



ABB ENERGY INDUSTRIES

# TechTalk: Upgrade of Gas Turbine Control

© COPYRIGHT [2021] ABB. ALL RIGHTS RESERVED.



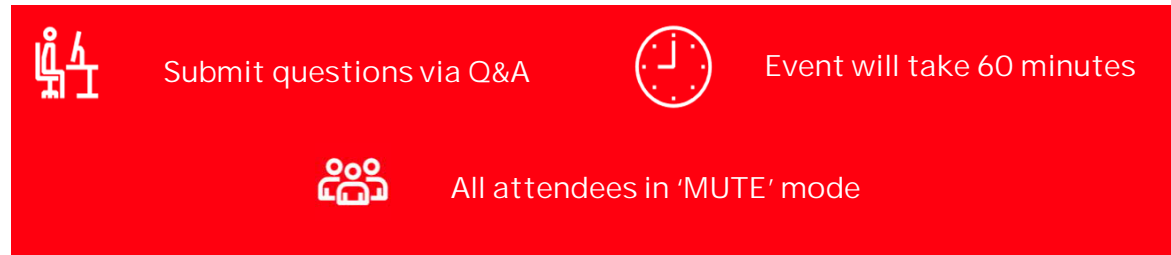
# Welcome!

## Presenter



### Thomas Fischer

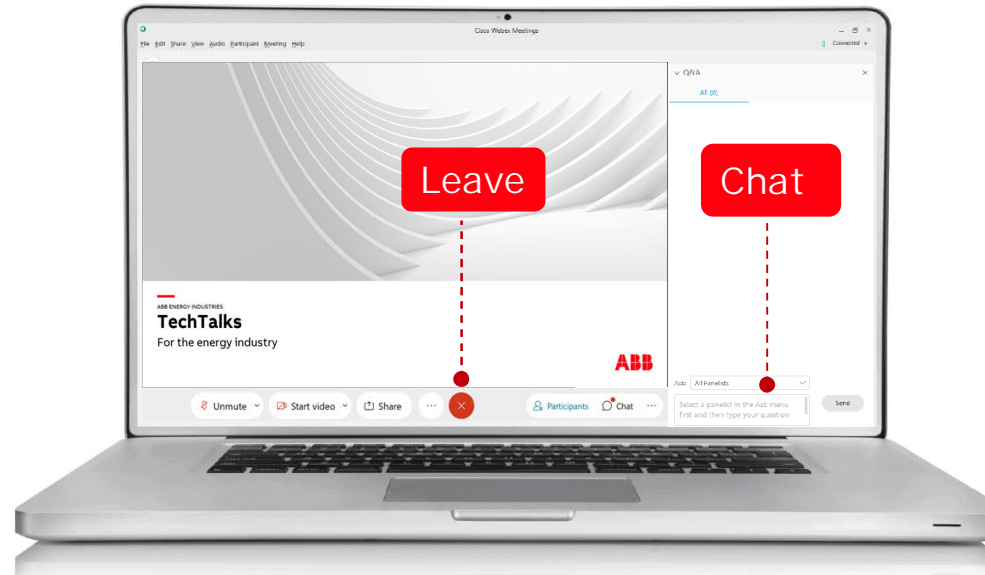
Sales & Project Management Global Markets  
Mannheim, Germany  
Phone: +49 621 381 - 7456  
Mobile: +49 170 2692583  
Email: [thomas.d.fischer@de.abb.com](mailto:thomas.d.fischer@de.abb.com)



Submit questions via Q&A

Event will take 60 minutes

All attendees in 'MUTE' mode



## Host



### Alexander Schröder

Sales & Project Management Global Markets  
Mannheim, Germany  
Phone: +49 621 381 - 6461  
Mobile: +49 151 72510481  
Email: [alexander.schroeder@de.abb.com](mailto:alexander.schroeder@de.abb.com)

# ABB Power Generation / Mannheim Germany

## Welcome

### Displayed on picture:

Robert Dettmer  
Dinah Weinkötz  
Thomas Fischer  
Greyces De Castro Mendoza  
Peter Beer

Thomas Jäger  
Maximilian Köhler  
Alexander Schröder  
Wolfgang Kourschil  
Dieter Fleck

### Not displayed:

Frank Seeber  
Horst-Dieter Krahl  
Oliver Jennes  
Klaus Kern



## Head of Service Global Markets



## Peter Beer

Head of Service Global Markets  
Mannheim, Germany

Phone: +49 621 381 - 7088

Mobile: +49 172 7446444

Email: [peter.beer@de.abb.com](mailto:peter.beer@de.abb.com)

---

# Stay Safe & Healthy!

ABB is committed to highest standards regarding Health and Safety



---

## Health and Safety

- Our employees and contractors are equipped, trained and instructed to fulfil highest performance regarding H&S.
- Being at site, ABB will fulfil customers H&S and local country regulations (e.g., COVID-19).
- Please support and guide ABB regarding your local rules in order to follow the common goals of H&S.
- Our target is to ensure safe work environments and to create a culture of health and safety that supports an optimal business performance for customer and ABB.

