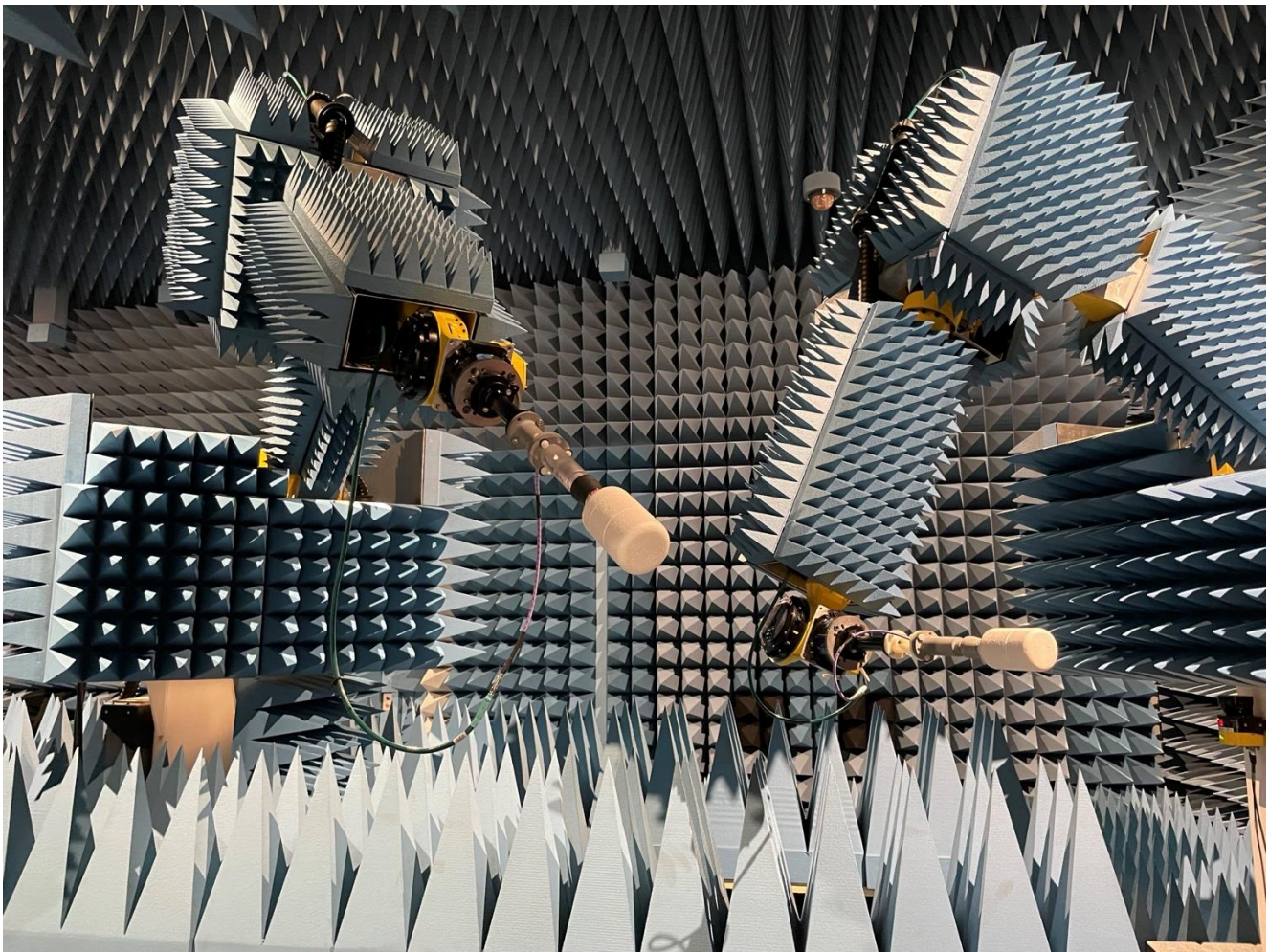
SW6 - Innovative Methods for Enhancing Antenna Measurement Accuracy and Data Interpretation

