AES Chapter – IEEE Italy Section

Ultra Wide Band Surveillance Radar

Aula Riunioni – Piano Terra
Dip. Di Ingegneria dell'Informazione
Via Caruso 16, Pisa

Friday 29 October 2021 – 10:00am

Dr. Mark E. Davis, Consultant USA

Description: Ultra Wide Band Surveillance Radar is an emerging technology for detecting and characterizing targets and cultural features for military and geosciences applications. It is essential to have fine range and cross-range resolution to characterize objects near and under severe clutter. This Lecture is divided into five parts.

- **The Early History of Battlefield Surveillance Radar:** Battlefield surveillance from manned and unmanned aircraft, along with early experiments in fixed and moving target detection and foliage penetration are covered.
- **UWB Phased Array Antenna:** Wideband waveforms place a significant demand on the ESA design to maintain gain and sidelobe characteristics. Design of ESA systems with time delay steering and digital beamforming will be illustrated.

- **UWB Synthetic Aperture Radar (SAR):** A brief description of key UWB surveillance SAR systems will be provided, along with illustrations of the SAR image and fixed object detection capability.
- **UWB Ground Moving Target Indication:** Space time adaptive processing (STAP) has been used for over 20 years for detecting and tracking moving targets in clutter. As the resolution is improved for target characterization, the limits of STAP are tested. This section will discuss an approach for increasing the bandwidth and maintaining geolocation accuracy with Along Track Interferometry.
- **New research in Multi-mode Ultra-Wideband Radar**, The last section of the lecture will illustrate new technologies that have promise for future multimode operation: simultaneous SAR and GMTI in a multichannel radar.

Lecturer Biography: Dr Mark E Davis has over 50 years' experience in Radar technology and systems development. He has held senior management positions in the U.S. Defense Advanced Research Projects Agency (DARPA), Air Force Research Laboratory, and General Electric Aerospace. At DARPA, he was the program manager on both the foliage penetration (FOPEN) radar advanced development program and the GeoSAR foliage penetration mapping radar. Dr Davis has written a new text on Ultra-Wide Band Surveillance Radar, published by IET in January 2021.

His education includes a PhD in Physics from The Ohio State University, and Bachelor and Master's Degrees in Electrical Engineering from Syracuse University. He is a Life Fellow of both the IEEE and Military Sensing Symposia, and President Elect of IEEE Aerospace Electronics Systems Society (AESS). He is the 2011 recipient of the AESS Warren D White Award for Excellence in Radar Engineering, and the 2018 IEEE Dennis J. Pickard Medal for Radar Technologies and Applications.

Organisers:
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Enrollment rules for in-person attendance:
To enroll you will have to fill out an online form at:
https://docs.google.com/forms/d/e/1FAIpQLScA-nQcAjD86yw2Rzrym5OAtOUukWKySh0bp5qQuGzZa3ilVg/viewform
There is a limited number of available seats (36) and they will be assigned to the registrants until they are completely booked out.

Online link (no seat limitations):
https://teams.microsoft.com/l/team/19%3aKKNFeMM5_4nlyy3vD_yUqKBvmXXqWyfnE2L6a-ifojM1%40thread.tacv2/conversations?groupId=faa66a4b-ca09-4715-9035-e4557d593b6c&tenantId=c7456b31-a220-47f5-be52-473828670aa1