ABB is targeting a zero-incident policy regarding H&S

---

# Agenda

## Upgrade of Gas Turbine Control

1	Introduction
2	Technical description
3	Benefits
4	References
5	Summary
6	Questions & Answers

---

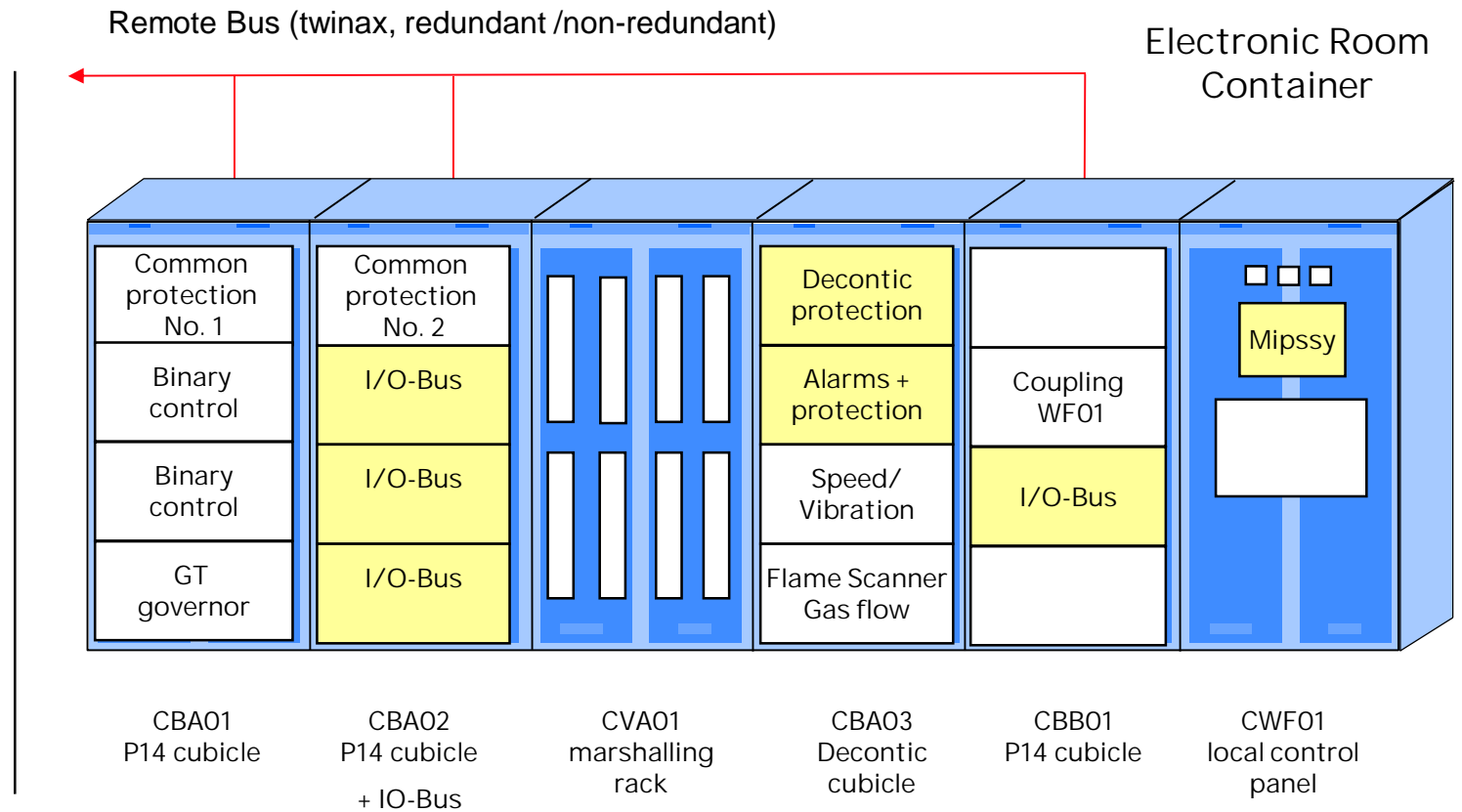
# Upgrade of Gas Turbine Controller

Introduction

# Gas Turbine Controller

## Present situation

- Procontrol IO-Bus modules  
-obsolete-
- Procontrol Remote Bus modules  
-obsolete-
- Decontic modules for GT Protection  
-obsolete-
- Speed monitors  
-obsolete-
- Vibration monitors  
-obsolete-

