



Yokogawa in the Mining, Minerals Processing and Metals Industry



Message from the Managing Director

Yokogawa - 114 Affiliates in 59 Countries and 102 Years of Innovation

The Sub-Saharan African market is one of the most important markets in Yokogawa's global business plan towards becoming worldwide market leader in the Industrial Automation and Control Industry. Yokogawa has grown the Middle East & African region through responding to customers' need to maximise local content and has established local customer support capabilities throughout this region.

Service and engineering centres are operating and will continue to expand in African countries where required. Yokogawa Middle East & Africa has executed more than 700 projects including numerous mega projects, and currently has the largest engineering facility in the Yokogawa group of companies today, in terms of space.

This capacity has been expanded to support the growing Sub-Saharan African market.

Yokogawa is committed to continuously develop and supply solutions and services with optimum quality and reliability thereby contributing to industrial growth in Africa.

We would like to take this opportunity to assure you of our commitment to customer satisfaction.

JOHAN LOUW

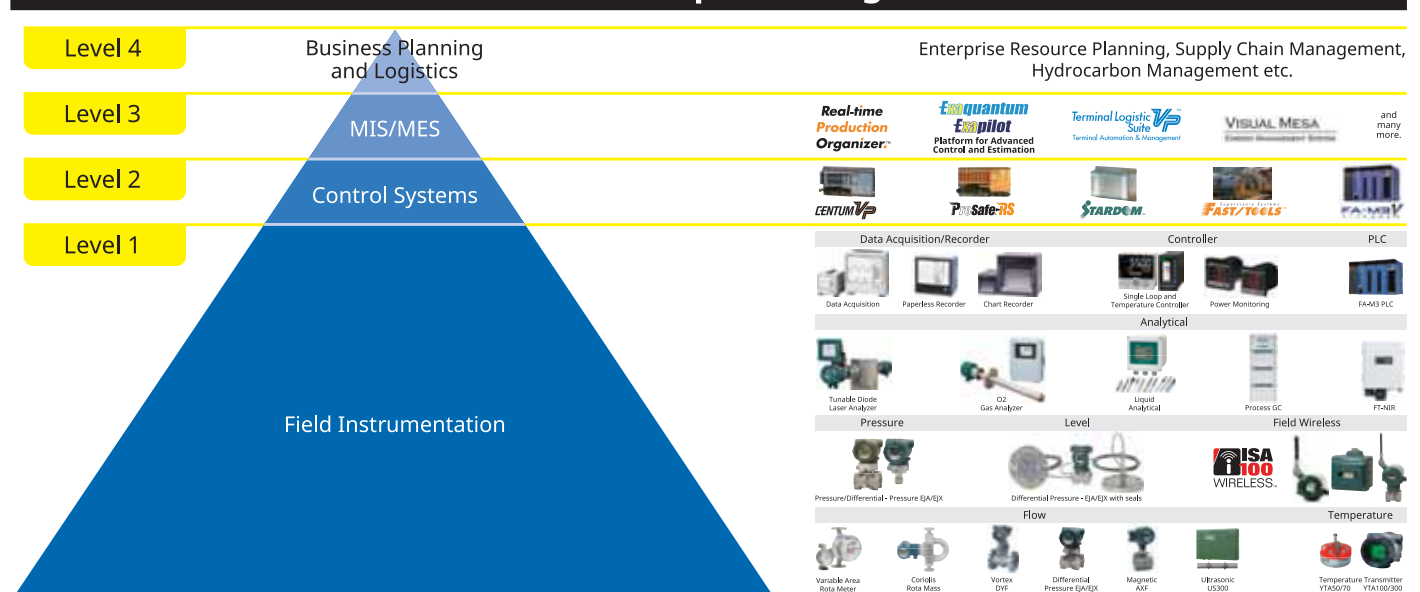
Managing Director:

Yokogawa South Africa & African Anglophone Region (Pty) Limited

Yokogawa Core Values

▶ Value Creation	We create value together with customers providing superior performance and developing customer loyalty
▶ Collaboration	We collaborate with our stakeholders to achieve mutual objectives
▶ Respect	We respect and trust each individual
▶ Integrity	Our business practices are fair and open
▶ Gratitude	We show appreciation and recognise effort

Sensor to Enterprise Integration



Co-innovating conveys our determination to continually engage in the co-creation of value with our clients by working with them in long-term partnerships to develop solutions.

tomorrow expresses our resolve to move steadily into the future, one step at a time.

Yokogawa South Africa (Pty) Ltd

Yokogawa South Africa is a turnkey supplier of high performance, high quality process control and field instrumentation systems, solutions and services in the chemical, food & beverage, iron & steel, mining, petrochemical, power generation and pulp & paper industries.

Yokogawa first entered the South African market in 1978 when a local company was appointed as the sole distributor for Yokogawa process control instrumentation. In 1997 Yokogawa South Africa (Pty) Ltd was formerly established and reported to Yokogawa Europe. In April 2013, Identity Capital Partners (Pty) Ltd acquired a 25.03% stake and the Yokogawa South Africa, Angola and African Anglophone operations became part of the Yokogawa Middle East & Africa regional organisation.

The company is recognized as a Level 4 B-BBEE Contributor providing our customers with 100% recognition for any spend with Yokogawa South Africa (Pty) Ltd. Operating from its Head Office in Cresta, Johannesburg, Yokogawa South Africa has regional offices in KwaZulu-Natal and Cape Town. Our dedicated workforce of more than 150 employees services a broad client base across South African industry.

Yokogawa African Anglophone Region

Yokogawa African Anglophone Region (Pty) Ltd has a network of branch offices and agents throughout Southern Africa covering the territories of Botswana, Lesotho, Malawi, Mozambique, Madagascar, Mauritius, Namibia, Swaziland, Zambia and Zimbabwe.

Incorporated in 2013, the company was established to meet the industrial automation needs of the existing installed base across 10 African countries. The region is serviced by experienced representatives who strive to deliver customer satisfaction to all clients and customers in the Southern Africa region.

Operating from its Head Office in Cresta, Johannesburg, the company shares resources in Sales, Engineering, Services and Administration with sister company and regional operational headquarters, Yokogawa South Africa (Pty) Ltd. Yokogawa African Anglophone Region (Pty) Ltd's operations report to the Yokogawa Middle East and Africa regional organisation.

Mining & Mineral Processing

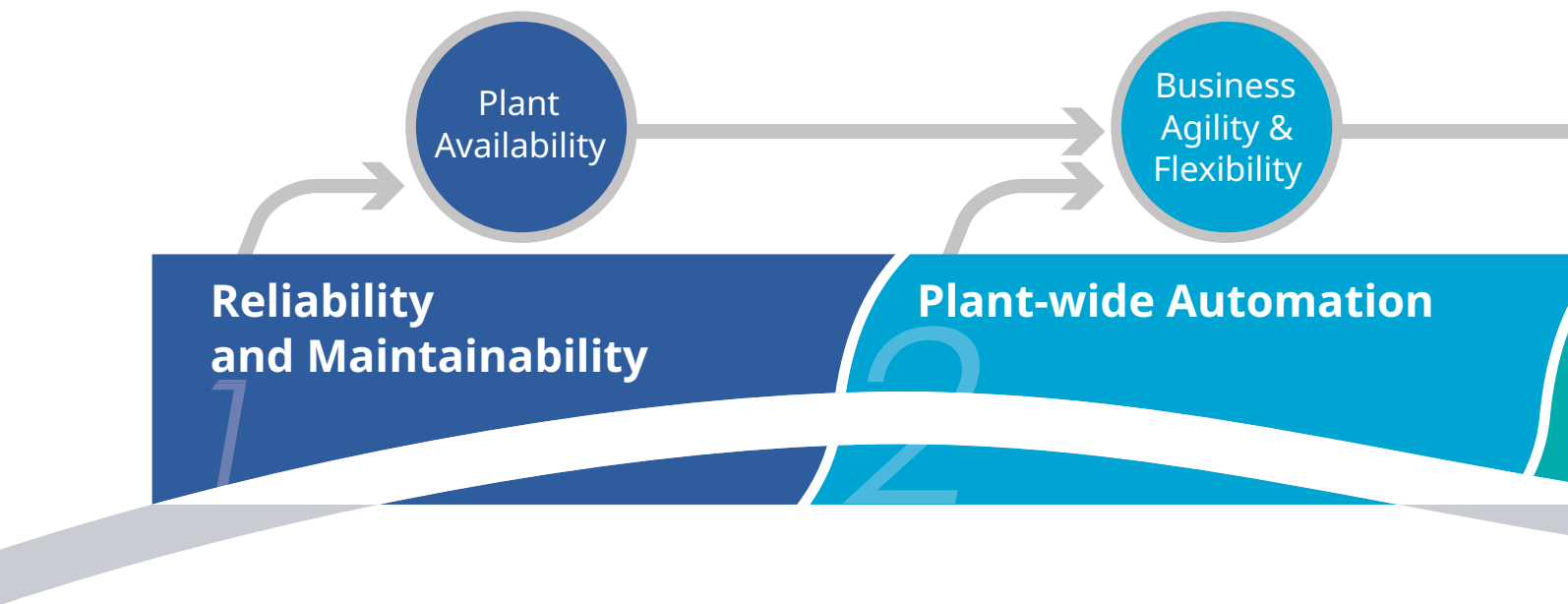
Yokogawa's core operating platform, CENTUM VP, empowers users in the Mining and Mineral processing industry to compose workflows ensuring maximum efficiency and profitability, always allowing total insight and control of the process chain. From mining, materials handling, mineral processing, smelting, refining and recovery, all production capabilities and statistics are easily available.

