ptc

LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

SESSION ID: II1142B

HOW SAFRAN AERO BOOSTERS LEVERAGE INDUSTRY 4.0

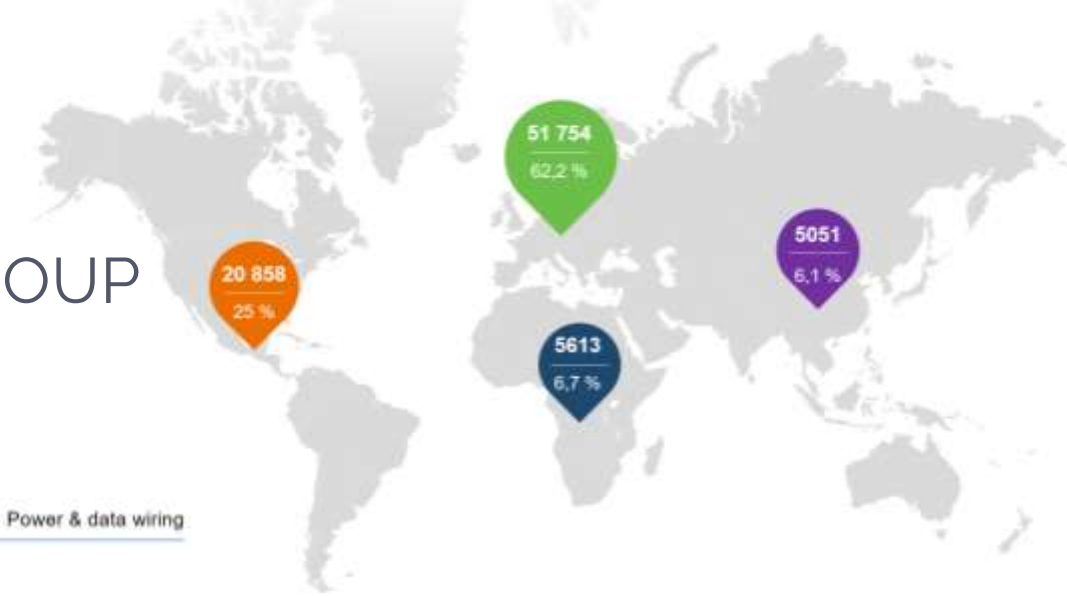
SPEAKER(s): **Jean-Louis JACQUERIE**
Chief Data Officer
SAFRAN Aero Boosters

