IEEE AP/ED/MTT North Italy Chapter

Chapter Seminar

Reflectarray Technology for the Next Frontier in Broadband Communications Satellites: Enabling efficient antenna architectures through advanced multi-beam reflectarray antennas

Prof. Daniel Martínez de Rioja
Universidad Politécnica de Madrid, Spain

Date: 21 May 2025

Time: 11:00

Location: **onsite** in Room 1L, Dipartimento di Ingegneria Civile, Ambientale e Meccanica, Via Mesiano 77, Trento; and **online** at

Contact:
Prof. Giacomo OLIVERI
(giacomo.oliveri@unitn.it)

This seminar presents some recent advances in multi-beam and multi-frequency antennas based on reflectarraysfor geostationary (GEO) communication satellites in K/Ka bands, developed at the Applied Electromagnetics Group of the Technical University of Madrid (Universidad Politécnica de Madrid, UPM), Spain.
Existing high-throughput satellites commonly employ four reflector antennas to provide cellular coverage over the Earth in a four-color reuse scheme. In this seminar, different reflectarray antennas will be presented as an attractive solution for the design of efficient antenna farmsto produce multispot coverage with a smaller number of apertures than conventional systems based on reflector technology. The traditional flat reflectarrays will be compared to parabolic reflectarrays, considering single and dual antenna configurations for the purpose of exploiting their ability to produce independent beams in different polarizations and frequencies.

Daniel Martínez de Rioja received his PhD Cum Laude with International Mention from the Universidad Politécnica de Madrid (UPM) in 2021. In 2016, he started his research career at the Applied Electromagnetics Group of UPM, where he completed his PhD thesis under the supervision of Prof. José Antonio Encinar.
From 2022 to 2023, he was a visiting researcher at the Department of Electrical Engineering of the University of Oviedo(Gijón, Spain). In 2023, he obtained a position as Assistant Professor at the Applied Electromagnetics Group of UPM, where he is currently an Associate Professor. He is also a recipient of a Grant from the Spanish Ministry of Science to conduct a 3-month research stay at the Eledia Research Center of the University of Trento.
His research is related to the design of reflectarray antennas and quasi-periodic surfaces applied to communication satellites and smart reflecting surfaces. Among other recognitions, he has received the Per-Simon Kildal Award from the European Association on Antennas and Propagation (2023).

https://r8.ieee.org/italy-apedmtt/

M3 Multifunctional Metamaterials & Metastructures

IEEE