



LEONARDO CYBER & SECURITY SOLUTIONS

# SECURE CONNECTED FACTORY



Industrial digital transformation is a complex process in which IT, OT and communication technologies cooperate to make production processes more efficient and, at the same time, improve safety and security. But this complex and gradual transformation process is not only related to the introduction of new technologies into an industrial plant, but has to address aspects as organization's processes or the way people interact both within and between organizations. Furthermore, in the industrial sector the introduction of innovative technologies supports the creation of models allowing to study the behaviour and progress of critical processes. The integration of data produced by equipment and systems with data from IT environments enables greater decision-making skills.

New business models and advanced solutions, the immediate sharing of content and information as well as the implementation of digital workflows supporting more efficient, collaborative and controlled approval processes improve the planning, execution and maintenance phases. This enables organisations to adapt to rapid changes in demand, ensuring optimisation of resources and warehousing, and respecting quality and production times.

## SECURE CONNECTED FACTORY

Leonardo's **Secure Connected Factory**, created to support the digital transformation of industries, is composed of advanced hyper-connected and secure solutions, industrial cyber security and cloud services, coupled with experience in big data & analytics projects and expertise in core manufacturing processes.

By taking advantage of innovative technologies such as the IoT, Big Data, Artificial Intelligence and Machine Learning, Mixed & Augmented Reality, Chat & Bots, Secure Connected Factory is a comprehensive platform supporting industries along their journey towards the Industry 4.0 paradigm, ensuring transformation into a modern and protected connected company.

Secure Connected Factory allows the complete and integrated control of all the processes and assets of a production plant, to increase efficiency and reduce development time and costs: it aims to provide real time strategic information, a differentiated view of the data collected by the systems, as well as complete control over the assets and industrial processes, in turn supporting the decisions of workers, supervisors and managers, all within a mindset of complete digital transformation.

Secure Connected Factory is based on the ability to connect any machine, automation system, CNC, PLC or sensor from the world's main manufacturers.

The data collected are transferred in real-time to the cloud (public or private), made immediately usable by remote monitoring and analysis tools that are targeted at supervising, optimising production and reducing downtime. In addition, it is possible to display the data in an interactive way and create dashboards for monitoring and analysing orders and mechanical part wear.

## SECURE CONNECTED FACTORY APPROACH

Secure Connected Factory provides functions to optimise resource consumption, thus enabling a virtuous process that addresses sustainability issues such as the reduction of scrap and products that require reworking with consequent energy savings.

### SMART PRODUCTION

Secure Connected Factory oversees industrial plants to identify potential or unexpected factors that could influence the success of production programmes and activities. Through the real-time acquisition of data from equipment and devices, operating parameters and telemetries, Secure Connected Factory monitors plants in real time analysing their operation. The availability of customised and configurable rules allows the detection of anomalies and malfunctions and the notification of alerts to enable more efficient machine monitoring.

Overall Equipment Effectiveness Analysis (OEE) calculation, which takes into account availability, quality and performance parameters, measures the overall efficiency of a machine, plant or production area. The analysis of the OEE indicator allows the verification of historical trends, on configurable time intervals, of plant resources' efficiency parameters and the comparison of actual resource activity times with non-use and stop times.

 AVAILABILITY	 QUALITY	 PERFORMANCE
% of actual activity time in relation to available time	% of quality standards objects in relation to total production	% of actual production speed compared to the nominal equipment speed
Overall Equipment Effectiveness Analysis		

Secure Connected Factory also performs administration, lifecycle management and virtual configuration tasks for devices, IoT gateways and production machines.

### SMART MAINTENANCE

The correlation and analysis of historical data and information from both inside and outside the plant allows to plan and perform maintenance interventions through a predictive model to make factory maintenance more efficient, reduce costs and maximise operational availability. Improved control over maintenance activities is achieved through the generation of maintenance KPIs, advanced management and operations tracking through automated report generation, and remote supervisor support. Field workers' activities optimisation in all production, service and maintenance phases is achieved through easy and immediate access to data, information and documents. Operators are supported using augmented and mixed reality devices, mobile applications, and chat bots using AI, automated rules and natural language processing. A Virtual Assistant supports operators and maintenance technicians in generating maintenance reports. The extraction and contextualisation of information derived from speeches is achieved through Machine Learning and Deep Learning techniques and enables automatic reports' generation reducing, in this way, manual compilation operations.

