CONFIDENTIAL

SKO PINTAR & INTEROPERABILITY

POSC CAESAR, 20th – 21st October 2010
Kuala Lumpur, Malaysia

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Malaysia

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Agenda

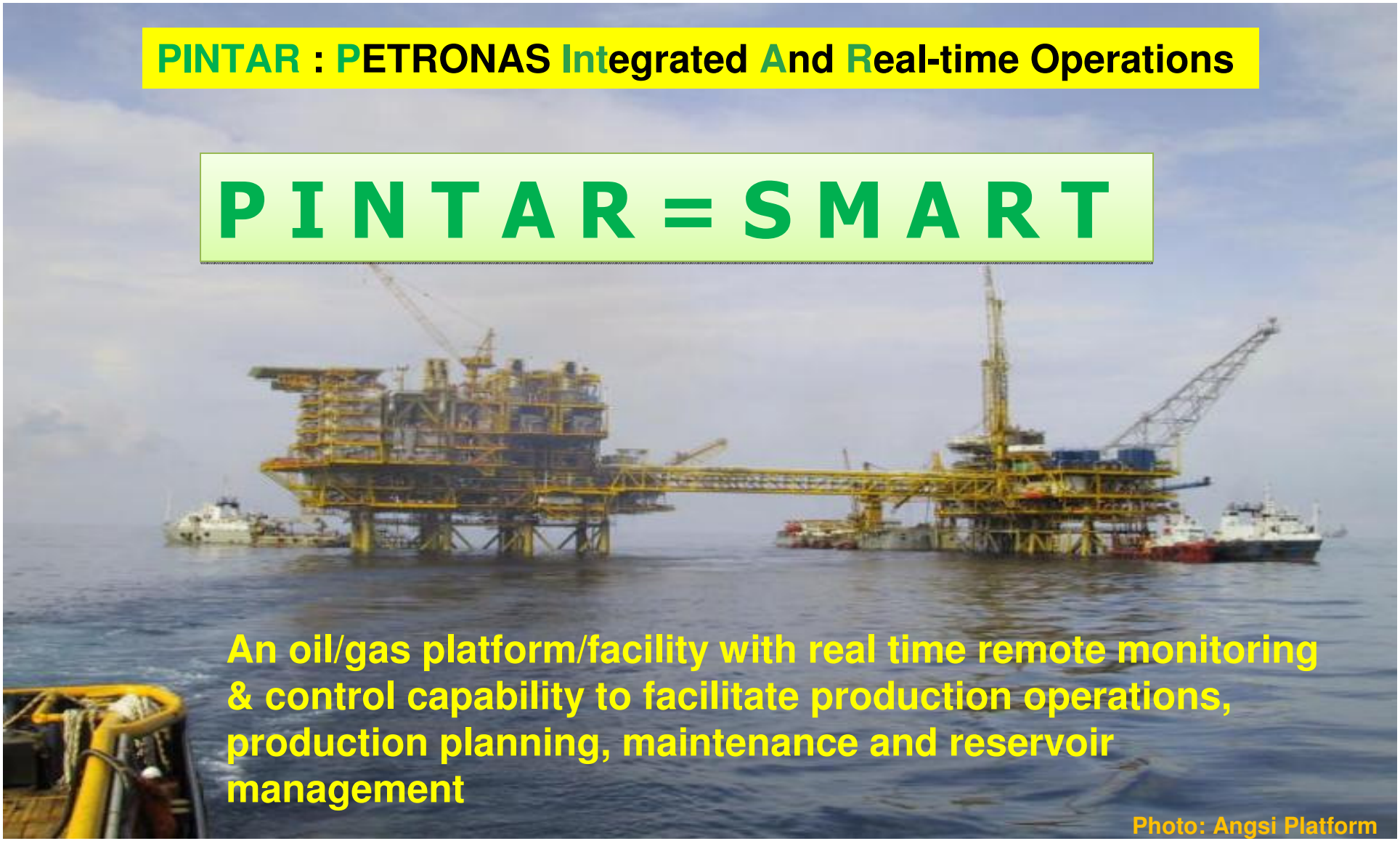
- Introduction and PINTAR concept
- Overview of PCSB – Sarawak Operation
- SKO PINTAR Room
- SKO PINTAR – Centralise and Integrated Monitoring
  - Computer Assisted Operation (CAO)
  - Platform Monitoring & Control System (PMCS)
  - Compressor Remote Monitoring System
- A key for the success of PINTAR : Interoperability vs. Integration
- PCSB PINTAR Road Map and Achievement To Date

Introduction
– Platform operation

- Traditionally, offshore platform operation is segregated from onshore offices.
- Now, it can be integrated with the onshore-based operations to enable sharing of information and providing support to operations.
- The experts can be anywhere – onshore, offshore, on a different platform, or even in another country. Specialists are able to provide their expertise to several platforms or office locations without having to be present on location.
- This approach is termed as Integrated or **PINTAR** Operation which can save cost, through improvement of quality and speed of decision-making.

PINTAR : PETRONAS Integrated And Real-time Operations

P I N T A R = S M A R T



An oil/gas platform/facility with real time remote monitoring & control capability to facilitate production operations, production planning, maintenance and reservoir management

Photo: Angsi Platform

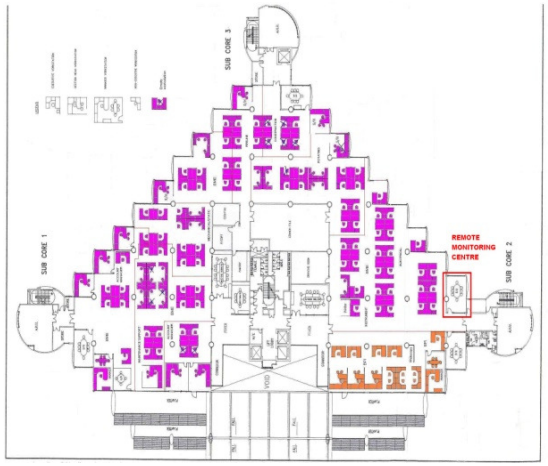
PINTAR : PETRONAS Integrated And Real-time Operations

- **Integrated operations** defined as integration of business processes and advanced technologies, supported by organizational alignment, to deliver a new standard for operational excellence in a diverse cultural environment.

- ***Integrated operations*** eliminate physical boundaries between people, making cooperation and **collaboration** across the globe **in real time** possible.

SKO PINTAR
- Centralised and Integrated Monitoring System

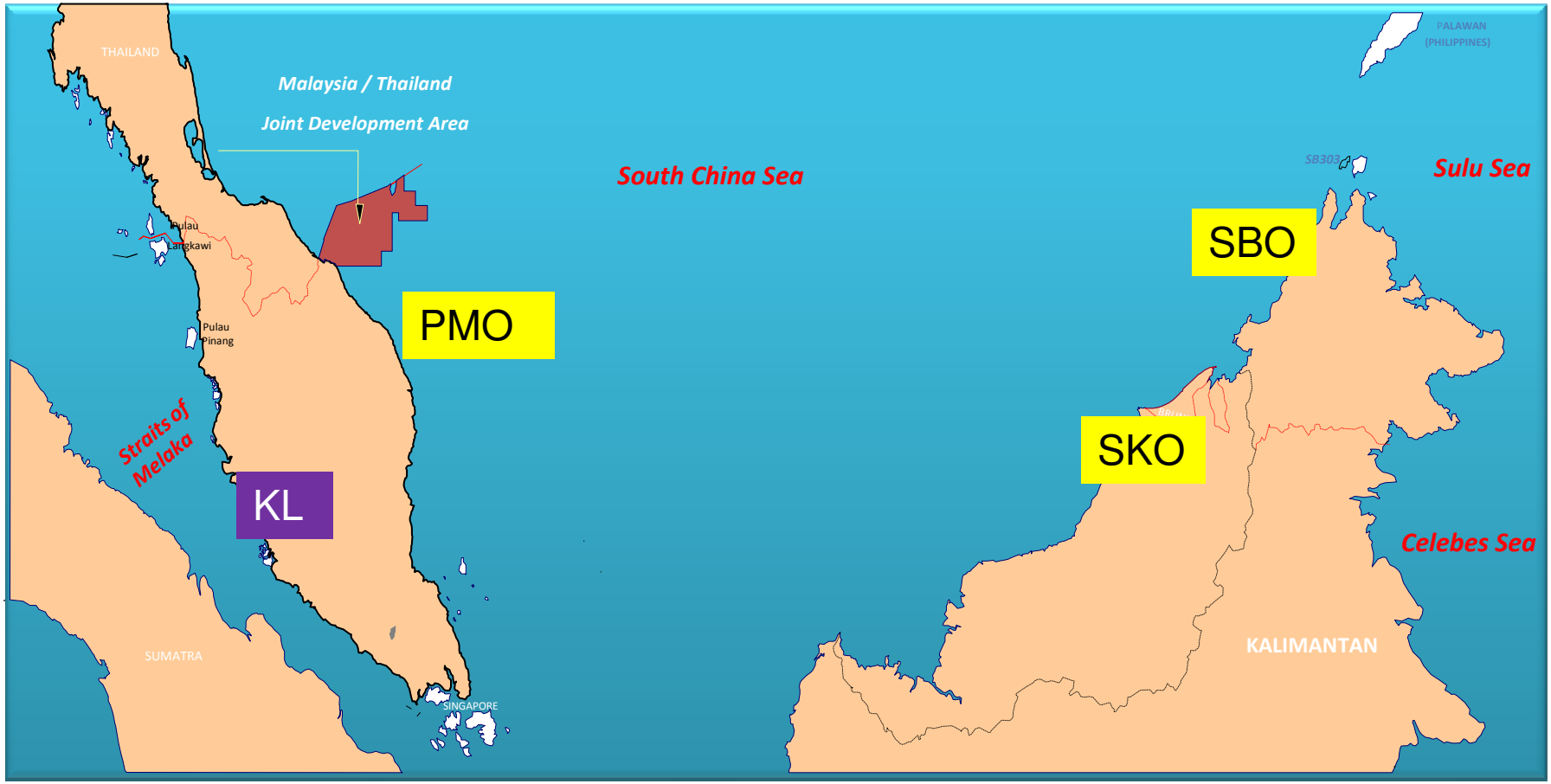
✓SKO PINTAR project is to centralise and integrate the monitoring of the offshore facilities, improve maintenance and troubleshooting efficiency via real time data and information. Important parameters such as controller mode, safety bypass status and equipment status can be remotely access from PCSB-SKO onshore office.



