



## Thesis, PhD, and PostDoc opportunities

### ***Time scale and timing with the European Navigation Satellite System Galileo***

Time and Frequency metrology has a main impact on navigation systems as precise time measures are necessary for the identification of the user position. INRIM has a long experience of activity in the development of the European Global Navigation Satellite System (GNSS), Galileo, which has been recently tested with 4 satellites in space and a network of control and mission centres on ground. The Early Service provision is expected by fall 2014.

INRIM is involved in the project with different activities:

- 1) studying and testing algorithms for the generation of the Galileo System Time and for keeping it strictly synchronised to the international time scale UTC (Universal Time Coordinated)
- 2) validating all the space and ground clocks and time scales in terms of stability, offset and ageing, checking for any anomalous behaviour, and validating the timing information transmitted in the Galileo navigation message
- 3) using geodetic algorithms applied to the measures of the INRIM MultiGNSS receivers to compare remote clocks and time scales, also in cooperation with European and Canadian partners.

To accomplish these tasks many activities are ongoing: development of signal processing algorithms, development of computation, monitoring, and management Software, set up of the Hardware machines including computers, network connection and security protection.

In addition, since the TVF is strongly relying on time and frequency measurement performed in the INRIM Time and Frequency Laboratory, it is fundamental to ensure reliability and accuracy to the Italian time scale UTC(IT) and to the equipment used for its generation, and international comparison. Therefore redundant chain of time scale generation are under investigation and realization at INRIM.

The projects related to Galileo are developed in collaboration with the European Space Agency and European space industries and research institutes. Thesis, PhD, and PostDoc positions may be available on the different topics. Depending on the topic, it may be necessary to have experience in mathematics and statistics or a good knowledge of software engineering and telecommunication measuring equipment.

Working in these fields gives the opportunity to study and to develop new tools and devices and to work in collaboration with European space industries and research institutions with which future team-work may be envisaged.

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