Yokogawa's commodity capabilities include:

- Base Metals (i.e. Aluminium and Copper)
- Coal
- Diamonds
- Ferrous Metals (Iron ore, Chromite, Manganese and Vanadium)
- Gold
- Platinum Group Metals (i.e. Platinum and Palladium)
- Rare Earths
- Uranium



How Yokogawa helps you achieve long-term business success!

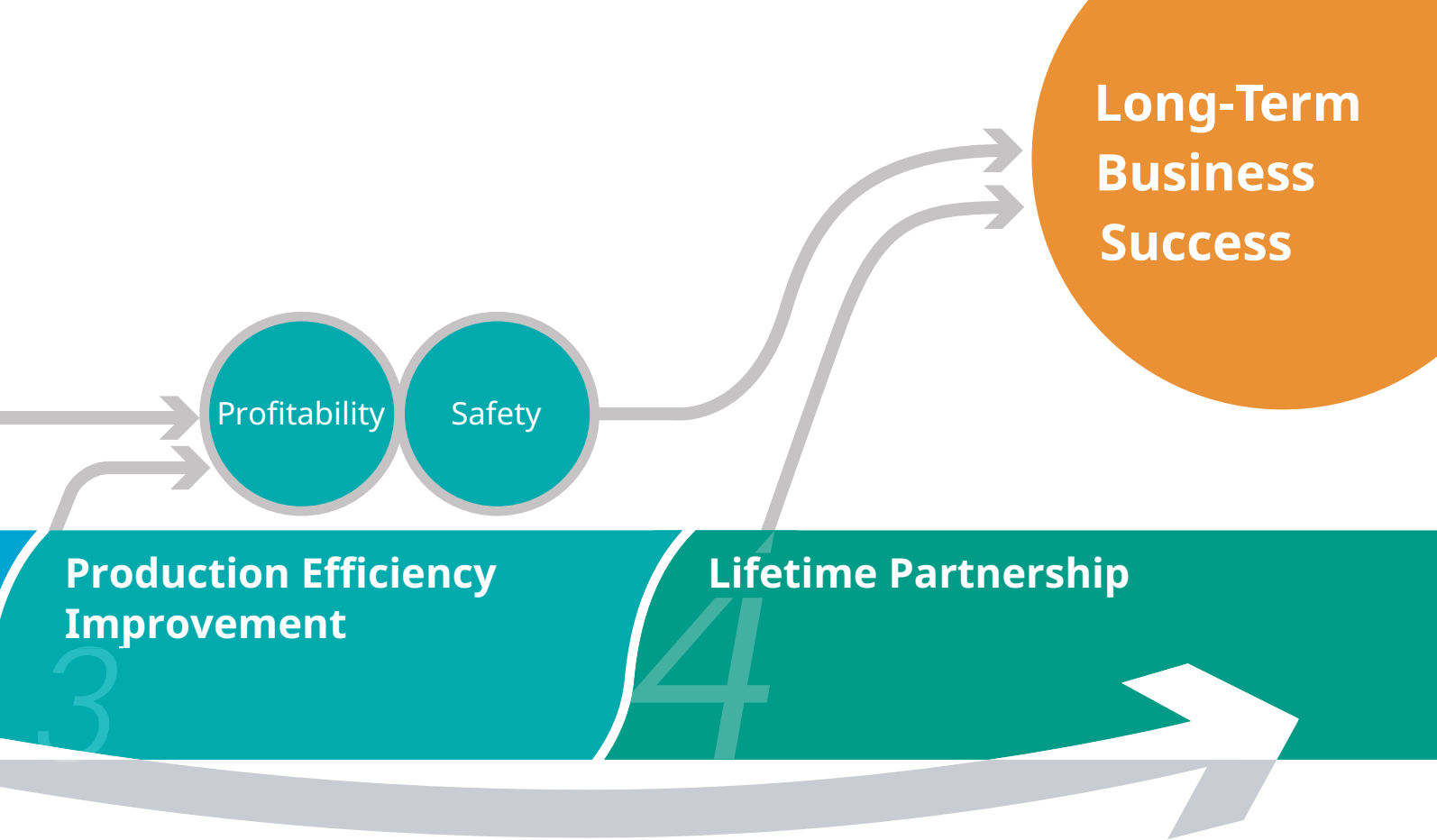


“Reliability and maintainability” of automation systems maximizes plant availability

2 “Plant-wide automation” enhances agility and flexibility of mineral processing production workflow

3 “Production efficiency improvement” increases profitability and enhances health, safety and environment

4 “Lifetime partnership” maximizes total value of ownership



Total Mining, Mineral Processing and

"Reliability and maintainability" of automation systems maximizes asset availability



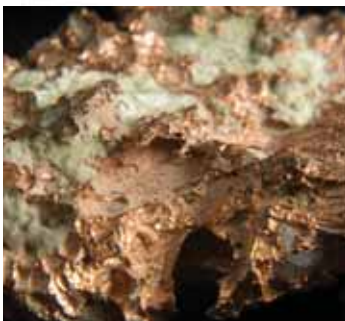
Mining, Haulage and Crushing Plants

"CENTUM VP provides an excellent platform for the comprehensive and coordinated control of Mining assets and Mineral Processing plants."

Mineral Processing Plants



Future migration and expansion security



Revamp and Expansion

Complex revamp/expansion projects test the alertness, care and skill of both the user and the supplier of automation. Yokogawa delivers practical engineering solutions with professional care, modernizing and expanding your plant with minimum disturbance to your business.



Maintenance and Upgrade

Be it diagnosis, root cause analysis, or predictive maintenance, practical solutions are in short supply. Yokogawa brings you the tools and services that help you take concrete actions to improve the effectiveness of your plant assets.

- Asset Optimization
- Life Cycle Solutions
- Operation & Maintenance Services
- Standard Knowledge Base

Metals Plant Control System



One of the most fundamental and often overlooked factors for maximizing revenue is the reliability and maintainability of automation systems. Utmost system availability is a key prerequisite for mining assets and mineral processing plants.

Design & Engineering

Early involvement and collaborative project execution lowers the overall risk of the project. Yokogawa strives to understand the goals of each project upfront and to secure a firm platform for on-going teamwork. Throughout execution, Yokogawa secures strict quality gates based on proven procedures.

- Front-End Engineering & Design (FEED)
- Main Instrumentation Vendor (MIV) Services
- Main Automation Contractor (MAC)



Installation & Commissioning

Good coordination between multiple suppliers and engineering teams is the key success factor in commissioning. Yokogawa ensures both human collaboration and technical integration throughout the project life cycle.

- Site Engineering
- Integration Testing
- Turn-Key Services
- Commissioning Services



Operation & Optimization

Ongoing adaptation and optimization requires continued collaboration. Yokogawa keeps in close touch with your investment through 24/7 operational support and expert consultation services.

- Optimization Consulting
- 24/7 Operation Support
- Online Diagnosis Support
- Operator Training



Reliability is in our DNA. Reliability of the production control system.

All automation suppliers take system reliability, a key factor for mineral processing plant availability, seriously. However none matches Yokogawa in its extreme commitment. At the heart of all the company's systems is the unique "Pair and Spare" controller architecture, consisting of a redundant set of CPU modules that, in turn, contains two microprocessors. These two microprocessors constantly compare each other's outputs, initiating a seamless switchover if any mismatch is detected.

