Legitimacy

AGILEO Automation
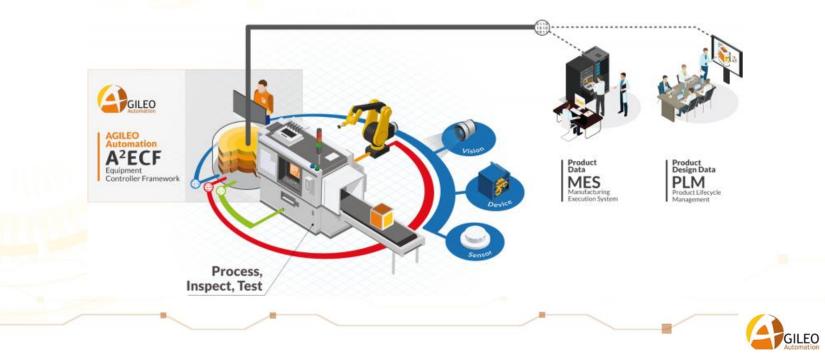
⬡ Connectivity and robotic control solutions for industrial production equipment

⬡ Software deployed around the world

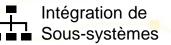|	
1 M€ sales	**18** employees
28 % exports	**Since 2004**

Core business

⬡ Software development for complex production machines by integrating an industrial automation framework
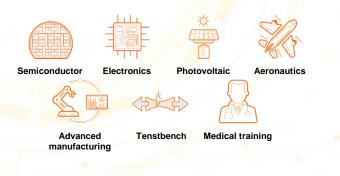
The challenges of production equipment manufacturers

⬡ Increasing complexity of the machines
- System of Systems: robot, camera, RFID reader, machining machine, etc., and in cascade

⬡ The machine must be interoperable
- In multiple factories, for multiple customers and with multiple needs

⬡ Time to market, Delivery times

⬡ Ranges of machines to manage

⬡ Global deployment of machines

⬡ Staying independent and capitalizing on their offer
- Independence from integrated systems
- Not to be bypassed by the computer systems or the materials used

Increasing complexity of the machines

⬡ Modular vision of architecture with well-defined interfaces and responsibilities

⬡ Adopt model driven engineering

⬡ Ensure compliance to domain standards, but stay open to adhoc interfaces

⬡ Choose iterative development methodologies

⬡ Cross fertilization of the knowledge base of multiple domains

Semiconductor **Electronics** **Photovoltaic** **Aeronautics**

Advanced manufacturing **Tenstbench** **Medical training**

Model	Search
⌄ ▨▨▨▨▨	
⌄ Cluster1	
Robot1	
LoadLockIN1	
TransfertModule1	
LoadLockOUT1	
⌄ ProcessModule1	
Vx8	
Vx1	
Reactor1	
Reactor2	
Reactor3	
> ProcessModule2	
> ProcessModule3	
> ProcessModule4	
ParkingStationIN1	
ParkingStationOUT1	

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Interoperability

- Compliance to standards
  - For example, OPC UA alone is not enough
  - Remain open to machine specificities and *ad hoc* interfaces
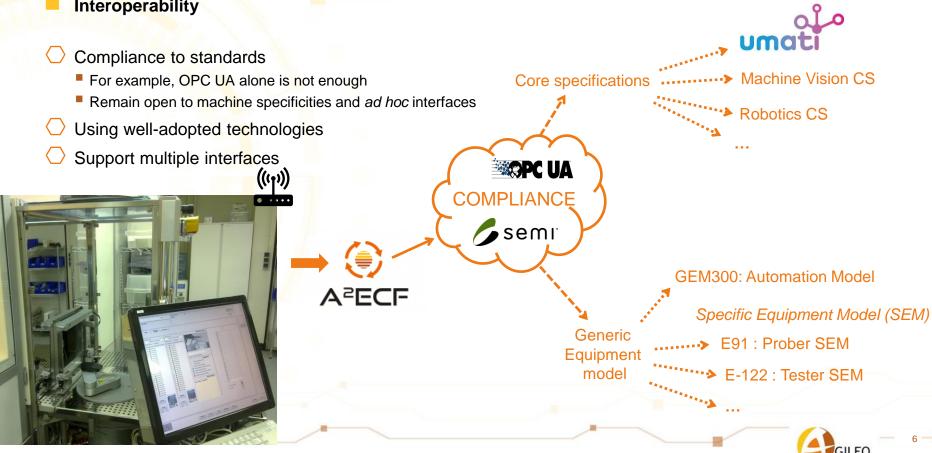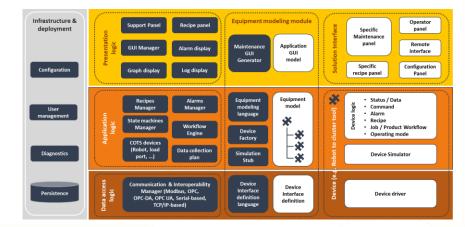- Using well-adopted technologies
- Support multiple interfaces

