

Improving Asset Management and Safety of Offshore Platform

Field Testing of Long Distance ISA100 Wireless Transmitter and Wireless Gas Detector

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Content





Introduction

Petroliam Nasional Berhad (**PETRONAS**) is Malaysia's fully integrated oil and gas multinational with proven capabilities in a broad spectrum of the petroleum value chain. Building on the success of managing Malaysia's oil and gas field resources, PETRONAS has grown into a major global oil and gas company.











Field Testing of Long Distance ISA100 Wireless Transmitter and Wireless Gas Detector DEIC/DE/P&E/TG Ali Azizan Maamor ©Petrol

20 countries

Presence in more than

Global Business Dimensions:

- 91 partners
- Over 15,000 employees
- More than 80 development projects
- 130 rigs onshore and offshore
- 23 FPSO / FSO
- 6 major LNG projects
- 4 unconventional assets



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Project Background

Goal

PETRONAS

Ali Azizan Maamor

• To improve safety and reliability of asset management

Objectives

- To assess the performance of long distance communication of ISA100.11a wireless system in offshore environment
- To test the performance and interoperability of ISA100.11a wireless gas detector



Demonstrate the reliability, interoperability, and delivery of full wireless functionality over long distance for improving asset management and safety performance.

Project Background

- Zuhal unmanned, platform with minimal facilities located 130km offshore in the South China Sea, Sabah, Malaysia
- Sumandak platform is 5km away from Zuhal

This site was selected for the following reasons;

- On-going fast track project with minimal facilities
- No gas detectors installed on site
- Harsh offshore environment and weather condition
- Possibility to test the communication reliability over 5km distance offshore





Field Testing of Long Distance ISA100 Wireless Transmitter and Wireless Gas Detector DEIC/DE/P&E/TG Ali Azizan Maamor Zuhal and Sumandak Offshore Platforms

Project Execution & Installation

Timeline

- Offshore Installation & commissioning - May 2014
- Field Test & Monitoring May 2014 – Jan 2015

Challenges

- Offshore installation
- Harsh environment
- Congested steel structures
- Long distance over sea surface
- Coordination various parties/equipment





System Architecture



ISA100 Wireless System Hardware

- □ Gateway: 1 pcs
- □ Access Point: 2 pcs
- □ Wireless Pressure Transmitter: 3 pcs
- □ Wireless Gas Detector: 3pcs

- □ Repeater: 4 pcs
- □ High Gain Antenna: 4 pcs
- □ Antenna Extended Cable: 4 pcs
- □ FAST/TOOLS: 1 pcs



Field Installation



Wireless Pressure Transmitters



Field Installation





Wireless Gas Detector



Field Installation









HMI Station





Field Test Result



RSSI & PER

The ISA100 wireless system reliability, interoperability, and stability were put on test for six (6) months by monitoring the Received Signal Strength Indicator (RSSI) and the Packet Error Rate (PER).

Robust and Reliable Wireless Network of 5km with Received Signal Strength Indicator (RSSI) of approximate 60dbm and Packet Error Rate (PER) of 0%

	1	letwork ID filter	A	*									
evice Tag	Network ID	Vendoe/Model	Device Role	Join Status	Operation Status	Primary Router	R53(P)	PER(P)	Secondary Router	RSSI(S)	PER(S)	BatteryLife	Power Supply Status
5501-131	101	6580/6901	10	Falljon(1)	Published	YTA510-2-2	-57dBm	0%	VTA\$10-1-2	-68d8m	0%	730	100-75%
5501-239	101	G58C/G901	10	Full join(1)	Published	YTA510-2-2	-63dBm	0%	YTA510-1-2	-71d8m	0%	730	75-25%
6501-252	101	GSEC/GS01	10	Full join(1)	Published	YTA510-2-2	-60d8m	0%	YTA510-1-2	-68d8m	3%	730	75-25%
97-5900	101	YOK064WA/	10	Falljar())	Published	YTA510-2-2	-@dBm	0%	YTA510-1-2	-768n	6%	1894	100-35%
PZIT-1310	101	YOKOGAWA/	10	Full join(1)	Published	YTA510-2-2	-63dBm	0%	YTA510-1-2	-71d8m	0%	1938	100-75%
PZIT-5000	101	YOKOGAWA/	10	Full join(1)	Published	VTA510-2-2	-65dBm	0%	YTA510-1-2	-75d8m	0%	1380	100-75%
S-1-106ATY	101	VOKOGAWA/	10+Router	Fall jon())	Published	YTA510-2-9	-óódBri	0%	YTA510-1-9	-60d8m	0%	1515	100-35%
YTA510-1-9	101	YOKCGAWAA	10+Router	Fall join(1)	Published	YE6W510-1	-73d8m	0%				985	75-25%
YTA510-2-2	101	YOKOGAWA/	10+Router	Fall join(1)	Published	VTA510-2-9	-61d9 m	0%	YTA510-1-9	-67d3m	0%	1445	100-75%
YTA503-2-9	101	VOKOG4WA/	10+Router	Fulljar()	Fublished	YEG//503-2	-68dBm	0%	VFG#501-1	-74d8m	2%	815	75-25%



Interoperability



ISA100 compliance devices stay interoperable



Remote Process Monitoring

Online monitoring of N2 and Pig Valve pressure and Hydrocarbon Gas Detection at Sumandak Platform



Online Pressure Monitoring

Online Hydrocarbon Gas Detection



Device Health Monitoring



Online Diagnostic Data of Wireless Pressure Transmitter

Online Diagnostic Data of Wireless Gas Detector



Conclusion

The test has proven the capability of improving asset management and improving safety via wireless implementation.

- ISA100 wireless system stays interoperable during the six (6) months test period. The communication remained robust and stable over the 5km distance in heavy steel multi-deck structure and the harsh offshore environment with monsoon, thunder storm and high tidal differences
- □ ISA100 wireless network installation and commissioning time is only 5% to 10% of that required for a conventional wired system lower project cost
- □ ISA100 wireless implementation in offshore platform has proven to be beneficial in terms of safety, operational flexibility and cost saving as demonstrated during the testing period
- □ ISA100 as Wireless Standard is able to deliver the full wireless functionality as promised



Lesson Learnt

- ISA100 communication has been proven to be reliable for long distance communication
- RSSI and PER is a good mechanism to gauge signal reliability
- ISA100 is fully functional as mesh or star or combination topology – flexible and field configurable by user to adapt to site implementation requirement
- Interoperability is achievable by plug and play mechanism simple integration of different vendor products in the network.





Thank you