APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY (ACES)

NEWSLETTER

Vol. 4 No. 1   June 1989

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EDITOR'S COMMENTS

During the ACES ADCOM meeting in March this year, ADCOM decided to separate the "Newsletter" from the "Journal". The term "Newsletter" was found to be a disincentive for some potential authors who would otherwise consider publishing with us. Henceforth, the formal ACES publication will be known as the ACES JOURNAL and we will establish a separate quarterly publication to be known as the ACES NEWSLETTER.

The ACES JOURNAL will continue on in the tradition already established as a fully-refereed publication. Although Journal papers may address theoretical issues in computational electromagnetics, they are required to establish some relevance to application. This requirement supports the ACES Charter and helps us to compliment, rather than compete with or duplicate, the long established publications of other professional societies. In addition, it will help us continue attracting papers from all segments of the professional community -- universities, Government and industry.

As a minimum, the ACES NEWSLETTER will include ACES Committee reports and other ACES news. We would like to include code update information, regular feature columns, and informal write-ups of the modeling and application experiences of code users. Otherwise, the ACES NEWSLETTER will not publish papers; these will be reserved for the ACES JOURNAL.

Obviously, we cannot publish material which we do not receive. Attracting the "informal" user experience write-ups has been a continuing problem -- even though we have never abandoned our goal to provide a forum for this purpose. Perhaps with the new ACES NEWSLETTER, there will be more incentive for authors to contribute informal write-ups. We need ACES members to volunteer to submit write-ups of their successful AND unsuccessful modeling experiences particularly if they are using codes for which no source of help is available for users who experience difficulties. (As ACES members, let's help one another where possible)! Likewise, we need a few volunteers to submit regular feature columns or otherwise solicit contributions for articles (possibly from existing code user groups).

Our most immediate need, however, is an editor for the ACES NEWSLETTER. Any ACES member interested in this very important post should immediately contact Dave Stein or Jim Logan.

ACES NEWSLETTER, Interim Editors:

James C. Logan   Richard W. Adler   David E. Stein

HISTORICAL NOTE

Some ACES History,   Up to May 1989

R.M. Bevensee, ACES Historian

The following items give a quick snapshot of some of the key events relevant to the development of our Society. Over the years during the development of the Numerical Electromagnetics Code (NEC), it had become custom for the sponsors and code developers to gather once a year to discuss the status of NEC developments and set goals for future work. Occasionally, a few outside this group were invited to sit in and add comments. Sometime in 1984, it was decided to invite a broad representation from the NEC user community to participate in the 1985 review.

The "1st Annual Review of the Numerical Electromagnetics Code (NEC) Applications" was held at the Lawrence Livermore National Laboratory March 19-22, 1985 with Edmund K. Miller acting as master of ceremonies. The turnout was enthusiastic. This dedicated group discussed the need for an "applications forum" and regular meetings with publications to go along. The seed was planted for the formation of a new professional society. Organizational committees were formed and Ed Miller was designated the President for the interlude.

The first APPLIED COMPUTATIONAL ELECTROMAGNETICS NEWSLETTER appeared in February 1985. On page 1, in the introduction, President Edmund K. Miller outlined goals for the new Society annotated with appropriate comments for the new ACE(S) NEWSLETTER.

The "2nd Annual Review of Progress in Applied Computational Electromagnetics" was held March 18-20, 1986 at the Naval Post Graduate School in Monterey. The enthusiasm of the group had not waned and the Society was officially born. The Constitution and Bylaws were adopted with modifications by the Conference attendees on March 18. The first slate of officers (the first ADCOM) was elected which comprised:

President	E.K.Miller
Vice President	J.C.Logan
Secretary	R.W.Adler
Treasurer	J.K. Breakall

ADCOM Members at Large

3-year term	R.M.Bevensee
2-year term	J.McDonald
1-year term	D. Campbell

R. Bevensee agreed to be the newsletter editor for the next issue, to be published in the Fall of 1986. Associate editors included V. Arens, R. Marhefka, D. Coblin, J. Logan, D. Campbell, S. Kubina, and D. Stein.