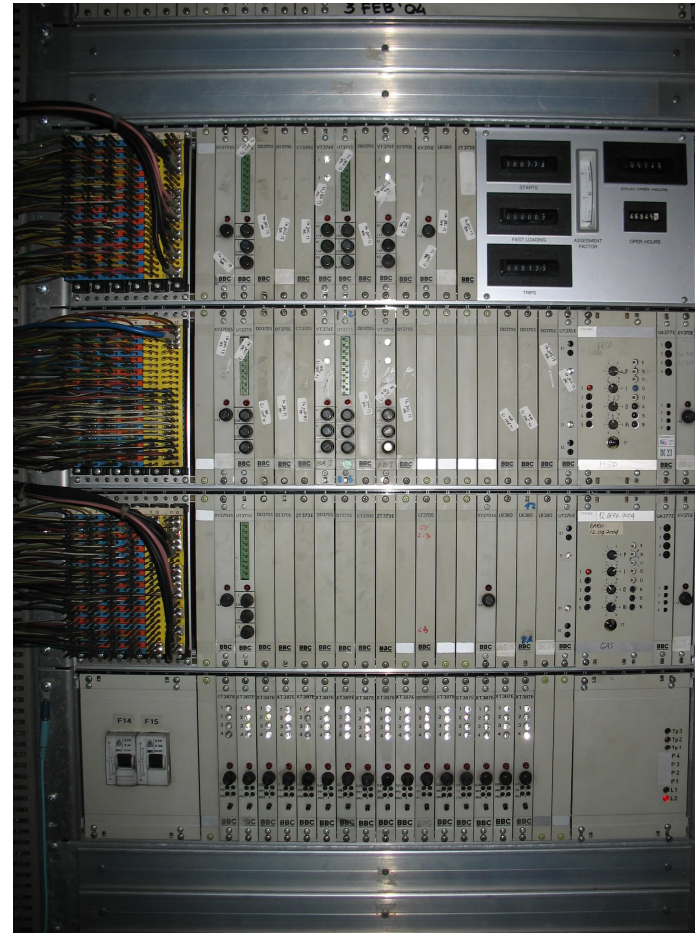


# Gas Turbine Controller

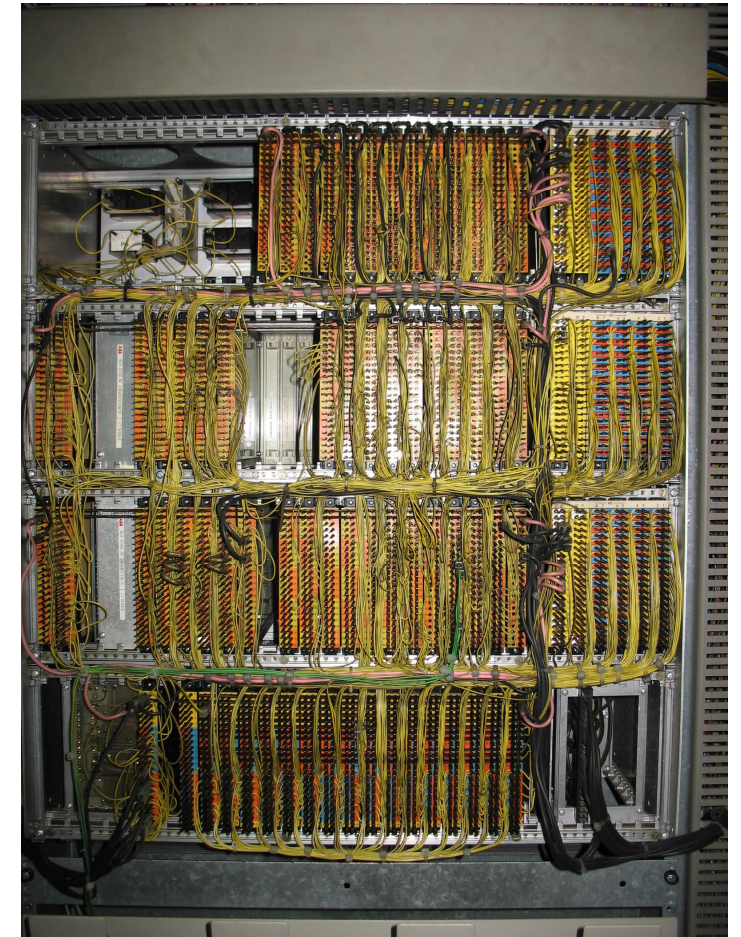
Present situation

## CBA03-Decontic cabinet

- Decontic modules for GT Protection
- Metering of electrical variables
- GT operating hours counter
- Aux. power supplies (transmitters, ...)
- Speed monitors
- Vibration monitors
- Fuel valves positioner