✓Officially Launched on 5th July; SKO PINTAR Project is the 1st in the region within PETRONAS Carigali .

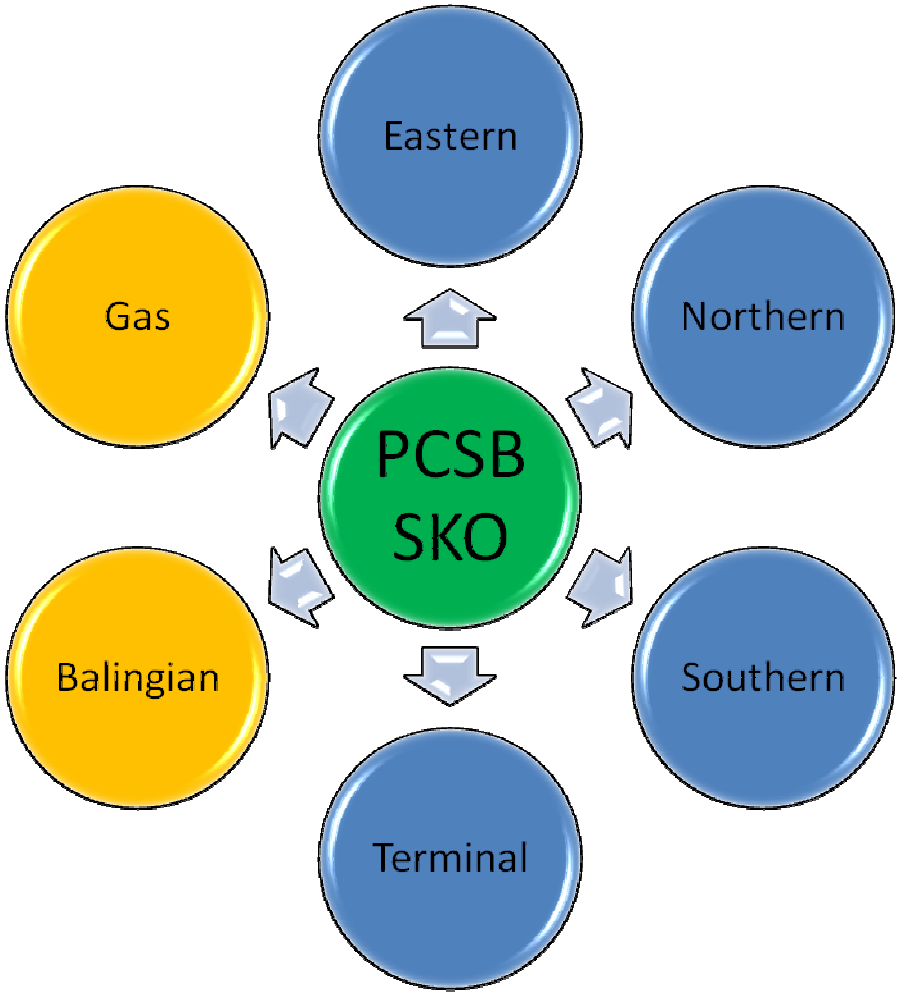
✓ Various system ranging from Platform Control & Monitoring System (PMCS), Fire and Gas (FGS), Safety Instrumented System (SIS), Condition Based Monitoring (CBM), Pipeline and Metering, Computer Aided operation(CAO) available at this SKO PINTAR Room.

Overview of SKO
- Located in West Malaysia

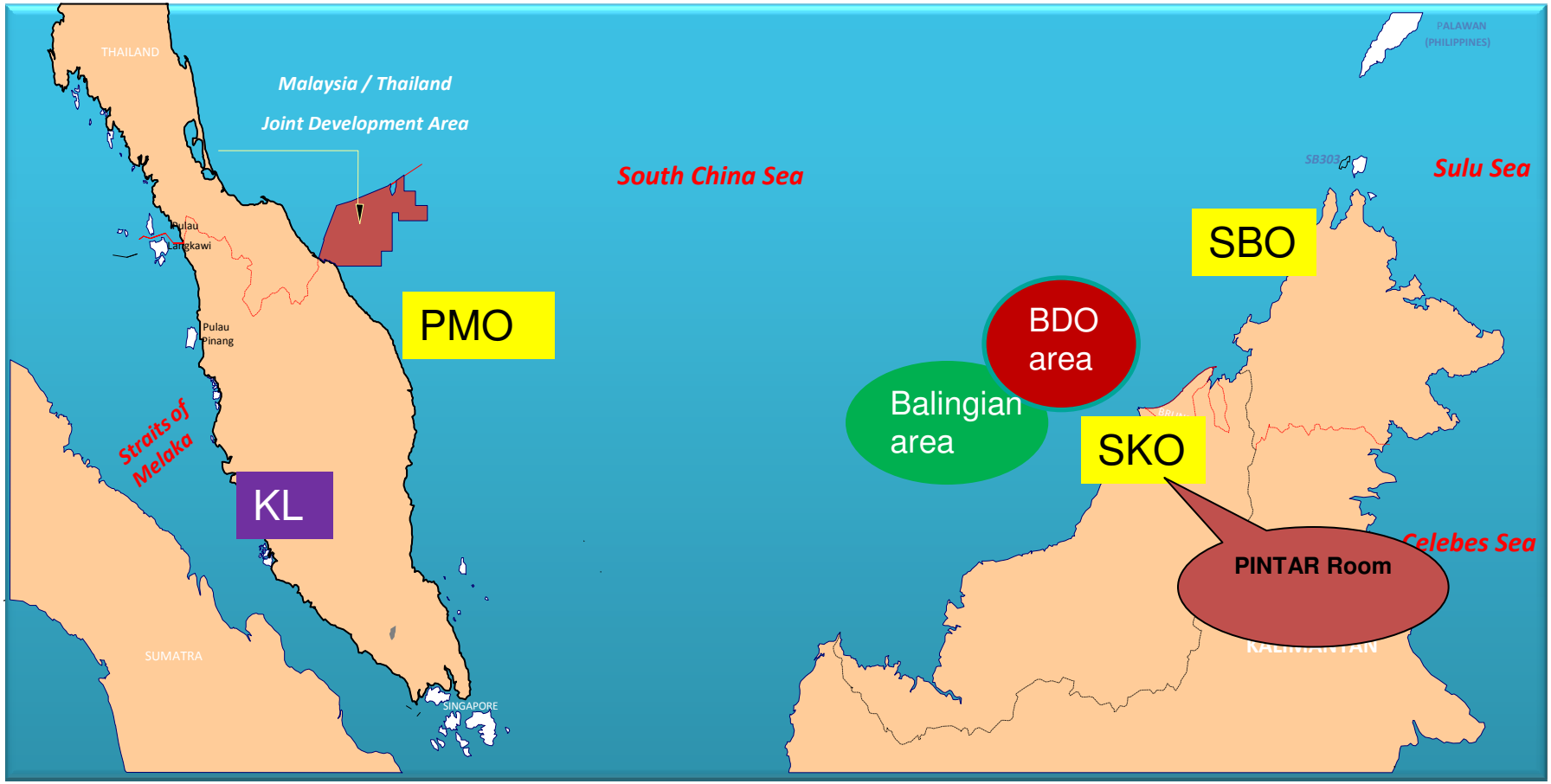


Overview of SKO
- Divided into 6 Operating Clusters with 114 platforms & 2 terminals

- **PETRONAS Carigali Sdn Bhd - Sarawak Operations** or better known as PCSB-SKO
- Malaysia's oldest and most prolific oil-producing areas.

