The UK/Ireland EMC Chapter is Proud to Present a Half-Day Workshop

From Simulation to Mission: Advanced Electromagnetic Modeling for Antenna and Aerospace Applications

DATE: Thursday, September 10, 2026

TIME: 12:00 to 5:30 pm

LOCATION: Cambridge Consultants, 29 Cambridge Science Park, Milton Road, Cambridge, CB4 0DW, United Kingdom, Reception: +44 (0) 1223 420024

AGENDA

12:00 pm	**Arrival/Complimentary Lunch Courtesy of Cambridge Consultants**
12:40 pm	Welcome by Cambridge Consultants and Introductions
1:00 pm	Ray Tracing and Physical Optics for Antenna Applications *By Oskar Zetterstrom, Cambridge University, United Kingdom*
1:40 pm	Extending Ray Tracing Accuracy with DCIM for Electromagnetic Chamber Modeling *By Zhong Chen, ETS-Lindgren, Cedar Park, Texas, US*
2:20 pm	**Break**
2:40 pm	Antenna Simulation and the Dynamic Mission: A Case Study in Airborne Radar Altimeter and 5G Coexistence, *By Jason Bommer, Synopsys, Seattle, Washington, US*
3:20 pm	Addressing the Increasing Wireless Requirements for Commercial Aircraft and Aerospace Applications *By Dennis Lewis, The Boeing Company, Seattle, Washington, US*
4:00 pm	**Wrap Up Comments + Technical Tour of Select Labs at Cambridge Consultants**
5:30 pm	**Conclude Technical Tour**

REGISTRATION: There is NO CHARGE to attend, but you must register in advance to secure seating and catering. **Please register here**. **OPEN:** All IEEE members and non-members are welcome to attend!

See the presentation abstracts plus the speaker bios and Workshop Coordinator contact info below!

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TECHNICAL PROGRAM

Ray Tracing and Physical Optics for Antenna Applications
By Oskar Zetterstrom, Cambridge University, United Kingdom

Abstract: Ray tracing coupled with physical optics allows for fast and accurate calculation of electromagnetic wave propagation. These tools are especially interesting for systems of large electrical size where full-wave simulations are too computationally costly. In this talk, we show how these tools can be used in the design of radome lens antennas, geodesic lens antennas, and to assess the early-time response of reverberation chambers. The developed work is expected to find applications in millimetre wave antenna and measurement systems.

Oskar Zetterstrom received his B.Sc., M.Sc., Lic., and PhD. degrees in electrical and electromagnetic engineering from KTH, Royal Institute of Technology, Stockholm, Sweden, in 2016, 2019, 2022, and 2024, respectively. He is currently a postdoctoral researcher at KTH and Cambridge University working on instrumentation for radio astronomy, and he is involved in the developments for the SKA and REACH telescopes. Oskar's research interests include radio astronomy, lens antennas, periodic structures, and leaky wave antennas.

Extending Ray Tracing Accuracy with DCIM for Electromagnetic Chamber Modeling
By Zhong Chen, ETS-Lindgren, Cedar Park, Texas, US

Abstract: Accurate electromagnetic modeling of large chambers requires balancing simulation accuracy and computational efficiency. Full-wave techniques provide high accuracy but become impractical for electrically large structures, while ray-tracing methods offer efficiency but may lose accuracy when wave interactions with material interfaces become significant, particularly at lower frequencies. This presentation introduces a hybrid electromagnetic modeling approach that combines the Discrete Complex Image Method (DCIM) with geometric-optics ray tracing. Complex antenna-to-material interactions are modeled using DCIM, while higher-order chamber reflections are efficiently calculated using ray tracing. This approach enables accurate and rapid simulation of large electromagnetic chambers while retaining important wave effects. The hybrid method is applied to chamber design and performance evaluation, demonstrating its ability to accurately predict chamber performance metrics and support design optimization. The approach provides a practical solution between computationally intensive full-wave simulation and conventional ray-tracing methods.

