Spherical Near-Field Scanning with Higher Order Probes

Thursday April 26
5pm Social Hour • 6pm Presentation
Syracuse University
Sci-Tech 1-019

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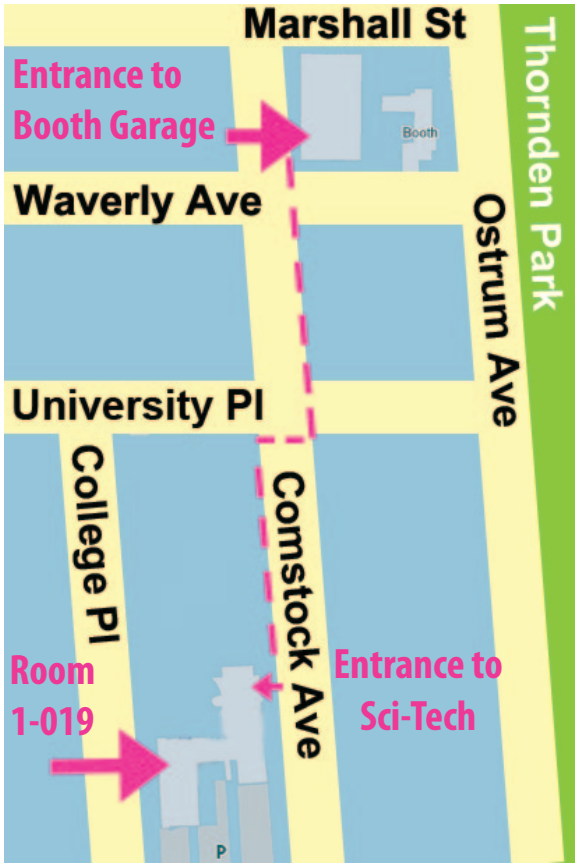

A general method for higher-order probe correction in spherical scanning is obtained from a renormalized least-squares approach. The renormalization causes the normal matrix of the least-squares problem to closely resemble the identity matrix when most of the energy of the probe pattern resides in the first-order modes. The normal equation can be solved either with a linear iterative solver (leading to an iterative scheme), or with a Neumann series (leading to a direct scheme). The computation scheme can handle non-symmetric probes, requiring only the output of two independent ports of a dual-polarized probe, and works for both φ and θ scans. The probe can be characterized either by a complex dipole model or be a standard spherical-wave representation. The theory is validated with experimental data.

ABOUT THE AUTHOR Thorkild B. Hansen (M'91) received the Ph.D. degree in electromagnetics from the Technical University of Denmark in 1991. From 1991 to 1997, he worked at the Air Force Research Laboratory (formerly Rome Laboratory) of Hanscom Air Force Base, MA. on techniques for analyzing electromagnetic waves and antennas. He joined Schlumberger's underground radar project in 1997 and transferred with the project to Witten Technologies in 2000. He is currently developing techniques for RFID and near-field communications at Seknion, Inc. Dr. Hansen received the R.W.P. King Prize in 1992 and the S.A. Schelkunoff Prize in 1995 for publications on electromagnetic wave propagation. He is coauthor of Plane-Wave Theory of Time-Domain Fields, a featured book of IEEE press in 1999. The underground radar imaging technology he helped develop at Schlumberger and Witten Technologies won the 2002 NOVA Award for innovation in construction and Wall Street Journal's 2004 Technology Innovation Award in Software.

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