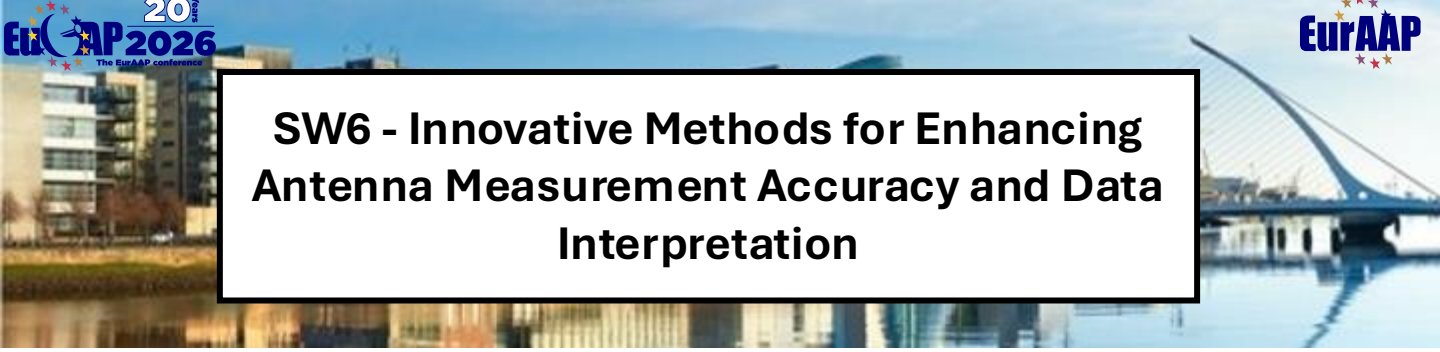
Abstract:

This workshop explores emerging techniques and practical approaches to improving the reliability of antenna measurements. Presentations address topics ranging from traceability and accuracy factors to uncertainty budgets in 5G massive MIMO systems, post-processing methods for refining gain measurements, and tools for uncertainty propagation in time-domain S-parameter analysis. Attendees will see a live demonstration with antennas and VNAs, learn how infrared thermography can serve as a diagnostic tool for electromagnetic field accuracy, and examine statistical methods for estimating independent samples in virtual reverberation chambers. Together, these sessions share innovative strategies for advancing measurement precision and data interpretation in modern antenna testing.

Workshop outline:

We have invited several excellent speakers from industry, government/defense, and academia who are well-known researchers in the EuCAP and AMTA communities. Each speaker will present for approximately 20 minutes followed by a LIVE demonstration to make the workshop very interactive between the speakers and the attendees. Two of the speakers (Chen and Gregson) were nominated for or received a EuCAP Best Measurement Paper Award.





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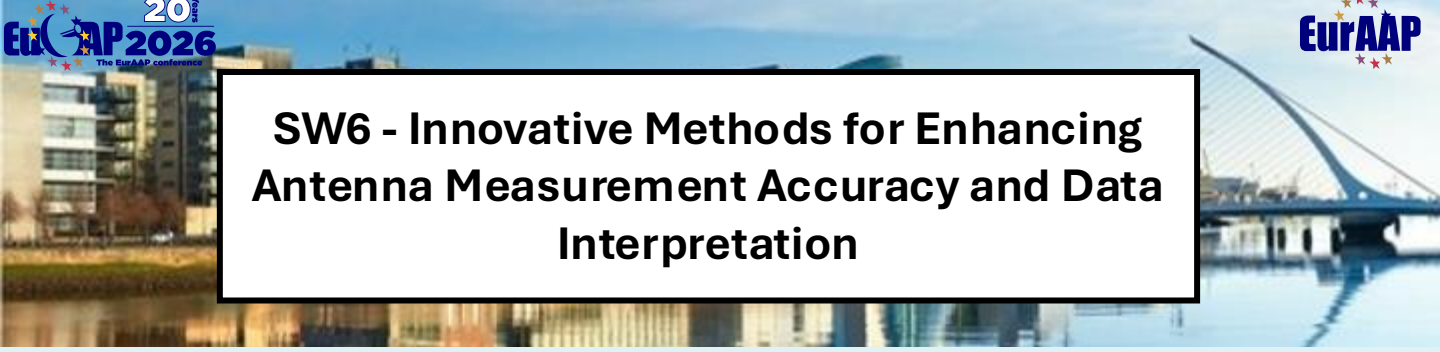
Agenda:

