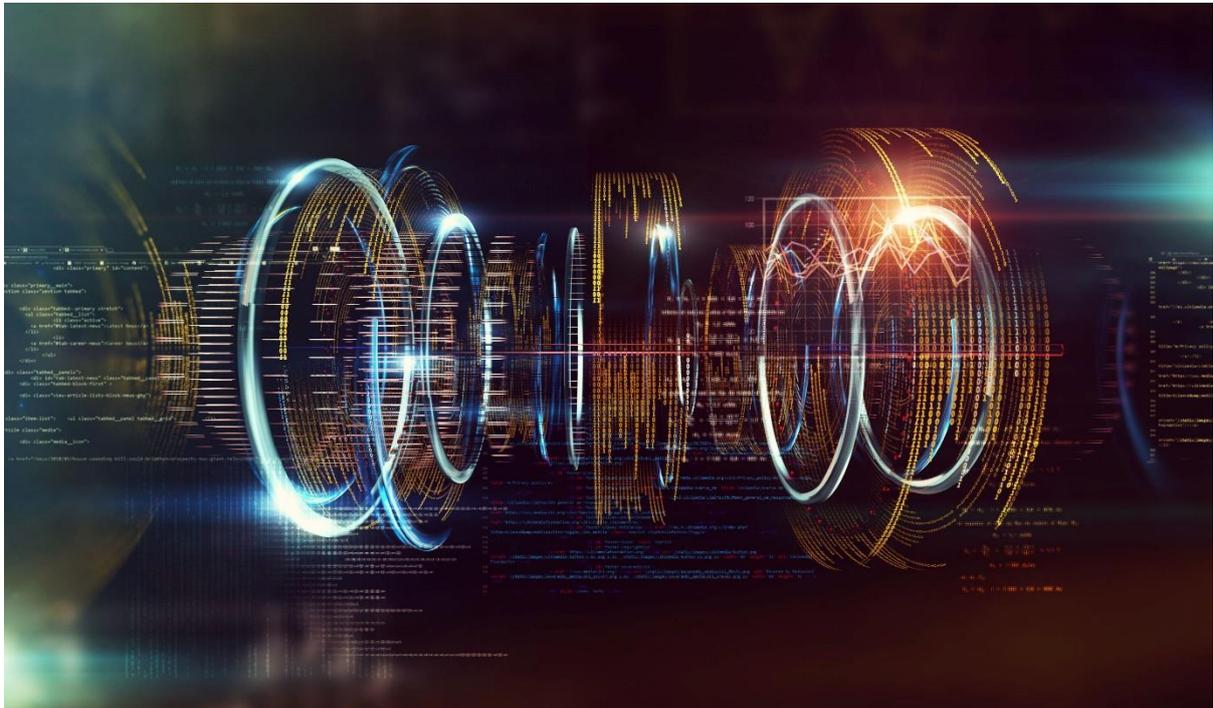


## **Quantum technologies: Thales and SYRLINKS to develop next-generation atomic clocks for civil and defence applications**



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Thales and SYRLINKS, a French company based in Rennes, Brittany, have signed an ambitious multi-year contract with the **French defence procurement agency (DGA)** to develop a new generation of very small, high-performance atomic clocks.

Code-named **CHRONOS**, these new quantum clocks will meet the requirements of numerous civil and military applications. Thanks to their very high stability (error of less than 1 second in tens of thousands of years), defence electronics equipment will be able to operate when a GNSS<sup>1</sup> signal (GPS, Galileo, etc.) is unavailable, for example due to hostile jamming.

Working with the procurement agency, the partners will help safeguard **France's technological sovereignty** in GNSS-denied positioning, guidance, navigation and ECCM-protected, encrypted military communications. In civil applications (5G network synchronisation, transport, energy, etc.), the CHRONOS quantum clocks will deliver unprecedented price/performance to French and international customers.

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<sup>1</sup> Global Navigation Satellite System

Large swathes of the modern economy now rely on satellite synchronisation, and all the world's major powers have their own GNSS satellite constellations (like Europe's Galileo system) to guarantee their independence and protect their sovereignty.

GNSS technology provides the precise time reference for critical infrastructure such as 4G/5G networks, Internet, air and rail transport, energy networks, global banking transactions, high-frequency trading, satellites, etc., which would quickly fail if the signal were unavailable. In view of this high level of dependency, back-up systems are needed to ensure that our civil and military infrastructure can continue to operate even if the GNSS timing signal is unavailable.

Thales's industrial facility in Vélizy-Villacoublay and the Thales Research & Technology centre in Palaiseau, both near Paris, have the right combination of industrial capabilities and talent to manufacture the atomic and optical core of these future quantum clocks.

SYRLINKS, based in Rennes, Brittany, specialises in satellite radiocommunications, radionavigation systems and miniature atomic clocks, and its products were selected to equip 650 satellites for the American operator OneWeb. The company will develop the electronic brain of the CHRONOS clock and guarantee its high-precision timing function.

The CNRS will provide critical scientific support for this project via its SYRTE (Observatoire de Paris) and Femto-ST (Université de Franche-Comté) joint research units.

## About Thales

Thales (Euronext Paris: HO) is a high technology global leader who invests in digital and “deep tech” innovations — connectivity, big data, artificial intelligence, cybersecurity and quantum technology — to build a future we can all trust. This is vital in the development of our societies, which is why the company provides solutions, services and products that help its customers, who are in the form of businesses, organisations and states. These cover several key markets including defence, aeronautics, space, transportation and digital identity and security, allowing them to fulfil their principal missions by placing humans at the heart of the decision-making process.

Thales has 81,000 employees in 68 countries. In 2021, the Group generated sales of €16.2 billion.

## Syrlinks

Located in Rennes, Brittany, the French tech company Syrlinks has expanded its workforce by a factor of 10 since it was established in 2011. In the space of a few years, the company has become the world's leading supplier of radio equipment for satellites, and its products were selected to equip the first mega-constellation designed to provide broadband satellite Internet service (OneWeb). Syrlinks has also designed a miniature, very low-power atomic clock that offers a competitive advantage in numerous civil and defence applications where ultra-precise measurements and low energy consumption are critical to users.

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