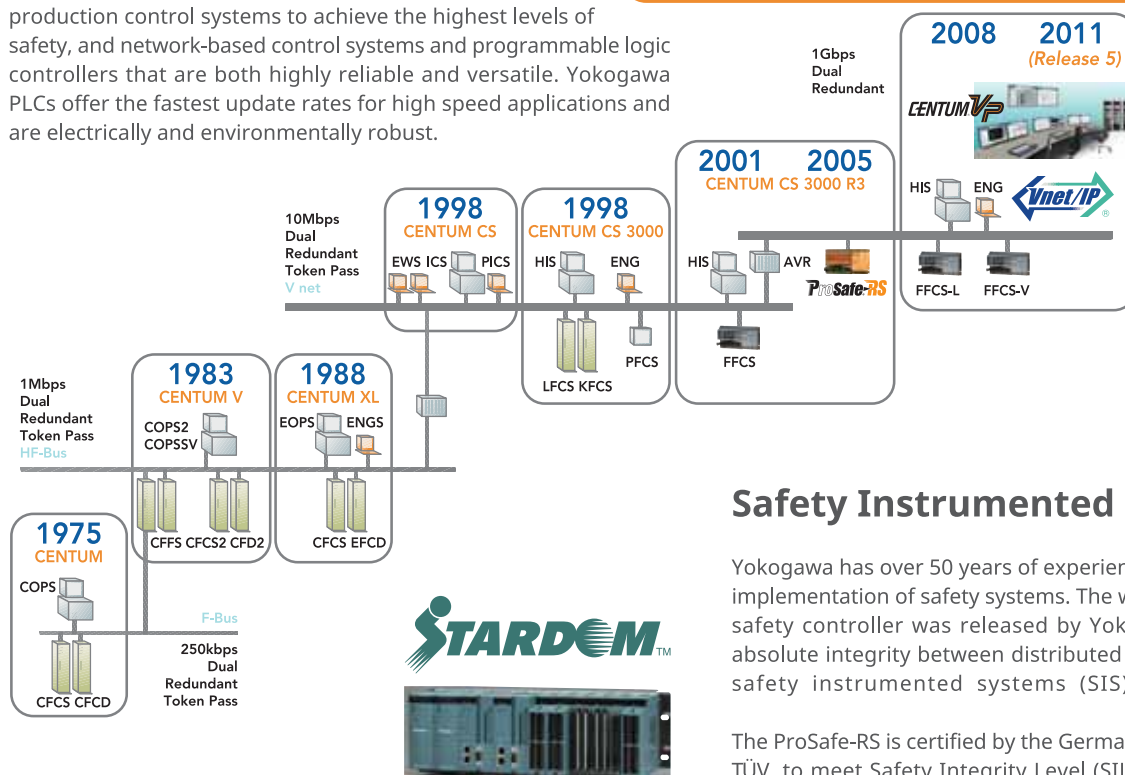
The actual availability track record of Yokogawa CENTUM DCS reaches 99.99999%.

Total Mining, Mineral Processing and

“Plant-wide automation” enhances agility and flexibility of processing workflow

Production Control Systems

We provide our customers with a range of systems that support the safe and efficient operation of their plants. These include highly reliable production control systems for the control and monitoring of plant operations, safety instrumented systems that are fully integrated with plant production control systems to achieve the highest levels of safety, and network-based control systems and programmable logic controllers that are both highly reliable and versatile. Yokogawa PLCs offer the fastest update rates for high speed applications and are electrically and environmentally robust.



Yokogawa offers multiple automation and control strategies, architectures, and solutions for every application size and complexity. Our distributed control system (DCS) is designed for large, complex industrial processes, and geographically distributed applications. The DCS can employ advanced process/supervisory control applications, operator-centric, enterprise-integrated information, configuring disparate systems into a holistic process overview and coordinated control strategy.

CENTUM VP is the latest generation of the CENTUM DCS series. CENTUM VP features unrivaled 99.99999% availability along with an intuitive human machine interface and a versatile field control station suitable for both large and small scale data processing tasks. To date, more than 25,500 CENTUM series systems have been delivered around the world.

2014



Distributed Control Systems
CENTUM VP
Release 6

Safety Instrumented Systems

Yokogawa has over 50 years of experience in the development and implementation of safety systems. The world's first truly integrated safety controller was released by Yokogawa in 2005, achieving absolute integrity between distributed control systems (DCS) and safety instrumented systems (SIS) for plant automation.

The ProSafe-RS is certified by the German certification organization, TÜV, to meet Safety Integrity Level (SIL) 3 specified in IEC 61508. Our expertise covers all major applications such as ESD (Emergency Shut Down), F&G or FGS (Fire and Gas Systems), BMS (Burner or Boiler Management Systems) as well as HIPPS or HIPS (High Integrity (Pipeline) Protection Systems).



ProSafe-RS



Supervisory Systems
FAST/TOOLS



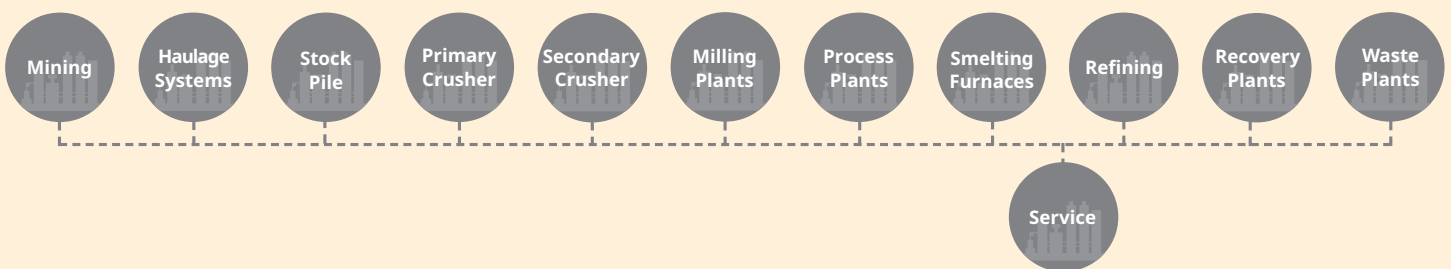
FA-M3V
VITESSE

Metals Plant Control System



Yokogawa is an automation supplier with extensive hands-on understanding of the usage of information for complex and varied mineral processing production processes. Yokogawa is a premier supplier of integrated plant-wide automation solutions that deliver agility and flexibility to all process workflows.

Mining and Mineral Complex



Management Information Systems (MIS) / Management Execution Systems (MES)

Yokogawa's MIS / MES systems consistently ensure fast return on investment and help operators to keep their plant operating environments optimized for years after the initial implementation.

Yokogawa's MIS / MES platform applications collect and store large volumes of process data providing actionable information that can be viewed and analysed by key personnel.

Common to all Yokogawa products is our commitment to ensuring there is always a clear migration path available for all our customers.

Exaquantum

Exapilot

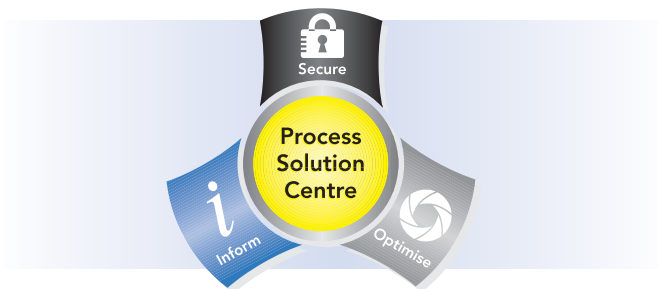
PRM
Plant Resource Manager

**Real-time
Production
Organizer.™**

Terminal Logistic Suite

VISUAL MESA
ENERGY MANAGEMENT SYSTEM

Advanced Process Solutions



Safety Excellence

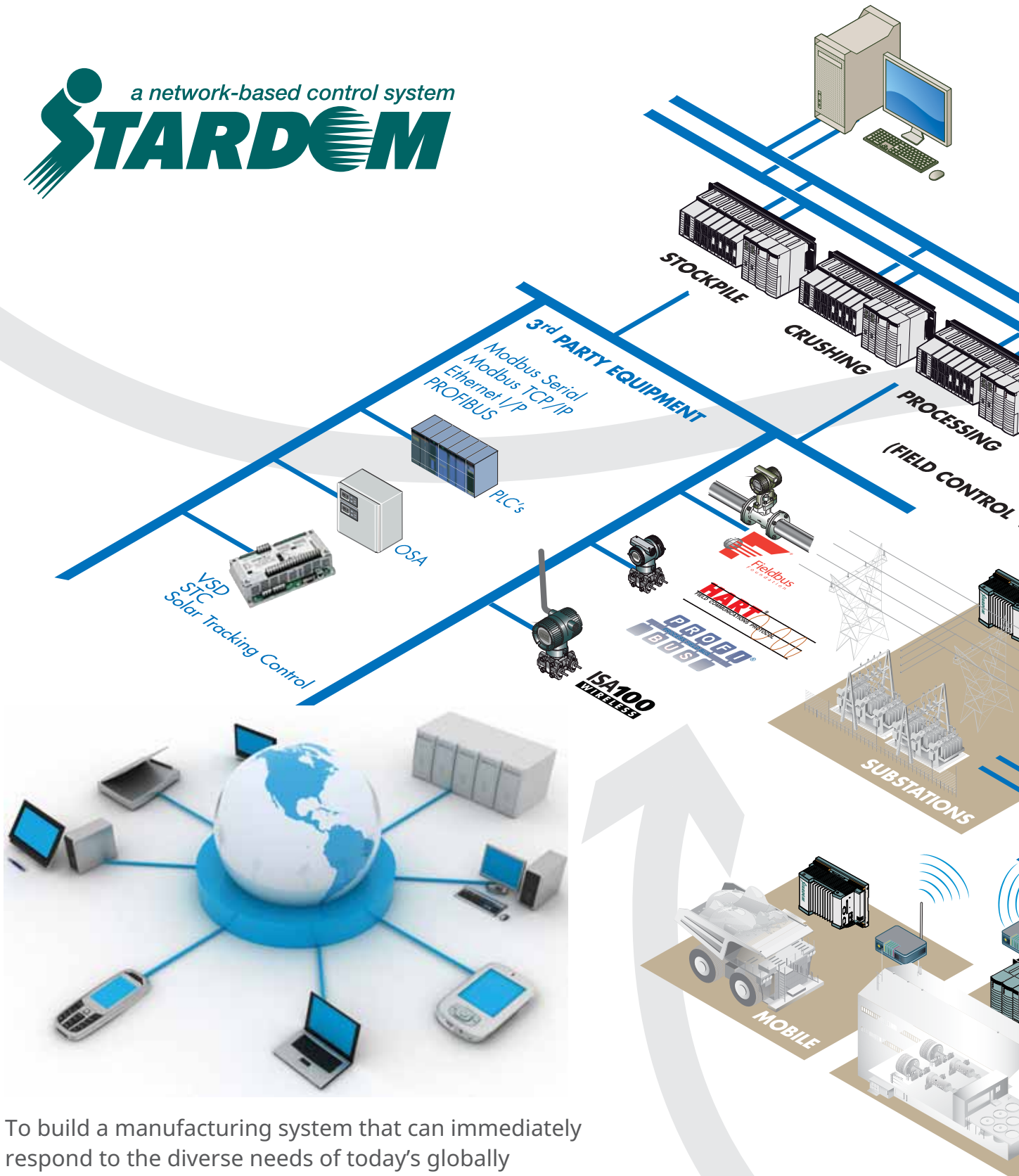
- Advanced Decision Support
- Alarm Rationalisation
- Regulatory Control Stabilisation
- Control Room Design
- Incident Analysis
- Integrated Closed Circuit Television (CCTV)
- Cyber Security