Front View



Rear View



---

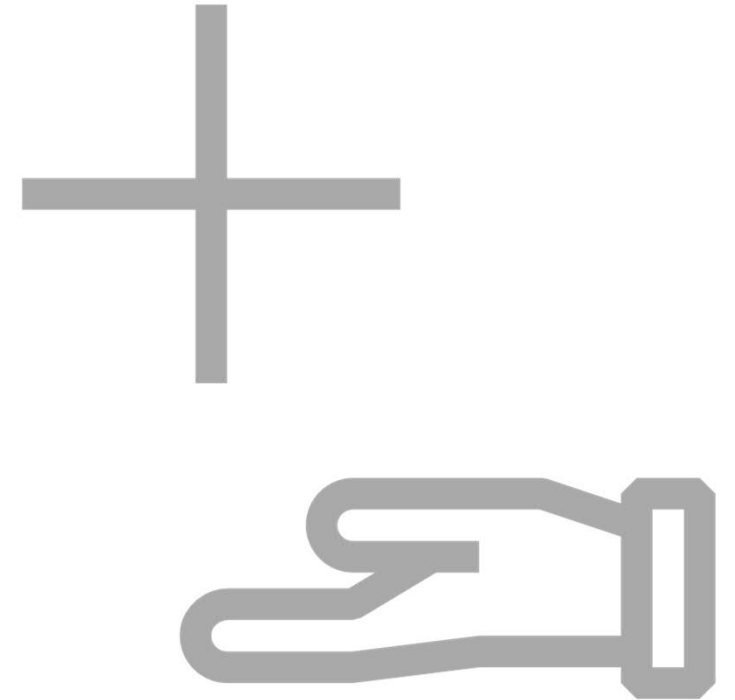
# Upgrade of Gas Turbine Controller

## Motives

### Why do I need a turbine controller upgrade?

---

- Unwanted trips due to aging of components
- No more spare parts available on stock
- Safety issues (protection system)
- Obsolescence of modules:
  - DCS
  - field sensors, transmitters
  - monitoring system components
  - position controllers



---

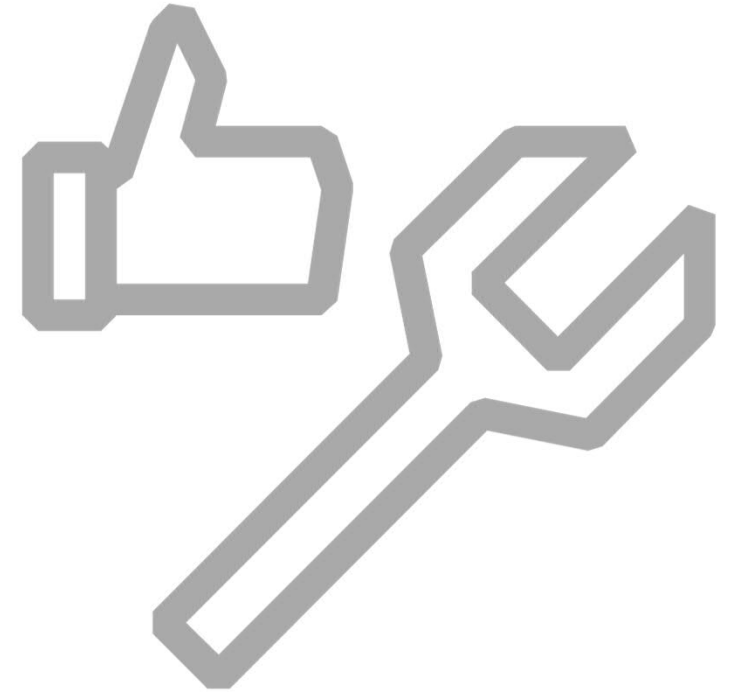
# Upgrade of Gas Turbine Controller

## Motives

### Why do I need a turbine controller upgrade?

---

- Missing engineering system to facilitate maintenance and troubleshooting
- Missing accessibility throughout the whole application
- Obsolete maintenance and service tools
- Missing remote support
- Missing space for extensions, improvements or further upgrades