Time to market & Delivery delay

⬡ Reuse based development
- components, modules, libraries ...
- Reusing architecture
- Domain knowledge & best practices

⬡ Frameworks for development

⬡ Decouple software development from hardware availability
- Support partial hardware virtualization for integration
- Prepare IT connectivity before commissioning

■ **Ranges of machines to manage**

⬡ Product line engineering
 ▪ Specify the variability
 ▪ Apply at the level of the machine
 ▪ Apply at the level of the software for the machine

⬡ Modular automation systems
 ▪ production systems and their software controllers

A²ECF

Product family 1

Product family 2

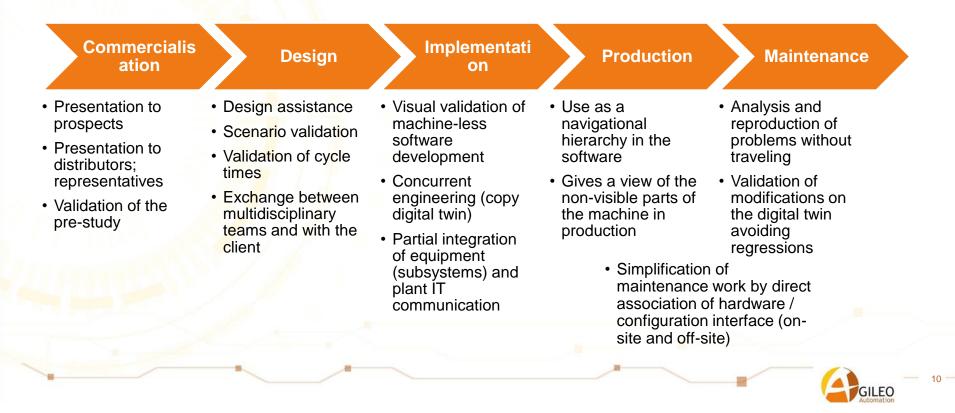**Global deployment of machines**

Remote supervision
- Collect operational data
- Analyze KPIs of reliability, availability and maintenance data e.g., OEE
- Close the loop - Improve equipment process based on real data usage

Use digital twins
- Virtual commissioning
- Maintenance a distance

Added value of the digital twins on the development cycle of a machine

Commercialisation	Design	Implementation	Production	Maintenance
• Presentation to prospects • Presentation to distributors; representatives • Validation of the pre-study	• Design assistance • Scenario validation • Validation of cycle times • Exchange between multidisciplinary teams and with the client	• Visual validation of machine-less software development • Concurrent engineering (copy digital twin) • Partial integration of equipment (subsystems) and plant IT communication	• Use as a navigational hierarchy in the software • Gives a view of the non-visible parts of the machine in production	• Analysis and reproduction of problems without traveling • Validation of modifications on the digital twin avoiding regressions

• Simplification of maintenance work by direct association of hardware / configuration interface (on-site and off-site)

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Continuity in the digital tool chain

⬡ Avoid using programming languages based on hardware choices

⬡ Use widely-adopted programming languages and not the vendor-specific ones
- Ensure long term maintenance and potential ramp-up
- Avoid dependance on very small group of experts
- Reduce development costs

⬡ Don't let IT systems decide the internal equipment architecture and the hardware vendors
- Ensure good interaction with both IT and OT
- Reduce the risk of being by-passed as an equipment manufacturer
- Capitalize on experiences from each application e.g., code base, domain knowledge, best practices, etc.

More than 6 million* programmers for

C#

How many for a vendor-specific language?

* https://www.daxx.com/blog/development-trends/number-software-developers-world

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■ **Conclusion**

⬡ A²ECF is the capitalization more than a decade of field proven experiences in industrial automation.

⬡ We address the challenges of Industry 4.0 from the point of view of equipment manufacturers.

A²ECF alleviates machine manufacturers' workload

and brings more value to end-users

Contact

Agileo Automation
11 Rue Victor Grignard
86000 POITIERS

marc.engel@agileo-automation.com
+33 5 49 49 61 79
+33 6 67 17 37 25

https://www.agileo.com