Zhong Chen is Chief Engineer at ETS-Lindgren, located in Cedar Park, Texas. He has more than 25 years of experience in RF testing, anechoic chamber design, as well as EMC antenna and field probe design and measurements. He is an active member of the ANSC C63® committee currently serving as Vice-Chair and is the immediate past Chair of Subcommittee 1 which is responsible for the antenna calibration (ANSI C63.5) and chamber/test site validation standards (ANSI C63.4 and the ANSI C63.25 series). Mr. Chen is chair of the IEEE Standard 1309 committee responsible for developing calibration standards for field probes, and IEEE Standard 1128 for absorber evaluation. He is a former member of the IEEE EMC Society Board of Governors and the Antenna Measurement Techniques Association (AMTA) Board of Directors. He is a past Distinguished Lecturer for the EMC Society and is recognized as an AMTA Fellow. His research interests include measurement uncertainty, time domain measurements for site validation and antenna calibration, and development of novel RF absorber materials. Several papers authored and co-authored by Mr. Chen have received best paper recognition at global conferences. Zhong Chen received his M.S.E.E. degree in Electromagnetics from the Ohio State University at Columbus. He may be reached at zhong.chen@ets-lindgren.com.

Antenna Simulation and the Dynamic Mission: A Case Study in Airborne Radar Altimeter and 5G Coexistence

By Jason Bommer, Synopsys, Seattle, Washington, US

Abstract: Physics-based simulation, such as the finite element method (FEM), has been the cornerstone of antenna design for decades. As computational efficiency improves year over year, so has the demand on size and scale of applications. No longer is simulation of the isolated antenna adequate as vehicle integrators (aircraft, satellites, automobiles, etc.) expect full installed performance assessment via simulation as well. Thanks to myriad computational techniques and the resourcefulness of developers, hybrid methods enable enormous scale that include small RF components and antennas as well as interactions with the much-larger platform. This can be extended farther by including relevant features of the environment including terrain, buildings, and other objects and actors. Furthermore, the combination of installed antenna simulation with digital missions, such as a flight dynamic scenario, increases the fidelity and usefulness of the overall virtual prototype. In this presentation, we provide an overview of simulation techniques and demonstrate the first advantage of large-scale antenna simulations. Next, we demonstrate the power of digital mission engineering using the example of interference characterization and mitigation between a 5G base station and an airborne radar altimeter.

Jason Bommer is a Principal Application Engineer in the electronics business unit at Synopsys specializing in RF, antenna, mission, and interference applications. He is also an adjunct instructor at the Science and Math Institute in Tacoma, Washington where he teaches computational physics and engineering. Prior to joining Synopsys through the Ansys acquisition in 2026, Jason served as an electromagnetics effects engineer at Boeing for over sixteen years. He holds BS and MS degrees in physics from University of New Orleans and University of Washington, respectively. He is currently a Distinguished Lecturer of the IEEE EMC Society.

Addressing the Increasing Wireless Requirements for Commercial Aircraft and Aerospace Applications
By Dennis Lewis, The Boeing Company, Seattle, Washington, US

Abstract: With the proliferation of wireless devices, it is important to understand how they behave in complex electromagnetic environments and how they interact with other devices and systems with which they are co-located. Aircraft environments have been shown to behave similarly to reverberation chambers, and therefore these techniques can be employed to achieve precision measurements of the propagation environments and system interactions. This presentation will give examples of how these techniques were employed to measure bulk absorption used to simulate passenger loading of aircraft, field mapping which is useful for the evaluation of signal coverage and channel interference, as well as signal propagation characteristics. Utilizing this same approach, it is possible to assess the shielding of large structures such as commercial aircraft. These aircraft shielding measurements are necessary for High Intensity Radiated Field Susceptibility (HIRF) certifications.

Dennis Lewis received his BS EE degree with honors from Henry Cogswell College and his MS degree in Physics from the University of Washington. He has worked at Boeing for 35 years, and is recognized as a Technical Fellow, leading the enterprise antenna measurement capability for Boeing Test and Evaluation. Dennis holds 12 patents and is the recipient of the 2013 and 2015 Boeing Special Invention Award. He is a Senior Member of the IEEE and several of its technical Societies, including the Microwave Theory and Technologies Society (MTT-S), the Antennas and Propagation Society (AP-S) and the Electromagnetic Compatibility (EMC) Society. He actively contributes to these Societies as a member of the IEEE MTT-S Subcommittee 3 on Microwave Measurements, and as a current Board Member and past Distinguished Lecturer for the EMC Society. He is a Senior Member and served as Vice President on the Board of Directors for the Antenna Measurements Techniques Association (AMTA) and chaired its annual symposium in 2012 and 2023. Dennis developed and taught a course on Measurement Science at North Seattle College and is a past chairman of its Technical Advisory Committee. His current technical interests include aerospace applications of reverberation chamber test techniques as well as microwave and antenna measurement systems and uncertainties.

CONTACT: For more information, please contact Workshop Coordinator Janet O'Neil at +1 425-443-8106 (mobile) or j.n.oneil@ieee.org