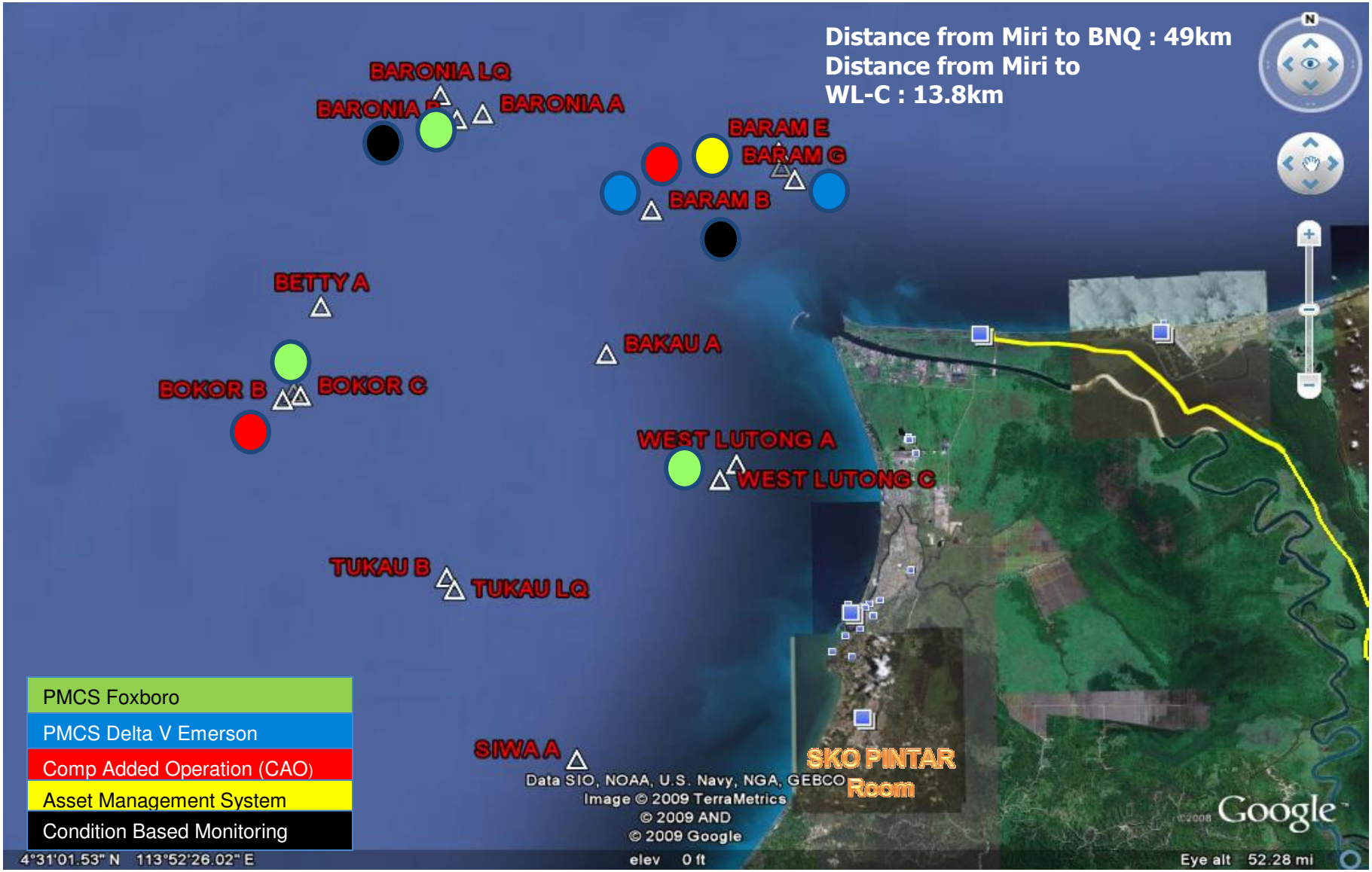


Overview of SKO
- Located in West Malaysia



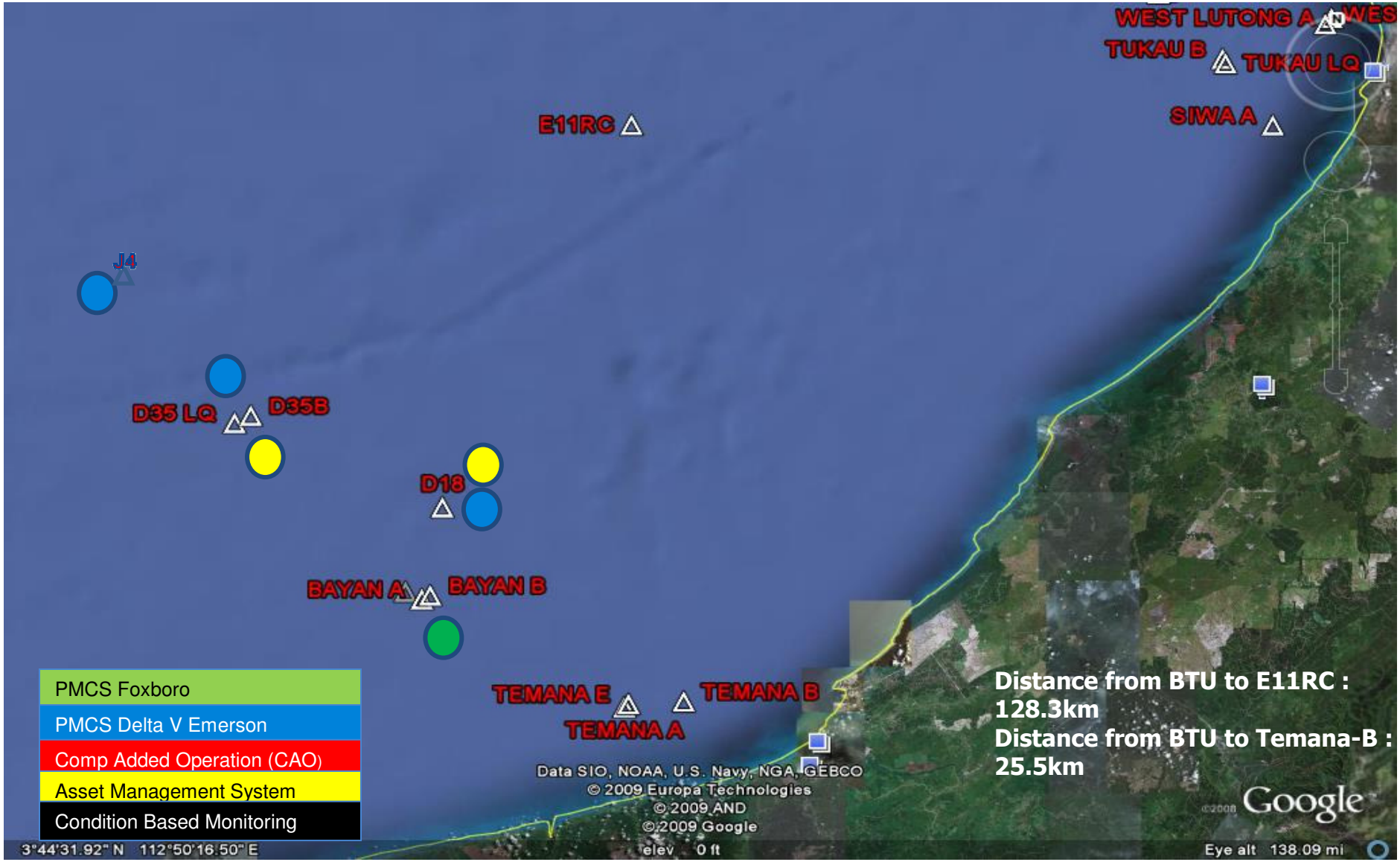
Overview of SKO

- Baram Delta Operation (BDO) with 4 Operating Clusters and 1 Terminal



Overview of SKO

- Balingian Operation with 2 Operating Clusters and 1 Terminal



SKO PINTAR

- Launched in July 2010

SKO PINTAR Room

✓Wide Screen Flat Panel Monitor DELL Ultrasharp U2410

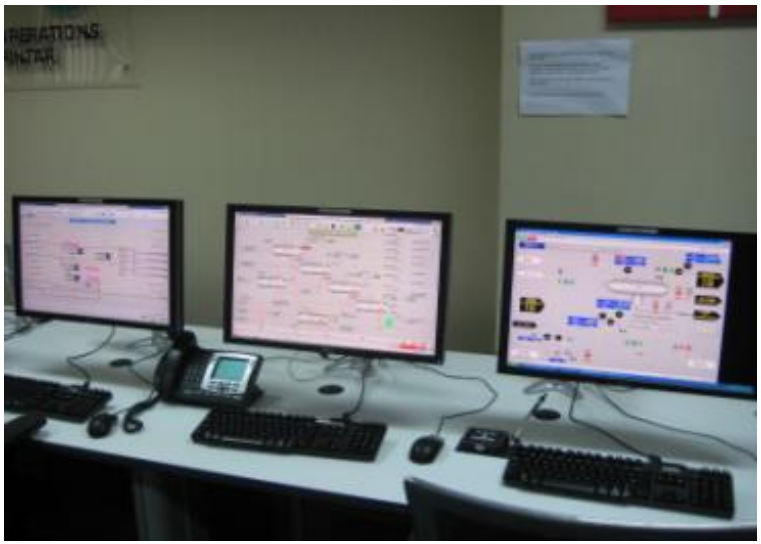
✓UPS 650VA 230V APC

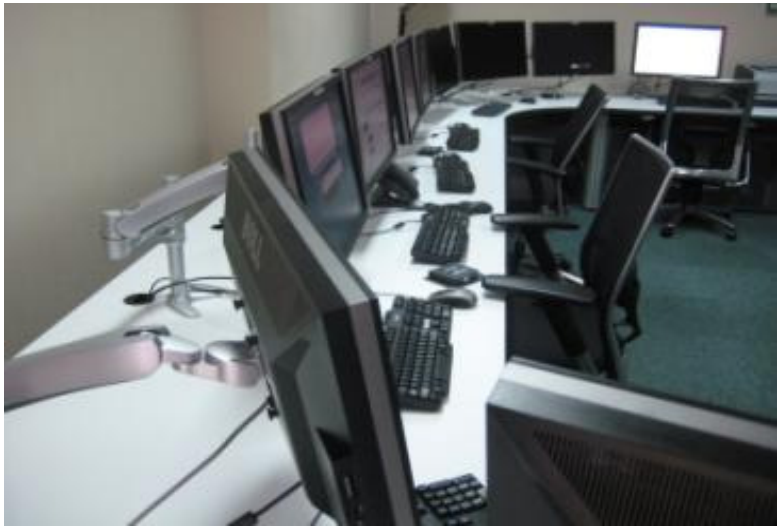
✓Stradek Open Series with modular cabinet

