CIFS – Calcium Ion Frequency Standard



CPI TMD Technologies are leading a collaboration of companies and research organisations to industrialise and manufacture a compact optical frequency standard.

The CIFS unit is based on the measurement of a single trapped calcium ion as a frequency reference. This technology offers world-leading performance in an industry standard 19" footprint with low weight and power consumption.

The design is based on research work carried out by Professor Matthias Keller at the University of Sussex.

Manufacturing and test being conducted by CPI TMD and their manufacturing facility in west London and involving Covesion Ltd. as the principal partner for frequency conversion components.

The design is a robust, all-fibre optical reference system based on single trapped calcium ions provide an accurate optical reference.

CIFS will allow full independence from GNSS-derived time for significantly longer periods than any other commercially available product with comparable size, weight and power consumption.

Stability	**$10^{-14}\,\tau^{-1/2}$**
Accuracy	**10^{-16} - 10^{-16}**
Power consumption	**< 80 W**
Size	**19" module**
Weight	**< 20 kg**
Robustness	**All fibre integration, robust mechanical design with application in mind**
Low SWaP	**Compact and low power based on trapped Ion technology**
Autonomous Operation	**Microcontroller control system for intervention-free operation**
Maintenance Free	**Robust, all-fibre integrated system**

CPI EDB

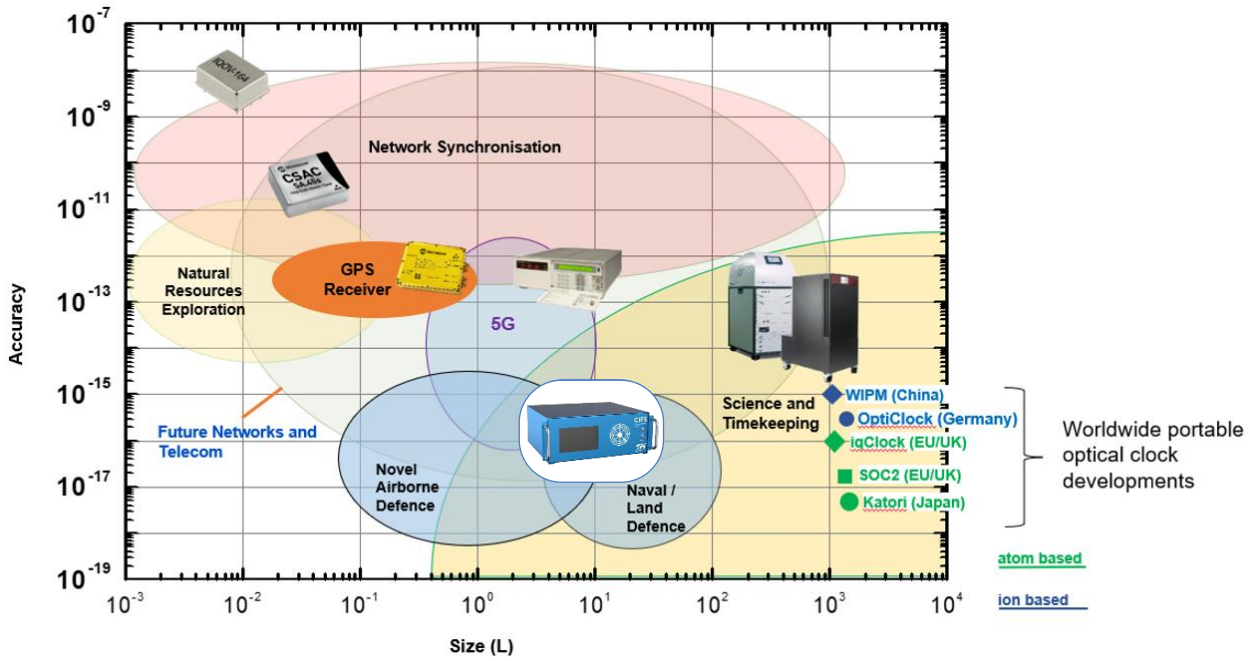


Figure 1. CIFS performance and size vs. other existing and in-development atomic clocks

Demand for improved timing coordination across infrastructure networks and for military applications is growing rapidly. Currently these demands cannot be met with off-the-shelf equipment. Competing systems are often large, heavy and have high-power consumption, or requirements for very controlled environments.

CPI TMD are working closely with potential customers to ensure that the resulting products meet user needs.

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