



Istituto di Elettronica
e di Ingegneria
dell'Informazione e
delle Telecomunicazioni

Thursday seminars

IEIIT Youth



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UAV technology for MHz- to-THz scientific missions

A new era in astronomy will begin when the first sky images will be taken by huge radio telescopes such as the Square Kilometre Array (SKA). On the other hand, large radiometers such as the Copernicus Imaging Microwave Radiometer (CIMR) will enable high-priority Earth observation missions and direct monitoring of climate change (ice at poles, sea temperature, sea salinity). These antenna-based sensors will be providing a huge amount of data and information to the scientific community. Of course, such instruments require a very accurate characterization in order to guarantee properly calibrated measurements. This task has been addressed in an innovative way at CNR-IEIIT.

The Unmanned Aerial Vehicle (UAV) technology has been experimented as antenna measurement solution thanks to its portability, low cost, and ability to perform arbitrary paths. Using UAVs, previously mentioned large instruments (ground-based instruments) can be characterized in situ through high signal-to-noise ratio and high dynamic range measurements, a feature that no calibrator has ever achieved so far with this level of accuracy. The increased flexibility is also capable of end-to-end system verification.

Inverse source techniques have been exploited to process Near-Field data, whereas optimization strategies provided significant reduction of the UAV flight time.

The promising results suggest the usage of the presented technique in other applications such as radars, 5G base stations, satellite ground-station and user terminal measurements.

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