---

# Upgrade of Gas Turbine Controller

Technical Description

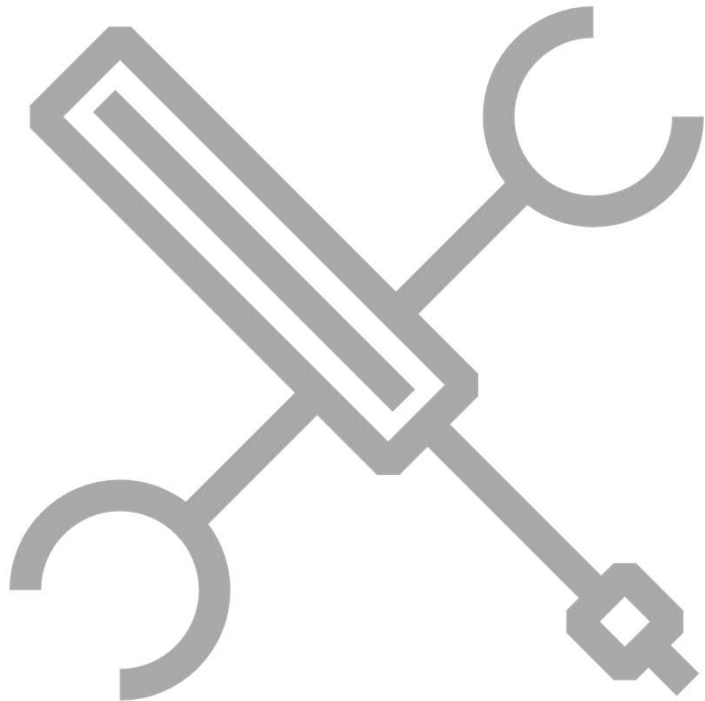
---

# Upgrade of Gas Turbine Controller

## Recommendations No. 1

### What is supposed to be upgraded?

---



- Upgrade of Control Cabinets (Procontrol cabinets, Decontic, marshalling rack) with pre-tested Standard cabinets with improved EMC stability (same dimensions, same look-and-feel)
- Use of new ABB Procontrol modules from latest development (I/O modules, Processing modules for open- and closed loop controls)
- ABB Pluto safety controller for GT Protection
- Convert non-redundant communication bus into fully redundant
- Upgrade exhaust gas temperature measurements with latest solution
- Replace local mimic boards on GT control cubicle with new operating system client

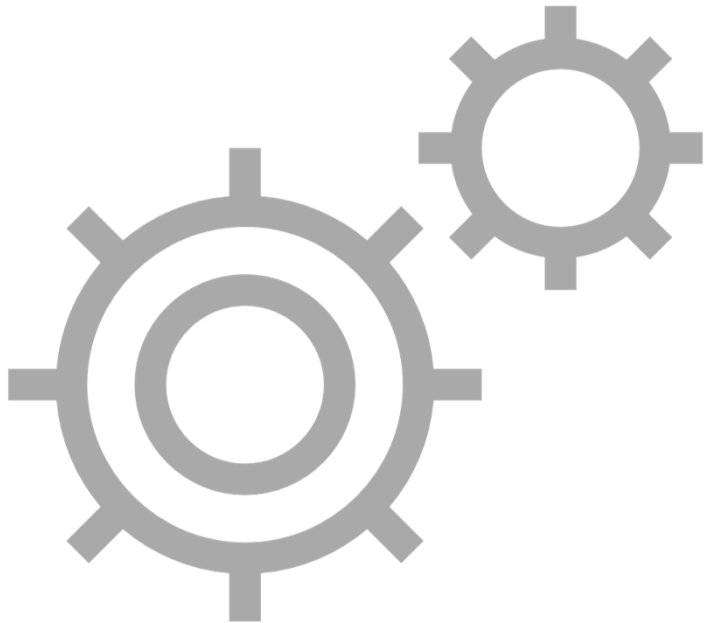
---

# Upgrade of Gas Turbine Controller

## Recommendations No. 2

### What is supposed to be upgraded?

---



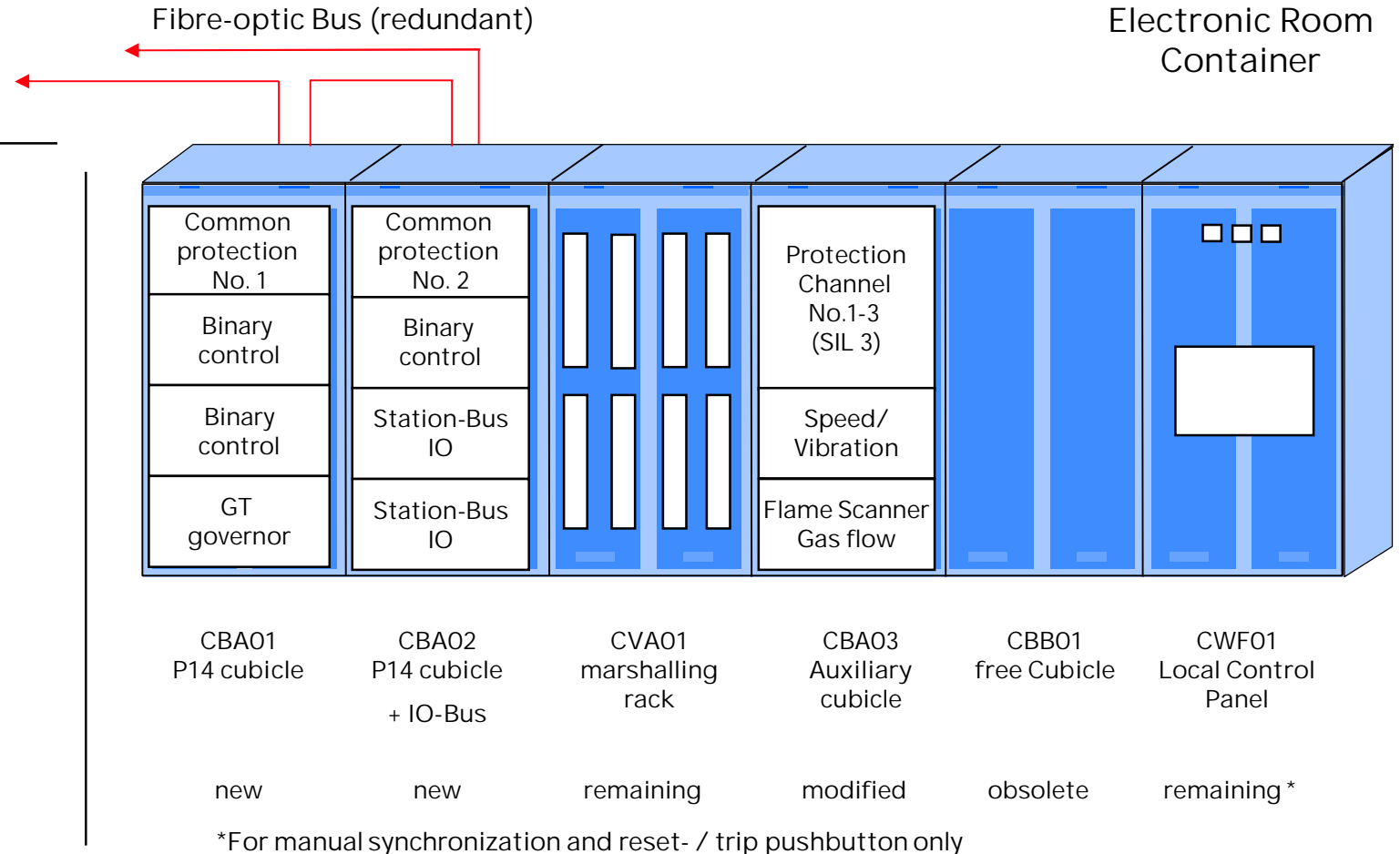
- Turbine monitoring system
  - vibration monitoring
  - speed probes, -monitors, overspeed protection,
  - common protection system
- Position controller for electro-hydraulic converter (PID controller)
- Hydraulic system
- Additional requirements from customer to be evaluated

