

INGESYS CMS



Condition Monitoring System

Ingeteam

CORPORATE HISTORY

A GREAT HISTORY FOR A GREAT FUTURE



BACKGROUND

First in-house products in control, measurement and power electronics.



EIGHTIES 80'S

Ingeteam strengthens its position in the industry and energy sectors, digital control products and application engineering.



NINETIES 90'S

Strengthening of the commitment to develop electrical and control systems for the renewable energy, wind and solar areas. The beginning of international expansion (Founding of subsidiaries in Germany, Czech Republic, China, Brazil and Mexico).



21st CENTURY

Commencement and consolidation of activities in the marine, traction, rail, engineering sectors and the turn-key supply of energy plants.

A comprehensive range of products and services, customised to meet the specific needs of each customer or project



Energy



Industry



Traction



Marine

Ingeteam Service offers its customers all the experience and assurance of being part of the Ingeteam Group:
A leading company in the electronics-electrotechnical sector.

The core of **Ingeteam's** business is based on power and control electronics, the technology for electric machines, generators and motors, and application engineering.

Ingeteam's key asset is its team of more than **3,500 professionals**, **9%** of which are dedicated to R&D&I. Whilst, with regard to the Renewable Energy division, the percentage of personnel dedicated to **R&D** is as high as **37%**.

Ingeteam is committed to Technology and Innovation as a growth engine.

A business corporation structured into 4 sectors, each specialising in the development of customer-oriented technology and service provision.

INGETEAM IN THE WORLD



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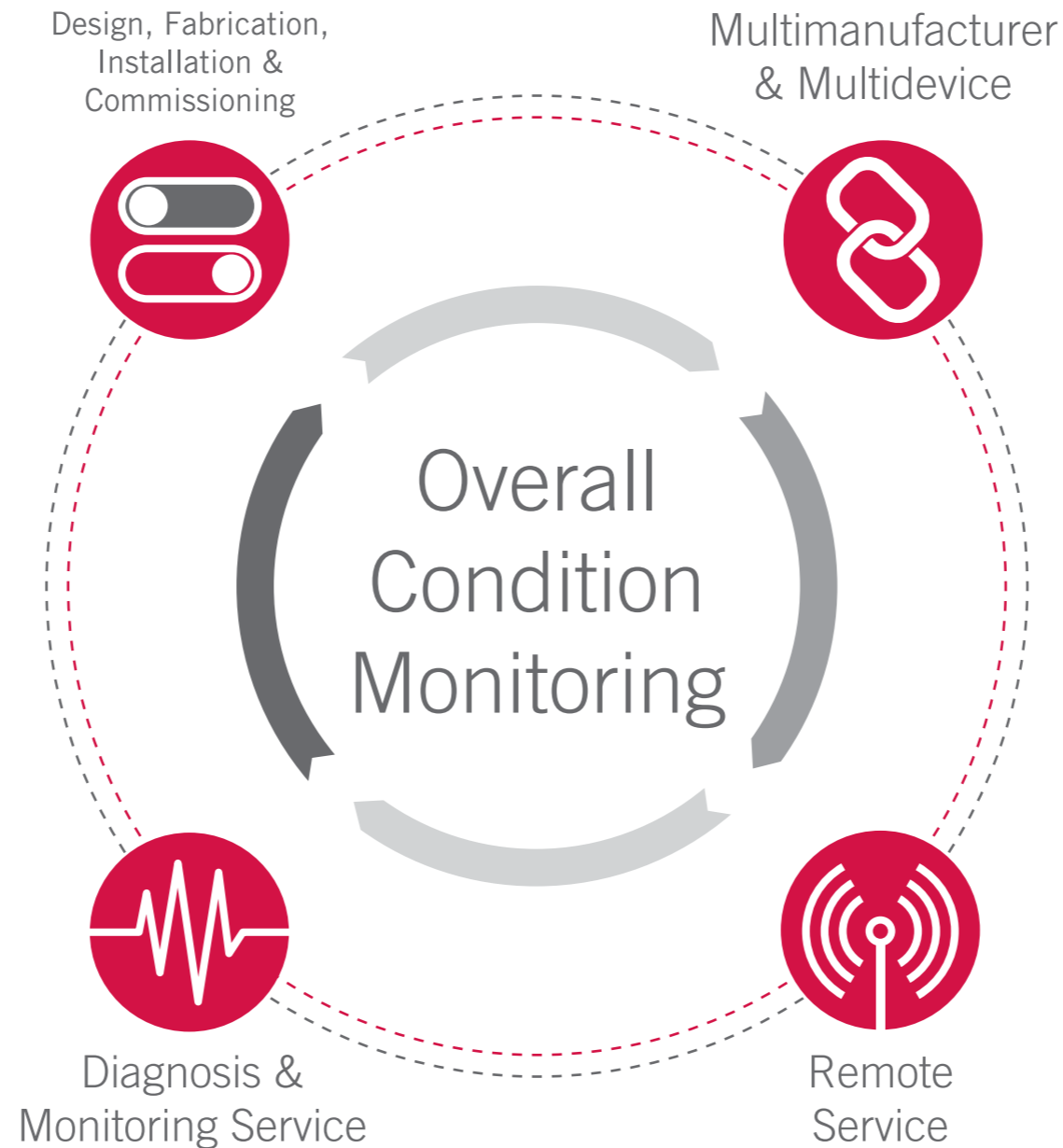
About INGESYS™ CMS