The "3rd Annual Review for ACE(S)" was in Monterey in March 1987. Ed Miller convened the first official meeting of the ADCOM and Dave Stein agreed to serve as the new newsletter editor. Lee Corrington was elected by the general membership (all members present at the conference) for a 3-year term as a Member at Large to ADCOM.

The second issue of Volume 3 of the Newsletter, published in the Fall of 1987, officially became the APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY JOURNAL AND NEWSLETTER.

At the "4th Annual Review for ACE(S)" (again held in Monterey) in March 1988, Ed Miller, as one of his last acts in office, signed the papers for the application to the State of California for ACES to become a non-profit corporation. He also announced that URSI-Commission B and the IEEE AP-S will allow use of their names "in cooperation" in a call for papers for a special newsletter issue or for a conference. Elections were held and the new slate of officers include:

President	J.C.Logan
Vice President	S.Kubina
Secretary	R.W.Adler
Treasurer	J.K. Breakall

ADCOM Members at Large

3-year term	P.Cunningham

with L. Corrington and R. Bevensee still serving from previous elections.

At the "5th ACE(S) Review", attendance was up to 200 with 100 plus papers presented. The ADCOM formerly adopted a 2-year budget, for the first time, and ACES held its first annual awards banquet. Our society has come of age.

We now look forward to the first elections by mail and the next "ACES Symposium" to be in Monterey in March 1990. See you there!

OFFICER'S REPORTS

PRESIDENT'S REPORT

Somehow, it doesn't quite seem possible that more than a full year has gone by since I was elected. It may be a sign of my age, but I prefer to think it is because I have been so very busy with many things including the duties of this office. A lot has happened in this year and those of you who could attend our March Symposium are aware of most of it. At the risk of repeating myself or restating the obvious, I will summarize the items I believe to be most important to our Society.

In March 1988, we set a two year goal to double our membership roles. I am pleased to say that in one year, we have grown from just under 300 to over 500 members. I believe we can easily achieve our goal and then some. Let me renew my call for each and every member to contact your colleagues (please contact at least one) that has an active interest in electromagnetic modeling and convince him or her of the value in ACES membership. At $25, ACES membership remains a true bargain.

The Meetings Committee, under the leadership of Bob Noel, put together a multi-year plan for holding the ACES Symposium at a number of different locations. The incentive was to attract people to the Symposium that would not otherwise attend due to the West Coast location. During the ADCOM meeting in March, Bob presented a proposal from Penn State to Host ACES in 1990 and another proposal from Washington State for 1991. Both were very appealing and I wish to say thank you again to Ray Lubbers of Penn Sate and Bob Olson of Washington State for their efforts.

After much debate and two 5 hour marathon sessions, ADCOM decided that ACES is not yet mature enough to sustain its membership and activities while moving the Symposium location every year. Moving the location also necessitates changing the time of the meeting from March to late Spring or Summer. This would potentially conflict or compete with other scheduled Symposiums as well as members' vacation plans. The March date and the very mild climate of Monterey are very real drawing cards for ACES. Some members refer to the ACES Symposium as "the Monterey Meeting". The ADCOM decision is to hold both the 1990 and 1991 Symposiums in Monterey, in the month of March (providing the facilities are available).

In the meantime as an alternative to moving the Symposium about, ADCOM directed the Meetings Committee to explore the possibility of sponsoring workshops or seminars at alternate sites. The idea is that ACES, in cooperation with a host organization, would sponsor a one to two day workshop on some appropriate EM modeling subject. The workshop would be held in the Fall of the year and would be open to the public as well as ACES members. ACES would provide from its membership, one or more guest lecturers and the host would supply the facilities and one or two lecturers as well. The host would share with ACES the local publicity as well as the advantages of attendance in workshop. Students would be encouraged to attend, possibly at no cost. ACES would use the opportunity to recruit new members.