Asset Management

- Optimise Plant Asset Effectiveness
- Maximise Plant Uptime
- Plant Asset Management

Production Excellence

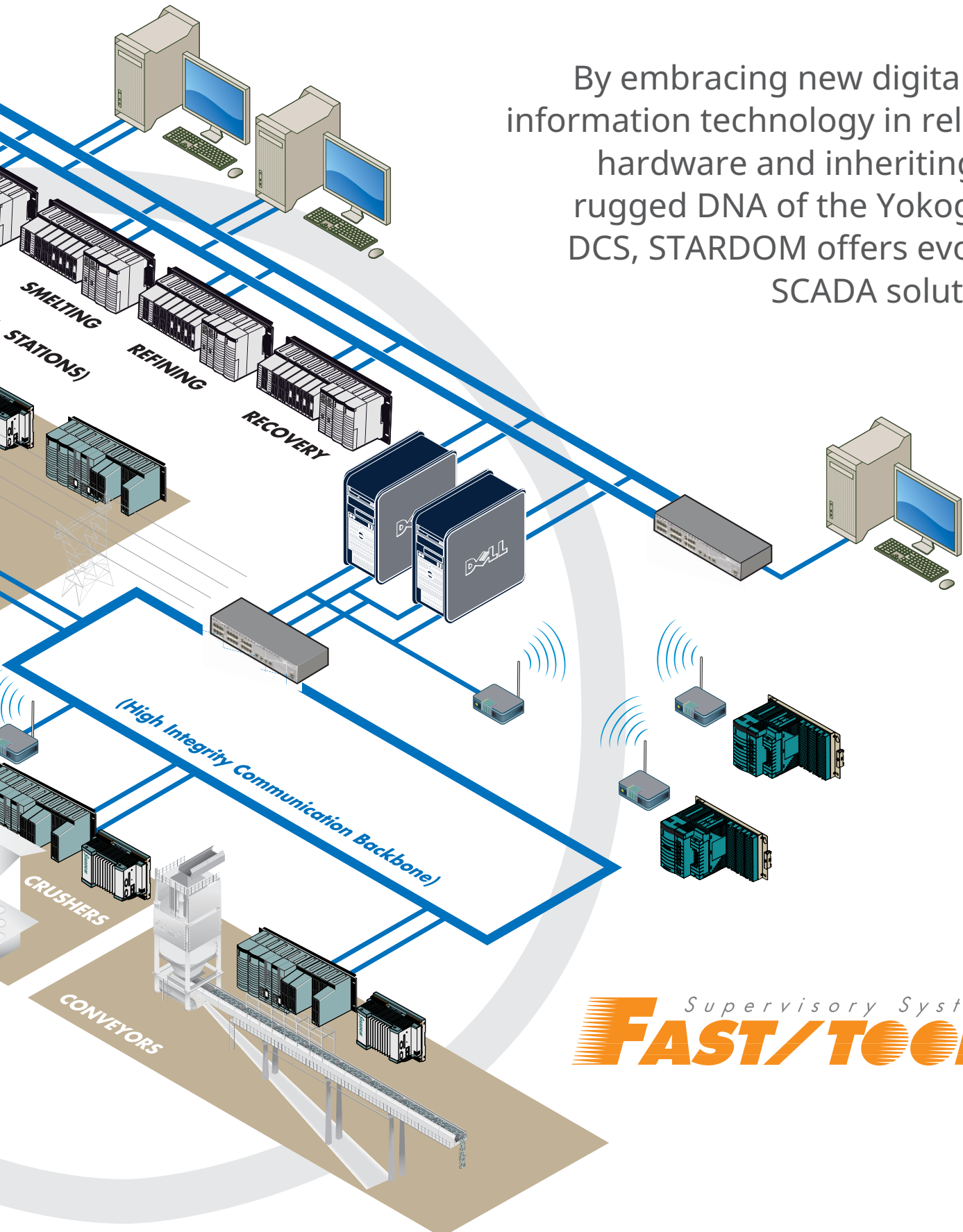
- Energy Management Solutions
- Best Practice Pilot
- Regulatory Control Stabilisation
- Platform for Advanced Control and Estimation (APC)
- Blend Property Control
- Real-time Production Organiser
- Operator Training System



To build a manufacturing system that can immediately respond to the diverse needs of today's globally networked society, an electronic Real Time Manufacturing (e-RMTM) system is required. This is a new concept that promotes the standardization of system configurations and component-based applications, using IT networks to link resource planning, manufacturing systems and control throughout the enterprise.

STARDOM Network based control and FASTTOOLS SCADA package

By embracing new digital and information technology in reliable hardware and inheriting the rugged DNA of the Yokogawa DCS, STARDOM offers evolved SCADA solutions.



Supervisory Systems
FAST/TOOLS

Field Instruments Industrial

3 “Production efficiency improvement” increases profitability and enhances health, safety and environment



Pressure Transmitters – DPHarp EJX/EJA Series

The EJX range of transmitters is Yokogawa's premium performance line of DPHarp pressure transmitters. Released in 2004, it offers the most technologically advanced solution with class leading performance and stability specifications. In addition, the EJX family offers unique features such as standard IEC61508 certification, optional contact output, advanced diagnostics, multivariable mass flow measurement and ISA100 wireless capability. Suitable for harsh mineral processing environments.



Magnetic Flowmeter: ADMAG Series AXF™

AXF/RXF magnetic flowmeters are sophisticated products with outstanding reliability and ease of operation, developed on the basis of decades of field experience. The ADMAG AXF™ employs the fluid noise free “Dual Frequency Excitation Method,” achieving excellent stability for instrumentation. A variety of liners enable you to choose a meter suitable for applications such as water, acid and slurry.



Coriolis Mass Flowmeter: RotaMass Total Insight

A mass flow meter for all fluids, including high viscosity liquids, slurries and multi phase media. Refined digital signal processing enables accurate and stable measurement. A special detector decoupling system makes the device highly independent from external loads or vibrations. Accurate density measurement, up to $\pm 0.0005 \text{ g/cm}^3$ concentration for solutions, suspensions and emulsions.



Vortex Flowmeter: Digital YEWFLO

The Digital YEWFLO Vortex Flowmeter combines the field proven sensor and body assembly used in more than 260,000 units installed worldwide with a unique and powerful combination of digital technology that includes spectral signal processing (SSP), a Yokogawa innovation. The digital YEWFLO vortex flowmeter is accurate and stable, even in harsh process conditions, and has a highly reliable and robust design that delivers improvements in plant efficiency and reduced operating costs.



Variable Area Flowmeter: RAMC

The short-stroke Rotameter RAMC allows for the measurement of high flow rates using a relatively short metering tube. It is a stainless steel armoured construction for the safe measurement of a variety of liquids, gases and steam. Its special application is for hazardous, dangerous or aggressive fluids, for high temperatures and high pressure rates. It has an electronic transmitter and Hart® communication that offers a high degree of safety thanks to the patented float blockage detection function.

Automation

The accurate and stable measurement of the process value with Yokogawa Field Instruments supports the safe and reliable operation in your plant.



Field Wireless System – Pressure Transmitter DPHarp EJX B Series

The high performance differential pressure and pressure transmitters EJX feature a single crystal silicon resonant sensor and are suitable to measure liquid, gas or steam flow as well as liquid level, density and pressure. These transmitters send not only process variables, but also the setting parameters, using wireless signal. The transmitters are powered by internal batteries and the installation cost can be decreased as hard-wiring is not required. Communication is based on ISA100.11a protocol specifications.



Field Wireless System: Multi-input Temperature Transmitter YTMX580

The YTMX580 can accept inputs from up to 8 points of measurement such as thermocouples (8 types: K, E, J, etc.) or RTD signals (3 types: Pt100, etc.), converting the corresponding measurement input values to a wireless signal. It can also accept DC voltage, resistance and 4 to 20 mA DC signal input. In addition to temperature signals, it can also wirelessly send and receive setting parameters. Internal battery power means eliminating not only signal wires, but also power cables—this offers great installation cost reductions. The communication is compliant with ISA100.11a protocol specifications.



