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ATOMIC CLOCKS CONTINUOUS DEVELOPMENT IN SELEX GALILEO FOR NAVIGATION SATELLITE SYSTEMS.

Abstract

On-board atomic clocks represent the key technology for the success of any satellite navigation system mission, and their development has been continuously supported by ESA. The PHM (Passive Hydrogen Maser) has been selected as master clock of the Galileo Navigation Payload and three years of continuous observation on board of GIOVE-B satellite has confirmed the outstanding performance in terms of frequency stability and negligible drift. The results coming from ground life testing have given important feedbacks on the PHM technology capability to comply with the required 12 years of lifetime.

The above was the starting point for the development of other Atomic Clocks solutions like POP Rubidium clock and Mini PHM (mPHM). The main target is to preserve the excellent PHM frequency stability performance with a reduction of the overall mass, power consumption and more in general constraints for their usage on Navigation Payloads (i.e. environmental sensitivity, maintenance..).

This paper presents an overview of the atomic clocks time stability central role in a Navigation Satellite System mission and an overview of POP and mPHM main performances and characteristics according to the past and present developments running at SELEX Galileo.