There are a number of ACES members from Europe. They have proven to be strong advocates for the goals and success of ACES. A few of them have consistently attended the "Monterey Meeting" almost every year. At their request, I convened an informal conference during the March Meeting to discuss organizational issues relative to the European community. Do to their strong enthusiasm and support of ACES, I have established a committee to organize ACES activities in Europe.

The ACES Europe Committee is established with Ruediger Anders as Chairman, for a period of at least one year, or thereafter until the first opportunity for the Committee to make a formal report to ADCOM. Given reasonable success, the Committee and Chair will be continued beyond that point as may be appropriate.

The ACES Europe Committee is established to create and promote ACES activities within the European Community. The Committee is entitled to use the ACES monogram in promotion of such activities in keeping with the goals of ACES as stated in our Constitution and Bylaws including:

1. Providing a focal point for ACES activities in Europe.

2. Recruitment of new ACES members from the European Community.

3. Staging or conducting European meetings, seminars and workshops on computational electromagnetics in the name of ACES.

4. Begin the process to establish a formal ACES Europe Chapter.

ADCOM will allow considerable latitude to the ACES Europe Committee to define geographic boundaries, membership participation, appropriate professional activities, and rules of order and organization. At some future time deemed suitable by the Committee and the European community, ADCOM will entertain formal application from the Committee to found an ACES Chapter, as may be appropriate.

ADCOM also met extensively in March to consider other issues. Among them are the budget. For the first time ADCOM has formerly established a budget for 1989 and 1990. But our work is not yet done. To meet the requirements of the State of California for incorporation, and as a prudent planning tool, ADCOM will meet again in June to consider a 5 year budget, among other things. Thanks to the kindness and cooperation of the IEEE Antennas and Propagation Society, ADCOM has a meeting room reserved at the Red Lion Inn during the IEEE AP-S 1989 Symposium. This ADCOM meeting has been called because it is becoming increasingly difficult to complete ADCOM business with only one meeting a year. We try to conduct ACES business over the telephone and by mail as much as possible, but there is no substitute for a face to face meeting.

The success of our organization depends a great deal on the active participation of its members. It takes strong leadership in the chair of key committees to make things happen. But it takes volunteers, ie. committee members, working behind the scenes to actually carry out the work. For those of you that have been helping out, I thank you for all your time and hard work. For new members and those of you that have so far been sitting on the sidelines, I call upon you to become active in one or more committees. These people are working hard to make your organization a success. You owe your fellow members a little of your time to help get the work done. And I assure you that every effort you make to help ACES along will be a rewarding experience.

James C. Logan
ACES President

SECRETARY'S REPORT

The new form of the Journal and Conference Proceedings reflects our membership growth to the near - 600 number. We can now afford to have an offset press-run and perfect binding. The smaller size for the Proceedings reflect the need to hold the line on printing costs, in spite of a growth in the number of pages by 20%.

We are considering the cost and benefits of employing desk top publishing (DTP) in the production of the Newsletter and Journal. If the use of DTP is warranted, we would achieve a uniform format in our publications and could solicit articles in word-processor format on floppy disks. A scanner might be used to import figures into the text.

NEEDS 2.0 is finally available but not yet fully capable. Since all portions of NEEDS are public domain, and some of them are continuously being upgraded, we may never have a "completed package". See the NEEDS 2.0 announcement in this newsletter for details on features.

Richard W. Adler
ACES Secretary

TREASURER'S REPORT

As Treasurer of ACES I am pleased to inform you that we are very healthy, presently, in the financial department. However, we need to formulate a five year budget plan to preserve our healthy condition for the future and more importantly to achieve California State Law Incorporation status. This should be our number one concern of business at the ADCOM meeting in June.

I have included excerpts from the financial status report given at the ADCOM meeting on March 20, 1989 to help you understand where we have been and where we are going. The data given for the years 1989 and 1990 constitute the budget adopted by ADCOM for those years. The data given for 1987 and 1988 reflect real income and expenses.