Field Wireless System: Integrated Gateway YFGW710

The YFGW710 Field Wireless Integrated Gateway complies with the wireless communications standard ISA100.11a for industrial automation set by the International Society of Automation (ISA) and relays ISA100 device data to the system via an integrated backbone router. A YFGW710 unit has integrated functions including backbone router, system manager, security manager and gateway manager.



ISA100Wireless

Field Wireless System: Temperature Transmitter YTA510

The YTA510 is the high performance temperature transmitter that accepts thermocouple, RTD, ohms or DC millivolt inputs. The dual input type independently measures and calculates process values for Sensor 1 and Sensor 2. YTA510 transmits not only process variables, but also the setting parameters, using wireless signals. The transmitters run on internal batteries and installation costs may be decreased as hard-wiring is not required. The communication is compliant with ISA100.11a protocol specifications.



Temperature Transmitters: YTA110 and YTA70

The YTA110 is a high performance temperature transmitter that accepts thermocouple, RTD, ohm, or DC millivolt input and converts it to a 4 to 20mA DC signal for transmission. It supports either BRAIN or HART communication protocol. The YTA70 is a head mount type temperature transmitter and conforms to the standard DIN form B head mounting.

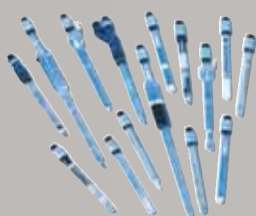
Field Instruments Industrial

3 “Production efficiency improvement” increases profitability and enhances health, safety and environment



Liquid Analytical: FLXA21

The FLXA21 is a next-generation modular liquid analyzer that can be flexibly configured to measure pH/ORP, contacting conductivity, inductive conductivity, or dissolved oxygen. The FLXA21 also supports the installation of up to two sensors of the same type, thereby reducing installation costs and saving space in addition to enabling the configuration of a highly reliable backup system.



Electrodes and Sensors

The heart of an analytical measuring loop is the electrode system. Yokogawa has designed a wide range of sensors to ensure this heart keeps beating under the most severe conditions.



Tunable Diode Laser Spectroscopy Analyzer TruePeak: TDLS8000

The TDLS8000 TruePeak Tunable Diode Laser (TDL) Analyzer is capable of measuring a number of near-infrared absorbing gases in harsh process environments. Able to make measurements under very challenging high temperature and pressure conditions as well as environments containing many corrosive, aggressive, and high particulate content materials, the TruePeak analyzer is one of the most robust process analyzers available.



In Situ Zirconia Oxygen Analyzer: ZR402G

The ZR402G Zirconia Oxygen Analyzer features a touch screen LCD with excellent operability for settings, calibration and trend graph viewing. The probe uses a highly reliable zirconia sensor and a field-replaceable heater assembly.



Controller Series: UT35/55 Advanced®

The UT35/55 Advanced® Digital Indicating Controllers offer the following features as a standard: Built-in control functions, ladder sequence control, fuzzy logic control, complete networking capabilities – Modbus TCP/RTU, CC Link and DeviceNet. These controllers present ideal low cost solutions for modular and remote plants within mines.

Automation

The accurate and stable measurement of the process value with Yokogawa Field Instruments supports the safe and reliable operation in your plant.



Data Acquisition: SMARTDAC+™

A fresh approach to data acquisition and control, with smart and simple touch operation as a design priority. Measure, display and archive process data with greater levels of clarity, intelligence and accessibility. The SMARTDAC+™ concept begins with the all-new GX/GP, an integrated I/O and recording system with a familiar touch operator interface. The new GX/GP is highly adaptable, very capable and easy to operate.



Web-enabled Data Acquisition System: MW100

Using your web browser, access any number of MW100's within a plant or installation, to see real-time site conditions and equipment operating status. The functionality of the web browser allows information sharing from multiple locations and constructs highly distributed remote monitoring data acquisition systems that are ideal for facilities management and equipment monitoring.



Digital Indicator with alarms: UM33A

The UM33A is a newly-released digital indicator with alarms, providing up to 9 alarm outputs and input correction functions (PV bias, Polygonal line approximation, polygonal line bias). A 24V DC sensor power supply is available as an option.



Versatile Device Management Wizard: FieldMate™

FieldMate™ is a PC-based configuration tool that performs tasks including initial setup, daily maintenance, troubleshooting and configuration backup for device replacement. These tasks are streamlined by FieldMate's™ intuitive operation and integrated environment which is independent of communication protocols and device vendors. FieldMate™ incorporates the open FDT/DTM standard and is compliant with DTM's per the FDT 1.2 standard. Additionally, FieldMate™ supports both HART® and Foundation Fieldbus H1 devices.



Handheld Communicator: YHC5150X FieldMate™

The YHC5150X FieldMate™ Handheld Communicator is the latest HART® Communicator from Yokogawa. All HART® field devices can be configured, polled and trimmed utilizing a Windows Embedded CE™ based system for faster processing and greater storage capacity. All options are standard and no subscription is required. The YHC5150X is a full function, DD Direct, HART® Communicator supporting universal, common practice and device specific commands for commissioning, configuration and maintenance operations.

Your Single-Source Partner for

“Lifetime partnership” maximizes total value of ownership

Industry leaders striving for operational excellence will benefit from a new vigilant approach to plant automation. Yokogawa VigilantPlant solutions help measure, control and optimize your processes, ensuring plant-wide integration. A worldwide network of committed experts supports your operations 24/7 for life-cycle optimization.



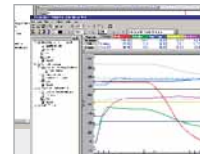
Optimize

Production Management

Plant Information Management



Advanced Process Control



Control

Production Control and Safety Management

Integrated Production Control



Integrated Safety Management



SCADA and Network-based Control



Measure

Sensing and Actuation

Flow



Pressure



Operational Excellence

Long-term business success needs a long-term strategy.
A long-term partnership with Yokogawa will help provide the highest total value of ownership for automation solutions.

Asset Management and Operational Efficiency

Operator Training Simulator



Operation Efficiency Improvement



Integrated Plant Resource Management



Open System Integration

High Integrity Pressure Protection Systems HIPPS



OST



MODBUS



Gas Analyzers

Multivariable



Temperature



Valve Positioner / Others



Gas Analyzer



Advanced Analyzer



Yokogawa Mining Installed Base in South

Installation Key

- Control Systems
- ★ Analytical
- ▼ Flow (mostly Magnetic)
- Pressure

Botswana

- BCL ■ ●
- Botash ■

Namibia

- De Beers Marine ■
- Dundee Precious Metal Tsumeb ■
- AngloGold Ashanti

North West

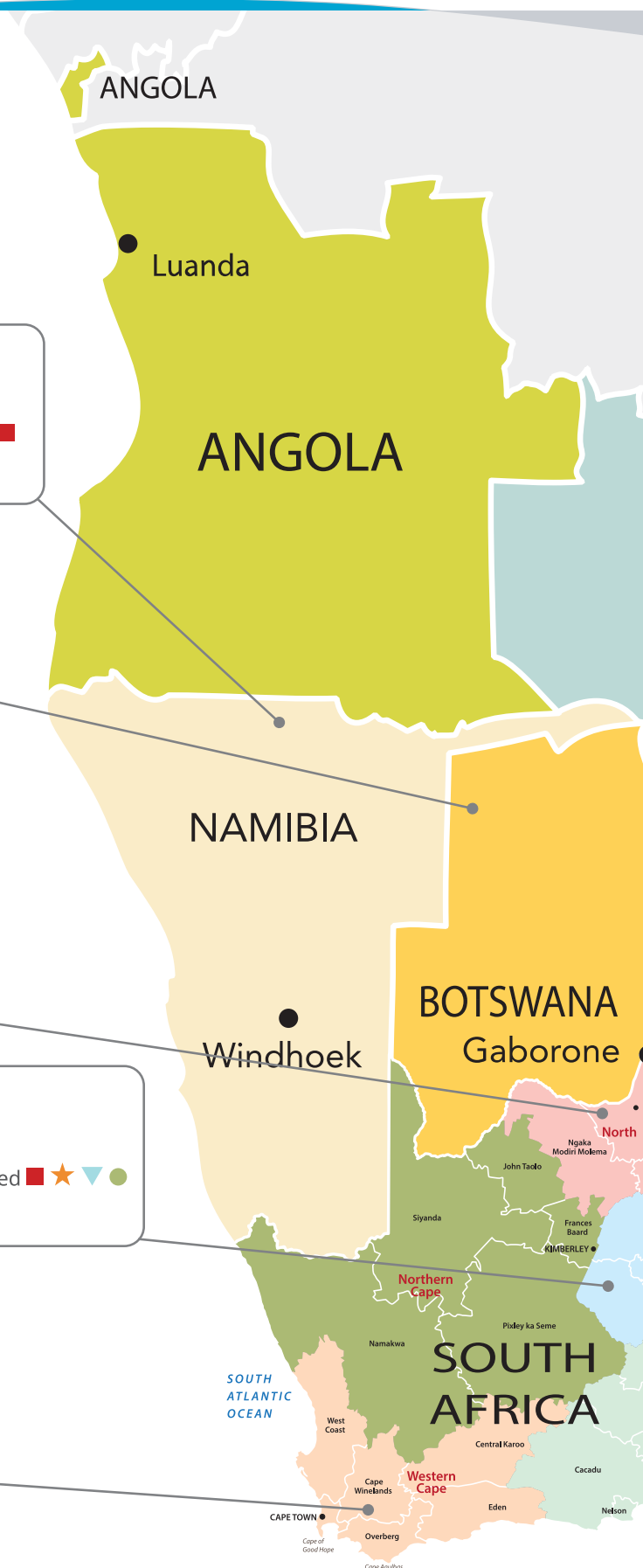
- Vergenoeg Mining Company ▼
- Evraz Vametco ★
- Anglo Rustenburg Platinum Mines ★ ▼
- Northam Platinum Ltd ●
- Lonmin Plc ★ ▼
- Xtrata Mining Sa (Pty) Ltd
- Glencore Merafe Venture ●

