ST reveals industrial-grade accelerometer with edge AI and ultra-low power for maintenance-free smart sensing

Advanced MEMS accelerometers leverage unique ST technologies for longer battery life and smarter sensing, even in harsh conditions

industrial MEMS accelerometer

GENEVA, SWITZERLAND, April 10, 2025 /EINPresswire.com/ -- STMicroelectronics' IIS2DULPX industrial MEMS accelerometer combines machine learning, power saving, and capability to operate at high-temperature, facilitating intensive sensorization for smarter, data-driven operations and decision making in asset tracking, robotics, and factory automation, as well as industrial-safety equipment and healthcare devices.

With in-sensor AI to relieve the host processor and automatic self-configuration to optimize power consumption, the IIS2DULPX lets equipment makers build maintenance-free, battery-powered smart sensor nodes in convenient form factors. "Our new IIS2DULPX accelerometer uniquely combines edge processing with ultra-low-power consumption and extended operating temperature range for the next generation of smart industrial sensors," said Tarik Souibes, MEMS sub-group marketing director, STMicroelectronics. "With their on-chip intelligence, these accelerometers operate and adapt in real time to context, giving flexibility to adopt a deterministic algorithm or AI approach as best suited to the application."

Typical applications for the new accelerometer include event tracking of assets or goods in transit. ST's machine-learning core (MLC) can host AI algorithms to classify the kind of transportation system the asset is on and the events such as dropping, shaking, tilting, and flipping, enhancing quality assurance and supply-chain process improvement. Performing inference directly in the sensor relieves demands on the host-processor thus helping greatly extend the sensor battery life.

In addition, the IIS2DULPX is used in sensors for smart condition monitoring that are attached to

assets such as industrial machinery or robotic arms to detect excessive vibrations, hits, and shocks. Here, small size and ultra-low power consumption let device makers create sensors with a compact outline and extended operation from a small and lightweight battery, that can be easily used to retrofit equipment that is already installed and operational. End users can thus instantly start collecting data from any equipment, including legacy machinery, to accelerate and extend their digital transformation initiatives.

Among ST's early customers, Treon has recently developed a smart condition-monitoring system containing the new sensor. "We have just launched the Treon Industrial Node X, our long-lasting wireless condition-monitoring system, featuring the IIS2DULPX accelerometer, which we chose for its exceptional ultra-low power performance," said Joni Korppi, CEO at Treon. "The intelligence embedded in this sensor enables the entire system to operate at extremely low power, achieving the battery duration we need. Moreover, its 10-year guaranteed market availability aligns perfectly with our product lifecycle requirements."
In the Treon system, the IIS2DULPX accelerometer performs continuous monitoring of vibration levels with ultra-low power consumption, working in conjunction with an ST IIS3DWB high-performance vibration sensor to react to changes in vibration level and trigger more detailed measurements.

"With the Treon Industrial Node X, we have set a new standard in efficient, reliable, and long-lasting condition-monitoring solutions leveraging ST's innovative MEMS sensors," added Korppi.

Further applications for the IIS2DULPX include smart protective equipment and portable healthcare devices, including monitoring systems designed into industrial safety helmets to detect proper helmet wearing, impacts and falls for accident prevention or prompt emergency alerts, improving overall workplace safety. The sensor can detect a dangerous fall and immediately generate an alert for prompt assistance, as well as monitoring activity to identify unusual work patterns and ensure safety compliance. With its embedded machine-learning core and finite state machine (MLC/FSM), as well as automatic self-configuration, the IIS2DULPX permits continuous supervision while consuming very little energy, enabling a simple battery-operated accessory to transform a conventional safety helmet into a smart helmet.

The IIS2DULPX has also been integrated in an advanced battery-powered sensor for monitoring wafer-handling robot arms in semiconductor fabrication, to measure vibrations and shocks that could impact yield or reliability of chips. The accelerometer's embedded MLC and automatic self-configuration let the battery-operated sensor node provide accurate and continuous monitoring, maintenance-free, for more than three years.

The IIS2DULPX operates over an extended operating temperature range, up to 105°C. It is available now, priced from $1.57 for orders of 1000 pieces.

Please visit www.st.com/IIS2DULPX for more information.

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