Time Slot	Speakers (Affiliation)	Topic
08:00 – 08:05	Janet O'Neil (ETS-Lindgren) and David Knight (NPL)	Welcome and Workshop Scope
08:05 - 08:40	Dennis Lewis (Boeing)	Overview of Antenna Measurement Traceability and Factors Effecting Measurement Accuracy
08:40 - 09:10	Stuart Gregson (Next Phase Measurements and Queen Mary University of London)	On the use of Range Assessments and Uncertainty Budgets with Plane Wave Generator EIRP Measurements of 5G Massive MIMO antennas
09:10 – 09:40	Zhong Chen (ETS-Lindgren)	Assessing Test Environment Uncertainties Through Post-Processing for Improved Antenna Gain Measurements (includes live demonstration with antennas and VNA)
10:10 – 10:50	David Knight (NPL)	An uncertainty propagation tool for time-domain and time-gated S-parameter measurements
10:50 – 11:20	Stéphane Faure (Anyfields)	Infrared Thermography as a Diagnostic Tool for Electromagnetic Field Measurement Accuracy
11:20 – 11:50	Guillaume Andrieu (XLIM Institute - University of Limoges)	On the estimation of the number of independent samples in a VIRC over long time sequences



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Speakers:

Guillaume Andrieu earned his Master's in radiofrequencies and optical communications from the University of Limoges in 2003 and a Ph.D. in electronics from the University of Lille in 2006. He worked at Renault Technocentre in 2003 and joined Xlim Laboratory as a postdoctoral fellow in 2006. Since 2009, he has been an associate professor at Xlim. His research focuses on cable coupling and EMC testing, including reverberation chambers and bulk current injection. He chairs the French IEEE EMC Chapter since 2021 and edited a reverberation chamber book published by IET in 2020.

Zhong Chen, ETS-Lindgren, Chief Engineer, is located in Cedar Park, Texas. He has over 25 years of experience in RF testing, anechoic chamber design, EMC antenna and field probe design and measurements. He is Vice-Chairman of ANSC C63® responsible for the antenna calibration (ANSI C63.5) and chamber/test site validation standards (ANSI C63.4 and ANSI C63.25 series). His interests include measurement uncertainty, time domain measurements for site validation and antenna calibration, and development of novel RF absorber materials. Zhong Chen received his M.S.E.E. degree in Electromagnetics from the Ohio State University at Columbus. Mr. Chen was a candidate for the EuCAP 2024 Best Measurement Paper Award.

Stéphane Faure, Senior Engineer at Anyfields (Toulouse, France), received his Ph.D. in Condensed Matter Physics from the University of Montpellier in 2001. He has over 10 years of experience in infrared thermography applied to antenna characterization. Formerly at ONERA (the French Aerospace Lab), he contributed to advancing IR thermography and developed a visible-spectrum variant. At Anyfields, his work focuses on phase retrieval algorithms, far-field and gain determination, and measurement metrology adapted to IR imaging.

Stuart F. Gregson is Director of Operations and Research at Next Phase Measurements and honorary visiting professor at Queen Mary University of London. With 30 years in aerospace, space, and communications, he specializes in near-field antenna measurements, computational electromagnetics, and 5G OTA testing. Professor Gregson has authored two IET books, published over 130 papers, and received multiple AMTA awards. He presents industrial and academic courses, including AMTA and IET short courses. A Fellow of AMTA, IET, and IoP, he served on the AMTA Board and received its Outstanding Service Award in 2022. He holds a PhD from Queen Mary University of London.

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Speakers:

David Knight, NPL, graduated in 1990 with BSc (Hons) Physics from Imperial College (London). After work at British Aerospace Space Systems designing satellite control systems, he completed an MSc in control theory in 1993. He joined NPL (Teddington, UK) where he is a senior research scientist, responsible for the VHF/UHF free field group, with focus on bespoke methods for novel antenna design projects. He has developed improvements in the calibration of standard types of antenna, for which he won an NPL Innovation Award. He contributes to national/international standard committees, such as the BSI GEL/210 (UK) and IEC CISPR/A (international).

Dennis Lewis, The Boeing Company, 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 in Seattle, Washington, for 35 years and is recognized as a Technical Fellow, leading the enterprise antenna measurement capability for the Boeing Test and Evaluation Electromagnetics group. Dennis holds 12 patents and received the 2013 and 2015 Boeing Special Invention Awards. Speaker is an AMTA Fellow.

Yahya Rahmat-Samii, UCLA, is a Distinguished Professor, holder of the Northrop-Grumman Chair in electromagnetics, member of the US National Academy of Engineering (NAE), winner of the 2011 IEEE Electromagnetics Field Award and the former chairman of the Electrical and Computer Engineering Department at UCLA. Dr. Rahmat-Samii was the 1995 President of the IEEE Antennas and Propagation Society and 2009-2011 President of the United States National Committee (USNC) of the International Union of Radio Science (URSI). Dr. Rahmat-Samii has authored or co-authored over 1000 technical journal articles and conference papers and has written over 40 book chapters and six books.