# Gas Turbine Controller

After upgrade

## The new GT Controller looks like

- Procontrol station bus modules
- Procontrol FDDI communication bus
- PLUTO safety modules for GT Protection System
- Speed monitors upgraded
- Vibration monitors upgraded



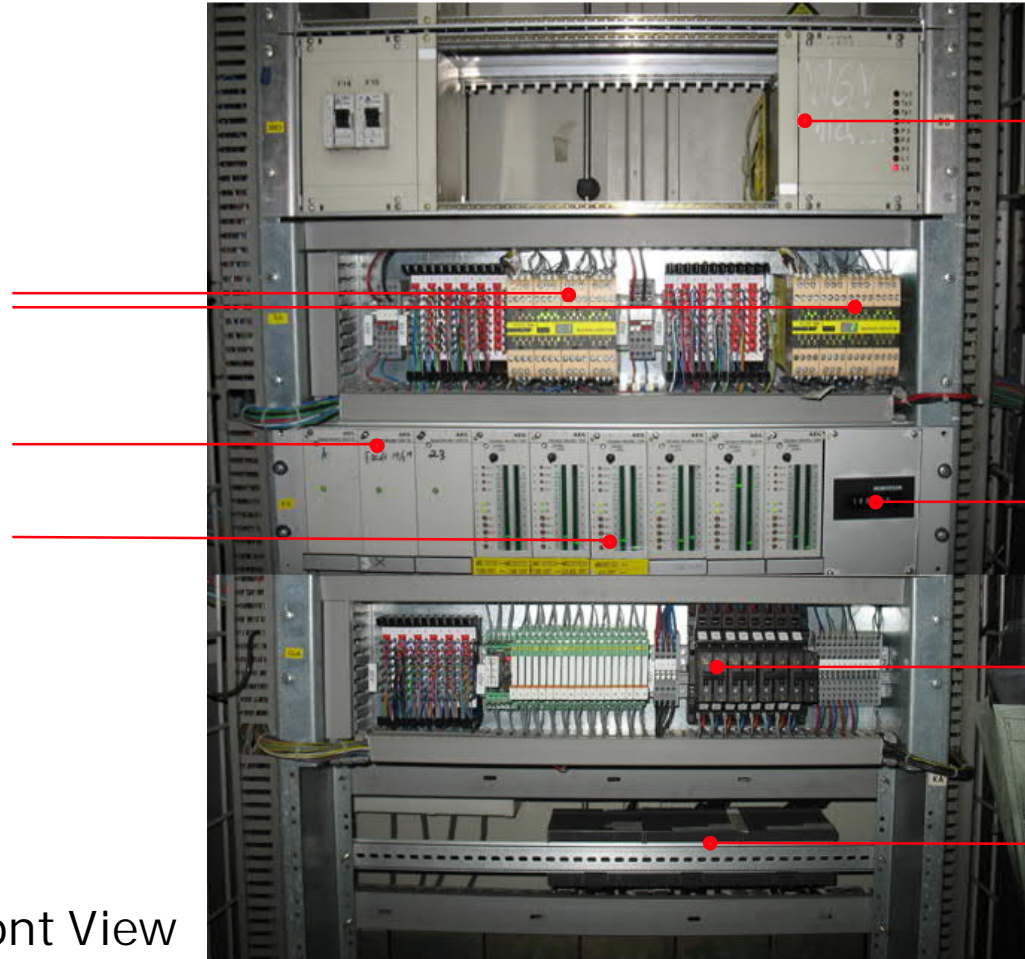
# Gas Turbine Controller

After upgrade - CBA03 Decontic cabinet - example

New: PLUTO safety modules for GT Turbine Protection System (1 out-of-2) - upgraded

