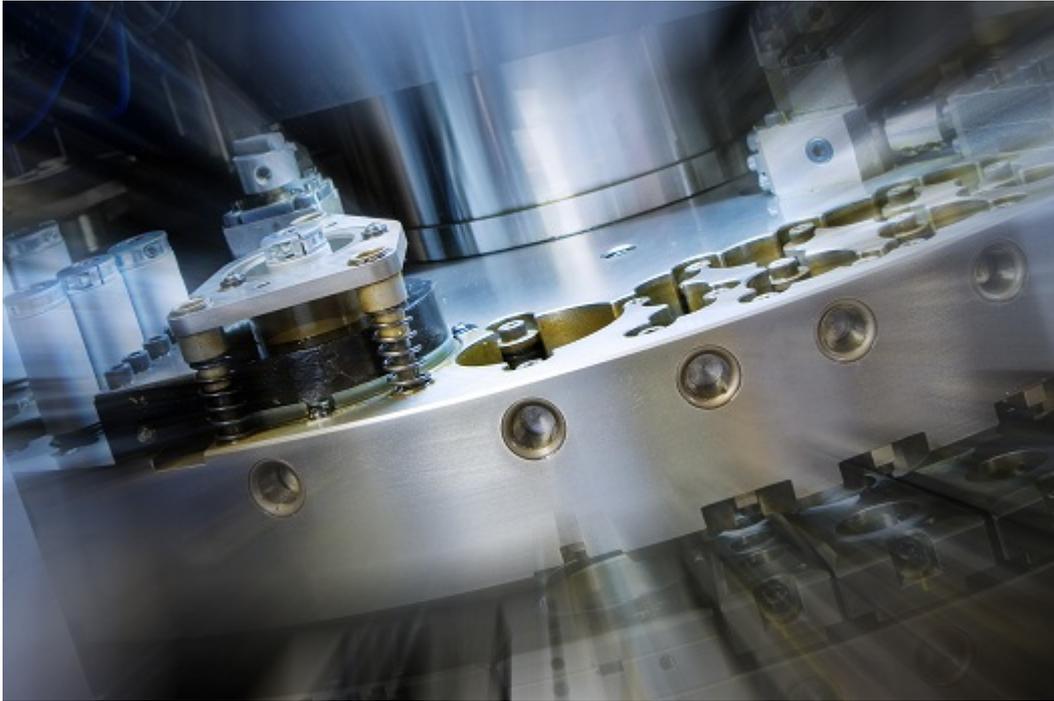




Published on *Horizon 2020* (<https://ec.europa.eu/programmes/horizon2020>)

Tuesday, 28 January, 2014



[1]

The automotive, electronics and printing machine sectors are not obvious allies. But all are united in the quest to make metal-cutting both more efficient and environmentally friendly.

A pan-European project has developed a solution using generic adaptive technologies – sensors, processes and actuator systems able to automatically adjust metal-cutting operations in response to changes on the production line. These technologies are now being used by major European companies.

The EU-funded project ADACOM, completed in 2012, sought to address a pressing challenge facing the entire European manufacturing sector: how to improve production flexibility and efficiency so as to stay ahead in a highly competitive globalised world.

The project consortium, made up of automotive, electronics and printing machine manufacturers, their suppliers and universities, approached the problem by focusing on a process central to their manufacturing activities: metal cutting.

The team developed a generic modular adaptive control platform – sensors, processes and actuator systems – for the milling, turning, gun-drilling and grinding operations involved in metal cutting operations.

The modular platform is designed to adapt cutting processes efficiently to changes on the production line – such as speed or feed rate, temperature increases, and wear and tear.

The team first identified the key parameters needed for adaptive machining systems. Then prototypes were built at universities, before being tested in industrial plants. The full system adaptation is controlled by sensors.

The results were overwhelmingly positive, with consistent improvements in production recorded following the introduction of adaptive manufacturing.

“The system also has environmental benefits,” says project coordinator Dr Dražen Veselovac, Chair of Manufacturing Technology at the Rheinisch-Westfälische Technische Hochschule in Aachen, Germany. *“The use of adaptive systems will reduce scrap, increase the lifetime of production systems and enhance the efficient use of resources like water, electricity and raw materials.”*

Gearing up for the future

Through a number of case studies, the team addressed specific problems affecting the milling, grinding and drilling of different metals. In each, an industrial partner teamed up with a university and a sensor provider.

In the case study involving Daimler, one of the biggest automotive manufacturers in Europe, the research led to a new milling strategy to reduce the manufacturing time for new gear concepts. The new process also introduced much-coveted flexibility – by applying an adaptive milling strategy to a standard milling tool, it was possible to produce new gear shapes faster.

“Daimler now has a general reusable machine tool that is geometrically adaptive and is capable of creating high-quality gears very quickly, without the need for investment in new equipment,” explains Dr Veselovac. *“The demonstration we ran with Bosch has similarly now been integrated into their mass production.”*

Another project partner – a supplier of advanced composites to the aerospace, defence and automotive sectors – sought to identify a milling strategy that would produce the optimal surface finish while preventing burning. An adaptation strategy was developed that would deliver near to real-time temperature information to prevent over-heating and damage to tools.

One unexpected but very welcome result has been the interest shown by the global aerospace sector, with large manufacturers planning to adopt the system in the production of critical engine components.

The United States Federal Aviation Authority (FAA) and the European Aviation Safety Agency (EASA) have also shown interest in the technology and are considering using it to establish their own systems within the next five years.

ADACOM brought together expertise from nine EU countries, a cooperative effort that Dr Veselovac believes was crucial to the project's eventual success.

“This project had to be conducted at the EU level,” he says. *“Without such a wide spread of expertise, the project would not have been able to attract leading industrial players such as Daimler, Robert Bosch and Heidelberg Druckmaschinen. No single country would have been able to provide all of the competence required, and it was important that the whole supply chain was involved.”*

See also:

[Info-centre](#) [2]

Project:

Adaptive Control for Metal Cutting

Project Acronym:

ADACOM

Source URL: <https://ec.europa.eu/programmes/horizon2020/en/news/smart-adaptable-machines-production-line>

Links

[1]

https://ec.europa.eu/programmes/horizon2020/sites/default/files/newsroom/fotolia_36112874_subscription_small_5971.jpg

[2]

http://ec.europa.eu/research/infocentre/article_en.cfm?id=/research/headlines/news/article_14_03_05_en.html&item=All&artid=31719&caller=AllHeadlines