

INTRODUCTION TO THE DESIGN OF LEO NANOSATELLITE ORBITS FOR LOCAL COVERAGE

This webinar introduces the design of orbits for Low Earth Orbit (LEO) nanosatellites and nanosatellite's constellations to maximise local transmission or coverage capacity with a limited number of satellites. It will describe the main drivers in determining orbital evolution in Low Earth Orbit considering the perturbed two-body problem of Keplerian orbital dynamic and deriving the expression for repeated ground track and revisit time considering different coverage or visibility conditions with multiple ground stations. Finally, the webinar will present the application of orbit analysis investigations to maximise the visibility of single satellites from multiple ground stations and optimise local coverage patterns using special architectures for regional constellation design (Walker and flower constellations) aimed at continuous optical and SAR monitoring of large infrastructures.

Learning objectives:

- Classical and perturbed two-body orbital flight dynamics;
- Repeated ground track orbits and revisits time calculation;
- Regional constellation design.

Target audience: doctoral students interested in Earth orbit nanosat constellations design, engineers who aspire to a deeper understanding of applied orbital dynamics, technical or non-technical professionals new to the space industry who need an introduction to the problem of orbital design in LEO.

Dates and time: 16 and 18 November 2021, 10:00-12:00 CET.

Speaker

Carlo Bettanini - is an Assistant Professor at the University of Padova and has been teaching courses in Aerospace Flight Dynamics to Aerospace Engineering students since 2014. His research activity has been carried on continuously for more than 20 years. It is mainly related to the analysis of sensors performance and the identification of optimal techniques to monitor and reconstruct the dynamic behaviour of flying systems for low and high atmosphere and space applications. He has collaborated in the design, construction, testing and qualification of components for numerous scientific missions for both the US Space Agency and the European Space Agency and was program manager of DREAMS (Dust characterisation Risk assessment and Environmental Analyzer on the Martian Surface) instrument of ExoMars 2016 mission. He is currently collaborating to project "New satellite Generation Components" led by Thales Alenia, working on the design of avionics and trajectory and attitude control optimisation for a Cubesat in LEO orbit dedicated to the calibration of Cosmic Microwave Background ground-based telescopes; he is also working in collaboration with Concessioni Autostradali Venete (CAV) on the design of satellite-based integrated ground-air-space systems for security, surveillance, and mobility management using optical and radar sensors.

Registration and Webinar Platform

The registration is mandatory via the online form at the web [link](#)

Deadline: 1 November 2021

Fees: there are no registration fees for AIDAA members. Instructions to become a member can be found here: <https://www.aidaa.it/become-a-member/>

Webinar platform: Webex, a link will be sent via email a few days before the event.

