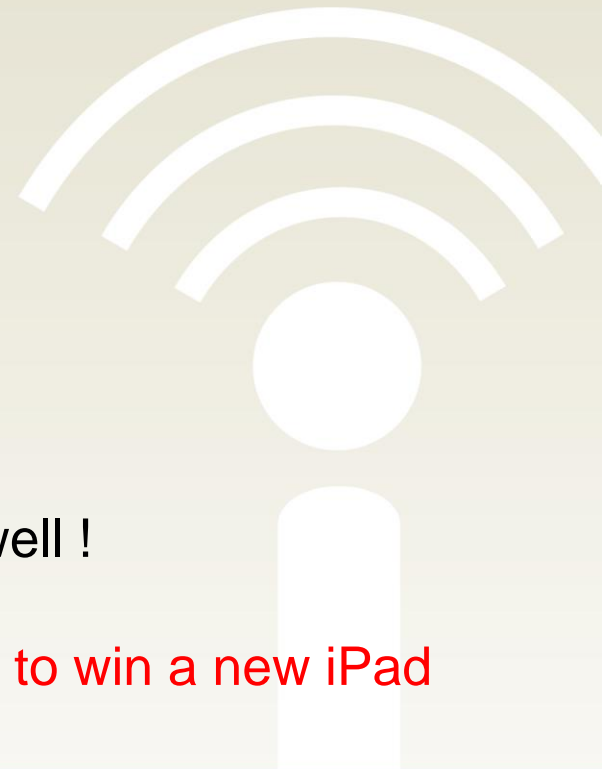


[www.isa100wci.org](http://www.isa100wci.org)

- Learning Center with White Papers
- Articles, End-user stories, Forum
- Receiving over 20,000 web views per month
- Full list of certified/registered ISA100 Wireless devices
- And more useful content for you and your business

**LinkedIn** [ISA100 Wireless Interest Group](#)

- Latest news, end-user and expert discussions, insights
- 1100 members and growing; please join and invite your peers to join as well !
- Receiving over 5,000 web views per month
- **Limited Time Offer: Join the group and you will be entered in a prize draw to win a new iPad**



# ISA100 Wireless Interest Group

## Limited Time Promotion



Scan the QR code and join the ISA100 Wireless LinkedIn group. If you join during our limited time offer, you will be entered in a prize draw to win a new iPad!



# Questions?

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[www.isa100wci.org](http://www.isa100wci.org)



[ISA100 Wireless Interest Group](#) 

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