Hervé DELHALLE
Manufacturing 4.0 Leader
SAFRAN Aero Boosters

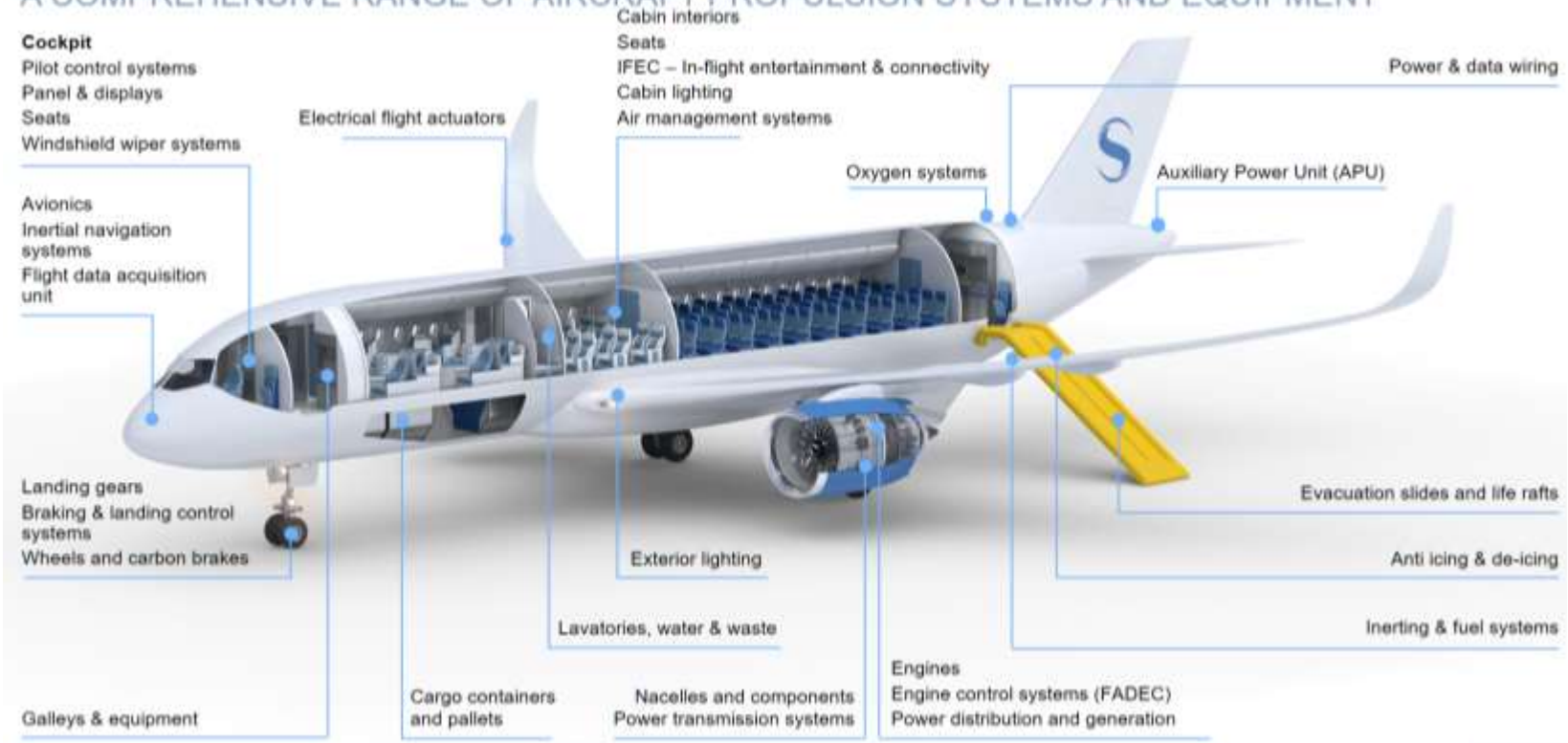
17th May, 2023

SAFRAN

AN INTERNATIONAL HIGH-TECHNOLOGY GROUP



A COMPREHENSIVE RANGE OF AIRCRAFT PROPULSION SYSTEMS AND EQUIPMENT



WORLD'S No.3 AEROSPACE COMPANY
(excluding aircraft manufacturers)

More than **83,000 EMPLOYEES** in **27 COUNTRIES**

5 CORE BUSINESSES :

- Aircraft propulsion
- Aircraft equipment
- Aircraft interiors
- Defense
- Space

