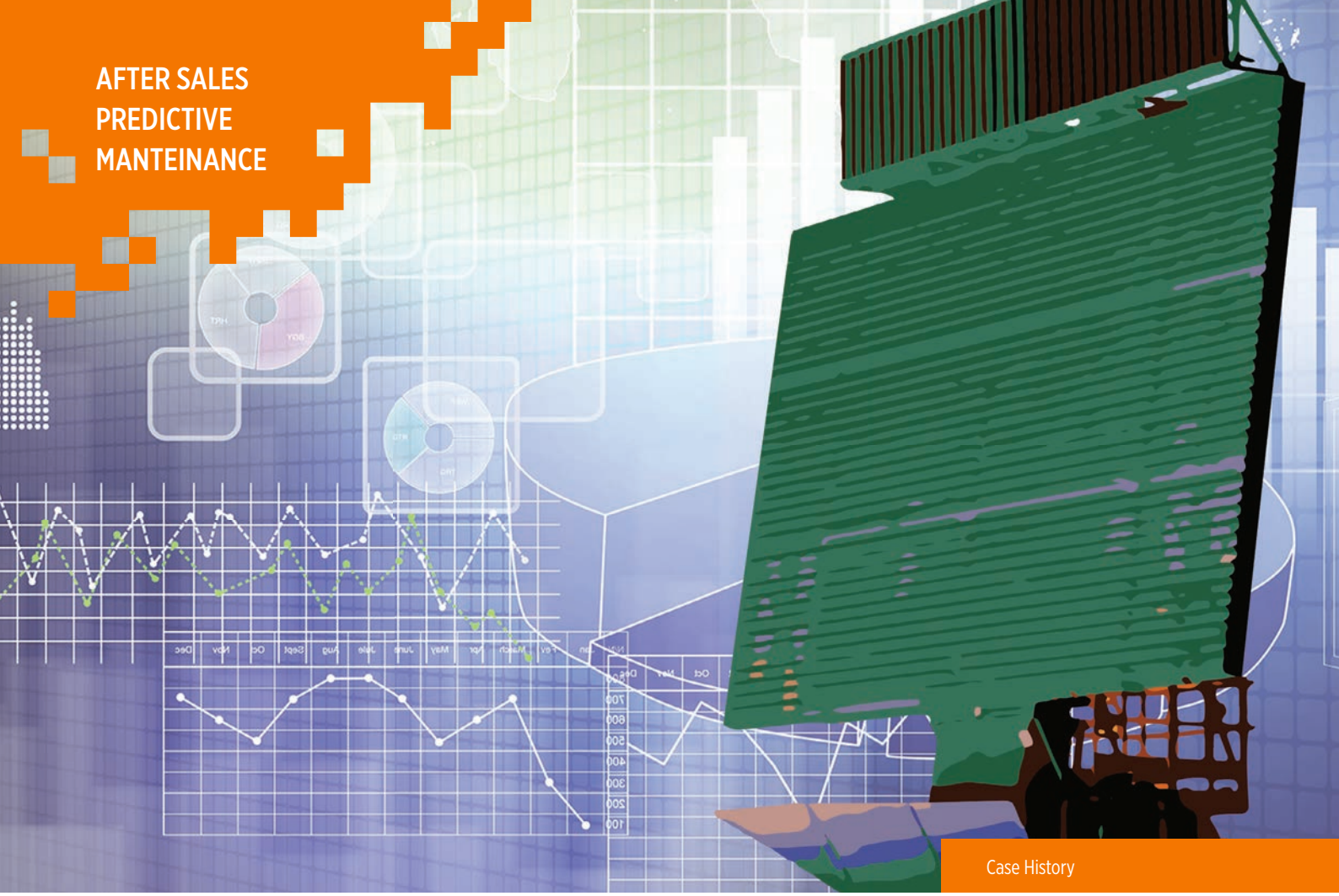
AFTER SALES
PREDICTIVE
MANTEINANCE



Case History

AFTER SALES PREDICTIVE MAINTENANCE

THE SECURE INTELLIGENCE MAINTENANCE PROJECT FOR RADAR SYSTEMS

High security, reliability and operational continuity standards represent critical elements for the products and services that Leonardo provides to key institutional Customers. Through its Land and Sea Defence Electronics Division, Leonardo is the leading company in Italy and among the main players worldwide in the design, production, installation and operation of radar systems for air traffic surveillance, control and management.