INCOME	1987	1988	1989	1990	1991
Advertising	$ 400	$ 700	$ 700.	$ 1,000	$ 1,000
Conference	$19,000	$26,000	$25,000.	$30,000	$30,000
Dividends	$ 300	$ 100	$ 300	$ 300	$ 300
Journal/Nwsltr	$ 15	$ 500	$ 250	$ 300	$ 300
Membership dues	$ 5,000	$10,000	$12,000	$17,000	$24,000
Proceedings	$ 2,000	$ 1,000	$ 1,500	$ 1,000	$ 1,000
NEEDS	$ 0	$19,000	$ 8,000	$ 5,000	$ 5,000
Short Courses	$ 0	$ 0	$ 5,000	$ 5,000	$ 5,000
Total	$26,715	$57,300	$52,750	$59,600	$66,000

EXPENSES	1987	1988	1989	1990	1991
Conference	$ 3,700	$ 4,700	$ 5,800	$12,000	$13,500
NEEDS	$ 750	$10,200	$ 7,000	$ 3,000	$ 3,000
Journal/Nwsltr	$ 4,200	$12,600	$15,000	$22,500	$22,500
Scty	$ 1,100	$ 5,900	$ 7,500	$ 7,500	$ 7,500
Misc	$ 50	$ 4,600	$ 9,000	$ 5,000	$ 5,000
Total	$ 9,800	$38,000	$44,300	$ 50,000	$51,500

James Breakall
ACES Treasurer

COMMITTEE REPORTS

PUBLICATIONS COMMITTEE

Plans are underway for upcoming special issues of the ACES JOURNAL. For additional details regarding our next special issue, please see the "Call for Canonical Problems" elsewhere in the ACES NEWSLETTER.

A Best ACES JOURNAL Paper Award (with cash prize), to be presented annually, has been authorized by the ACES ADCOM. The paper evaluation process will occur every year. Nonetheless, if no paper published during a given year is judged worthy of award, then no award will be presented for that year.

Also being considered is the publication of one or more topical books of ACES JOURNAL reprints. All topically-relevant papers published in the ACES JOURNAL would be eligible for consideration, subject to concurrence by the respective authors. (Suggestions? Comments?)

A number of efforts to enhance the stature of the ACES JOURNAL are now in progress. Details will be reported in subsequent ACES NEWSLETTER issues. Although the payoff for these efforts will be substantial, there remains no substitute for your continued support.

We received a suggestion to standardize the typeface (font), format, and layout of ACES JOURNAL papers, to enhance our professional appearance. We shall consider ways to accomplish this which do NOT create other problems. However, in view of our recent moves (such as improving the binding and dropping the term "Newsletter"), the need for such standardization might not be so urgent. (Comments?)

IT IS IMPERATIVE THAT WE NOT CREATE DISINCENTIVES FOR AUTHORS TO PUBLISH WITH US. Requiring authors to use certain word-processing software might impose an unacceptable burden on authors. Also, consider the following: While many longer-established professional publications do not require camera-ready text (because they employ typesetting staffs), they do require camera-ready figures, the preparation requirements for which are more burdensome than our own. For example, we do NOT require India ink, glossy diagrams, or other special paper.

An alternative is for ACES to assume responsibility for typesetting and related tasks, PROVIDED that we can commit the necessary funds (and/or volunteer labor). This may or may not be possible. However, we are also exploring possibilities of the optical recognition technology, which may provide the needed capability at a modest cost.

Our page charge policy has never been enforced, nor has it proven realistic, especially from a revenue standpoint. THEREFORE, PAGE CHARGES ARE HEREBY ELIMINATED. However, the page charges will be reinstated for "excess-length" papers (to be defined) if necessary to offset typesetting or other similar expenses, if ACES assumes responsibility for typesetting.

We invite comments on the ideas presented above. Please send me your comments as personal correspondence or as "Letters to the Editor" for publication in the ACES NEWSLETTER or contact me at:

Dave Stein(214) 266-4309
P.O. Box 530685
Grand Prairie, Tx. 75053

Please contact me if you wish to become involved in the activities and duties of this Committee.