Condition Monitoring Systems supply plant owners with comprehensive information of the state of the machines, enabling the detection of upcoming failures.

Based on the information obtained, plant owners can optimize their maintenance programs achieving important economic benefits in the plant operation.

Why INGESYS™ CMS?

- ▶ **Anywhere in the world**
More than **1,000** professionals working across the globe. Present in **17 countries** with local personnel and high performance capabilities.
- ▶ **Experience in Multi-technology**
Ingeteam Service's extensive experience in the sector means that the company is considered to be a **reputable leader** by the principal renewable energy OEMs.
- ▶ **Integration capability**
The data conversion modules developed by Ingeteam make it possible to integrate the data generated by CMS devices made by other manufacturers into the INGESYS™ CMS tool suite.



Design, Fabrication, Installation & Commissioning

INGETEAM designs and manufactures its own CMS as well as additional modules, with analog and digital inputs and outputs. INGETEAM has the capacity and experience to efficiently install the CMS in any wind turbine technology.

Diagnosis & Monitoring Service

Predictive analysis, supply, installation and commissioning of over 1.000 devices distributed in wind farms worldwide. The supervision processes and status diagnostics of the wind turbines be performed in Albacete (Spain) by ISO 18436-2-certified, category III vibration analysis engineers with over 9 years' experience in predictive maintenance.