This sector, long before others, has felt the need to increase the efficiency of the device maintenance process, as to guarantee the high standards required by the market. An inter-divisional and multi-disciplinary work team, consisting of domain, statistics, computer and security experts, has then been set up to work on a **Secure Intelligent Maintenance** project, based on predictive analysis applied to the operational data of some pilot radars.

KNOW-HOW AND SYNERGIES

The project leverages the Leonardo know-how and its many successful achievements in advanced analytics area, the data analysis capabilities, the development of Big Data solutions, as well as the well-established experience in SAP environment. Given the nature of the treated information, the program has been subject to strict security requirements, capitalising the whole Leonardo experience in Cyber Security programs. The project fully exploits the new **Leonardo Software Defined Data Center**, designed to guarantee flexibility, scalability and high automation level, even for security components.

ARCHITECTURE

The architecture of the Secure Intelligent Maintenance solution envisages five main layers:

- **Acquisition**, allowing real-time capture of data from heterogeneous sources..

AFTER SALES PREDICTIVE MAINTENANCE

- **Storage & Processing**, to enable distributed storage (by adopting the Hadoop framework) and in-memory processing of large amounts of data (through the SAP HANA® technology).
- **Consumption**, supporting the utilisation of the model's results both in direct mode (through dashboard) and through integration in external systems, e.g. to activate the maintenance logistic process.
- two cross layers for **Security and Configuration & Governance**.

BENEFITS

- Reduction of unscheduled interventions because of faults
- Spare part mix optimisation
- Costs reduction for not required scheduled maintenance interventions
- Transition from a **reactive** to a **proactive** approach, i.e. from maintenance in case of fault and/or scheduled maintenance to **predictive maintenance**.

CO-OPERATION BETWEEN LEONARDO AND SAP

The Secure Intelligent Maintenance project originates from the co-operation between the Leonardo Research & Development and the SAP Laboratories in Italy and Europe.

The computing power of SAP HANA® guarantees real-time processing of context data coming from sensors, whereas the predictive model is designed and fine-tuned on the SAP Predictive Analytics® platform. The developed solution may be a stand-alone product or find its natural integration in the logistic modules of the Customer SAP management system.

PREDICTIVE MODEL

The Predictive Model has been realized using the following enabling technologies:

- In-memory database (SAP HANA®) for the storage of large amounts of data acquired during long operational periods (Big Data) that are made available on-line for the analysis and identification of pattern of interest.
- Tools and algorithms (SAP Predictive Analytics®) for historical series correlation and for operational fault prediction through automatic learning techniques (Machine Learning).

The Predictive Model identifies:

- the remaining useful life of critical sub-systems
- the most likely causes in case of a generic failure
- the systematic cause-effect relationships between faults
- the variables affecting system operation.

LEONARDO FOR INDUSTRY 4.0

The Predictive Analytics solutions and services are part of the proposal catalogue through which Leonardo addresses Industry 4.0 issues for the manufacturing companies. The offering is structured into three families of solutions and services:

- **Evolve i4.0**, to enable the evolution of processes through migration towards world-class digital technologies.
- **Transform i4.0**, to transform Industry into high-velocity & hyper-connected enterprise, i.e. characterised by a business model easily adaptable to exogenous and endogenous change.
- **Enhance i4.0**, to improve Customers' change process by means of analysis supporting strategic decisions.

The same portfolio also includes the specific Cyber Security solutions for data protection as well as the cloud services provided by our new Software Defined Data Center.

LEONARDO
SECURITY & INFORMATION SYSTEMS

For more information please email cyberICT@leonardocompany.com
Leonardo S.p.a.
Via Laurentina, 760 - 00143 Rome - Italy - Tel: +39 06 50271 - Fax: +39 06 5051140
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.