Speed monitors

Vibration monitors



Fuel valve positioner

GT operating hours counter

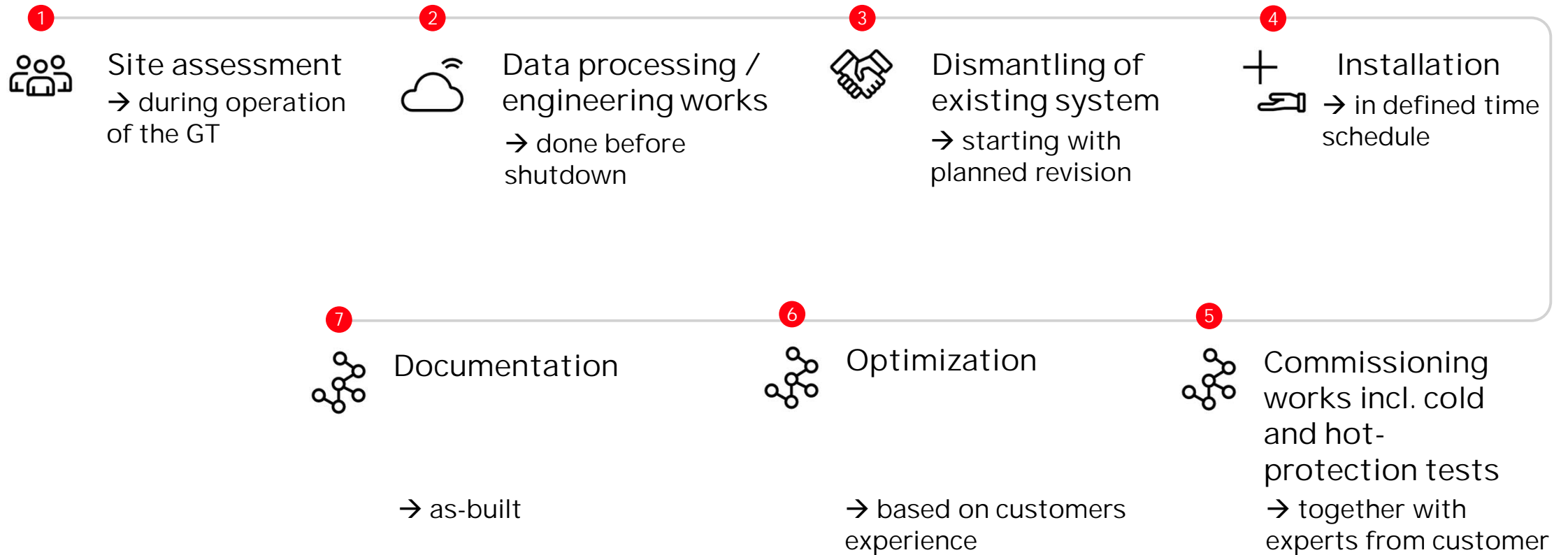
New: Aux power supplies - upgraded

Metering of electrical variables

Front View

# Upgrade of Gas Turbine Controller

## Upgrade process





---

# Upgrade of Gas Turbine Controller

Benefits

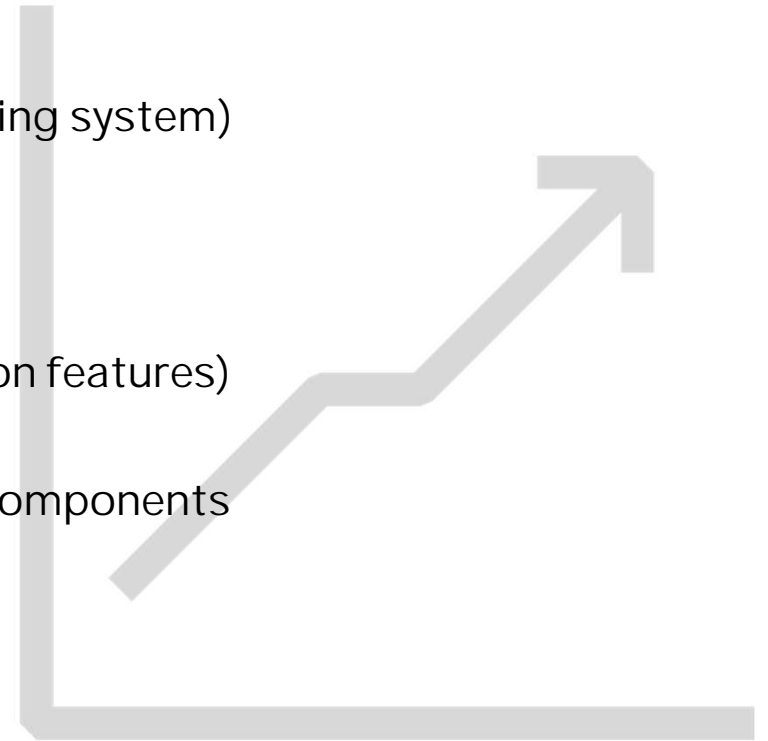
---

# Upgrade of Gas Turbine Controller

What improvements?

