

BAHX Core performance monitoring using ISA 100.11a compliant wireless Temperature Transmitters

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Date : 14th Feb 2013

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- **Objective**
- **Background**
- **Action Plan**
- **Cost Savings & Benefits of wireless**
- **Technology Selection**
- **System Architecture**
- **Wireless Network Topology**
- **Why Chose ISA100.11a?**
- **Why Yokogawa?**
- **Summary**

Brazed **A**luminum **H**eat **E**xchanger is a critical component of LNG production and hence its reliability & availability is of prime importance

Inlet & Outlet individual core temperatures of the BAHX were to be monitored to determine the performance of the core and subsequently its life cycle

- Brown field location
- Thermo wells could not be installed on BAHX Hot & Cold outlet piping due to high costs
- Cable trenching , laying , termination was not economical
- Several spare points in the DCS had to be used

Project Details

- 80 Nos (40+40) of Temperature Measurements for (5 + 5) BAHX of LNG Super Trains 6 & 7 were to be taken

Instrument Requirements

- Temperature Sensors
- Temperature Transmitters
- Data Availability in existing DCS / RTIS

Cost Savings & Benefits of wireless

- No usage of cables between field transmitter and DCS
- Modbus TCP integration with DCS
- Ease of installation , commissioning & testing
- Ease of maintenance & trouble shooting

Technology Selection

Temperature Transmitter

- Being a brown field project it was cost beneficial to adopt Wireless Technology
- Available Wireless Standards were reviewed
 - ***ISA100.11a (Selected)***
 - Wireless HART



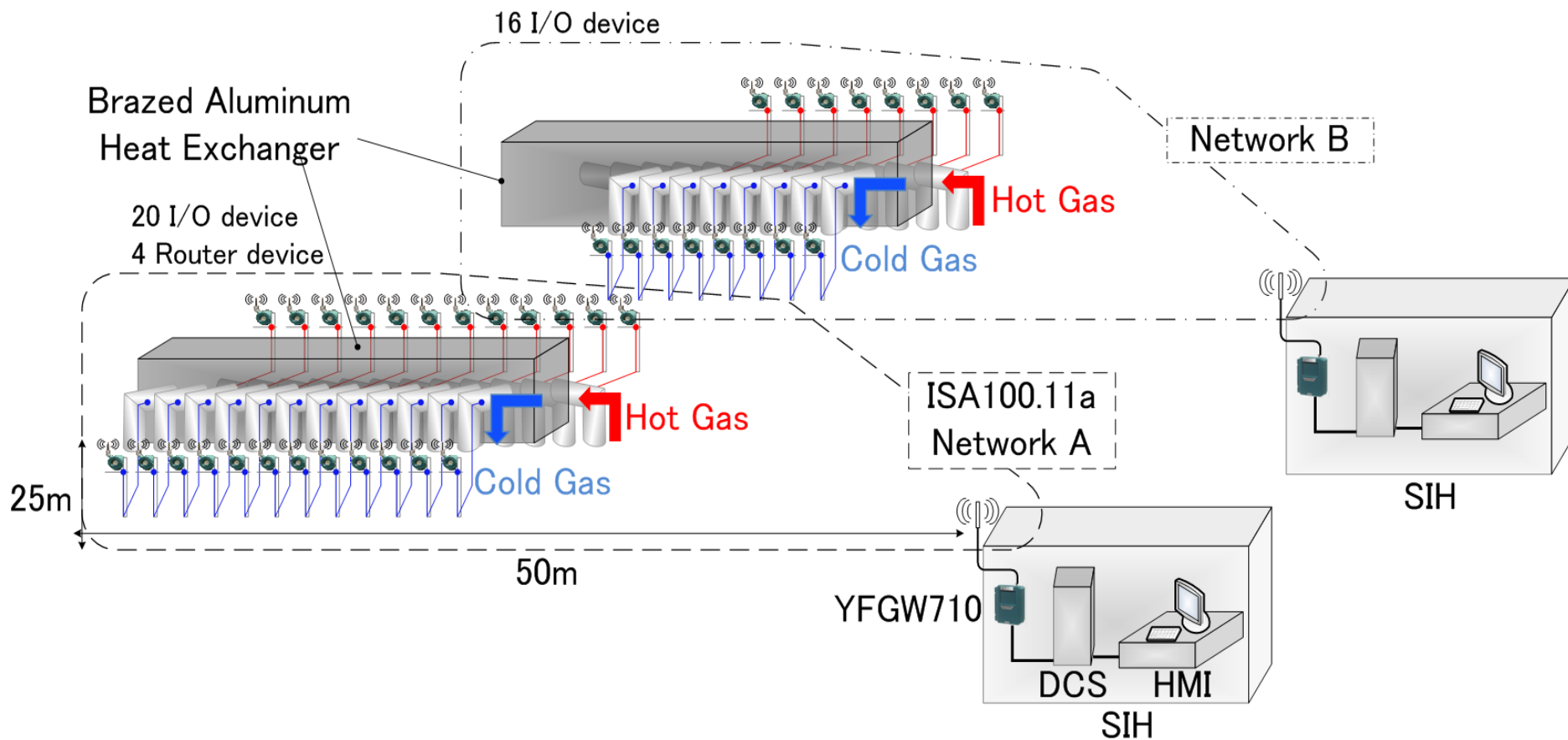
Temperature Sensor

- Due to cost & technical complications involved in installing thermo well , Skin Type Clamp On RTD was selected

