Building Robust Aerospace and Defense Products with Ruggedized MEMS Oscillators

Harpreet Chohan
SiTime
hchohan@sitime.com

Background:

Ruggedized platforms often operate in the most hostile environments. Aerospace and defense systems can be exposed to extreme temperatures or large magnitude shock and vibration events, and maintaining reliable operation under such harsh conditions is critical. In the past, when exposed to high levels of shock, vibration and extreme temperatures, legacy timing components have been prone to failure, degrading system performance and reliability. Now, state-of-the-art MEMS timing technology has come of age. MEMS-based timing products now exceed the performance of traditional quartz oscillators in many performance categories, making them ideally suited to meet the challenges of aerospace and defense applications.

How to Build Robust Aerospace and Defense Products with Ruggedized MEMS Oscillators:

- The Evolution of MEMS Oscillator Technology
- What Makes MEMS so Reliable
- Addressing Legacy Timing Component Problems
- Futureproofing via DualMEMS Oscillator Technology
- Addressing the Timing Challenges of Aerospace and Defense Applications

Content of Presentation:

This presentation will focus on the evolution of MEMS oscillator technology leading up to the latest DualMEMS architecture design, address legacy timing component problems, and provide technical information on how to improve reliability in ruggedized implementations. The presentation also will address the specific timing challenges of aerospace and defense applications with improvements that encompass the key elements comprising a high performance oscillator: resonator, temperature compensation circuitry, PLL, and on-chip voltage regulators to filter noise. This final part of the presentation will cover how, building on the intrinsic advantages of shock and vibration resistance, state-of-the-art MEMS timing technology also delivers best-in-class dynamic performance (resilience to system and environmental stresses), making it an ideal choice to address the challenges associated with equipment deployed in rugged environments.

Conclusion:

Attendees learn how and why MEMS oscillators, including DualMEMS oscillator technology, are ideal for addressing the timing challenges of aerospace and defense applications. In addition, attendees will gain insight into solving the problems of legacy timing component failure, degrading system performance, and reliability issues that are the result of exposure to high levels of shock, vibration, and extreme temperatures.