✓Sense medium high back chair

✓Magnetic door access and card reader integrated to IPTime Track

SKO PINTAR
- Control Room Photos

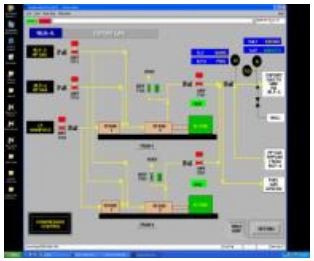




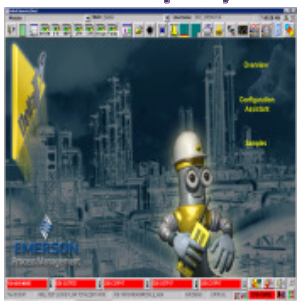
SKO PINTAR
- System Overview

PETRONAS

PLATFORM MONITORING CONTROL SYSTEM (PMCS)



FIRE& GAS (FGS) AND SHUTDOWN SYSTEM (SIS)



CONDITION BASED MONITORING (CBM)

SKO PINTAR

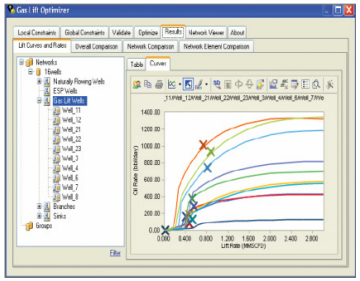
COMPRESSOR RR&SOLAR REMOTE MONITORING

ASSET MANAGEMENT SYSTEM(AMS)

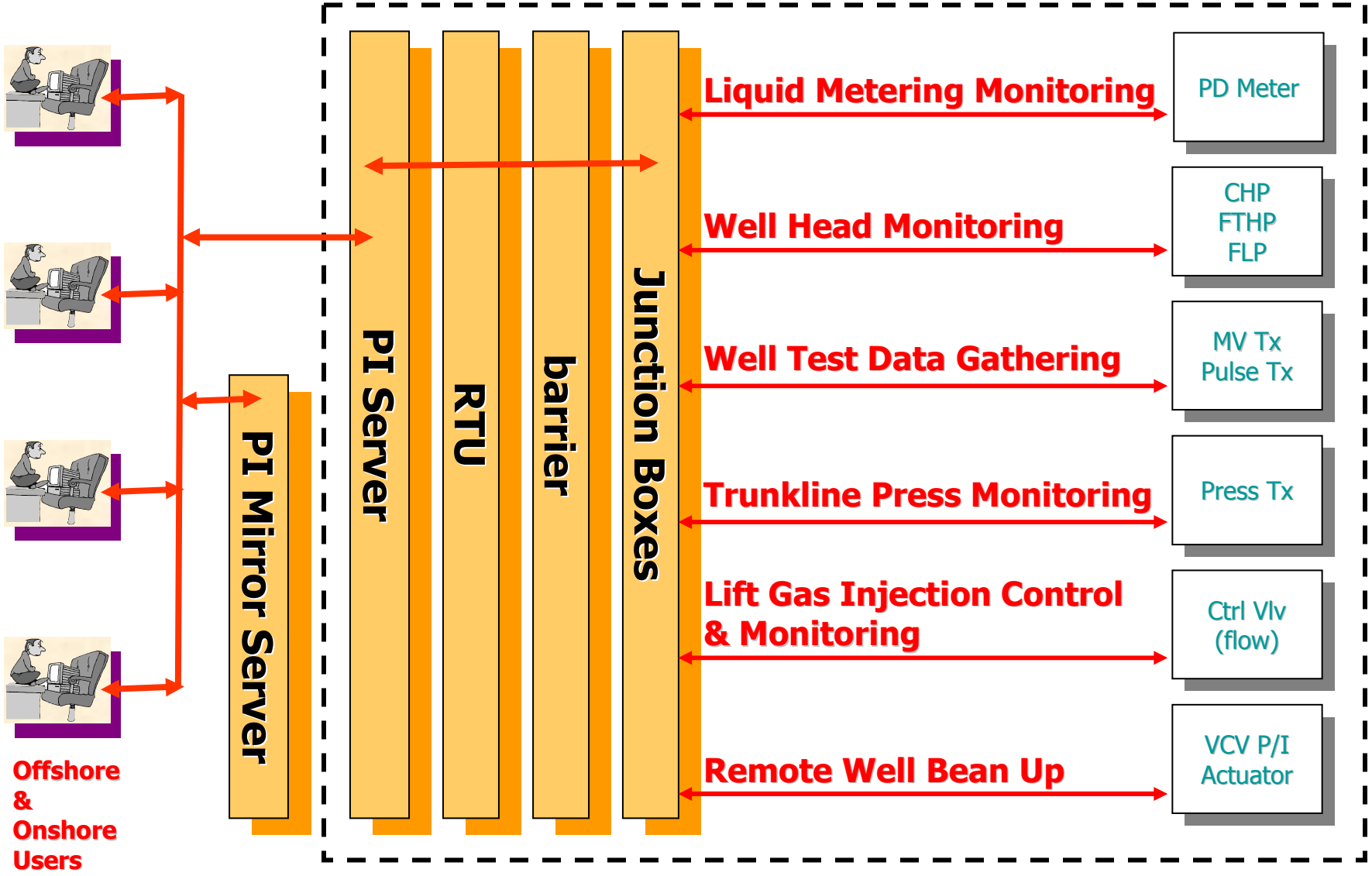
COMPUTER AIDED OPERATION (CAO)

METERING MONITORING SYSTEM

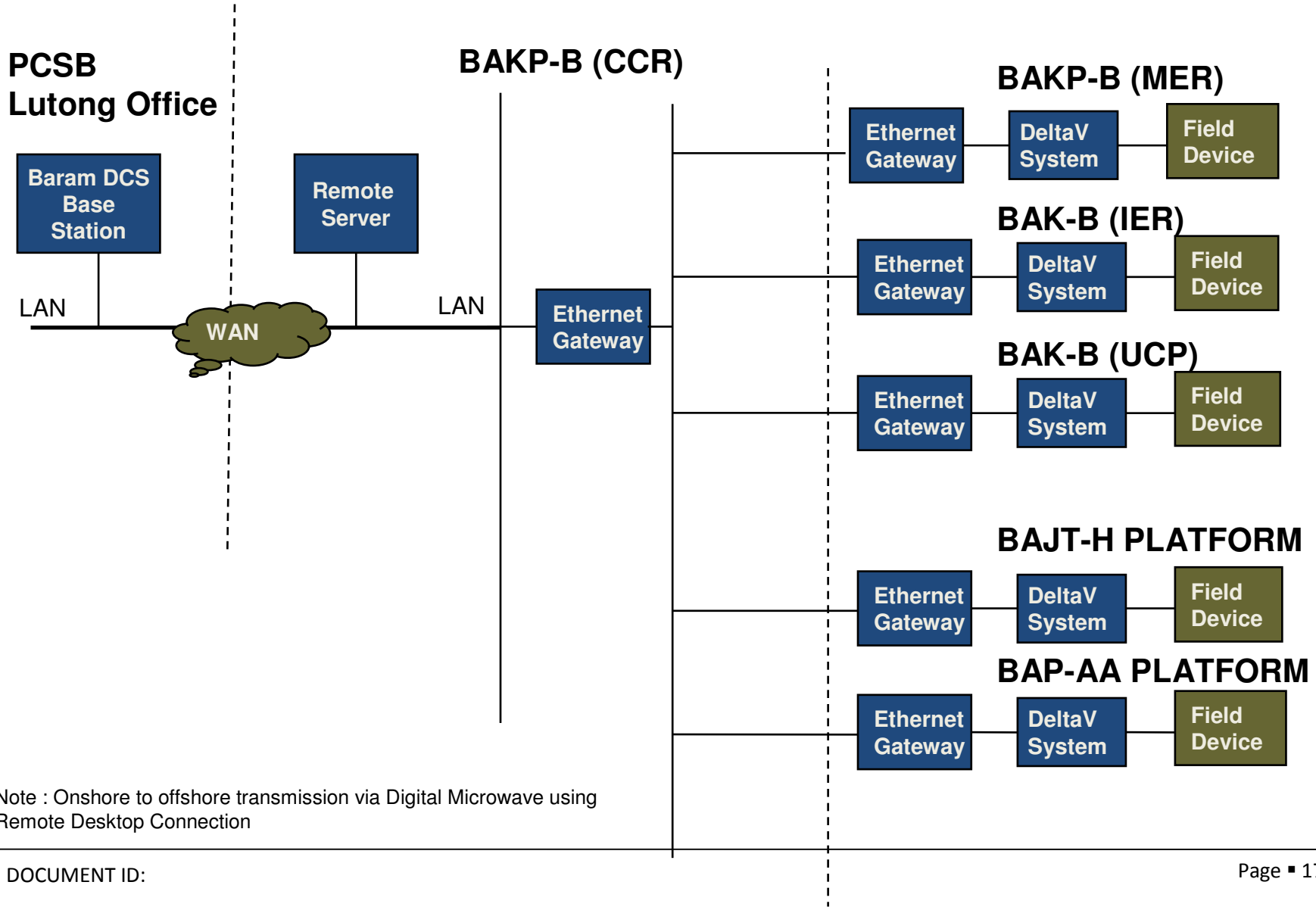
PIPELINE MONITORING SYSTEM



SKO PINTAR
- Computer Aided Operation (CAO)

