Uniqueness

Direct-to-Digital Sensing (DDS) is a revolutionary new approach to strain, force, pressure and vibration sensor design. It creates a new sensing category in a large and growing industry. Traditional sensors typically provide analog output requiring conversion to a digital format for data processing. DDS eliminates this conversion circuitry and instead offers "direct-to-digital" output. In this way, DDS functions as a micro-mechanical analog-to-digital converter. The result is a sensor category that is less expensive, requires no calibration, uses almost zero power and is extremely rugged.

History

Dr. Paul Okulov invented and patented DDS in conjunction with development of a structural integrity sensor for infrastructure and aerospace. The DDS design and patent stemmed from his research into extremely low-power strain sensing technology that could enable autonomous battery operation for potentially 10 years or more.

Availability

DDS has been implemented for lab testing using MEMS (Micro Electro-Mechanical Systems) technology. The prototypes confirm the DDS operating principle, paving the way for application trials. An evaluation kit including a DDS MEMS device will be available in 2022.

Applications

The ruggedness of DDS technology makes it well-suited for harsh environments including automotive and industrial. DDS is also useful for extremely low-power applications employing long-life battery and harvested power. The simplicity of design enables cost-effective sensor solutions spanning a wide range of high-volume applications.

The next generation of DDS devices will focus on prefabricated sensor arrays with applications ranging from high-sensitivity industrial leak detection, to Metaverse applications such as pressure-sensitive floors and footwear.

The Technology

DDS includes any form of sensor that involves multiple deformable electrical contacts that press together in sequence. This operating principle is comprehensively patented to include all applications and embodiments such as MEMS, membranes and arrays.

Videos

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