Free State

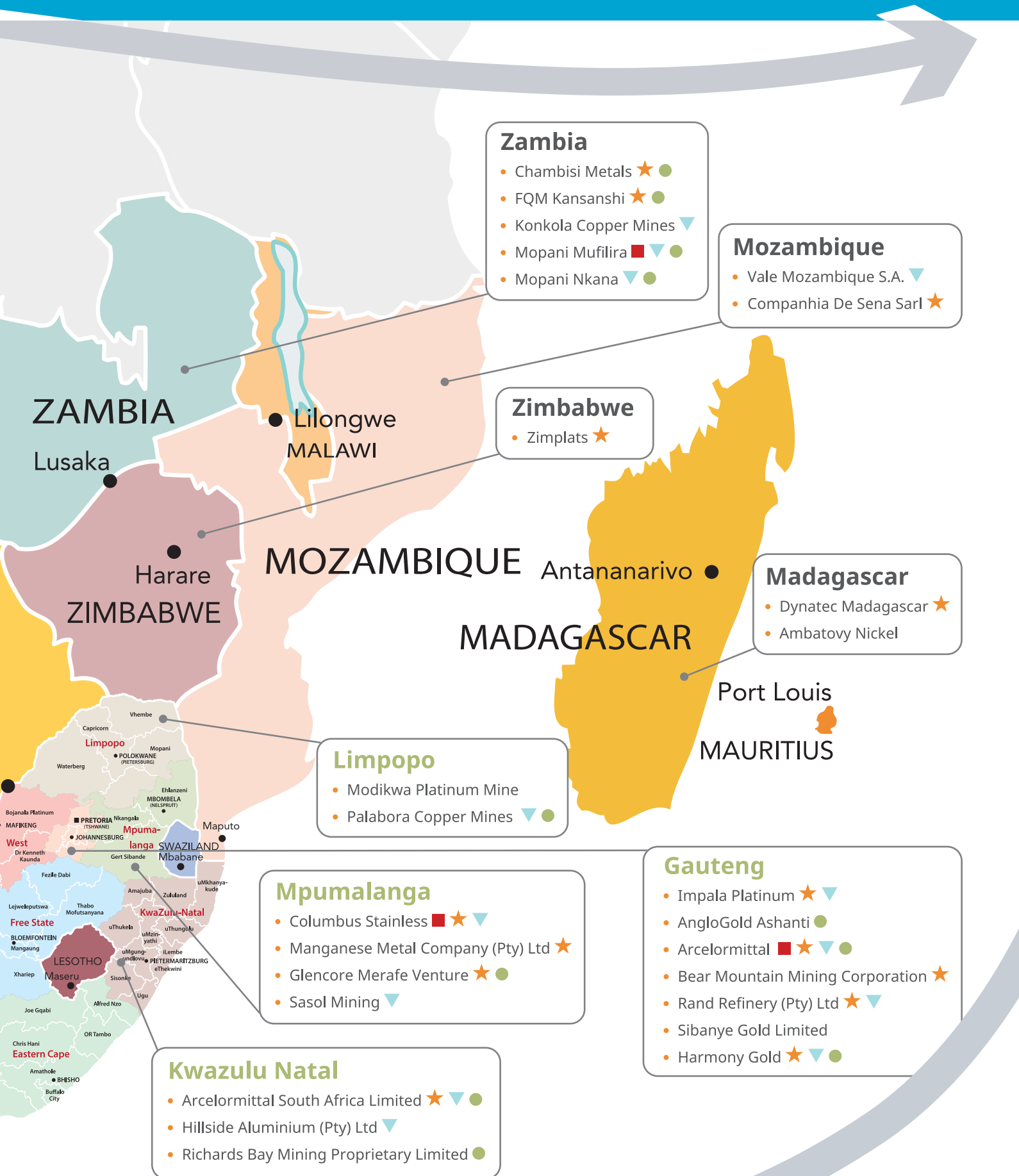
- Acacia Mining Plc ★ ▼ ●
- Arcelormittal South Africa Limited ■ ★ ▼ ●
- Harmony Gold ■ ★ ▼ ●

Western Cape

- De Beers Marine ■
- Elandsfontein Mine ▼
- Tronox Mineral Sands (Pty) Ltd ▼



Africa and African Anglophone Regions



Yokogawa in the Smelting and



Coal

Yokogawa Instrument Users:

- Anglo Coal's Capcoal Mine**, Bowen Basin Qld
 - AXF Flow Meters and EJX Pressure Transmitters
- Anglo Coal's Dawson Mine**, Bowen Basin Qld
 - AXF Flow Meters, EJX Transmitters, Rotamass
- Anglo Coal's Moranbah North**, Bowen Basin
 - AXF Flow Meters and Analytical products
- Yancoal's Austar Coal Mine**, Hunter Valley
 - EJX Transmitters, Analytical products
- BHP Billiton's BMA**, Bowen Basin Qld
 - AXF Flow Meters, EJX Transmitters
- GlencoreXstrata's Bulga Mine**, Hunter Valley NSW
 - AXF Flow Meters
- Caledon Coal**, Bowen Basin Qld
 - AXF Flow Meters, EJX Transmitters
- Integra Coal**, Hunter Valley
 - AXF Flow Meters, EJX Transmitters
- GlencoreXstrata's Newlands Coal**, Bowen Basin Qld
 - EJX Transmitters
- Peabody's North Goonyella Coal**, Bowen Basin Qld
 - Rotamass
- GlencoreXstrata's Oaky Coal**, Bowen Basin Qld
 - AXF Flow Meters
- Port Waratah Coal services**, Hunter Valley NSW
 - AXF Flow Meters
- Rio Tinto Coal**, Bowen Basin
 - AXF Flow Meters and EJX Pressure Transmitters
- Peabody's Coppabella mine**, Bowen Basin
 - AXF Flow Meters and EJX Pressure Transmitters
- GlencoreXstrata's Ulan Coal**, Western NSW
 - AXF Flow Meters and EJX Pressure Transmitters
- Wesfarmers Curragh**, South West WA
 - AXF Flow Meters and EJX Pressure Transmitters



Copper

Yokogawa Instrument Users:

- Aditya Birla's Nifty and Mt Gordon Mines**, located in the Pilbara and Mt Gordon near Mt Isa
 - AXF Flow Meters
 - EJX Transmitters and Analyser products
- Hillgrove Resources Kanmantoo Mine**, located West of Adelaide in South Australia
 - AXF Flow Meters
 - EJX Transmitters and Analyser products
- Snowpeak Mining**, several mines located in North Queensland
 - AXF Flow Meters
 - EJX Transmitters and Analyser products
- Oz Minerals Prominent Hill Mine**, located in the North West of South Australia
 - AXF Flow Meters
 - EJX Transmitters and Analyser products
- BHP Billiton Olympic Dam Mine**, located in the North West of South Australia
 - AXF Flow Meters
 - EJX Transmitters and Analyser products



Refining Industry



Gold

Yokogawa Instrument Users:

Gold Field's Agnew Mine, Goldfields Region of WA

- AXF Flow Meters

AngloGold Ashanti's Sunrise Dam, Goldfields Region of WA

- EJX Transmitters and Analyser products

Alacer's Avoca Mine, Goldfields region of WA

- Analyser Products

Evolution Mining's Ballarat Gold Mine, Victoria

- AXF Flow Meters and Analyser products

Barrick's Darlot, Lawlers, Plutonic and Cowal Mines, WA & NSW

- AXF Flow Meters, EJX Transmitters and Analyser products

Newcrest's Cadia Valley Mine, NSW

- AXF Flow Meters, EJX Transmitters and Analyser products

Resolute's Carpentaria Gold Mine, Northern NSW

- Analyser products

Norseman Gold's Central Norseman, Goldfields Region of WA

- AXF Flow Meters, EJX Transmitters and Analyser products

Crocodile Gold's Cosmo Mine, NT

- AXF Flow Meters, EJX Transmitters

KingsGate's Challenger Mine, SA

- Analyser products

Evolution Mining's Edna May Mine, Goldfields Region of WA

- AXF Flow Meters, EJX Transmitters

St Barbara's Gold Ridge Mine, Solomon Islands

- AXF Flow Meters, EJX Transmitters

Silverlake Resources' Randall Mine, Goldfields Region of WA

- AXF Flow Meters and Analyser products

Newmont & Barrick JV SuperPit Mine, Kalgoorlie WA

- AXF Flow Meters, EJX Transmitters and Analyser products
- Rotameter & DY Vortex Meters