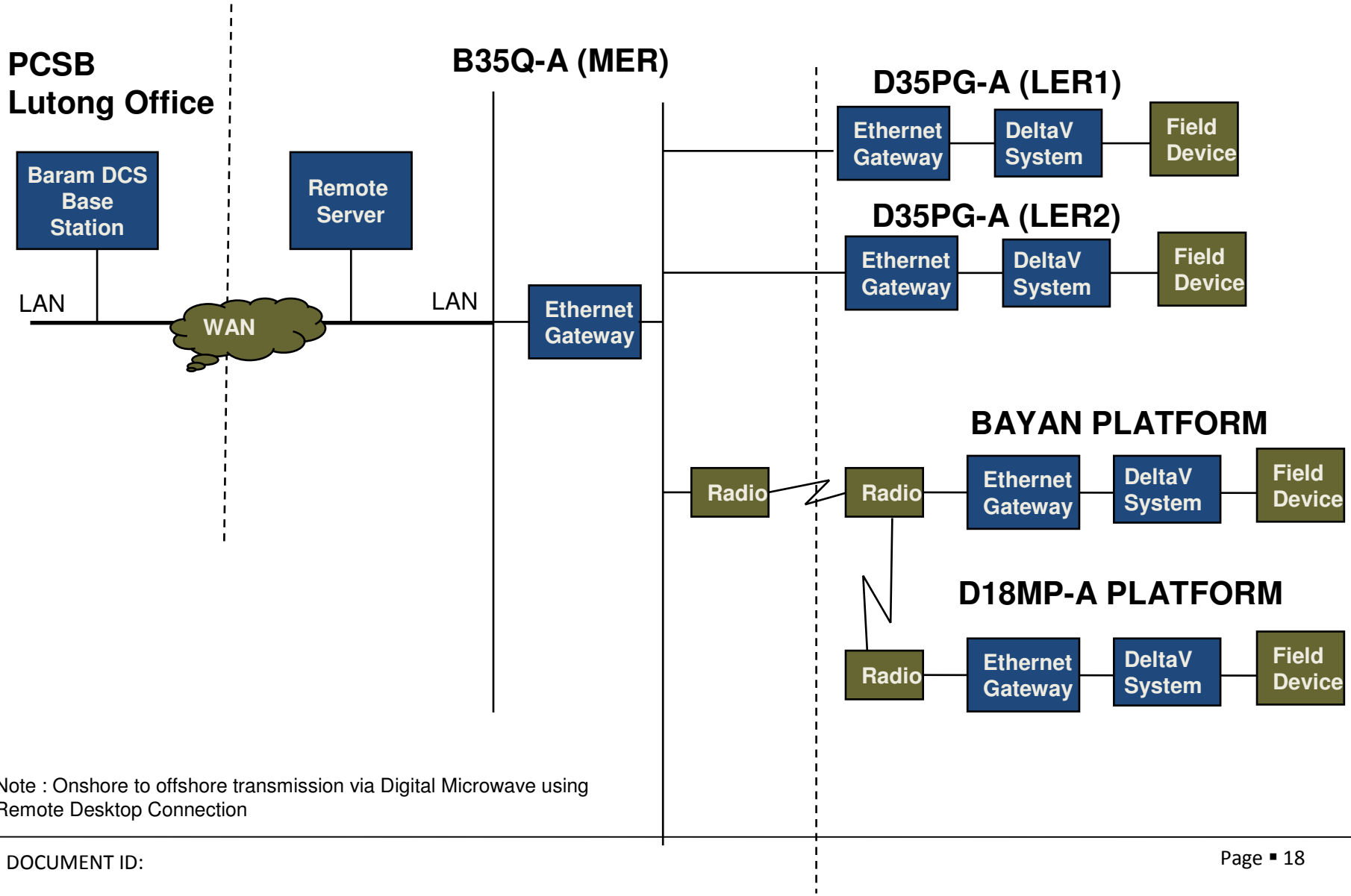


SKO PINTAR
- PMCS / DCS at BDO Operation



Note : Onshore to offshore transmission via Digital Microwave using Remote Desktop Connection

SKO PINTAR
- PMCS / DCS at Balingian Operation



Note : Onshore to offshore transmission via Digital Microwave using Remote Desktop Connection