- Modern GT control system (life cycle status: active)
- Enhanced module performance (capacity, module features, clock rate)
- Improved maintenance and troubleshooting (introduction of modern engineering system)
- Improved EMC (power supply, cabinet shielding and grounding)
- High reliability with redundancy improvements (bus coupling, power supply)
- Simplified spare parts inventory (reduced No. module types)
- More operation features (improved archiving, additional information, simulation features)
- Fully 2-channel protection design which can be also converted to 2oo3
- Certified Pluto Safety PLC (self-monitoring, analogue value processing, Pluto components are SIL3 certified)
- Modern concept to remove mechanical overspeed protection

→ All types of Gas turbines covered by this concept



---

# Upgrade of Gas Turbine Controller

References - Inspiring ABB projects with similar scope, setup or challenges

# Customers: References

## Indonesia , Power Generation

### ID Tanjung Priok: Upgrade of 5 Gas Turbine Controllers

#### Background

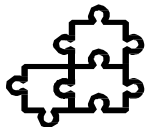
- Customer: Indonesia Power
- Location: Jakarta
- Units: 2 x 590 MW CCGT
- Commercial operation: 1993

#### Reasons for success

- Evolution strategy from existing ABB DCS system was proven to be the most cost-effective solution for the customer
- Customer engagement and partnership
- Close cooperation of with local ABB staff
- Streamlined project execution and operation through deployment of ABB DCS during overhaul period of the GT



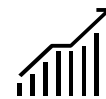
#### Technology



##### Procontrol P14

- Retrofit of GT-Controller and GT-Protection-System
- Per GT exchange of 2 Procontrol P14 cubicles and about 120 modules with new components of latest versions
- Preparation for P14 Master Station Upgrade

#### Key customer benefits



- Extended lifetime of the GT units
- Reduction of unscheduled shutdowns due to missing spares
- Upgrade active life cycle and latest Safety Functions
- New Engineering Tool P14 Engineering
- Installation, cold and hot commissioning during GT overhaul period

# Customers: References

## Kazakhstan , Power Generation

### KZ Aktobe: Upgrade of Gas Turbine Controller

#### Background

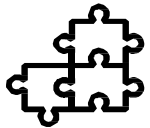
- Customer: Kazaghenergo
- Location: Kazakhstan
- Units: 130MW CCGT
- Commercial operation: 1995

#### Reasons for success

- Evolution strategy from existing ABB DCS system was proven to be the most cost-effective solution for the customer
- Customer engagement and partnership
- Streamlined project execution and operation through deployment of ABB DCS during overhaul period of the GT



#### Technology



##### Procontrol P14

- Retrofit of one GT Controller
- Exchange of obsolete Procontrol P14 cabinets incl. 195 modules with new components of latest versions
- Preparation for P14 Master Station Upgrade

#### Key customer benefits



- Extended lifetime of the GT unit
- Reduction of unscheduled shutdowns due to missing spares
- Upgrade active life cycle and latest Safety Functions
- New Engineering Tool P14-Engineering

---

# Upgrade of Gas Turbine Controller

Summary

---

# Summary

**Upgrade** of the existing GT controller and monitoring system including

- Procontrol P14 cabinets and –modules
- Procontrol P14 communication bus
- Protection system
- Field probes and –transmitters
- Project specific items ...

**Achievements:**

- additional functionality
- additional capacity
- higher reliability and efficiency
- state of the art control system
- streamlined spare part inventory

—

# Upgrade of Gas Turbine Controller

Q&A



---

# Q&A Session



---

# You can get in touch with us at any time

Contact us



---

ABB AG

Kallstadter Straße 1  
68309 Mannheim, Germany  
de-procontrol@abb.com

Homepage

<https://new.abb.com/power-generation/events/abb-techtalks-power-generation-export>



---

# Take a look into our upcoming events

- Upgrade of HSI Systems 24.06.2021
- Upgrade of Procontrol P14 modules 28.07.2021



---

# Disclaimer

The information in this document is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this document. In no event shall ABB be liable for direct, indirect, special, incidental or consequential damages of any nature or kind arising from the use of this document, nor shall ABB be liable for incidental or consequential damages arising from the use of any software or hardware described in this document.

**ABB**