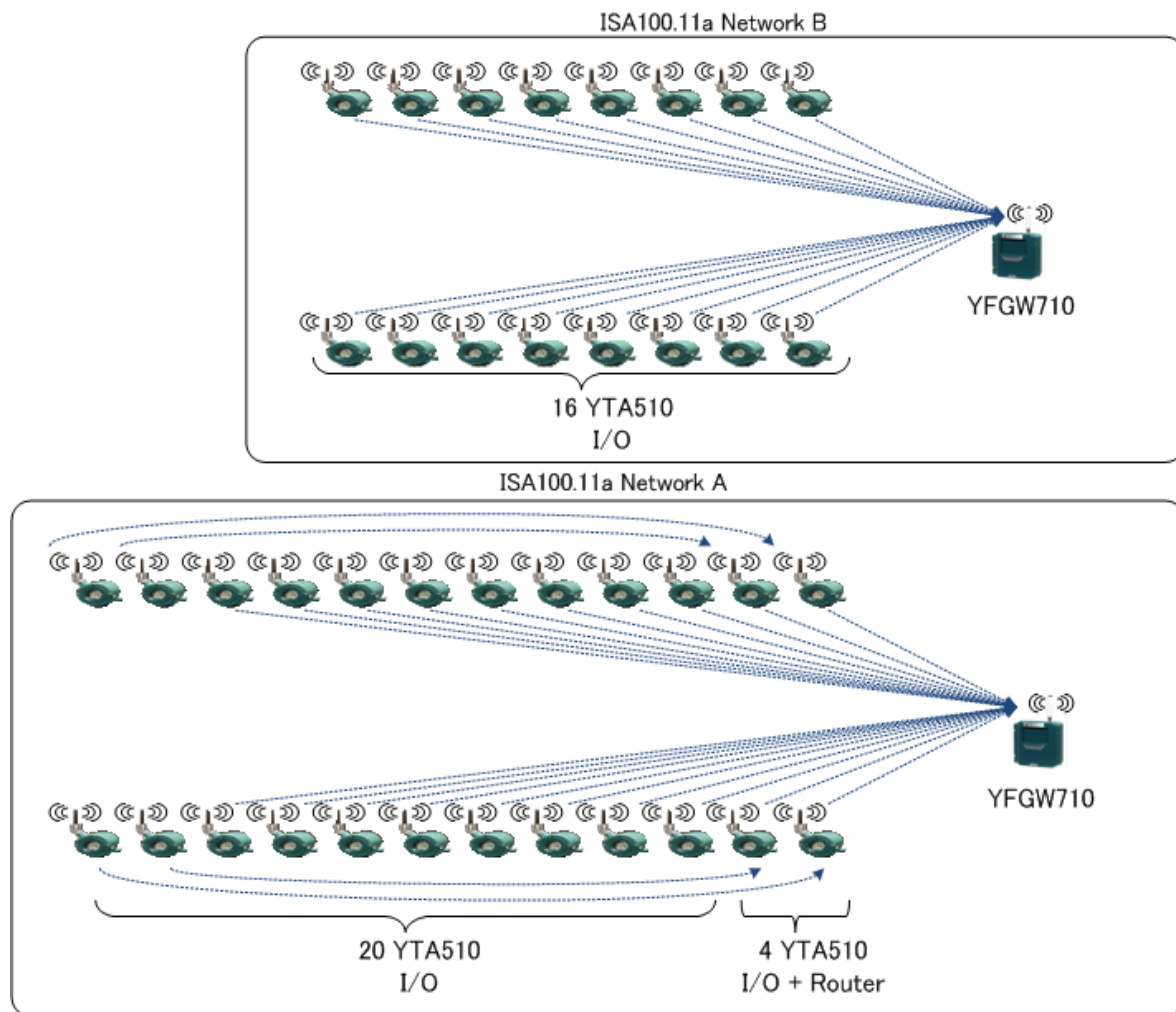
DCS Connectivity

- Integration with Existing DCS / RTIS via the Wireless Gateway through Modbus TCP