David E. Stein
Chairman, Publications Committee

MEETINGS COMMITTEE

The ADCOM has decided that the 1990 and 1991 Symposiums will be held again in Monterey. The Meetings Committee is exploring the possibilities for ACES sponsored workshops or seminars as an alternative to moving the Symposium around. The proposal is to hold the workshops or seminars six months or so after the regular Monterey Meeting, in selected regions of the country. This would give ACES more exposure in regions outside the West Coast.

The plan is for ACES to provide guest lecturers for one day short courses, panel discussions or workshops. In addition to providing the classrooms or lecture halls, the Host would also be invited to contribute lecturers. ACES would benefit from this arrangement by promulgating the benefits of ACES membership. The Host would benefit from the local and regional (and perhaps national) attention. Host employees or students may attend either free or at a nominal fee, to be determined. We would like to invite comments on this plan. In particular, we would like to hear from individuals interested in participating either as ACES lecturers or as part of the Host contingent. Please send your comments as "Letters to the Editor" or contact me at:

> Bob Noel(714)779-3073
> Rockwell International
> 3370 Miraloma Ave.
> Mail Stop OA13
> Anaheim, Ca. 92803

Please contact me if you wish to join the Meetings committee or volunteer to participate in the ACES "Workshop/Seminar Program".

> Bob Noel
> Chairman, Meetings Committee

LONG RANGE PLANNING COMMITTEE

The Long Range Planning Committee has 11 members at present and has representatives from industry, academics and Government. The Committee has developed a preliminary list of objectives. These proposed objectives were presented to ADCOM in March 1989 for consideration. The next phase of work will be to identify plans to achieve these goals.

The Long Range Planning Committee would be happy to receive any suggestions from the ACES membership concerning goals for the organization. Send your suggestions to the following address:

Dr. R. D. Coblin (408)742-2689
Lockheed Missiles and Space Co.
O/62-42, B/O76
P.O. Box 3504
Sunnyvale, Ca. 94089-3504

If you wish to volunteer to work on this committee, please call me.

> Dawson Coblin
> Chairman, Long Range
> Planning Committee

CONSTITUTION AND BYLAWS COMMITTEE

During the last ACES Symposium, ADCOM considered and approved amendments to the Bylaws to provide for election by mail and formally define the duties of the Software Validation, Historical and Awards Committees.

Does anyone have further suggestions for changes in the Constitution or Bylaws? If so, please contact me at:

CDR, USAISEC
ATTN: ASQB-SET-P (Mrs. McDonald)
Ft. Huachuca, Az. 85613-5300
(602) 538-7680 or AUTOVON 879-7680

Please contact me if you would like to serve on this Committee.

Janet McDonald
Chairman, Bylaws and Constitution Committee

SOFTWARE DISTRIBUTION COMMITTEE

We are still working on the fabled catalog of EM programs. We have the acquisition information on the most noted programs along with descriptions of their capabilities and limitations. It would take but a few pages to publish this information, but this seems inadequate. As a user group, we should be able to put some user opinions in the catalog comparing the various programs and how they do their jobs.

At the moment, we have author supplied information on the NEC method of moments codes from Lawrence Livermore National Laboratory (LLNL), MININEC and NEEDS (which includes IGUANA, GRAPS and other programs) from the Naval Ocean Systems Center (NOSC) and the Naval Postgraduate School (NPGS), the NEC uniform theory of diffraction codes from Ohio State University, and the GEMACS/GAUGE programs from Advanced Electromagnetics.

If your best friend, the Godparent of your children, was going to set up as an EM consultant, which codes would you advise him to acquire - or avoid, and why? THAT is the kind of information we need to include in our catalog covering EM codes. We need this information for the codes mentioned above as well as for any other codes that you feel we should add.

Please sit down and spell out your opinions in a "LETTERS TO THE EDITOR" format. We will compile your comments and publish them in the ACES catalog.

Please send comments and suggestions to:

Chuck Vandament (214) 705-3952
802 Brentwood
Richardson, Texas 75080

Also, please contact me to volunteer to work on this committee.

