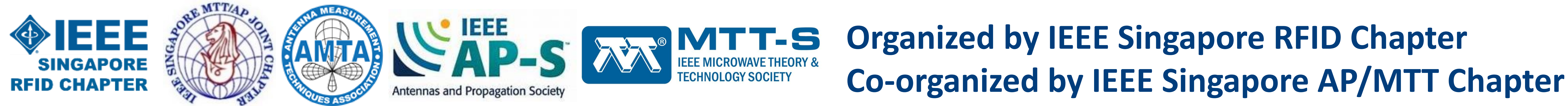


# High-Accuracy Satellite Antenna Testing Employing the Spherical Near-Field Measurement Technique

## Merlion RFID Forum 2025 · AMTA Distinguished Lecture



Organized by IEEE Singapore RFID Chapter  
Co-organized by IEEE Singapore AP/MTT Chapter

### Announcement

**Speaker (Onsite): Olav Breinbjerg**, AMTA Distinguished Speaker, ElMaReCo, Denmark

**Chair: Zhi Ning Chen**, Provost's Chair Professor, National University of Singapore

**Time:** 14:00-15:00 (Singapore Time), 10 December 2025 (Wednesday)

**Venue:** [Onsite] E7-03-08, seminar room, National University of Singapore

[Online] Zoom link following your registration

**Free Registration:** [https://nus-sg.zoom.us/meeting/register/gwk\\_46NNT4SfpZLUtSS\\_Og](https://nus-sg.zoom.us/meeting/register/gwk_46NNT4SfpZLUtSS_Og)

(Required for both online and onsite)

### Registration



### Abstract

The spherical near-field antenna measurement technique is unique in combining a range of fundamental advantages that render it the most accurate technique for experimental characterization of antenna radiation – and it is employed globally for testing of wireless technology from miniscule hearing aid antennas to giant satellite antennas. In particular, the inherent high accuracy makes this the preferable measurement technique for testing of science mission satellite antenna systems with very stringent demands for the measurement uncertainty – and many technical-scientific developments are being pursued to improve it even further. This presentation will review the central components of the spherical near-field antenna measurement technique – the spherical vector wave expansion and the antenna scattering matrix leading to the spherical transmission formula – emphasizing the close and stringent relationship between the theoretical and practical aspects of this measurement technique. Also, the presentation will discuss recent and on-going research to further develop this measurement technique – including such developments as antenna diagnostics, derivative sampling, numerical uncertainty estimation, and correction for signal averaging with on-the-fly sampling. Finally, the presentation will overview several challenging antenna calibration and measurement projects in relation to satellite missions within the European Space Agency's earth observation programme.



**Olav Breinbjerg** received the M.Sc. and Ph.D. degrees in electrical engineering from the Technical University of Denmark (DTU) in 1987 and 1992, respectively. He was on the Faculty of DTU's Department of Electrical Engineering as Assistant Professor from 1991 to 1995, Associate Professor from 1995 to 2005, and Full Professor from 2006 to 2021. From 1997 to 2021, he was also Head of the Electromagnetic Systems Group and the DTU-ESA Spherical Near-Field Antenna Test Facility, and he founded the DTU Electromagnetic Test Centre. He resigned his position at DTU in 2021 and founded ElMaReCo for independent research consultancy. Olav Breinbjerg was a Visiting Scientist at Rome Laboratory in 1988, a Fulbright Research Scholar at the University of Texas at Austin in 1995, and a Visiting Professor at the University of Sienna in 2011 and 2022. His research is generally in applied

electromagnetics - and particularly in antennas, antenna measurements, computational techniques, and scattering - for applications in wireless communication and sensing technologies. He is the author or co-author of more than 75 journal papers, 250 conference papers, and 250 technical reports. Dr. Breinbjerg was a recipient of a U.S. Fulbright Research Award in 1995, the 2001 AEG Elektron Foundation's Award, the 2003 DTU Student Union's Teacher of the Year Award, the 2013 and 2015 European School of Antennas Teacher of the Year Awards, the 2020 Hans Christian Ørsted Award, and the 2023 AMTA Distinguished Achievement Award. Dr. Breinbjerg is Fellow of AMTA, Fellow of IEEE, Knight of the Order of Dannebrog, and the 2024-2025 AMTA Distinguished Speaker.

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