

Call for Papers

The Applied Computational Electromagnetics Society

<http://aces.ee.olemiss.edu/>

Announces a Special Issue of the ACES Journal on:

Review of Computation and Modeling Techniques for Phased Array Antennas

The Applied Computational Electromagnetics Society is announcing the new Special Issue of the ACES Journal dedicated to the topic of **Review of Computation and Modeling Techniques for Phased Array Antennas**.

Phased array antennas have unique capabilities that enhance the performance of all **military** and **commercial** communication systems, of **remote sensing radar** systems, and some recent, innovative **biomedical** applications. The most fundamental requirement for attaining a cost-effective design and development of such antenna systems is, however, the ability of very rapidly predicting the system performance, already in the early phases of the design process, much ahead of any prototype fabrication. A continuous ongoing review and re-evaluation of state-of-the-art computational techniques, performed with the intent of pushing the envelope, has clearly shown fundamental limitations of current phased-array antenna performance-prediction capabilities. Fortunately however, the recognition of current limitation stimulates new, more advanced developments in the methods of computer analysis and design of phased arrays.

The Guest Editors of this Special Issue of the ACES journal solicit the submission of papers that re-evaluate the capabilities of current commercially-available, established, state-of-the-art Computer Simulation Codes, such as NEC, SuperNEC, HFSS, ENSEMBLE, IE3D, FIDELITY, NECBSC, NEWAIR, AAPG and similar, particularly those that are being routinely used to analyze the performance of Phased Array Antennas System characterized by a wide range of different architectures. In addition, application of these commercially available software to the performance modeling of phased arrays for biomedical applications shall receive special attention.

In keeping with the established ACES objectives and interests, the validation of the results computed from any of the available computer simulation codes, attained by verifying the simulation results from appropriate measurements, and against existing theoretical formulations of canonical problems, are strongly encouraged.

In contrast, papers that describe **NEW hardware design** or **theoretical analysis**, for phased arrays, are **deemed beyond the scope of this ACES special issue**. The Proceedings of the IEEE International Symposium on Phased Array Systems and Technology (1996, 2000 and 2003), and the special issue of IEEE AP Trans. on Phased Arrays (March 1999), that cover a broader range of topics, are considered more appropriate for such submissions, than the here announced special issue of the ACES Journal.

This special issue of the ACES Journal solicits papers that describe original work, relating to both planar and conformal arrays, and in particular to conformal arrays mounted on surfaces with variable and double curvatures, and flush-mounted on biological (humans etc.) media and other novel environments.

The following list, is an attempt at suggesting a number of open issues, that are still largely unresolved in the computer simulation of phased array performance:

- What is the maximum electrical size of a planar array that can be analyzed using the present CAD tools?
- What type of conformal arrays on non-canonical, convex surfaces can be analyzed using the present CAD tools? (Arrays flush-mounted on biological media are also included here.)
- What are the required computational resources, and the actual solution speed attained by the above CAD tools?
- How can the accuracy of the solution be determined, and what kind of physical validation is appropriate to verify the currently available CAD tools?
- What are the limitations of the algorithms currently used in the codes, in predicting the element-to-element mutual coupling, the active-element pattern, and radiation patterns of a complete phased array?

Prospective authors are encouraged to submit papers that cover the above-mentioned issues, and focus on the topics listed here below:

Suggested Topics:

1. Impact of element coupling on (finite) array performance parameters.
2. Evaluation of edge diffraction effects, and their reduction techniques.
3. Application of Multi-Level Fast-Multipole Methods (MLFMM) to array problems.
4. Beam-steering with reduced number of expensive steering controls.
5. Correlation between beam steering, element impedance and matching.
6. Design and performance modeling of multi-port matching networks.
7. Synthesis of aperture distributions for high-directivity phased arrays.
8. Modeling of arrays on canonical and non-canonical convex surfaces.
9. For planar and conformal phased arrays with **wideband** elements – the effects of: 1. ground plane size and shape (planar), and, 2. principal radii of curvatures (conformal), on beam-steering, gain, polarization and impedance bandwidths.
10. Validation of predictions obtained from CAD software against measured data and/or existing theoretical formulations.

TENTATIVE DEADLINE FOR SUBMISSION PAPERS IS November 15, 2004

Potential contributors wishing to discuss the suitability of their contribution may contact either of the Guest Editors listed below. Please upload your manuscript to the ACES server at <http://aces.ee.olemiss.edu> by using the “upload” button, “Journal”, “upload a new paper”, then select “special issue by Dr. Chatterjee and Dr. Speciale”. The review process will begin as the editor finds your paper(s) on the ACES web site. **Email or paper submission is not accepted.**

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