Evolution Mining's Mt Rawdon Mine, Central QLD

- EJX Transmitters

Newcrest's Lihir Gold Mine, PNG

- AXF Flow Meters, EJX Transmitters and Analyser products

Evolution Mining's Cracow Mine, Central QLD

- AXF Flow Meters

Navigator Resources' Bronzewing Mine, Eastern Goldfields WA

- Analyser products

Newcrest's Telfer Mine, East Pilbara WA

- AXF Flow Meters, EJX Transmitters and Analyser products

Newmont's Boddington Mine, South West WA

- AXF Flow Meters, EJX Transmitters and Analyser products

Newmont's Tamani Mine, NT

- AXF Flow Meters, EJX Transmitters

Norton's Paddington Gold Mine, Goldfields Region of WA

- EJX Transmitters and Analyser Products
- UT Temperature Controllers

Gold Field's St Ives Mine, Goldfields Region of WA

- AXF Flow Meters and Analyser Products

Crocodile Gold's Stawell Gold Mine, Victoria

- AXF Flow Meters, EJX Transmitters and Analyser Products

Oceana Gold's Reefion and Macrae's Mines, South Island New Zealand

- AXF Flow Meters, EJX Transmitters and Analyser Products



Iron Ore

Yokogawa Instrument Users:

Citic Pacific Mining, Western Australia

- EJX Pressure Transmitters and Analytical Products

Rio Tinto Pilbara Iron Company, Western Australia

- Analytical Products, DY Vortex Flow Meters and EJX Pressure Transmitters

Arrium, South Australia

- Analytical Products, AXF Flow Meters and EJX Pressure Transmitters

Yokogawa in the Smelting and

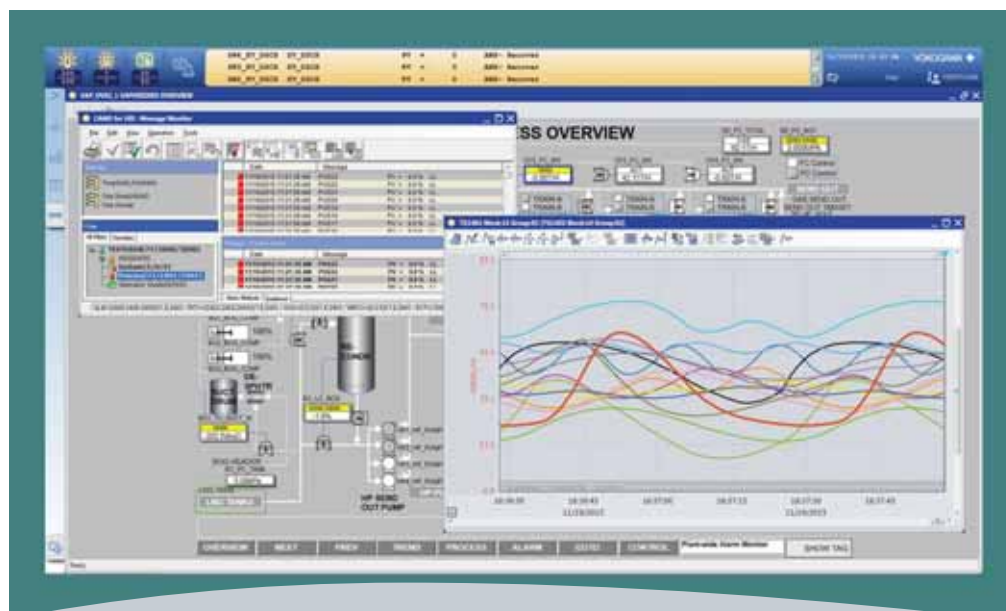


Outotec's Ausmelt TLS smelting processes incorporating Yokogawa Centum DCS control systems

Distributed Control Systems
CENTUM[®] **VP**
Release 6

Location of Smelters:

- Daye non-ferrous metals - China
- Wuxin Copper - China
- HCHM Hulunbeier - China
- Huludao Copper - China
- Yunnan Tin Copper - China
- Hindustan Zinc Chanderiya - India
- Karabash Copper - Russia
- Ongopolo Copper - Namibia



Refining Industry



Smelters and Refineries

Alumina Smelters:

Alcoa Alcoa Port Henry, Victoria

- AXF Flow Meters, EJX Pressure Transmitters and Analytical products

Alcoa Pinjarra, Western Australia

- AXF Flow Meters, EJX Pressure Transmitters and Analytical products

Rio Tinto's Queensland Alumina, Queensland

- AXF Flow Meters, EJX Pressure Transmitters and Analytical products

Pacific Aluminium's Boyne Smelter, Queensland

- DY Flow Meters, EJX Pressure Transmitters and Analytical products

BHP Billiton Worsley Alumina, Western Australia

- DY Flow Meters, EJX Pressure Transmitters and Analytical products

Tomago Smelting, NSW

- DY Flow Meters, EJX Pressure Transmitters and Analytical products

Pacific Aluminium Tomago, NSW

- AXF Flow Meters and EJX Pressure Transmitters

Pacific Aluminium Gove, Northern Territory

- Analytical products, AXF Flow Meters and EJX Pressure Transmitters

Zinc Smelters:

Sun Metals, Queensland

- DY Flow Meters, EJX Pressure Transmitters and Analytical products

Nyrstar Hobart, Tasmania

- AXF Flow Meters and EJX Pressure Transmitters

Nyrstar Port Pirie, South Australia

- AXF Flow Meters, EJX Pressure Transmitters and Analytical products



Mining Companies Using Yokogawa Products

Instruments
 Both Control Systems and Instruments

Mining Company	Mineral/Metal											
	Coal	Copper	Gold	Iron Ore	Lead	Mineral Sands	Nickel	Uranium	Zinc	Diamond	Cobalt	Platinum
ACACIA Mining												
Aditya Birla												
Anglo Coal												
Anglo Gold Ghana												
Anglo Gold												
Anglo Gold Joel												
Alacer												
Arrium												
Ambatovy Nickel												
Barrick Gold												
Base Titanium Mining												
BCL												
BHP Billiton Mitsubishi												
BHP Billiton Nickel West												
Bloomfield Coal												
BOTASH												
Caledon Coal												
Citic Pacific Mining												
Chambishi Metals PLC												
Crocodile Gold												
Cristal Mining												
De Beers Marine												
ERA												
Evolution Mining												
First Quantum Minerals												
FQM Kanshishi												
GlencoreXstrata Murrin Murrin												
Gold Fields												
Heathgate												
Hillgrove												
Iluka Resources												
Integra Coal												
IMPLATS												
Kingsgate												
MMG												
Mopani Nkana												
Mopani Mufulira												
Mitsubishi Cape Flattery Silica												
Murray Zircon												
Namibia Custom Smelter (Dundee Precious Metals)												
Navigator Resources												
Newcrest												
Newmont												
Norseman Gold												
Norton												
Oceana Gold												
Panoramic Resources												
Peabody												
Pilbara Iron Company												
Resolute												
Rio Tinto												
Shansteel Sierra Leone												
Sibelco												
Silverlake Resources												
St Barbara												
Snow Peak Mining												
Stami Gold Mining												
Tronox												
Uranium One												
Vale												
Wesfarmers												
Williamson Diamond Mine Ltd (WDL)												
Yancoal												
Xstrata												

Engineering Capabilities

Yokogawa delivers a total automation solution, covering the entire lifecycle of projects, as your automation partner. This proven method brings experience, engineering, technology, safety, and lifecycle support, while at the same time reducing risk and lowering overall costs.