SKO PINTAR
- Turbine Compressor remote monitoring system

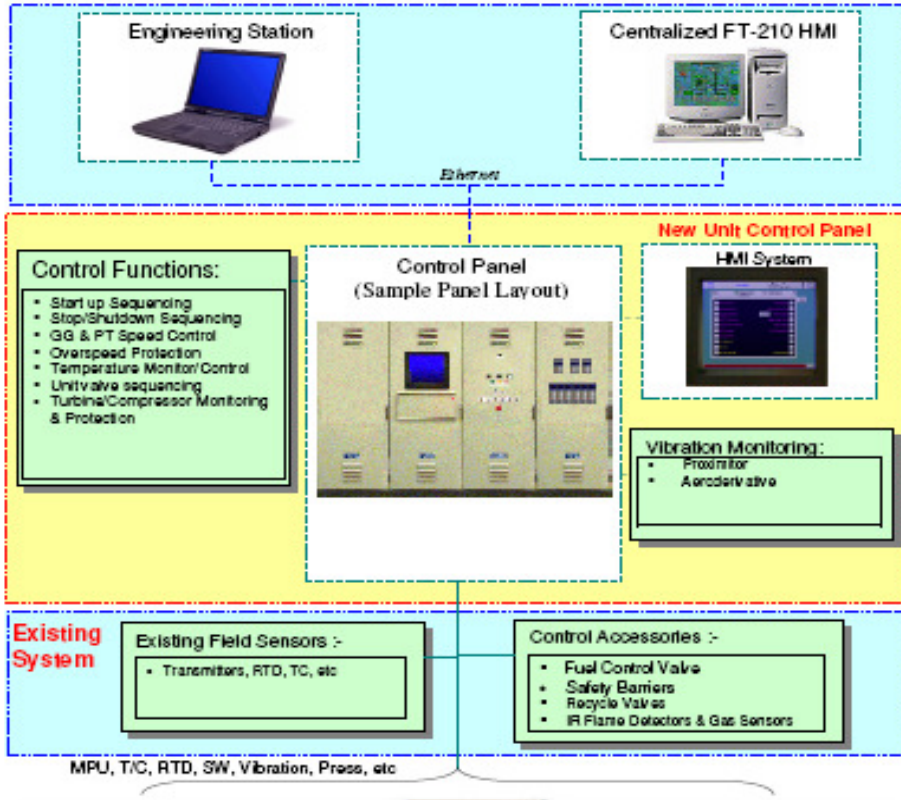


Figure 1:- Gas Turbine Compressor Control System Overview

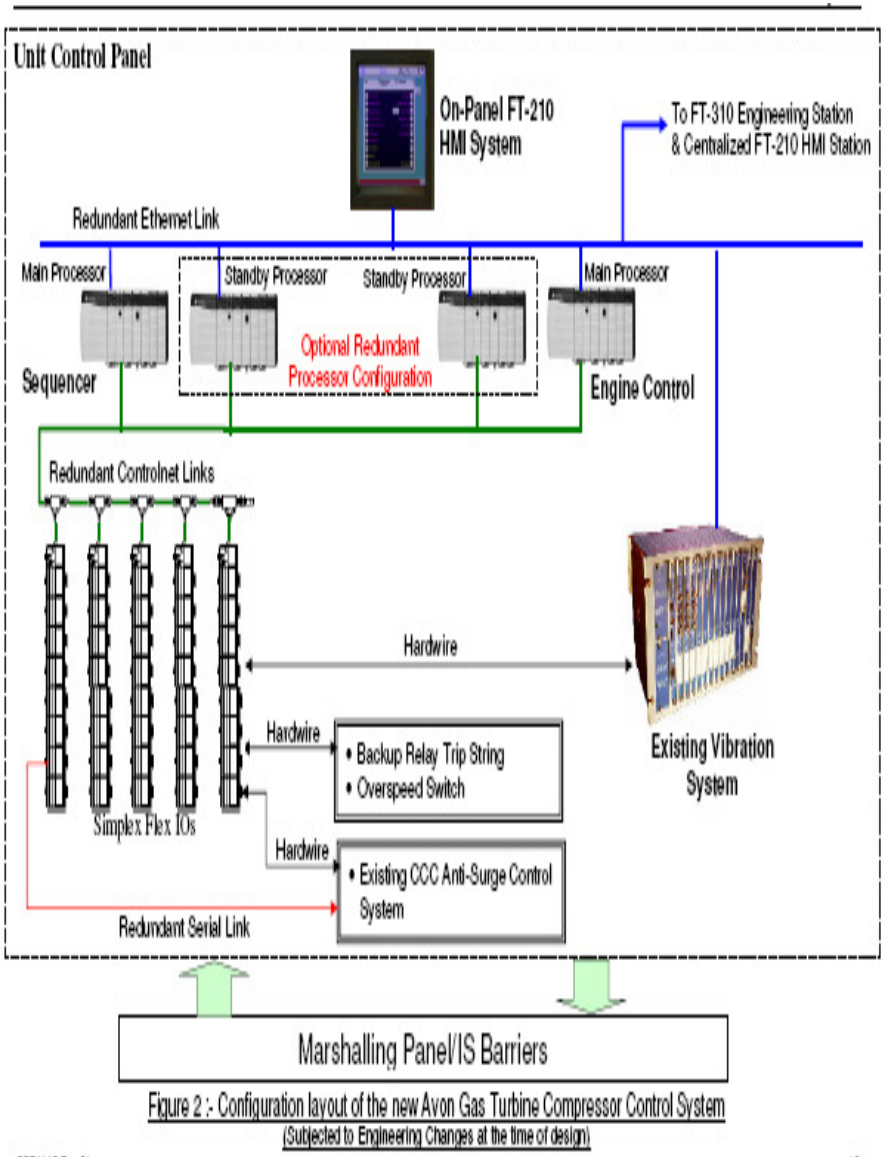


Figure 2 :- Configuration layout of the new Avon Gas Turbine Compressor Control System
(Subjected to Engineering Changes at the time of design)

A key for the success of PINTAR
- Interoperability vs. Integration

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Interoperability:

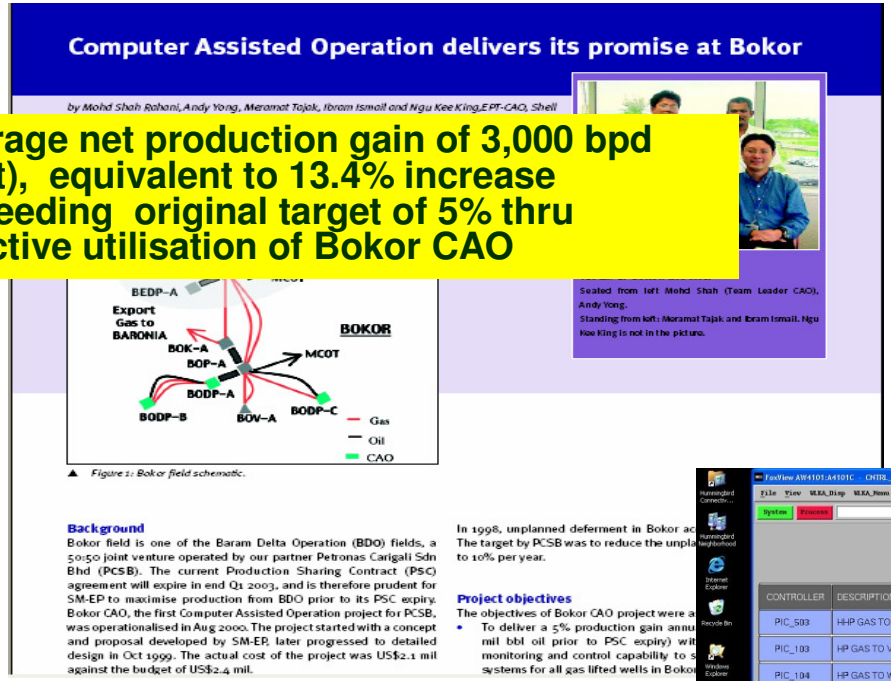
the ability of two or more systems, components or processes to work together (inter-operate) and **to exchange information** and **to use the information that has been exchanged.**

Integration:

A process to **link** two or more previously separate systems or processes to become part of a larger system or process.

Information Interoperability enables System Integration through
Standardization, Meta Data and Data Structures

Result & Achievement



Computer Assisted Operation delivers its promise at Bokor

by Mohd Shah Rahani, Andy Yong, Meramat Tajak, Ibram Ismail and Ngu Kee King,EPT-CAO, Shell

Seated from left Mohd Shah (Team Leader CAO), Andy Yong.
Standing from left: Meramat Tajak and Ibram Ismail. Ngu Kee King is not in the picture.

BEDP–A
Export Gas to BARONIA
BOKOR
BOK–A
BOP–A
MCOT
BODP–A
BODP–B
BOV–A
BODP–C
Gas
Oil
CAO

▲ Figure 1: Bokor field schematic.

Background

Bokor field is one of the Baram Delta Operation (BDO) fields, a 50:50 joint venture operated by our partner Petronas Carigali Sdn Bhd (PCSB). The current Production Sharing Contract (PSC) agreement will expire in end Q1 2003, and is therefore prudent for SM-EP to maximise production from BDO prior to its PSC expiry. Bokor CAO, the first Computer Assisted Operation project for PCSB, was operationalised in Aug 2000. The project started with a concept and proposal developed by SM-EP, later progressed to detailed design in Oct 1999. The actual cost of the project was US$2.1 mil against the budget of US$2.4 mil.

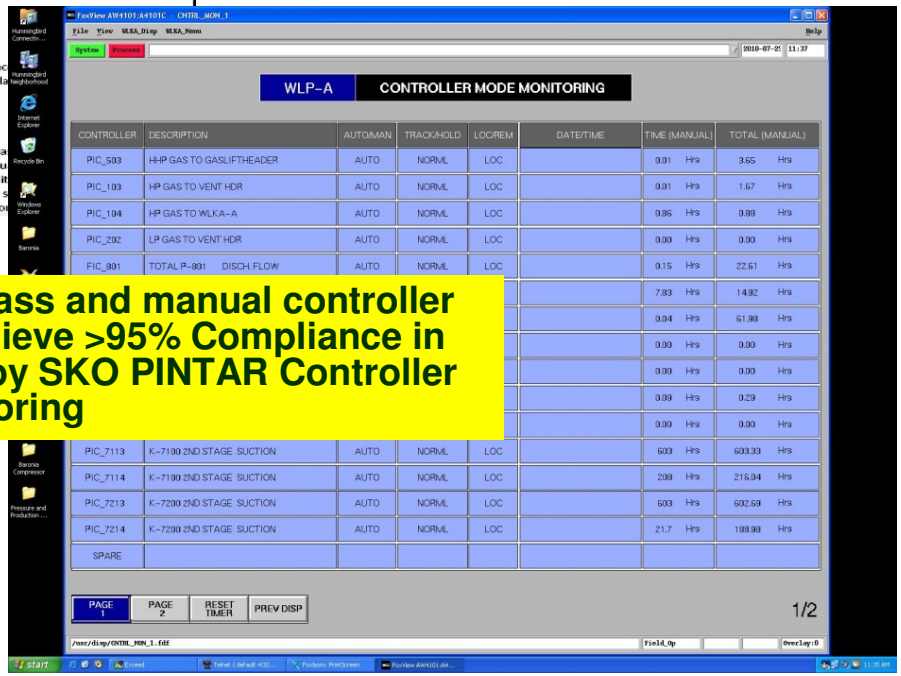
In 1998, unplanned deferment in Bokor ac
The target by PCSB was to reduce the unpla
to 10% per year.

Project objectives

The objectives of Bokor CAO project were a

- To deliver a 5% production gain annu
  mil bbl oil prior to PSC expiry) wit
  monitoring and control capability to s
  systems for all gas lifted wells in Bokor

- Average net production gain of 3,000 bpd (Nett), equivalent to 13.4% increase ,exceeding original target of 5% thru effective utilisation of Bokor CAO



WLP–A CONTROLLER MODE MONITORING

CONTROLLER	DESCRIPTION	AUTO/MAN	TRACK/HOLD	LOC/REM	DATE/TIME	TIME (MANUAL)	TOTAL (MANUAL)
PIC_503	HHP GAS TO GASLIFTHEADER	AUTO	NORML	LOC		0.01 Hrs	3.65 Hrs
PIC_103	HP GAS TO VENT HDR	AUTO	NORML	LOC		0.01 Hrs	1.67 Hrs
PIC_104	HP GAS TO WLKA–A	AUTO	NORML	LOC		0.86 Hrs	0.88 Hrs
PIC_202	LP GAS TO VENT HDR	AUTO	NORML	LOC		0.00 Hrs	0.00 Hrs
FIC_801	TOTAL P–801 DISCH. FLOW	AUTO	NORML	LOC		0.15 Hrs	22.61 Hrs
						7.83 Hrs	14.92 Hrs
						0.04 Hrs	61.98 Hrs
						0.00 Hrs	0.00 Hrs
						0.00 Hrs	0.00 Hrs
						0.09 Hrs	0.29 Hrs
						0.00 Hrs	0.00 Hrs
PIC_7113	K–7100 2ND STAGE SUCTION	AUTO	NORML	LOC		603 Hrs	603.33 Hrs
PIC_7114	K–7100 2ND STAGE SUCTION	AUTO	NORML	LOC		208 Hrs	216.04 Hrs
PIC_7213	K–7200 2ND STAGE SUCTION	AUTO	NORML	LOC		603 Hrs	602.59 Hrs
PIC_7214	K–7200 2ND STAGE SUCTION	AUTO	NORML	LOC		21.7 Hrs	189.98 Hrs
SPARE							

