

CEM News From Europe

Pat Foster

The United Kingdom branch of ACES, ACES(UK), held its annual one-day meeting on December 16th, 2002. The highlight was a half-day short course from Professor Ron Marhefka of Ohio State University who addressed us on 'Application of Asymptotic Methods to Large Practical Electromagnetic Prediction and Design Problems'. After a short introduction on the contents of the NEC-Basic Scattering Code, he concentrated on the latest developments to the code and discussed some detailed applications. For example, multilayer radomes can now be modeled and hybrid methods based on the importation of antenna or element data from elsewhere have been implemented and extensively used. He emphasized that NEC-BSC has a limit on the number of structure-ray interactions because the code is dealing with exterior problems.

The algorithm treatment of dielectric including wedge diffraction was discussed as was coupling between antenna elements on a curved impedance surface. These are important developments which have not yet been published in full. Extensions to coupling theory on a curved surface give better agreement than previously.

Examples given included

- 1) An example of a GPS antenna on the International Space Station
- 2) An antenna array mounted on a box and the box mounted on an aircraft. This was modeled by first modeling the array on a box in NEC-BSC and then feeding the radiation patterns back into NEC-BSC as a point source. This was measured on a scale model and the agreement was excellent down to very low signal levels of -50dB below peak gain.

The course extended into the afternoon due to the number of questions from the audience on the course and there was an animated discussion of validation and how to determine numerically the error in predictions. This course was much appreciated by the audience (24 people).

The rest of the day was taken up by four papers presented by members.

Chris Emson of Vector Fields described an FDTD program, CONCERTO, which has a number of useful features apart from the comprehensive GUI which Vector Fields always supplies. The code can deal with curved surfaces and thus avoids the problems of staircasing. The program, of course, includes dielectrics and the results I have seen presented (here and elsewhere) are very impressive.

Pat Foster described recent work on a hybrid method which imports PO currents into a GTD/UTD program, ALDAS. The examples discussed were all of high gain reflectors, particularly earth-watch reflectors on spacecraft where the local structure of the spacecraft may influence the radiation patterns.

Wayne Arter of Culham discussed INSTANTE which is a GTD/UTD program using Shoot-and-bounce ray tracing and a structure geometry based on NURBS. Most of

the paper was devoted to the computation of coupling between antennas and results compared favourably with the standard measurements made by Bull and Smithers. Agreement is to +/-5 db at the -70 dB level.

Colin Sillence of Sowerby Research Centre, BAE Systems, Filton discussed Fast Multipole Methods in Method of Moments code as applied to the NASA almond. Good agreement with other codes was achieved for a dimension of 40 wavelengths. FMM allows the extension of the geometry to a 60 wavelength NASA almond which is very impressive. There was a lengthy discussion of agreement between various computational methods for the NASA almond.

One interesting thread running through the day's presentation, and this includes the short course, is that the dimensions of the problems tackled have risen rapidly over the past few years and that much better agreement with measurement is expected and achieved.

Publications Report for March 2003

As my three-year term as Publications Chair comes to a close, I would like to thank all the ACES members who support our publications, especially our hard-working editors Atef (Journal) and Bruce (Newsletter), and our managing editor (Dick Adler). ("Hard-working" somehow doesn't do justice to Dick's efforts on behalf of ACES.)

I also continue to encourage our readers to submit noteworthy articles to these publications. At the present time, our primary means of publication is changing from print media to electronic media, and none of us are quite sure how that transition will be accepted!

I also encourage any of you out there with ideas for special issues to share them with the editors. I believe that one of the best ways that ACES can maintain momentum and continue to carve out a niche for our publications is to aggressively seek out timely topics for special issues.

My impression at the present time is that ACES publications are strong and are meeting the needs of our members. The editors, officers, and board members of ACES are all receptive to suggestions, so keep them coming!

Andrew F. Peterson
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2002 FINANCIAL REPORT

ASSETS

BANK ACCOUNTS	1 JAN 2002	31 DEC 2002
MAIN CHECKING	13,943	9,431
EDITOR CHECKING	3,316	3,325
SECRETARY CHECKING	2,156	6,458
SAVINGS	111	111
HIGH RATE SAVINGS	51,383	37,320
CREDIT CARD	12,193	1,587
CD #1	13,642	14,088
CD #2	13,468	13,968
CD #3	13,353	14,071
CD #4	<u>13,415</u>	<u>13,982</u>
TOTAL ASSETS	\$136,979	\$114,342

LIABILITIES: \$0

NET WORTH 31 December 2002: \$114,342

INCOME

Conference	35,419
Short Courses	7,485
Publications	1,201
Membership	12,725
Interest & misc.	<u>3,427</u>
TOTAL	\$60,257

EXPENSE

Conference	48,743
Short Courses	3,390
Publications	10,073
Services (Legal, Taxes)	1,526
Postage	2,868
Supplies & misc.	9,000
Website & Electronic Publishing	<u>7,294</u>
TOTAL	\$82,894

NET DECREASE for 2002 was \$22,637

In 2001, the net operating loss was \$11,594. In 2002 our net operating loss was \$22,637. Our current net worth, \$114,342, has decreased by 17% from last year.

Allen Glisson
Treasurer

THE APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY, INC.

NOTICE OF THE ANNUAL BUSINESS MEETING

Notice is hereby given that the annual business meeting of the Applied Computational Electromagnetics Society, Inc. will be held on Monday 24 March 2003, in 102 Glasgow Hall at the Naval Postgraduate School, Monterey, CA. The meeting is scheduled to begin at 7:55 AM PST for purposes of:

1. Receiving the Financial Statement and Treasurer's Report for the time period ending 31 December 2002.
2. Announcement of the Ballot Election of the Board of Directors.

By order of the Board of Directors
Bruce Archambeault, Secretary

ANNUAL REPORT 2002

As required in the Bylaws of the Applied Computational Electromagnetics Society, Inc. a California Nonprofit Public Benefit Corporation, this report is provided to the members. Additional information will be presented at the Annual Meeting and that same information will be included in the July Newsletter for the benefit of members who could not attend the Annual Meeting.

MEMBERSHIP REPORT

As of 31 December 2002, the paid-up membership totaled 272, with approximately 34 % of those from non-U.S. countries. There were 23 full time student, unemployed and retired members; 62 industrial (organizational) members; and 187 regular members. The total membership has decreased by 17 % since 1 Jan 2002, with non-U.S. membership decreasing by 21%.

Bruce Archambeault, Secretary