SAFRAN

SAFRAN AERO BOOSTERS

Headquarters & Test Center
BELGIUM | Herstal | 1,500 people

SAFRAN Test Cells
USA | Minnesota | 100 people

SAFRAN Oil Systems
USA | Florida | 100 people

443 M€ (2021)
851 M€ (2019)

1,700
employees

Design & manufacturing
on an integrated site

LEADERSHIP IN 4 ACTIVITIES

WORLD LEADER FOR MEDIUM- AND LONG-HAUL AIRCRAFT

SAFRAN

GE Aviation

Pratt & Whitney
A United Technologies Company

WORLD LEADER FOR MEDIUM-HAUL AND REGIONAL AIRCRAFT

~50 customers

- Airline companies
- Engine manufacturers
- Maintenance centers

1 OUT OF 3 TEST CELLS WORLDWIDE

~50 customers

- Engine manufacturers
- Maintenance centers
- Military forces

EUROPEAN LEADER

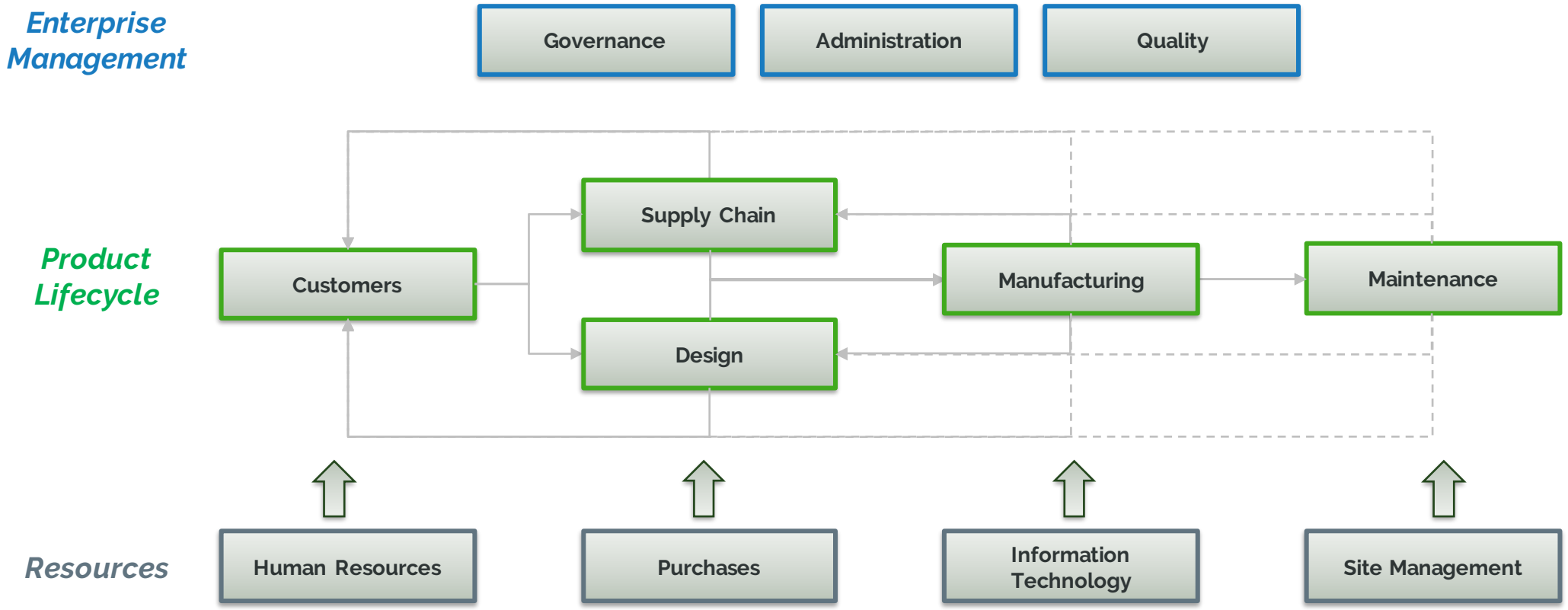
esa

ariane GROUP

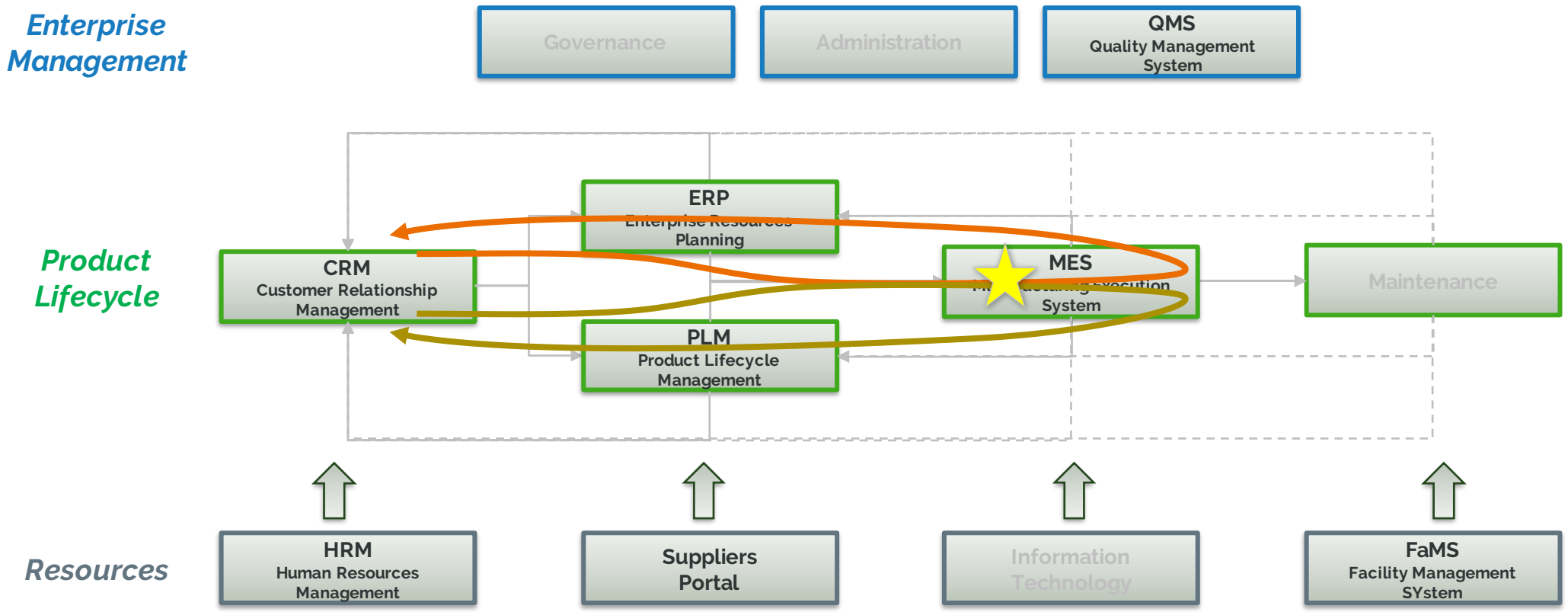
AVIO

REACTION ENGINES

DIGITAL STRATEGY (1/2)



DIGITAL STRATEGY (2/2)



The MES (Manufacturing Execution System) is the key system to close the two main loops of digital continuity

ANSI / ISA 95 STANDARD (ISO / CEI 62264)

ERP, PLM, Analytics,...

