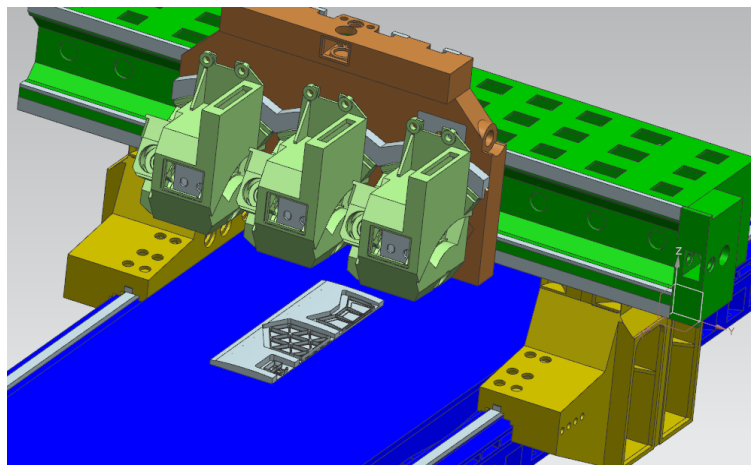
Exploitable results:

Twin-Control results

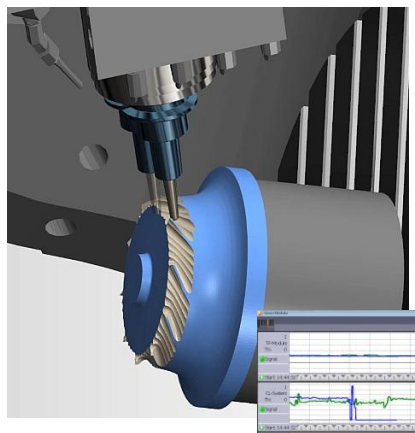
Twin-Control provides a set of features that improve Machine tool life-cycle, with the objective of increasing the Overall Equipment Efficiency (OEE).

The developed features are gathered in three main groups:

- A state-of-the-art Digital Twin of Machine Tools has been developed. The integrated simulation tool developed in the project is based on a FEA software that integrates the machine structural analysis with the control and the machining process. This Digital Twin also accounts for life-cycle features like energy efficiency and end-of-life of components. To complement this complete simulation model, a tool that focus on the machining process has been developed that perform fast machining simulations by, of course, reducing the available results such as effect of machining process on the structural components on the machine tool.
- A local monitoring infrastructure has been developed and implemented. In addition, new features have been developed to provide “intelligence” to the monitoring system and use it to control the manufacturing processes. Adaptive feedrate control, energy monitoring, Collision Avoidance System, etc. are examples of this new features. Depending on the application and/or sector, different features are of interest and can be applied independently.
- A cloud based fleet-wide platform for machine tool condition, performance analysis and proactive maintenance has been developed.

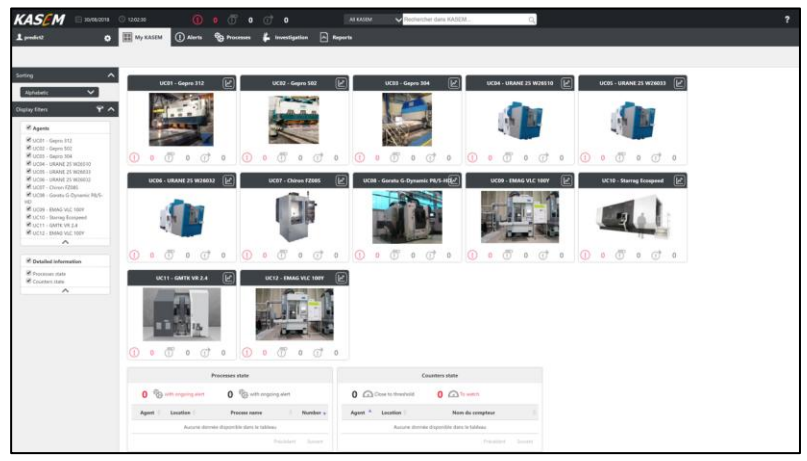


Virtual Machine Tool



Collision Avoidance System

Component-level energy monitoring



Twin-Control fleet platform

Impact

- Reduction of machine tool design, development and set-up time and costs **(10%)**
- Reduction of machining process design and set-up time **(10-20%)**
- Reduction in energy consumtion **(60%),** combining efficient machine design and energy monitoring
- Reduction of scrap parts **(10 %)**
- Reduction of **30 %** in corrective maintenance costs
- Increase in machine up-time **(up to 10%)**
- Reduction of life-cycle costs by **15%**
- Reduction of Operation and Maintenance costs by **25%**

Factories of the Future
Public Private Partnership

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