PAGE 1 | PAGE 2 | RESET TIMER | PREV DISP | 1/2

- Reduce bypass and manual controller mode to achieve >95% Compliance in Auto Mode by SKO PINTAR Controller Mode monitoring

Interoperability Standards and Guidelines
- Information Management

Data Integration, Sharing, Exchange, Interoperability	Reference Designation System	Document and Record Management
ISO 15926 Part 1, 4	IEC 61346, Part 1	IEC 61355, Part 1
Industrial automation systems and integration -- Integration of life-cycle data for process plants including oil and gas production facilities, Overview and fundamental principles (Part 1), Initial reference data (Part 4)	Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules	Classification and designation of documents for plants, system and equipment,
CFIHG, (NISTIR 7259)	ISO/TS 16952-1	IEC 82045, Part 1, 2
Capital Facilities Information Handover Guide	Technical product documentation, Reference designation system, General Rules	Document Management - Principles and methods, Metadata elements and information reference model
		ISO 15489, Part 1, 2
		Information and documentation - Records Management , General Rules and Guidelines

PCSB PINTAR Operation
- Road Map

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Platform Domain

Business/Enterprise Domain

Wireless Instrumentation and Data Network

P4 Wireless

P1 CBM-FP

Condition Based Monitoring and Fault Prediction

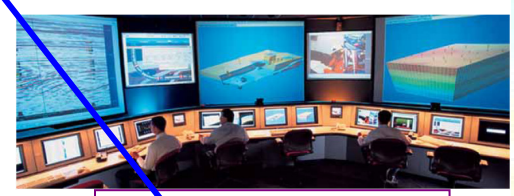
Mobile Operators, Maintenance Plan & Logistics

P5 Mobile

P2 S/D Mgmt

Alarm Mgmt and S/D Optimization

P0 Information Management



IT Infrastructure and Info Mgmt Platform

Onshore Control room

PCIM

As-build existing and new facilities

P6 Virtual

P3 Collab

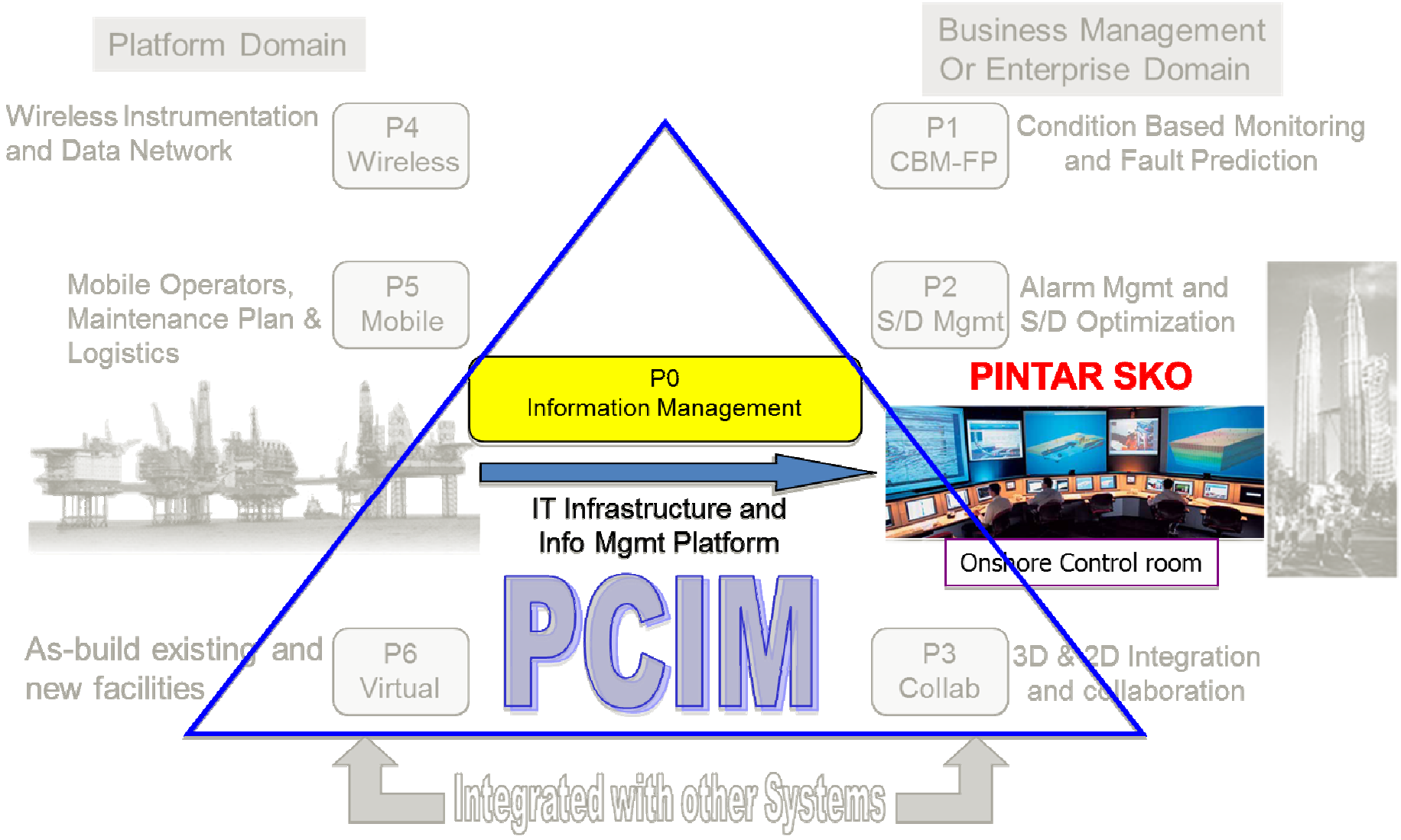
3D & 2D Integration and collaboration

Integration with other Systems

ISO 15926 compliance

ISO 15926 compliance

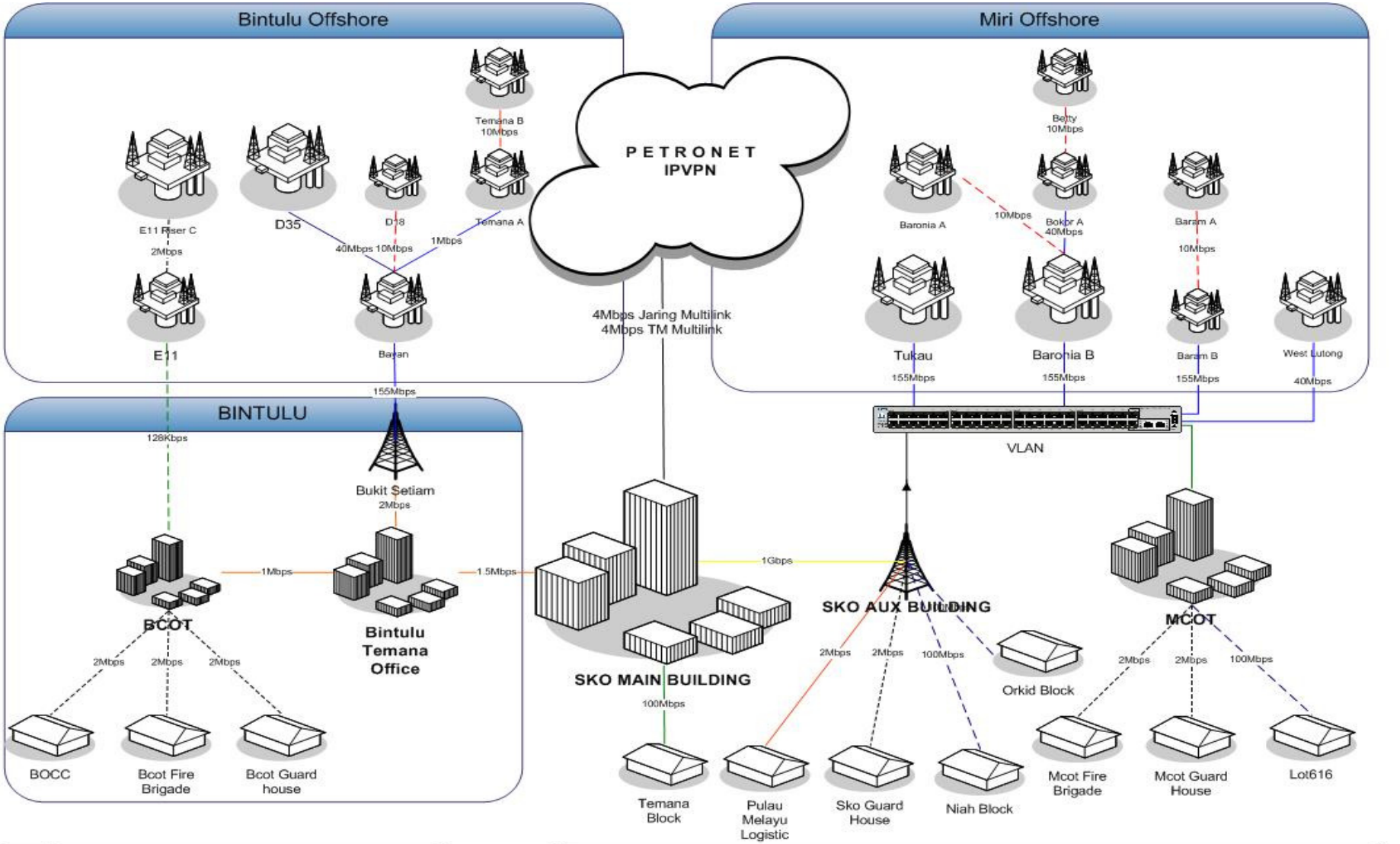
PCSB PINTAR Operation
- Achievement To Date