SCADA

Sensors

Process

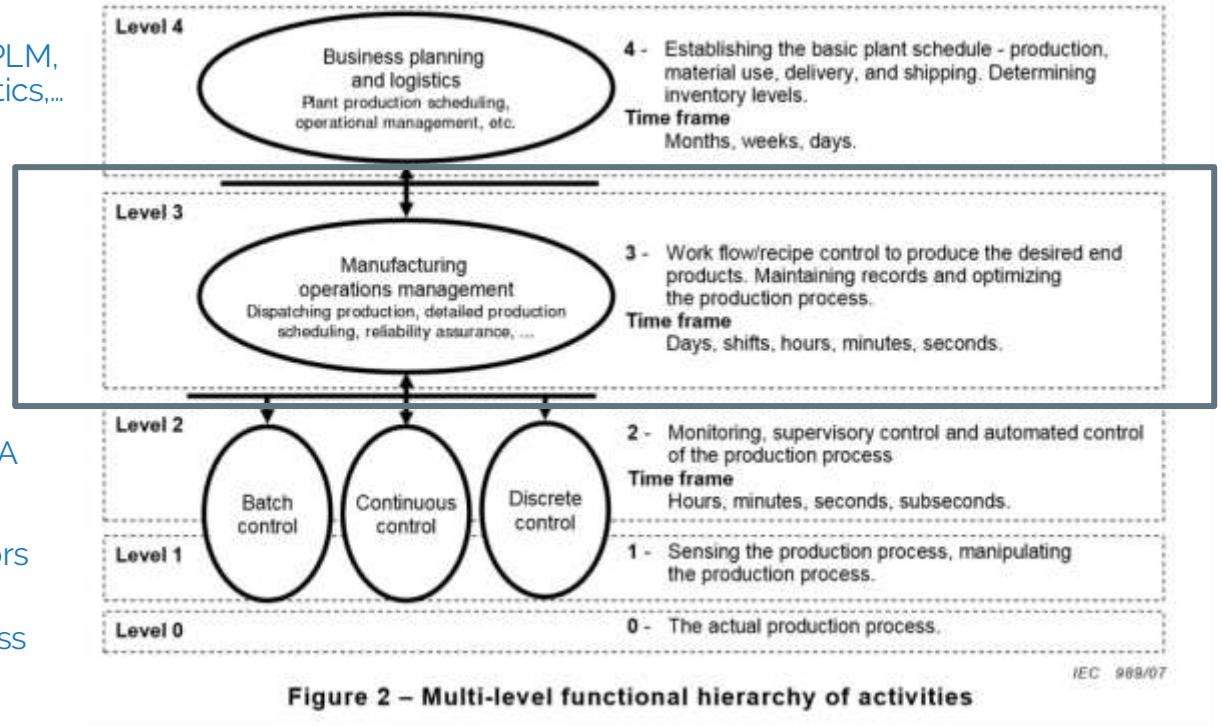


Figure 2 – Multi-level functional hierarchy of activities

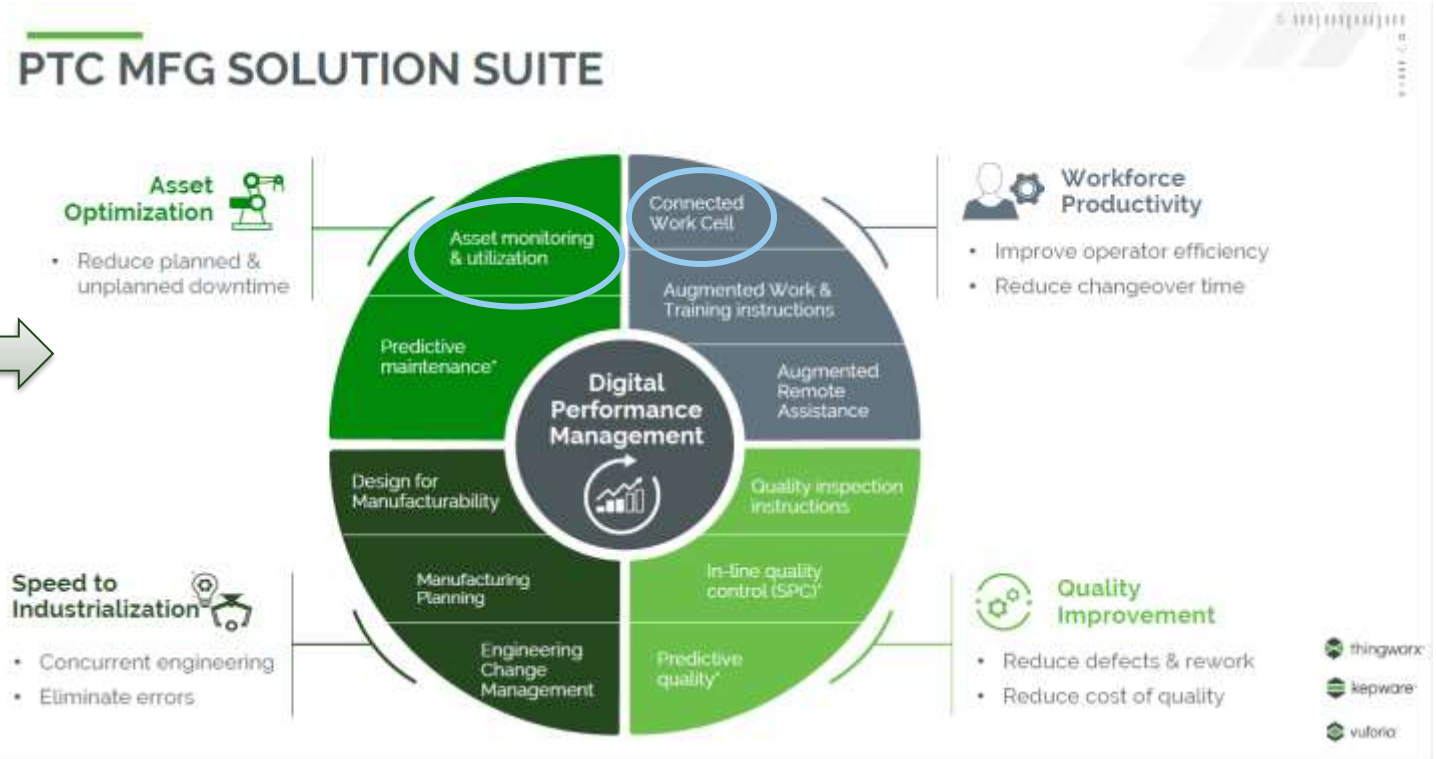
thingworx®

SAFRAN performed a first benchmark to identify the right technology for "Data Collection" and we selected PTC Thingworx.

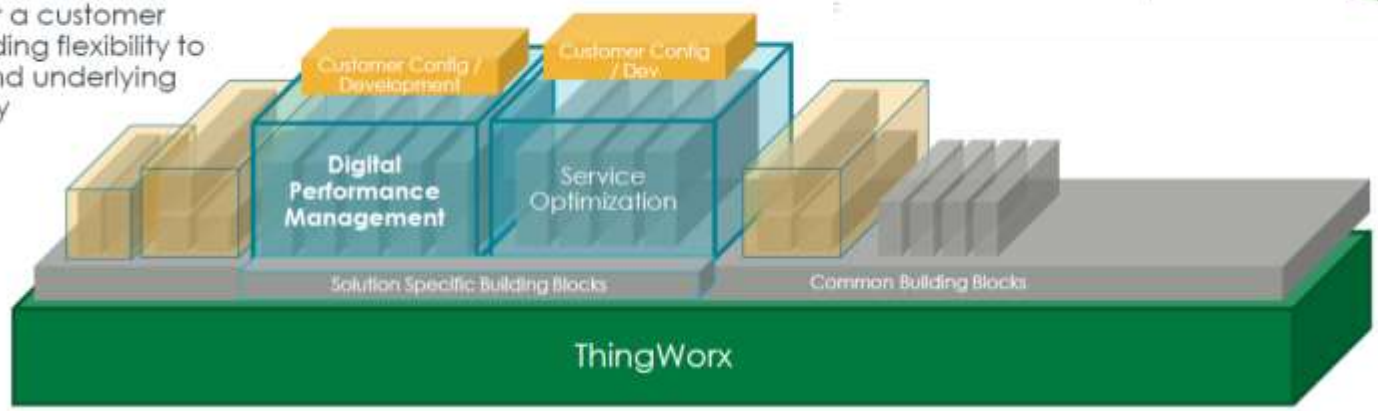
In search for a market solution covering the other ISA95 functionalities, SAFRAN evaluated 31 different products and tested some of them on real use cases. None was able to provide full coverage and compliance to ISA95 standard

