QUANTIFYING THE UNKNOWN



www.quantxlabs.com

ABOUT

Established in 2016, QuantX Labs' mission is to be a globally leading provider of precision technologies that enhance communication, navigation, computing and defence systems. QuantX Labs specialise in developing world-leading quantum technology in precision timing and sensing products.

Our state-of-the-art production and testing facility in Adelaide, South Australia delivers unique industrial capabilities that currently support Australia's Defence and Space programs.

Our core focus is advancing precision timing and sensor technologies that address opportunities in three domains:

- radar and communications
- resilient operation in environments that are denied access to satellite navigation signals (GPS)
- sensing of covert activities underwater and underground

CAPABILITY

CRYO

Delivering the world's most pure and stable output signal. Cryo-clock, an ultra-low phase-noise oscillator, is the culmination of twenty years of research, delivering a signal with purity that is 100 -1000 times higher than that of any other device.

The time-keeping ability of these sources is also world-leading: 100-fold better than the best previous solution available to the market.

A 'turn-key' product that is continuously-operating, autonomous, self-contained, and requires no expert knowledge. The Cryo offers a low maintenance cycle interval of 20,000 hours and includes monitoring software to ensure the device is operating perfectly and can recover from errors or power interruptions.

The Cryo can be configured to provide multiple frequency outputs from X-band down to 1PPS including all the usual RF signals necessary for synchronisation.

KEY APPLICATIONS:

- **Over the horizon radar**
- **Radio astronomy: VLBI, VLBA**
- **Deep space tracking and navigation**
- **Scientific frequency reference source**
- **Quantum computing systems**
- **Data Centre and telecommunication networks**



TEST & EVALUATION

QuantX Labs offers a state-of-the-art timing and phase noise test and evaluation facility. The oscillators and atomic clocks available at QuantX Labs, notably the Cryoclock, have phase noise a that is orders of magnitude better than anything commercially available and timing stability representing the "gold standard" that performance can be measured against. The timing and phase noise facility can be used to verify the performance of timing and local oscillator sub-assemblies for sell-off testing, and the ability to draw upon our extensive experience in precision timing and ultra-low phase noise signal generation and measurement.

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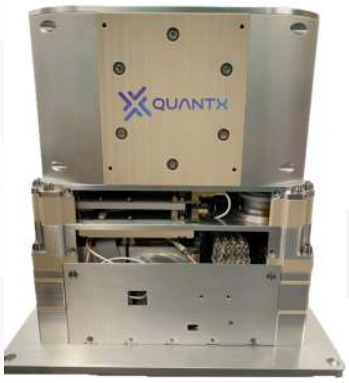
CAPABILITY DEVELOPMENT

TEMPO – COMPACT RUBIDIUM OPTICAL CLOCK

QuantX Labs is developing ground-breaking, next-generation atomic clocks that aim to simultaneously improve on the stability of current commercially available microwave atomic clocks with development plans to also offer greatly reduced size, weight, and power (SWaP). This advancement is made possible through a combination of state-of-the-art compact laser development and innovative and patented optical interrogation techniques.

KEY APPLICATIONS:

- Terrestrial navigation and timing on mobile platforms
- Deep space communication
- Data centre and telecommunication networks
- GNSS constellations



SENTIO – QUANTUM MAGNETOMETER

QuantX Labs are developing a compact, ultra-high-performance quantum sensor that senses extremely small changes in magnetic fields associated with ferrous material. The SENTIO provides extreme sensitivity that allows detection of small targets at significant range, but equally important, is calibration-free and drift-free –allowing fusing of multiple sensors into an array that delivers reliable and high value information on the target.

A capability able to detect covert activities underwater and underground. Effectively our sensors make the ocean and land transparent through the uniquely high sensitivity of quantum sensing.

KEY APPLICATIONS:

- Extreme magnetic field sensing
- Defence – detection of submarines, underwater mines, underground tunnels / munitions / buried IED's / hazards.
- Space – geospatial intelligence, mineral exploration



SYNCHRO – TIME TRANSFER SYNCHRONISATION

QuantX Labs is developing methods of time transfer over optical fibre and optical free-space links utilizing both conventional and quantum techniques. Compared to current techniques, these approaches have the potential for vastly improved performance and guaranteed security and authenticity of received PNT data. This synchronisation is the building blocks towards a secure, flexible alternate architecture for a GPS-like timing and position system.

KEY APPLICATIONS:

- Assured Positioning, Navigation and Timing
- Network Synchronisation and data centres
- Finance
- Space-based services



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WINNER SME OF THE YEAR 2023