

PRESS RELEASE

Detecting failures before they occur

- IK4-IDEKO participates in the European project PreCoM, which seeks to develop a platform for predictive maintenance that increases the efficiency of machinery
- The initiative, which is based on intelligent data analysis, also aims to reduce incidents caused by breakdowns and reduce the consumption of raw materials in manufacturing processes
- The project consortium is made up of 17 international partners, among which are the machine tool manufacturers DANOBAT Overbeck and SORALUCE and the big data analytical solutions company SAVVY
- With a total budget of 7.2 million euros, of which 6.1 million are financed by the European Commission, the project will conclude in 2020

Avoiding breakdowns and production stops, increasing the availability of equipment and ensuring optimum performance are some of the main concerns of companies that use machine tools to manufacture industrial parts and components of high added value with ultra-precision results.

It is in this context that the European project PreCoM (Predictive Cognitive Maintenance Decision Support System) is being developed, an initiative that has the participation of the Basque technology center IK4-IDEKO and pursues the objective of developing an intelligent platform for the capture and analysis of data from machines, to optimize the maintenance tasks of the equipment.

The platform will be a support system for a predictive cognitive maintenance decision-support system able to identify and localize damage, assess damage severity, predict damage evolution, assess remaining asset life, reduce the probability of false alarms, provide more accurate failure detection, and issue notices to activate preventive maintenance actions.

"Ultimately, the developed platform is an intelligent system that increases the in-service efficiency of the equipment by at least 10%," says Iñigo Bediaga, the person responsible for the project at the IK4-IDEKO research center.

The PreCoM initiative, which started at the end of 2017 and will continue until 2020, has also set goals such as increasing the availability of equipment, reducing incidents related to machine failures, reducing energy consumption and the reduction of raw material consumption.

The project consortium, led by the Swedish university [Linneaus University](#), is made up of 17 international partners among which, in addition to IK4-IDEKO, are the machine tool manufacturers [SORALUCE](#) and [DANOBAT Overbeck](#) and a company specializing in the development of monitoring systems and big data analysis in manufacturing industry, [SAVVY](#).

The consortium includes 3 end-user factories, 3 machine-tool suppliers, 1 leading component supplier, 4 innovative SMEs, 3 research organizations and 3 academic institutions. Together, we will validate the platform in a broad spectrum of real-life industrial scenarios (low volume, high volume and continuous manufacturing). We will also demonstrate the direct impact of the platform on maintainability, availability, work safety and costs in order to document the results in detailed business cases for widespread industry dissemination and exploitation. The project has a duration of 3 years and an EC requested contribution of €6.1M

Sensor solutions/Sensing to anticipate breakdowns

The PreCOM consortium will be responsible for developing and validating a cognitive predictive maintenance decision support system composed of four differentiated modules.

The first of these modules is designed for the acquisition of data through the use of both external sensors and sensors embedded into the components of the machine-tool, with the mission of providing information that makes possible the detection of anomalous behavior.

“El actual desarrollo de sensores más baratos y potentes, sumado a las prestaciones de la analítica big data, nos brinda una oportunidad única para hacer un seguimiento exhaustivo y preciso del estado de la máquina herramienta”, asegura el investigador.

"The current development of Cheaper and more powerful sensors, together with big data analytics, gives us a unique opportunity to carry out an exhaustive and precise monitoring of the state of the machine tool," says the researcher.

The second is an artificial intelligence module that consists of a device that combines physical models, statistical models and machine learning algorithms capable of tracking the state of the components analyzed.

The PreCoM platform will enhance physical models with statistical models to build trend reference models to predict the machine-tool condition. The platform will use machine learning algorithms to continuously identify the causes of damage and imminent failures, predict damage development and visualize the results of impending maintenance actions "adds Mr.Bediaga.

The third module is aimed at connecting the platform with production planning and maintenance systems for machine users through the cloud, a private and secure access that presents autonomous repair and self-learning capabilities.

Finally, the platform will integrate a user interface that includes dashboards that support the visualization of production and maintenance performance, as well as augmented reality interfaces that support maintenance tasks.

IK4-IDEKO, leading the demonstrators

In the framework of the project, the researchers of IK4-IDEKO will coordinate the three demonstrators in which the PreCoM solution will be validated.

Specifically, three use cases have been selected that cover different production scenarios (low volume, high volume and continuous manufacturing).

They will also cover a wide variety of machine tool types such as milling-boring machines, grinding machines and paper machines.

The platform will be applied to key components of the machines (gearbox, milling spindle, workhead spindle, grinding spindle, linear motors, yankee dryer, blades, doctors among others).

The research entity will also assume the exploitation and standardization functions of the final solutions.

Data in real time

The PreCoM platform will use real-time data collected by the sensors embedded in the machine tool to initiate operations aimed at reducing failures and increasing performance.

The development will take into account the total production life cycle and will allow data sharing with the department in charge of the production line, which will reconfigure processes if necessary. The platform will also allow data sharing with the machine tool manufacturer to apply continuous improvement of systems.

Another advantage of the PreCoM solution is that it can be applied in the assembly phase of the machine tool to monitor the status of each component and detect quality defects, as well as being fully integrated into the production planning systems and improving maintenance schedules.