Multimanufacturer & Multidevice

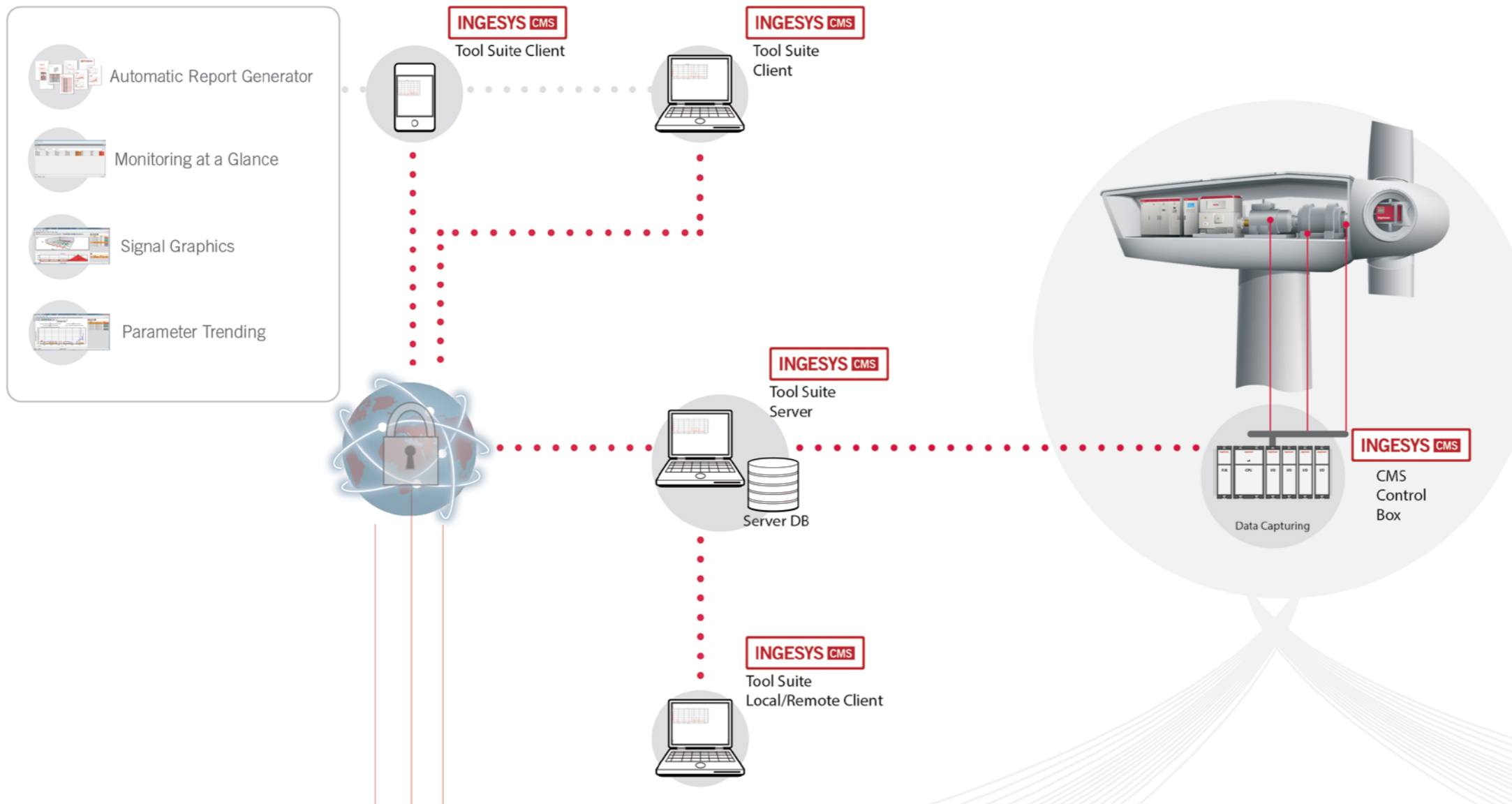
Integration of own INGETEAM'S CMS systems and other manufacturers' condition monitoring systems under the same central monitoring platform.

Remote Service

The INGESYS™ CMS EXTENDED TOOL SUITE is a centralized monitoring software platform, enabling operation status based diagnosis and monitoring task for distributed machines, providing user specific functionalities for global and individual extensive diagnosis, historic data base, reporting, etc. It also has centralized access to the data distributed around the world.



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Centralised access to worldwide distributed data

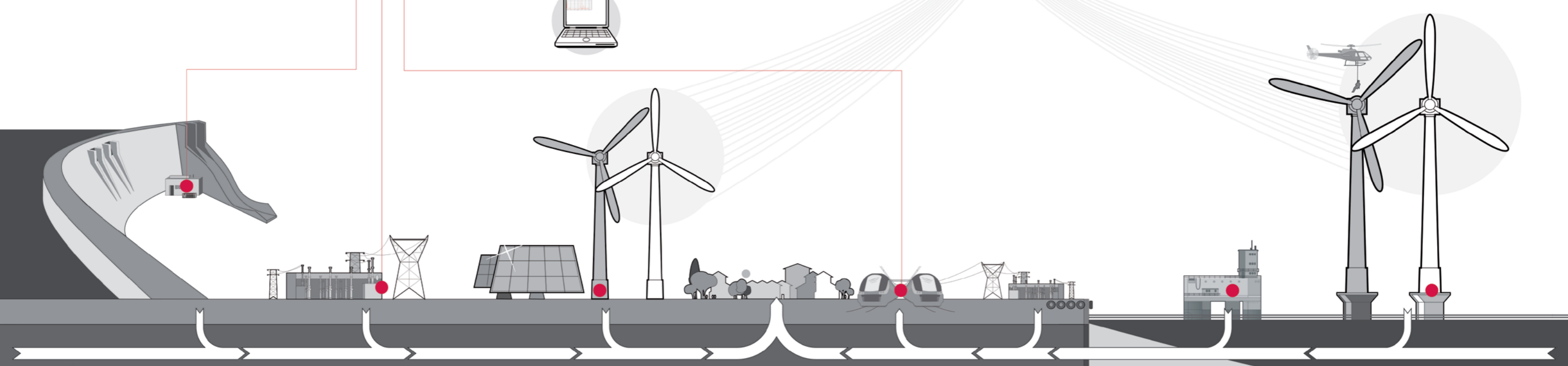
A comprehensive tool suite for an easy and extensive system configuration & diagnosis.