THANK YOU

BACK-UP

SKO Network Diagram



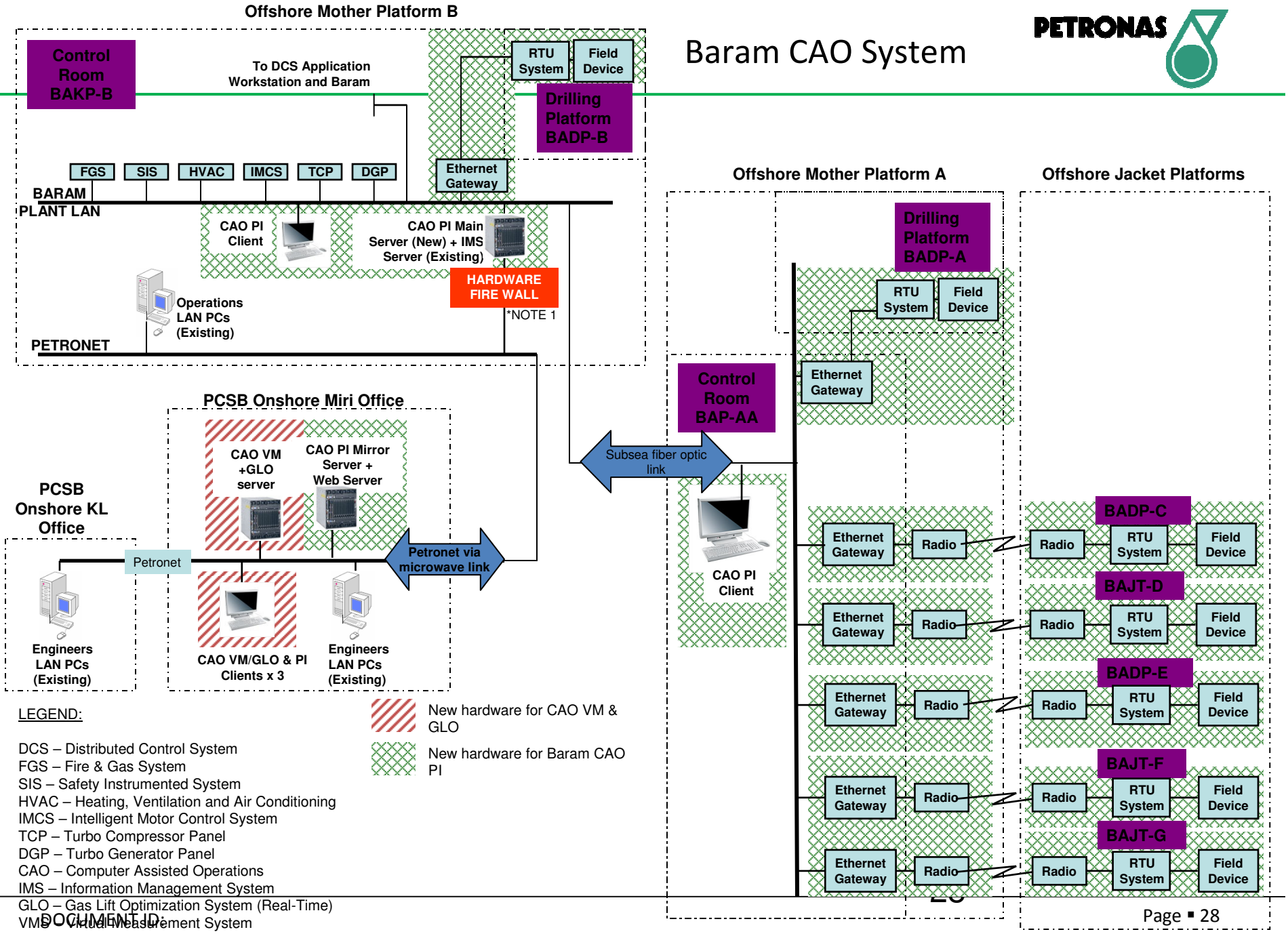
Drawn by: M Faizal B Zamhari	
Date Revised	08/06/2010

Legends

DMR — Aruba AP — FSO — Fiber optic (SM)

Motorola Canopy AP — Cisco 800Series — TM Leased — Troposcater

Baram CAO System



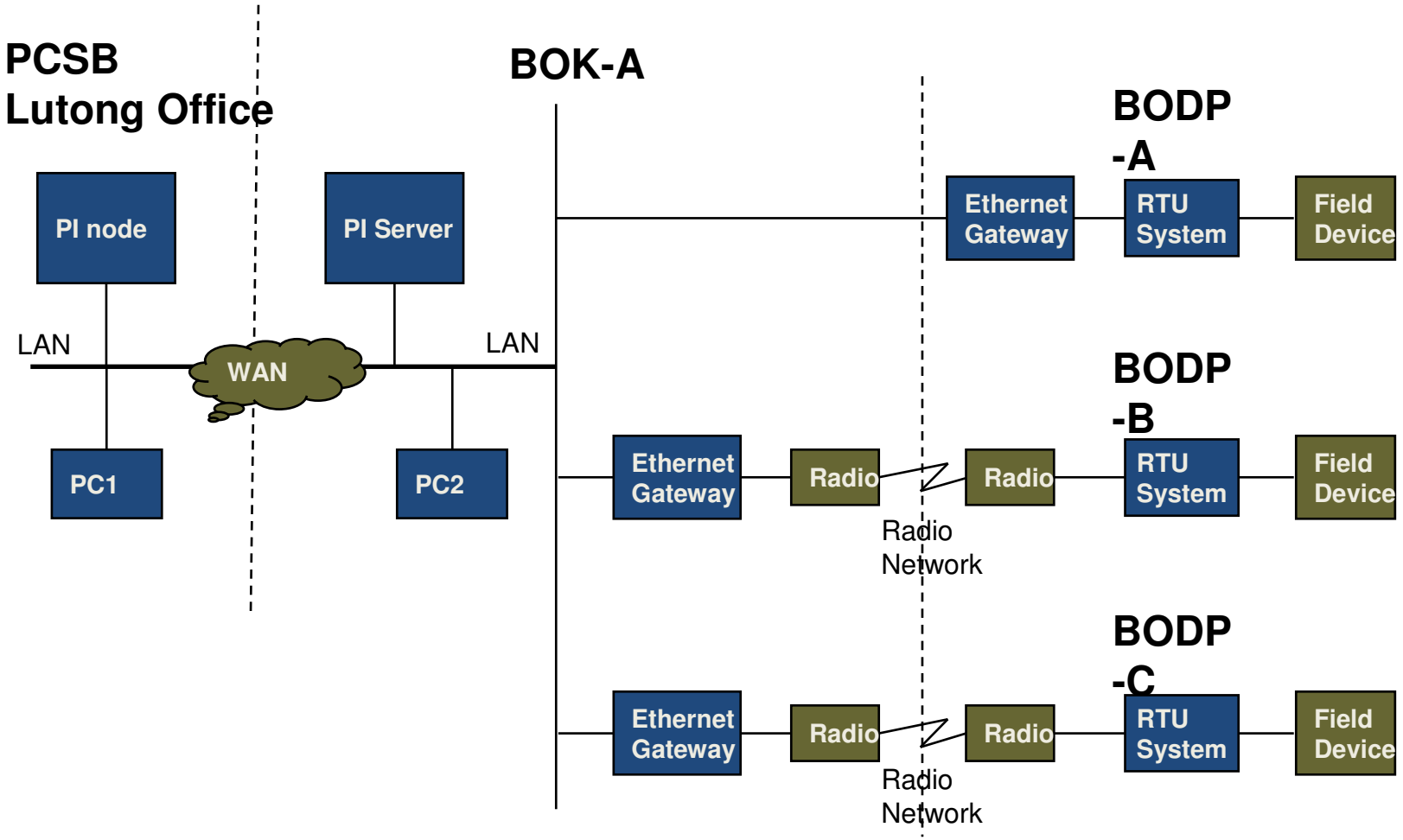
LEGEND:

New hardware for CAO VM & GLO

New hardware for Baram CAO PI

DCS – Distributed Control System
FGS – Fire & Gas System
SIS – Safety Instrumented System
HVAC – Heating, Ventilation and Air Conditioning
IMCS – Intelligent Motor Control System
TCP – Turbo Compressor Panel
DGP – Turbo Generator Panel
CAO – Computer Assisted Operations
IMS – Information Management System
GLO – Gas Lift Optimization System (Real-Time)
VMS – Virtual Measurement System
PI – Plant Information

Bokor CAO System



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Note : Onshore to offshore transmission via Remote Dekstop Connection

CAO Page Summary