Chuck Vandament
Chairman, Software Exchange Committee

SOFTWARE PERFORMANCE STANDARDS COMMITTEE

Nominal membership (you have signed up or indicated interest in an unguarded moment) of the Software Performance Standards Committee (SPSC) is the following:

Ruediger Anders	Bob Balestri	Steven Best	Bob Bevensee
Gerry Burke	Y C Cho	Ken Demarest	David Faust
Julian Holtzman	James R.Jameson	Joseph Janni	Stan Kubina
Ron Marhefka	Andy Peterson	Harold Sabbagh	Dave Thomas
Frank Walker	Perry Wheless	Wes Williams	

About half of those listed above met during the lunch on March 23, 1989 in conjunction with the ACES meeting at NPGS. Our initial discussion centered on speculating about why we (ACES) have not had more success in soliciting applications notes for the Newsletter/Journal, and what if anything, could be done about it. After much consideration, we concluded that of the two alternative ways of developing a modeling handbook, a topdown approach was less likely to work. Thus, rather than proceeding from the very general to the increasingly specific in terms of what works and doesn't work, developing modeling guidelines, etc., it would be more productive instead to start from the bottom up by collecting specific details for specific problems.

For example, we should define a set of test objects and test problems for which representative results are to be collected along with validation data. Considering the interests of the ACES community in wire antennas specifically, we concluded that a set of wire objects would be a logical starting point. These could in particular include straight-wire and circular-loop antennas, arrays such as log-periodic and Yagi, and possibly helices and conical spirals. Data to be collected include:

1) input impedance
2) current distribution
3) boundary and near fields; and
4) far fields as a function of number of unknowns and frequency.

The data to be collected for these problems would be provided by contributors in hard copy and electrical form, following some to-be-determined guidelines. Both numerical and graphical formats would be used. Independent experimental or other data would also be sought for comparison purposes. The idea would be to start a data base of reference solutions for purposes of intercode comparison and validation, and to provide guidance for the modeling of other problems concerning their numerical representation and anticipated accuracy.

Clearly, we need to develop more specific recommendations for how this should actually be started, which is where the sample applications notes might come in. As one possibility, a study done in the early 1970s by LLNL [Miller, Bevensee, Poggio, et. al. (1974), "An Evaluation of Computer Programs Using Integral Equations for the EM Analysis of Thin Wire Structures", AFWL Interaction Note 177] might provide a model. In that case, LLNL compared several different wire codes for application to three wire scatters; a straight wire, L wire, and a crossed wire. They developed both detailed data such as current distributions as well as integrated data such as the RMS current value. It might be worthwhile summarizing the LLNL report as an ACES note to provide a sample applications note.

A one day workshop on the subject of "EM Software Validation" has been organized for the AP-S 1989 Symposium by Ed Miller who chairs the AP-S EM Modeling Software Committee. We would hope that one outcome of the workshop will be some specific plans for this rather-fuzzy problem. Concerning ACES role vis-a-vis that of AP-S, both organizations have a mutual interest in software validation, but ACES is more strongly oriented towards applications issues, of which validation is but one of many. There is enough work to go around to keep members of both organizations productively busy, and it seems to me that a logical assignment of responsibilities might indeed revolve around whether code application is the main thrust of a given computation, or whether it is code development instead. I'd appreciate any input that you may want to provide.

Edmund K. Miller
Chairman, Software Performance Standards Committee

AWARDS COMMITTEE

The first annual ACES awards banquet was held on 22 February 1989 at the Naval Postgraduate School Officer's Club in Monterey, California. The banquet, which was held the second evening of the symposium, was a great success due to the exceptional turnout of about 75 symposium attendees and their escorts. The banquet followed a no host reception. Attendees report that the food was excellent.

Six Awards were presented to highly deserving individuals. The awards are preserved by engraved brass plaques mounted on solid walnut. As presently structured, ACES awards fall into two broad categories -- Service and Technical. I would like to briefly describe these award categories and identify the 1989 recipients of these awards.

