



Press release for IDTechEx in Berlin, [www.IDTechEx.com/Europe](http://www.IDTechEx.com/Europe)  
Hahn-Schickard, Convention hall II, booth R10

## Intelligent multi-sensor systems for industry 4.0 condition monitoring

Experienced machine operators know “their” machines down to the last detail, they literally can hear when a certain problem is about to occur.

Based on this knowledge, Hahn-Schickard developed intelligent sensor systems for continuous condition monitoring of industrial machines with its project partners Robert Bosch GmbH, Siemens AG, Schaudt-Mikrosa GmbH, Fraunhofer IPK, Binder Elektronik GmbH and Stackforce GmbH.

The detection of structure-borne and acoustic noise in combination with energy-efficient signal pre-processing at sensor level and a modular system architecture is one of the key technologies of networked, self-sustaining sensor systems for industrial condition monitoring.

By using MEMS-based acceleration sensors, microphones and ambient sensors, structure-borne and acoustic noise, vibration as well as temperature, humidity, air pressure and brightness is recorded and simultaneously analysed directly on the sensor node itself.

The data obtained not only provides information about the current condition of the machine, but also allows to predict when a failure is likely to occur in future.

The AMELI4.0 “Vibration Node” monitors and processes vibration data up to a bandwidth of 30 kHz with the integrated MEMS sensors. Sensor-embedded, intelligent signal processing algorithms, developed by researchers of the Fraunhofer Institute for Production Systems and Design Technology and Bosch, substantially reduce the data in the sensor, extract relevant signal features and classify any occurring signal anomalies. The system design developed by Hahn-Schickard and Bosch includes an additional temperature sensor, a cable-based CAN interface and a rugged industrial IP67 metal housing.

The AMELI4.0 “Condition Node” combines MEMS vibration sensors with environmental sensors for airborne noise, temperature, pressure, humidity and light. The electronic circuit implemented by Binder Elektronik contains a bluetooth interface and a replaceable AA primary battery. Modern software architecture from Hahn-Schickard and Stackforce provides the user with authentication and encrypted data transfer in the production network, as well as an energy lifetime of several years. The AMELI4.0 Condition Node can optionally be powered by a kinetic, self-trimming energy harvester developed by Hahn Schickard. Additional NFC and USB interfaces make this sensor an all-rounder for a wide range of applications. The AMELI4.0 Condition Node can be freely configured in both its frequency range and data compression features using the visualization solution designed by Hahn Schickard.



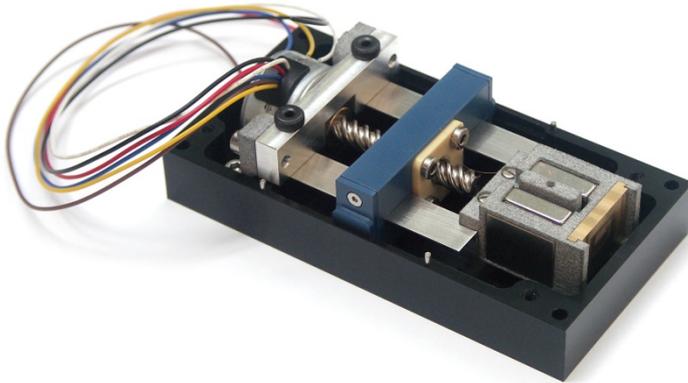
# AMELI 4.0

GEFÖRDERT VOM



Bundesministerium  
für Bildung  
und Forschung

**The AMELI4.0 complete system**



**The AMELI4.0 adaptive energy harvester**

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