System Architecture



Wireless Network Topology



ISA100.11a compliant wireless TT



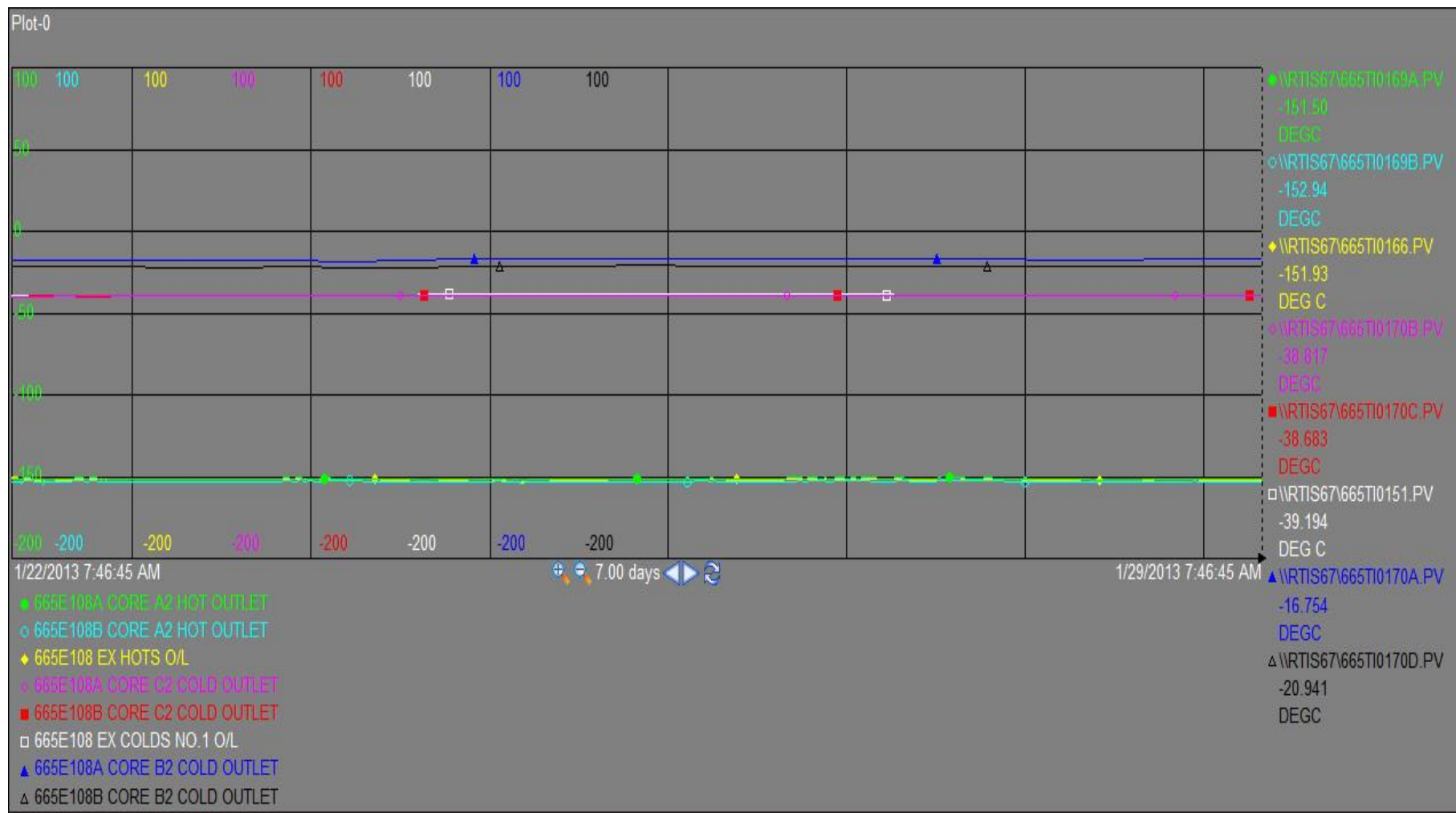
ISA100.11a compliant wireless TT



ISA100.11a compliant wireless TT



ISA100.11a compliant wireless TT



Why Chose ISA100.11a?

- **Adaptive Network Topology**
 - Network Topology Selection (STAR, MESH, Star-Mesh etc.) with ISA100.11a
- **Fast Update Time**
 - Fast Update Time with ISA100.11a Protocol, In addition multiple update timing from multiple devices.
- **Unified Application Interface**
 - Ensures an open and interoperable application environment provided a common integration point for multiple-host systems.
- **Robust Security**
 - Wireless Data protected with AES 128 block-cipher secure communication and device authentication enabled by exchange of secret keys and unique device identifiers.
- **Reliable Low Power Communication**
 - Based on IEEE 802.15.4 radio operating at 2.4 GHz ISM band time synchronized, Channel Blacklisting and hopping to sidestep RF interference and minimizing the power consumption.

Why Yokogawa?

- **Robust in Dense Plant Environment.**
 - Yokogawa's Wireless equipment are robust in dense plant environment with low Packet Error Rate.
- **Fast Update time**
 - 1 Sec to 3600 Sec
- **Open Battery Concept**
 - Batteries are available world-wide, and can be procured by Ras Gas directly.
- **On-line Battery Replacement**
 - Battery pack is replaceable in Hazardous Area
- **Long Battery Life**
 - More than 10 year with Scan time of 30 Sec.
- **Long distance Communication with Low PER**
 - 600 Meters with 0% Packet Error rate

- The first wireless application – BAHX core performance monitoring using ISA100.11a compliant wireless TT was successfully implemented and all operational objectives were met
- ISA100.11a as a plant wide Wireless Standard adopted for all future wireless applications
- Based on the LNG super Trains 6 & 7 wireless installation results , Several major wireless application projects are currently underway

QUESTIONS.?

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