Application specific object based software tool simplifies the system configuration and commissioning.

Different notification levels can be user defined on each characteristic value and per operation state.

Warning logs to monitoring service and actions such as physical output activation, or email and message sending, can be triggered upon threshold trespassing.

The monitoring and diagnosis expert has at his disposal an extensive tool set for signal and trend analysis (Frequency selective characteristic values, envelope, FFT envelope spectra, FFT amplitude spectra, Angular Delta, Order analysis, etc.).



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INGESYS™ CMS Hardware

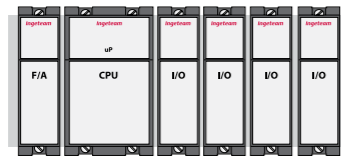
INGESYS™ CMS Services



The INGESYS™ CMS consists of three main components:

▶ System's rack

It supports the power supply module, the processor module and the input/output modules. There are two different racks available, one with up to 4 slots and another with up to 8 slots.



- Up to 4 Inputs or Outputs Modules
- Up to 8 Inputs or Outputs Modules

▶ Power Supply

Powered by a single external **+24Vdc power**.

▶ Processor module

The processor module is focussed on performing digital signal processing, data storage, alarm and logic processing, and communications with the INGESYS™ CMS ToolSuite and plant automation systems.

The processor module has available an internal web app for diagnosis purposes and allocates one Compact Flash connector as well as a USB connector for plugging data storage devices.

Selectable modules up to a maximum number of 8.

INGESYS™ CMS Condition Monitoring System:

- ▶ Equipment supply, installation and commissioning: INGETEAM is present throughout the INGESYS™ CMS "turnkey" supply chain.
- ▶ 24/7 worldwide monitoring: status supervision service of the devices monitored anywhere in the world, 24 hours a day, 7 days a week.
- ▶ Data analysis and processing: production of reports on the evolution of the status of the machine monitored and detail reports should a fault be detected in any component.
- ▶ Training in vibration analysis: training in vibration theory and in the operation and use of the INGESYS™ CMS tool suite, given by ISO 18436-2-certified, category III professionals with more than 10 years' experience in predictive maintenance.
- ▶ Specific status audits using portable equipment: availability of portable equipment to carry out specific status audits on any type of rotating machinery.
- ▶ Integration of data from different manufacturers: the capability to integrate data from other CMS manufacturers into the INGESYS™ CMS tool suite.

▶ Input Modules

The INGESYS™ CMS has available three different input modules:

- ▶ 8 IEPE Accelerometers Channel Input module
- ▶ 8 IEPE Accelerometers Channel module + 8DIO + 4 Analog Inputs V/I + 2 Encoder Inputs
- ▶ 8 V/I Analog Inputs

▶ Output Modules

The INGESYS™ CMS has available one output module:

- ▶ 16 Relay Output module



experience in the wind turbine market

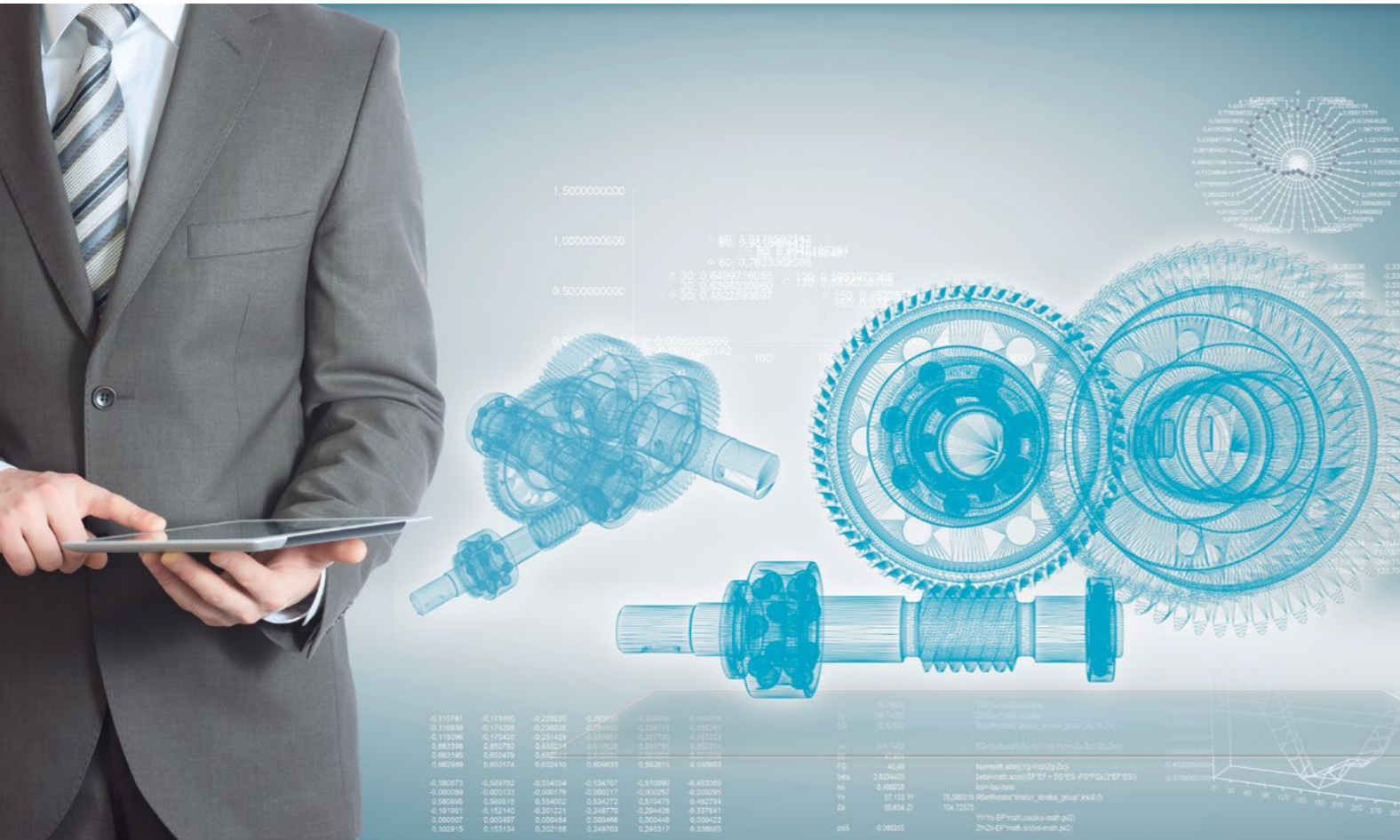
reduction of overall cost solution

easy maintenance (reduce the MTTR)

robustness = availability


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Application oriented



The Ingeteam group has an extensive experience in the design and application of smart automation systems (controller, condition monitoring systems, electrical machines, converters) along with plant operation oriented services for different application sectors.



 Water Treatment



 Oil & Gas Industry



 Steel Industry



 Energy Generation



 Railway Traction



 Marine

INGESYS™ CMS has been designed considering the main technical issues to be monitored in these sectors, in order to reduce maintenance costs optimizing performance. With the target, the INGESYS™ CMS system focusses on the measurement and processing of the key parameters that determine the condition of a rotary machine:

- Temperature
- Pressure
- Particles in Oil
- Vibration
- RPM
- Load
- Oil Condition

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