PTC BUILDING BLOCKS

PTC roadmap is aligned with SAFRAN Aero Boosters goals



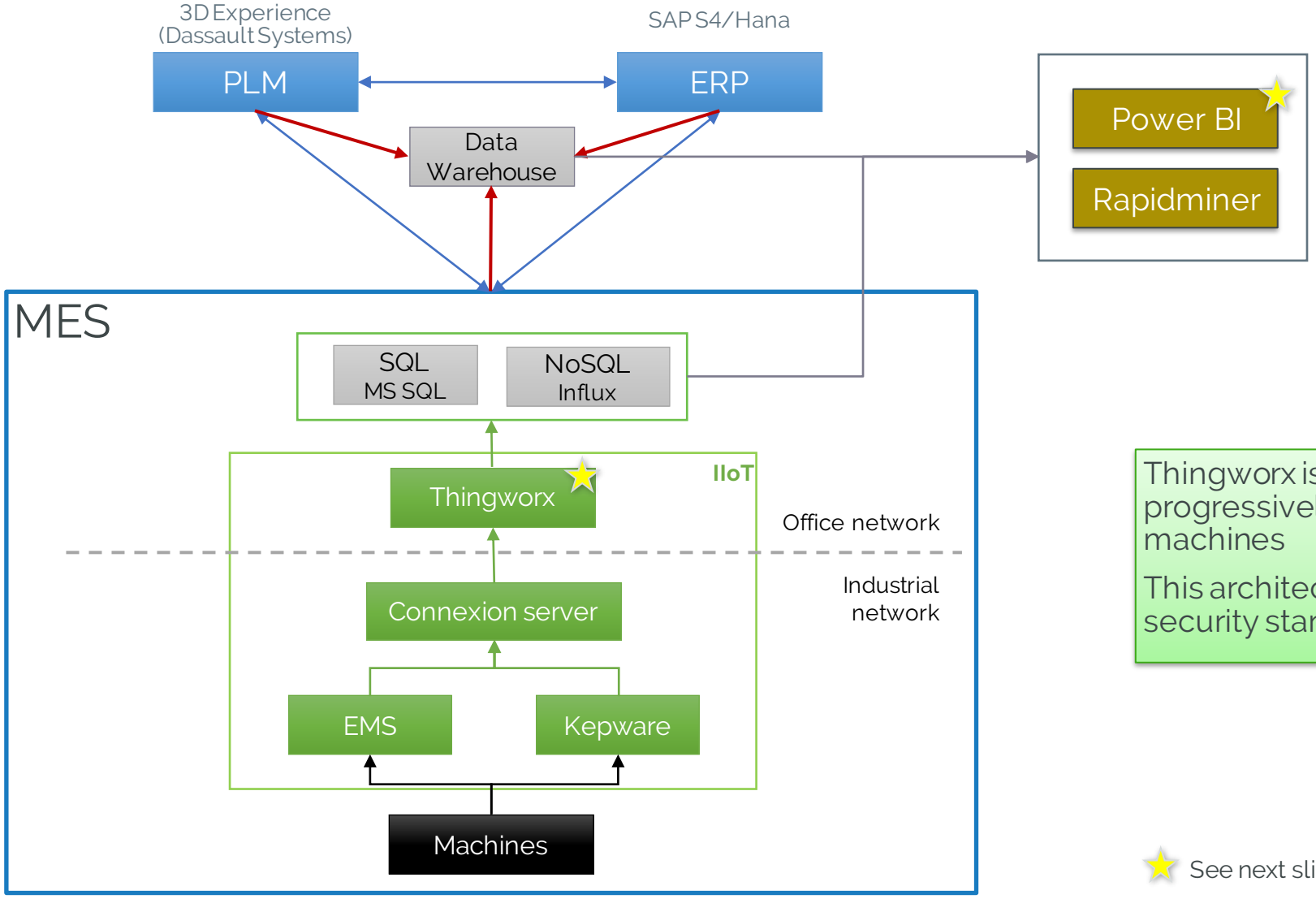
The packaging of building blocks solves a business problem for a customer while providing flexibility to reuse/extend underlying functionality



Building block layer added on top of Thingworx, compliant with ISA95 dictionary

SAFRAN Aero Boosters selected some products of PTC manufacturing suite to progressively build his MES.

