



## **Metrology, Timekeeping & Navigation**

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Even if not largely known, navigation and timekeeping are closely linked. The current navigation systems, daily used by each of us, are based on timekeeping systems and time measurements. To do so, precise atomic clocks need to be installed on board of Regional and Global Navigation Satellite Systems (GNSS), as well as in the stations and control centres on ground.

Therefore, atomic clocks and time scales relying on them, turns to be one of the key elements to ensure centimetre-accuracy to the users, as an error of only 10 ns in timing may lead to a 3 meters' error in the final user position. Atomic clocks and time scales are also the hearth of timing laboratories, this is why time metrology people are involved in the design and development of navigation systems.

Timekeeping and navigation basic concepts will be introduced in order to allow a proper understanding of the strong relation between the two fields. Moreover, an overview of the practical GNSS timing services will be given, as well as their application to Critical Infrastructures (e.g Energy, Telecom, Finance).