_power predictive maintenance

predictive intelligence serving efficiency





Fincantieri DSCM a world of integrated solutions

— Fincantieri is a leading player in the research, design and production of systems and components, starting from a philosophy of applied engineering and integration that leads to high-quality standards. A result is achieved thanks to efficient and dedicated structures, with application in both naval and industrial fields. Today, the Department of Mechanical Systems and Components (DSCM) is structured into seven production areas: Ship Systems and Components, Turbines, Diesel Engines and Generation Systems, Ship Automation Systems, Integrated Systems, Cabins and Steel Structures.

Management provides customers with a team of engineers who, through feasibility and detailed studies, define the ideal solution in terms of efficiency and cost-effectiveness. Fincantieri's tradition in the design and construction of steam turbines, built to meet the highest technical standards and customers' several application requirements, is more than a century old. High efficiency, reliability and quality are its pillars, applied to power generation, mechanical drive, marine propulsion and combined cycles.

Turbo-alternators are used for power generation in oil refineries, paper mills, sugar refineries, petrochemical, waste treatment, biomass, cogeneration, food production, steel and cement plants.



PREDICTIVE MAINTENANCE

monitoring service of plant operation.

It is an essential support for customers in maintenance activities.

The system provides real-time monitoring via a dedicated DSCM platform, complementing on-site preventive interventions such as vibration analysis, boroscopy, and thermographic analysis.

The platform continuously and automatically analyses the parameters of interest to indicate the degradation towards undesirable events, such as malfunctions, loss of performance and failures, or supporting strategic choices in terms of capital spare parts management.



The system - a virtuous process



Anticipate to act only when needed

— The new system developed and proposed by Fincantieri, in collaboration with beanTech, aims to offer a remote

SYSTEM CHARACTERISTICS

A customised solution benefiting maintenance

- The development of a tailored solution for plant analysis has the main objective of offering a customised, proactive service, which can recognise anomalies in turbine behaviour and anticipate malfunctioning phenomena.

The aim is to offer a high-level overview - based on turbine status, integrates alerts from the plant with customised control algorithms.

Turbine Remote Monitoring allows a precise analysis of the individual component.

The collected data are processed according to a specific standard and managed in a single, centralised platform that is integrated into the customer's existing IT infrastructure.

The platform consists of several main modules:

- MONITORING REAL TIME, for a real-time overview of the operational status of the turbine and plant
- **ANALYTICS**, historical data to be used to support strategic decisions
- **CUSTOMIZED CONFIGURATOR** for controls
- SCHEDULED REPORTING on events to be shared with the customer
- **SCHEDULER** for past, present and upcoming maintenance.



SYSTEM SETUP

Three simple hardware components for a system of excellence

— The remote monitoring system is incorporated into the customer's plant logic controller (PLC) employing simple components placed inside the control panel. The three components adapt to the most varied types of PLCs and complement their use:



• EMBEDDED PC with high-performance multi-core architecture, fanless version, configurable with SSDs, for shock and vibration resistance and use in heavy-duty applications.



• INDUSTRIAL SWITCH to allow other devices to be connected together to manage the flow of data, relaying it back to one or more devices in the network. The data is directed correctly to ensure appropriate network security. It operates through a protocol and is therefore able to obtain the information needed to route the data.



• **OPCUA SERVER** (Open Platform Communications Unified Architecture) according to the standard to facilitate the exchange of data between PLCs, human-machine interfaces (HMIs), servers, clients and other machines for the circulation of information.

SOLUTION COMPOSITION



THE TECHNICAL AND ECONOMIC ADVANTAGES

Real-time control and business analytics for superior energy performance

- Turbine Remote Monitoring solution is a state-of-the-art platform, able to improve plant performance by implementing real-time control and business analytics techniques, with a clear advantage in terms of lower costs and management optimisation.

The solution integrates with the IT systems of the customer's plant through up-to-date operating systems, which can be installed in the domain and follow all defined security policies.

SYSTEM IMPLEMENTING BENEFITS



EDGE COMPUTING BENEFITS



- The communication of data from the plant to the cloud takes place via the latest and innovative Edge technologies, which allow for a refinement of the management, with the transition from a vast amount of data collected and transmitted in bulk for analysis, to the preliminary analysis of the raw data for the subsequent forwarding of only the necessary data, with a significant saving in storage space, processing time and costs.

Need-to-Know.





Edge computing also excludes data breaches. Again through encryption and permission systems, data on the cloud is only accessible for necessary functions, guaranteeing the principles of Least Privilege, Separation of Duties and

BENEFITS From diagnosis to predictivity

— The system monitoring software is under continuous development and improvement.

The solution allows the creation of an ad-hoc scheduling of interventions, thus drastically reducing the possibility of unexpected failure of a component and consequently increasing its reliability and availability.



Availability is a method of measuring production effectiveness to which all plant operators pay attention. By combining several performance indicators into a single score, an indication of the plant's operational efficiency is obtained.



CASE STUDIES Application: the system in operation

— The system is applied in biomass management plants. Remote Monitoring ensures the continuity service continuity of biomass management, together with self-generated electricity for plant services.

Monitoring is focused on the continuous verification of the turbogenerator's main components:

- Journal and Thrust bearing
- Lube oil system
- Regulation oil system
- Generator
- Steam Generator

Diagnostics allows the Fincantieri team to receive alerts directly via e-mail of possible unconventional component malfunctions that may affect the integrity and functionality of the components. In addition, procurement procedures for critical components with high lead times can be pre-activated so that they are received exactly when needed.



FUNCTIONS

Different levels of action, a unique result

MONITORING REAL-TIME

- Continuous monitoring of turbine status and replication of any alarms from the plant in real time
- Real-time visualisation of signals and alarms and their temporal correlation trends to highlight cause-effect relationships

ANALYTICS

- Centralised database of validated and correlated information
- Semantic model that allows the user to extract, analyse and correlate all the information collected by the platform
- Native integration with Microsoft solutions, including Excel and Power BI
- Correlation trend analysis in the short, medium and long term

CUSTOMIZED CONFIGURATOR

- Ability to create specific customised and advanced control algorithms
- Centralised data analysis engine that exploits the persistence of acquired data to continuously carry out set controls
- Automated anomaly detection system that triggers alerts on the portal and to Fincantieri personnel through
- activation of alert notifications and creation of event reports
- Possibility of enabling and disabling controls without losing the history of all past events

SCHEDULED REPORTING

- Scheduled reporting with adjustable frequency, in which Fincantieri can remotely diagnose the turbine by analysing the collected data
- Event-based reporting. The report highlights the significant quantities for the type of event, before, during and
- after the occurrence, to allow for cause-effect study
- On-demand report prepared by Fincantieri personnel based on an analysis requested by the customer or other specific agreements

SCHEDULER

Planning of all future maintenance work possible

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- Permanent availability of verification of current and past maintenance work
- End-of-intervention report that remains on file, so that a file of ordinary and extraordinary maintenance work is lways available and can be consulted.

MULTIPLE OFFER A solution for every need

- Compared to a standard LTSA, the planning of a customised maintenance programme, enhanced with Fincantieri's Remote Monitoring service, ensures the added value of timely interventions based on real needs, thus reducing the need for partial or emergency solutions and benefiting warehouse management.



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