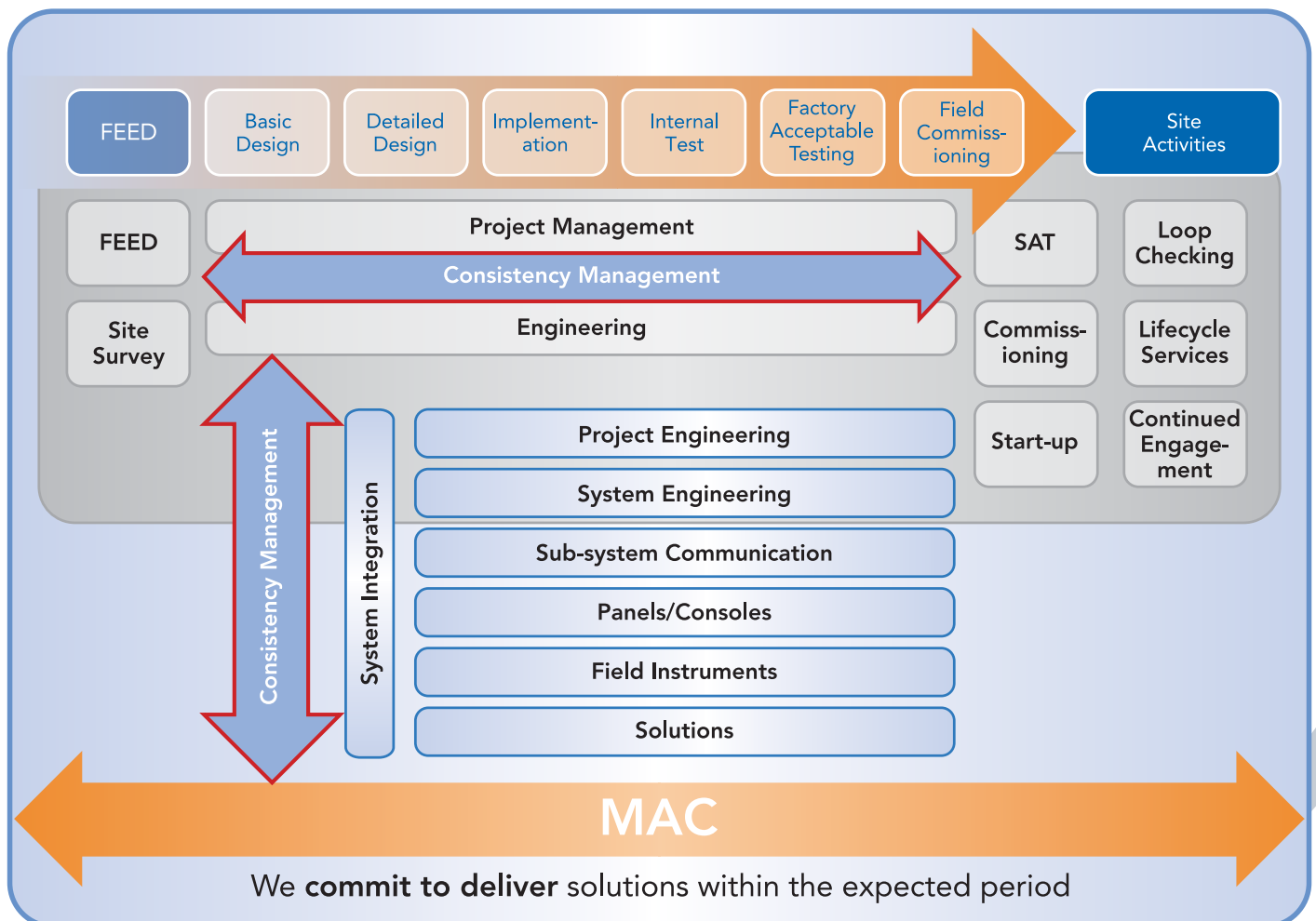
Yokogawa's Project Execution Team applies excellent communications with all parties including the Contractor, End user, Licensor, etc. to ensure successful project delivery. Yokogawa has the advantage of a local and global knowledge base and resourcing for project execution.

Yokogawa's Engineering capabilities include:

- Green Field Projects Execution
- Main Automation Contractor "MAC"
- Front End Engineering Design "FEED"
- Functional Safety Management
- Systems Migration / Replacement



Combining full understanding of customer requirements with professional management of multiple vendors, Yokogawa is strongly positioned to deliver the set objectives of any project.



Accredited Training Courses



Africa is experiencing a severe shortage of well qualified, competent and experienced people in the areas of control and field instrumentation. Technical training provides a platform for companies to improve the skill levels in their organisations. Well trained employees will be able to pre-empt plant systems outages and therefore save time and money. Yokogawa provides flexible training courses in the areas of control and field instrumentation, in order for participants to

understand the technologies both in theory and practice.

The Learning Material for Field Instrumentation and Systems (Control) Training has been accredited by Society for Automation, Instrumentation, Measurement and Control (SAIMC) to comply with the Engineering Council of South Africa's (ECSA's) guidelines for Professional Registered people to earn Continuous Professional Development (CPD) points.

The Field instrumentation Learning Material is also internationally accredited by the Institute of Measurement and Control (IMC) in the UK. Yokogawa's Facilitators are registered as Assessors, Moderators and Trainers at the Energy and Water Sector Education and Training Authority (EWSETA).

The following courses are offered by Yokogawa:

a) Systems Training:

- **Distributed Control System (DCS) Training courses:** CENTUM VP Essentials, Engineering and Maintenance
- **Systems Advanced Training:** Prosafe RS Engineering, Profibus and Exaquantum
- **Systems and Solution Software Training:** Foundation FieldBus
- **Plant Resource Management and Consolidated Alarm Management Software**

b) Field Instrumentation Training:

- **There are three distinct levels of Field Instrumentation Training identified to accommodate engineers, technologists, technicians, artisans and apprentices in the Field of Process Instrumentation and Control.**
 - Measuring Principles Product Training (Theoretical Explanation)
 - Advanced Product Training (Hands-on Training)
 - Customised Product Training (Hands-on Training)

These courses are practical and outcome-based, driven on real plant simulators. On successful completion of the theoretical and practical assessments, participants will be deemed competent and issued a Certificate of Competence. Training is offered at the Yokogawa South Africa Head Office, KwaZulu Natal office or at customer sites in the African Anglophone Region.



Lifecycle Support Services



Yokogawa prides itself in providing customer centric solutions. We partner with our customers to find optimum outcomes for your process plant and provide holistic and tailored service solutions that:

- Ensure minimum production losses and predictable operational costs;
- Preserve assets;
- Sustain operational performance;
- Maximise profits.

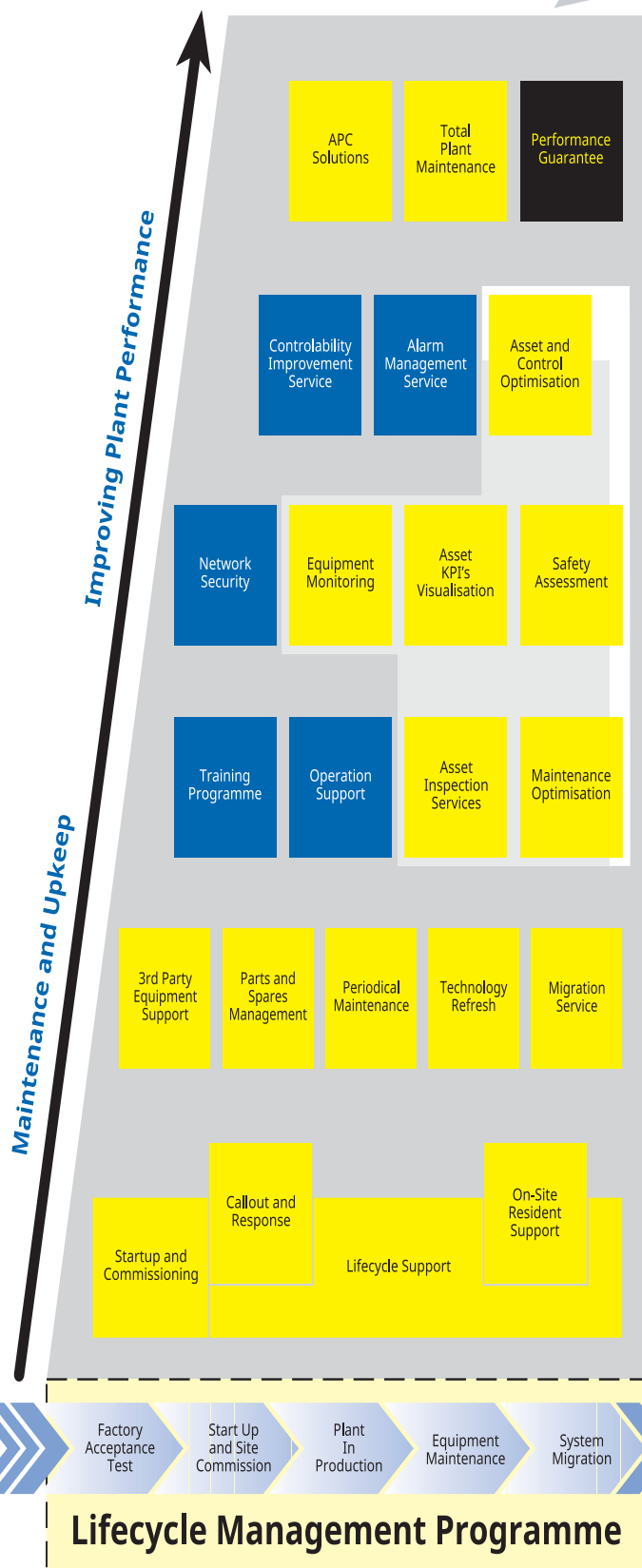
Our reputation of uncompromising reliability in providing maintenance and support products is evident with the Yokogawa Lifecycle Agreement (LCA). This demonstrates our commitment to prolonging the satisfaction of ownership and providing a range of options on new and existing systems.

Yokogawa's life cycle support services include the following:

- Preliminary Assessment Work prior to executing an agreed technical proposal
- Emergency Services offering access to the Yokogawa regional and global Response Centre
- Telephone consultation regarding maintenance and resolution of operational issues
- Remote maintenance services to remotely operate and diagnose problems

Periodic Maintenance

- Shutdown Maintenance
- Software/Hardware Support Services
- Parts Holding
- Bench Repair
- Calibration
- Reports on periodic and shutdown maintenance service support activities
- Field Instrumentation and Control Systems Training offered at the customer's site or Yokogawa offices
- Remote Backup



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