The Spectratime mRO-50 is Orolia’s new low SWaP-C Miniaturized Rb Oscillator, specifically designed to meet core requirements for military airborne, ground, and mobile radio communications applications. It provides better holdover and higher stability in the same volume as a standard OCXO oscillator but with much lower power consumption. It can be a drop-in replacement for most applications.
Fast, accurate GNSS lock for positioning data

Military GNSS-based systems use very long pseudo random codes for signal recognition. These codes prevent civilian GNSS devices from detecting military codes and their positioning data. The disadvantage of lengthy codes is the amount of time necessary for military systems to decrypt them (up to two minutes).

With the new mRO-50 technology, detection time can be reduced to seconds.

Accurate timing and synchronization for radio transmission

Most modern radios operate by transmitting data in small packets. If many users in a group such as an infantry platoon are communicating, differing times are allocated to the radios to allow transmission on the same frequency (TDMA). The data packets have guard bands that protect individual packets from overlapping. This timing feature ensures communications, even if all of the radios are not synchronized.

With the new mRO-50 technology, guard bands will be reduced and thus allow at least twice the level of information to be transmitted.
Precise time stamping, inertial navigation, and waveform synchronization for UAVs

UAV sensor payloads typically use a clock synchronized to GNSS. When that signal is lost, the mRO-50 provides a “holdover” function to maintain precision for extended periods of GNSS denial.

UAVs also rely on Inertial Navigation Systems (INS) in the absence of GNSS. The high stability of the atomic clock with mRO-50 as the INS time base reduces the time integration error drift during extended GNSS outages.

Accurate clocks are also needed in UAV communications: high-density encrypted waveforms have been employed to transmit and receive UAVs control data as their sensor payloads have advanced from still photos to video, and to video integrated with infrared.

The new mRO-50 technology enables the constant synchronization and stabilization of those waveforms.
Spectratime mRO-50 Benefits for Military Applications

Key features

- Power consumption: 0.45W
- Long term stability: < 5 x 10^{-12}/day
- ADEV: ≤ 4 x 10^{-11} @ 1s
- Frequency retrace: < 1 x 10^{-10} within 1 h
- Operating Temperature: -40°C to +75°C
- Environmental: rugged design meeting extreme environmental conditions defined by norms MIL-STD-810
- Standard OCXO footprint, drop-in replacement.

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29 June, 2020. Spectratime mRO-50 Designed for Military Applications
Specifications subject to change or improvement without notice.
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