ARCHITECTURE FOR DATA COLLECTION



Thingworx is fully operational and we are progressively connecting all main machines

This architecture is compliant with SAFRAN security standard

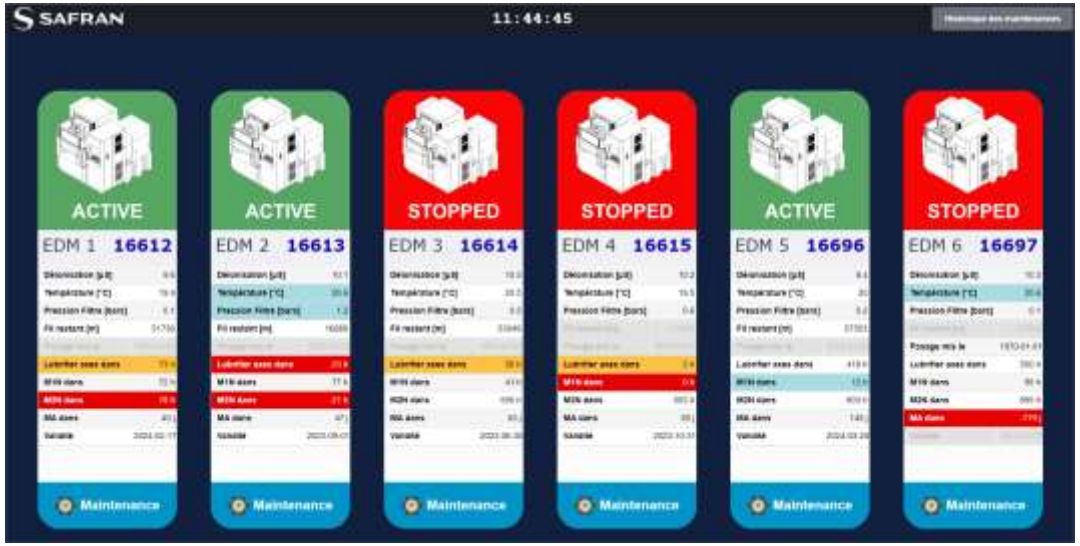
★ See next slide for two examples…

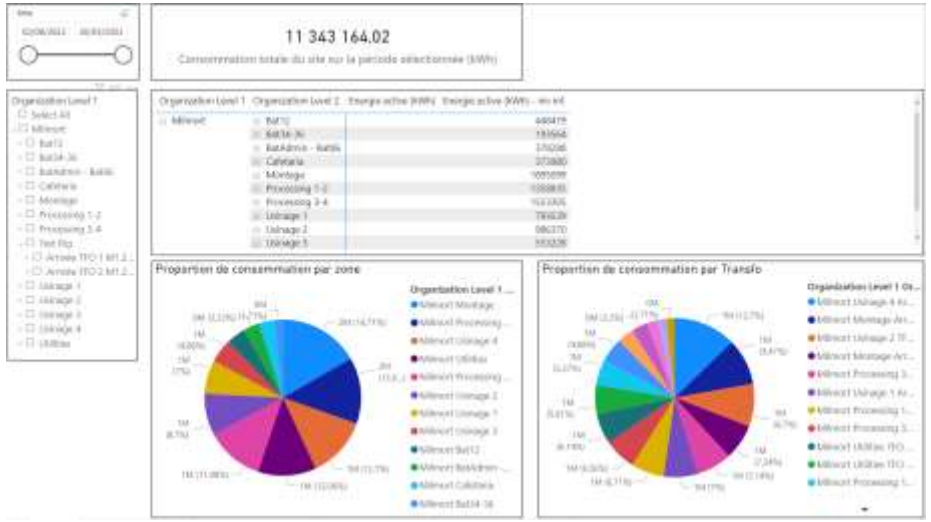
TOOLS DEVELOPED BY SAFRAN AERO BOOSTERS

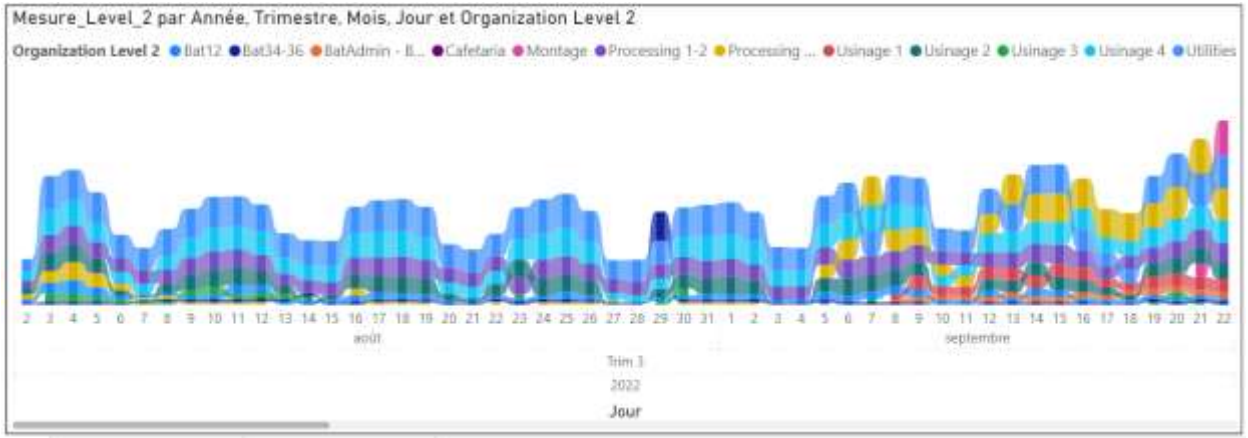
Energy consumption monitoring.
Data collection with Thingworx and analyze with Power BI