Secure Connected Factory is natively integrated with Leonardo's EMODS solution for energy efficiency and savings allowing plant managers to have a deep knowledge of their consumptions through a complete view on the energy usage for all their processes. EMODS, starting from the analysis of consumption data and current energy contracts, allows the definition of the plant energy profile in order to define the efficiency interventions.

### SMART QUALITY

The verification of products' quality at different processing stages is a critical aspect that must be taken into due consideration in order to ensure product integrity, achieve customer satisfaction, and thus protect the company's reputation.

Anomalies and production defects detection is achieved through the use of Artificial Intelligence techniques and Augmented Reality functions which allow:

- the comparison of audio to identify potential machines' malfunctions
- the comparison of the 3D model –obtained via scanner laser 3D –with 3D project technical specifications
- the definition of a model to predict quality in real time, using telemetry data
- the production of real time quality reports in digital format
- the generation of real time quality indexes for OEE calculation
- the standardization of quality controls.

The connection between machines and sensorized microphones, to record the sounds generated by production equipment, allows an initial training phase for the recognition of acoustic patterns. The subsequent comparison of reference audio files with the recordings acquired in real time allows the detection of possible anomalies.

### SMART TRACKING & TRACING

Secure Connected Factory can automatically track components within plants, monitor the items' movement during the various production phases and provide information about the position of objects in the production flow by reading and capturing data associated with production items.

The installation of data acquisition points allows the detection of the transition from one processing stage to another. The identification of production items –and any aggregates containing them –is carried out using heterogeneous technologies to better adapt to the specific context of the production plant (e.g.: video, NFC, QRcode, serial number, RFID).

A specific dashboard and a mobile application are available to trace the location of components and items on the plant map.

Secure Connected Factory also provides capabilities for the recognition of specific components through shape analysis.

## SMART PROCESS

Secure Connected Factory integrates a set of tools to support the Early Equipment Management (EEM) and Early Product Management (EPM) pillars of World Class Manufacturing which allow continuous monitoring of the design process. In addition, the management of the People Development (PD) pillar enables the identification and elimination of staff knowledge and competence gaps through three phases (reactive, preventive and proactive) to achieve an overall improvement in quality of the entire plant.

## SMART DIGITAL TWIN

Secure Connected Factory enables cyber-physical environments modelling, the creation of a digital representation of real-world items, places, business processes, and people, and the connection of IoT devices. This integration provides insights that help to drive better products, optimize operations and costs, and create breakthrough customer experiences.

## CYBER SECURITY

Secure Connected Factory is implemented with a secure by design approach specifically conceived to reduce the risks posed by potential fraud or sabotage, and which already begins in the software design and development phase.

Secure Connected Factory can also be integrated with Cyber Security services and solutions developed by Leonardo to predicatively and proactively protect data and critical assets of companies and organisations, both with regard ICT and in terms of Operations Technology (OT) systems.

## BENEFITS

- Greater transparency and real-time control of production activities
- Optimisation of production processes
- Optimisation of energy consumption on a machine, production site and production process level
- Support for field service activities
- Automated generation of intervention reports
- Establishment of maintenance plans linked to actual operating conditions
- Maintenance operations optimisation and spare parts inventory 'on site'
- Maintenance performance verification and automatic tracking of maintenance operations
- Reduction of costs related to anomalies



**For more information:**  
[cyberandsecurity@leonardo.com](mailto:cyberandsecurity@leonardo.com)

**Leonardo Cyber and Security Solutions Division**  
Via R. Pieragostini, 80 - Genova 16151 - Italy  
T. +39 010 658 7003 - Fax +39 010 10013290

This publication is issued to provide outline information only and is supplied without liability for errors or omissions. No part of it may be reproduced or used unless authorised in writing. We reserve the right to modify or revise all or part of this document without notice.

2022 © Leonardo Sp.a.

MM08937 04-22