

# Miltiadis Chatzinikos - Towards the development of an autonomous satellite orbit determination process via ISLs

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## Towards the development of an autonomous satellite orbit determination process via ISLs

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Several projects exist of constellation or swarms of satellites using Inter-Satellite Links (ISLs) with ranging capabilities, such as Galileo second generation which will fly as soon as 2024, or scientific projects such as NOIRE, a radio telescope consisting of a swarm of around 50 satellites around the Moon. Moreover, more and more satellites in low-earth orbit (LEO) will be equipped with Galileo receivers, creating a link between Medium Earth Orbits (MEO) and LEO satellite constellations. All these will create a network of connected satellites in space, and will offer a unique opportunity for precise orbit determination, clock synchronization and other scientific applications.

We have developed a new simulator to study the absolute and relative orbit determination problem using only inter-satellite range measurements. This simulator is designed to deal with different satellite constellations; applying different parametrization models (absolute or relative orbital parameters) and considering most of the physical dynamical models.

The aim of this presentation is to highlight the main results of this study carried out in an ESA project in the time-period 2020-2022.

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