Exploitable results:

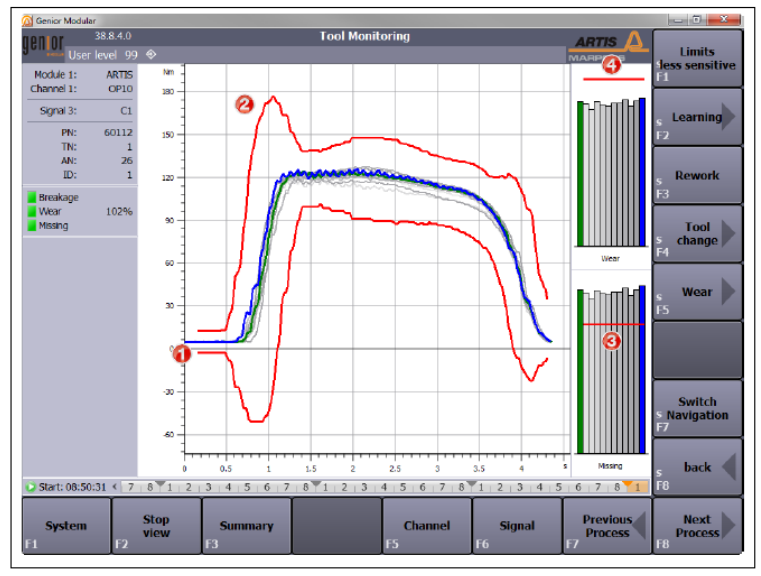
Local Monitoring and Control System

An advanced local monitoring and control system has been developed, based in ARTIS hardware and integrating new features developed by Twin-Control partners.

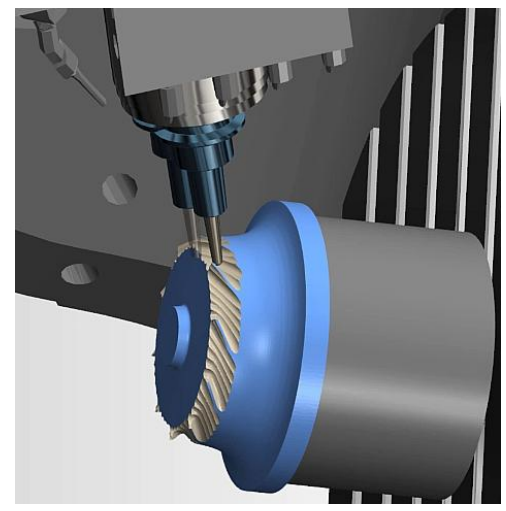
ARTIS Genior Modular is able to connect to machine CNC/PLC and get internal signals at a high sample rate. Additional modules are used to measure additional signals (total power consumption, vibrations…), that are also integrated inside the ARTIS Genior Modular. All acquired signals are requested by ARTIS OPR, that acts as a long-term storage system and provides additional features like OPC based communication, computation capabilities and connection to cloud platforms, like KASEM.

Apart from the complete monitoring capabilities, this system has enhanced features:

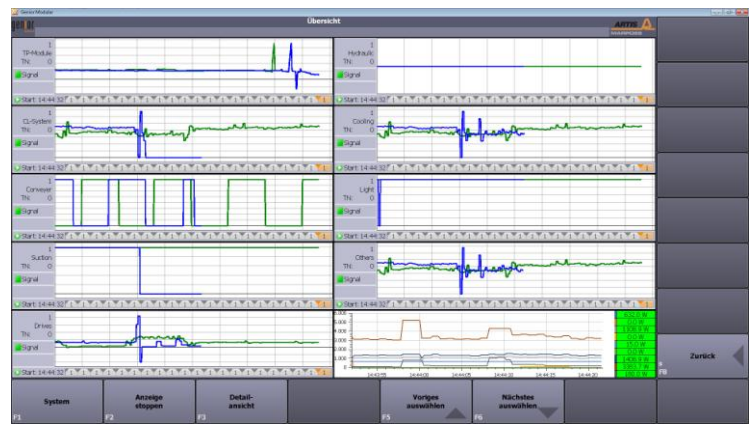
- Process monitoring: after a learning stage of a specific process, process related thresholds are defined for all monitored signals (e.g. spindle torque) that allow detecting anomalous performance. The integration of the new process models developed in Twin-Control will allow the determination of these thresholds without the need of a learning stage (suitable for small batch processes)
- Adaptive feedrate control: According to a defined spindle consumption setpoint, the system is able to adapt machine tool feedrate to increase productivity.
- Component-level energy monitoring: a low-cost energy monitoring concept is proposed, based on the disaggregation of the machine's total power consumption.
- Collision Avoidance System: a graphical simulation environment that uses real positions of the machine, and I able to predict collisions and stop the machine in advance.



Process monitoring and Adaptive control



Collision Avoidance System



Component-level energy monitoring

Impact

- Reduction of **10 %** in cycle times
- Reduction of **10 %** in scrap parts
- Reduction of **5-10 %** in tooling costs
- Reduction in energy consumtion **(35%)**
- Reduction of manual activities for process control **(50 %)**
- Increase in machine up-time **(1 %)**

Factories of the Future
Public Private Partnership

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