Real-time status of EMD machines + Maintenance log book

Data collection + Dashboard with Thingworx

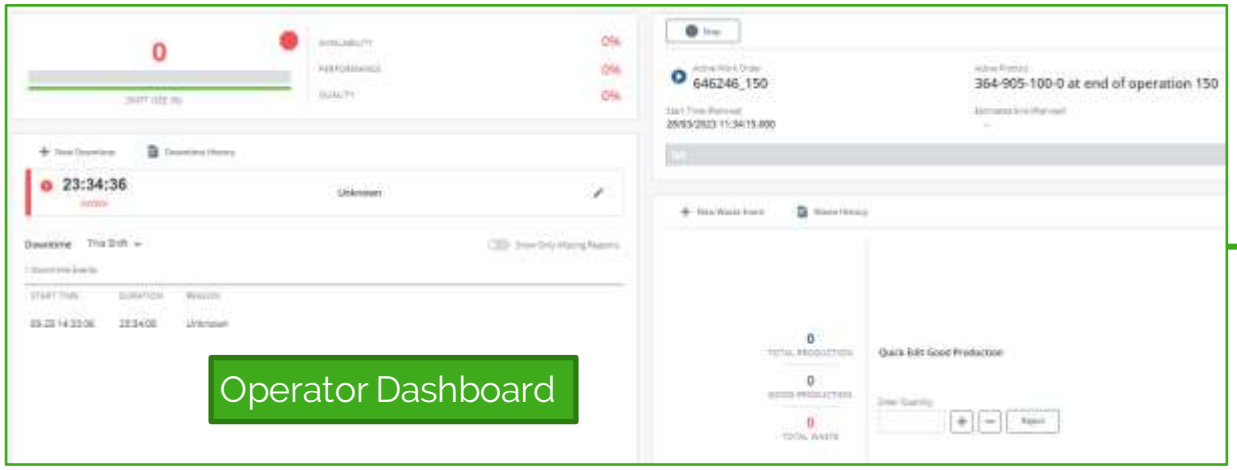




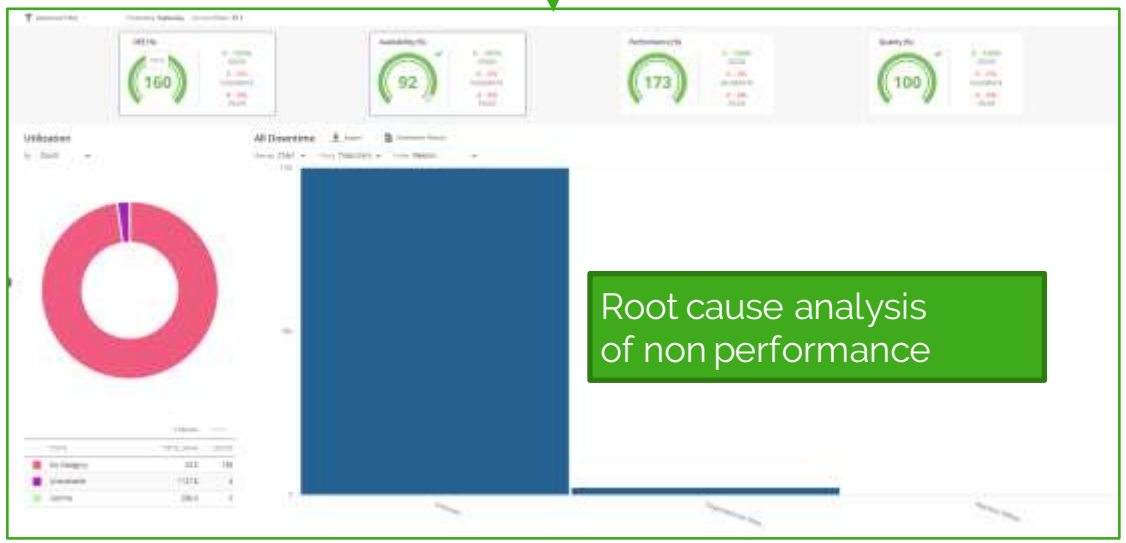


RTPPM (REAL TIME PERFORMANCE PRODUCTION MONITORING)

Standard KPI



Operator Dashboard



Root cause analysis of non performance

Goals :

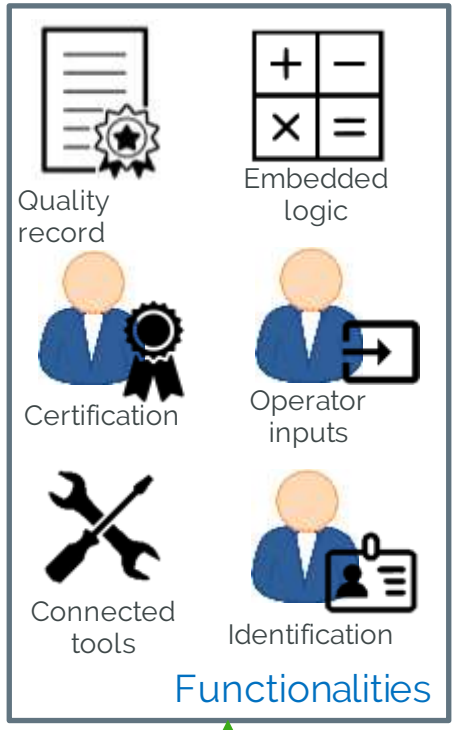
- Provide machine availability directly at workplace
- Access to a cause analysis for unavailability, standardized for all assets

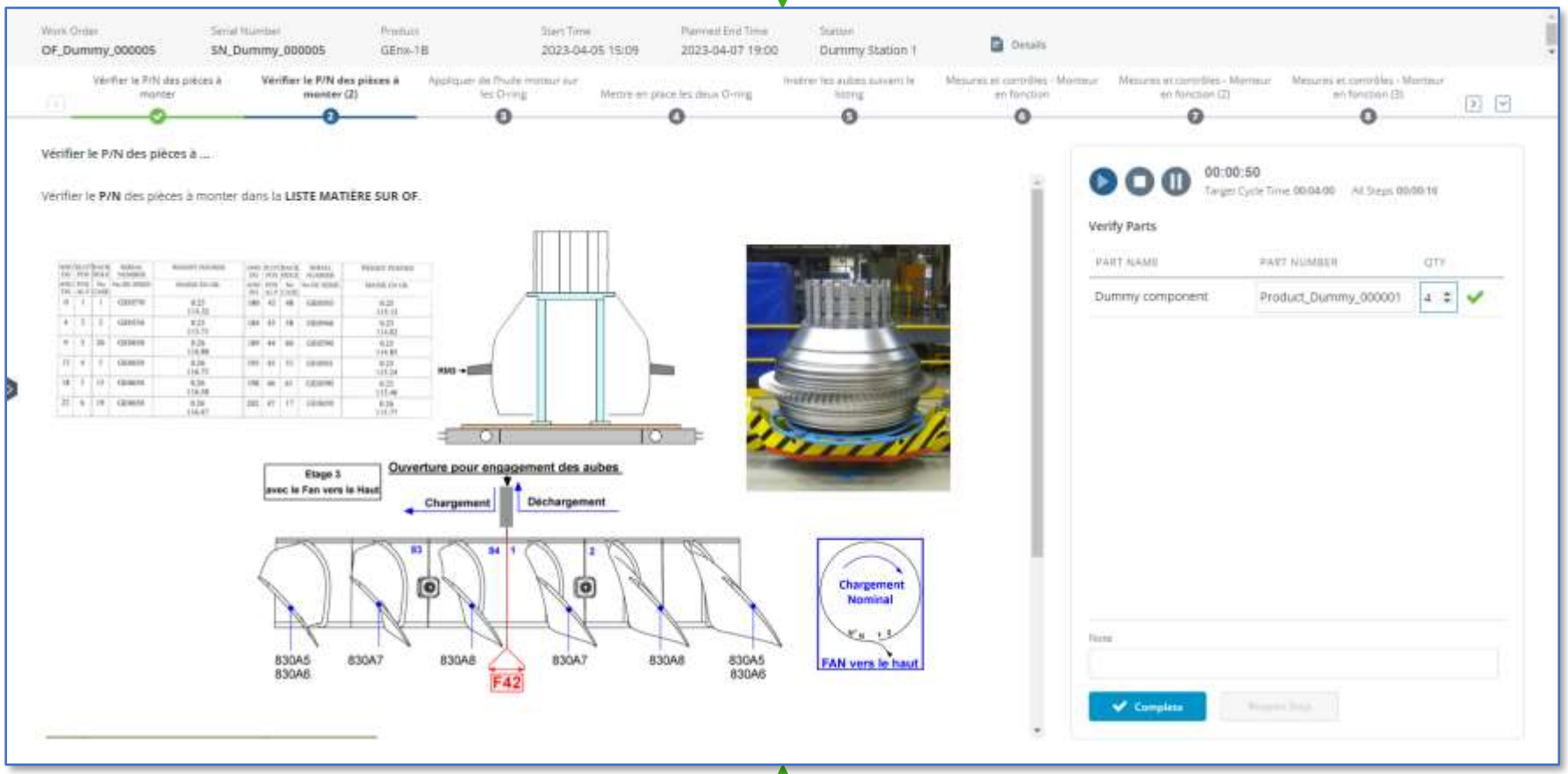
Test ongoing on RTPPM module developed by PTC.

- Automated collection of machine states
- Collection of manual data that are not available automatically
- Provide an analysis interface

DIGITAL INSTRUCTIONS (CWC = CONNECTED WORK CELL)

ERP **PLM**





WAY FORWARD – CONCLUSIONS

- In SAFRAN digital transformation, the MES is the key system to ensure digital continuity in operations and design activity loops (ERP-PLM-MES is the golden triangle)
- SAFRAN Aero Boosters selected PTC Thingworx for machine data collection and is now building his MES with PTC building blocks and some products from PTC Manufacturing suite.
- This choice was mainly based on
- Decision from PTC to include in Thingworx building blocks compatible with ISA95 standard
  - PTC roadmap for tool development aligned with SAFRAN Aero Booster strategy
  - Openness and Quality of Technical support
- Next challenges are
  - Development of missing ISA95 features (Traceability, Detailed Scheduling)
  - Interface with the PLM (Product Lifecycle Management) to get digital instructions and provide manufacturing data
  - Interface with the ERP (Enterprise Resources Planning) for production request and resources management, and provide production feedback in real time for Advanced Planning Scheduling
  - Interface with the QMS (Quality Management System) to manage non conformance and provide traceability
  - Interface with the HRM (Human Resources Management) for operator qualification and availability

Please fill out the session survey.

Take your post-session survey(s) either in the event mobile app or via email post-event.

Your feedback provides us with valuable information on how to shape future content strategy for the event!

PROVIDE SESSION FEEDBACK

ptc

LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

THANK YOU

LIVEWORX.COM | **#LIVEWORX**

ptc.com