Service Awards Category:

FOUNDERS AWARD -- This award recognizes individuals who, while serving ACES, have demonstrated exceptional vision and leadership as exemplified by the founding fathers of ACES. Although recipients need not be ACES officers, they must have clearly assumed a leadership role in the affairs of the Society.

The 1989 ACES Founders Award was presented to Edmund K. Miller for his valued services and contributions as Founding Father and First President.

MAINSTAY AWARD -- This award is presented to recognize individuals who devote their time and talents over a sustained period to benefit the day-to-day functions and activities of ACES. Recipients need not be elected officers or committee chairmen, but they will generally be officers or members of one or more committees.

The 1989 ACES Mainstay Award was presented to Richard W. Adler to recognize his services as First Secretary and for four years contributions as host and Publisher.

PUBLICATIONS AND PROMOTIONS AWARD -- This award recognizes individuals who have exceptionally supported ACES publications and/or promotional activities by donating their time and talent. This award emphasizes the importance of publications to a professional society. Recipients need not necessarily serve as Publications Committee Chairman, but they should at least serve as an editor on that committee.

One of the two 1989 ACES Publications and Promotions awards was presented to David E. Stein in appreciation of his services and contributions as Publications Chairman and Editor. The other 1989 ACES Publications and Promotions award was presented to Robert M. Bevensee to recognize his contributions to ACES as First Editor and Program Chairman for two years.

VALUED SERVICE AWARD -- This award is presented to individuals to honor valued services or contributions to single events or functions of ACES. Recipients need not be committee chairmen, but they will generally be members of one or more committees.

The 1989 Valued Service Award was presented to Michael Thorburn for his valuable contributions of time and talent to organize the 1989 ACES Symposium.

Technical Awards Category:

BEST PAPER AWARD -- This award is presented to author(s) of an exceptional paper published in the ACES JOURNAL. This award need not be given annually, but more than one Best Paper Award may be presented in a given year.

Time constraints, not a lack of excellent papers to choose from, precluded presentation of this award in 1989.

SUSTAINED TECHNICAL EXCELLENCE AWARD – This award is given to ACES members who demonstrate technical excellence through publication of a number of high quality papers in ACES publications over a period of years. Sheer numbers are not sufficient; the papers must be of an above average technical quality, importance, or impact.

As with the Best Paper Award, time limitations rather than a lack of qualified candidates precluded presentation of this award in 1989.

TECHNICAL ACHIEVEMENT AWARD – This award is presented to ACES members who demonstrate technical achievement in applied electromagnetic modeling through activities other than ACES publications. Appropriate factors for consideration include efforts to support computational techniques, electromagnetic modeling software, code validation and distribution, and emphasis on applications, rather than electromagnetic theory.

The 1989 ACES Technical Achievement Award was presented to Gerry Burke in recognition of his valuable contributions to applied electromagnetic modeling as principal author of the NEC-Method of Moments Code.

If anyone has any questions, comments, suggestions, or nominations related to the awards process or specific awards, feel free to contact me at:

CDR, USAISEC (602)-538-7797
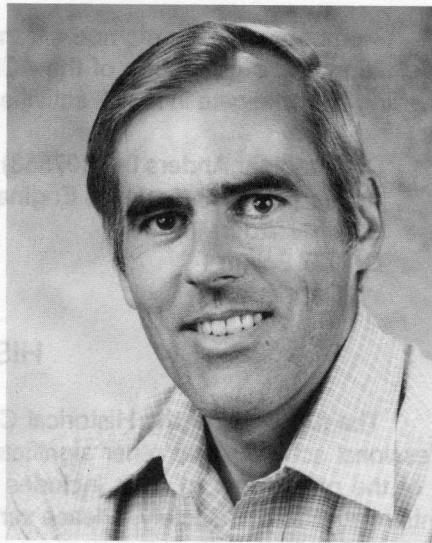ATTN: ASQB-SET-E (Lee Corrington)
Ft. Huachuca, AZ, 85613

Anyone wishing to serve on the Awards Committee, please call me.

Lee Corrington
Chairman, Awards Committee
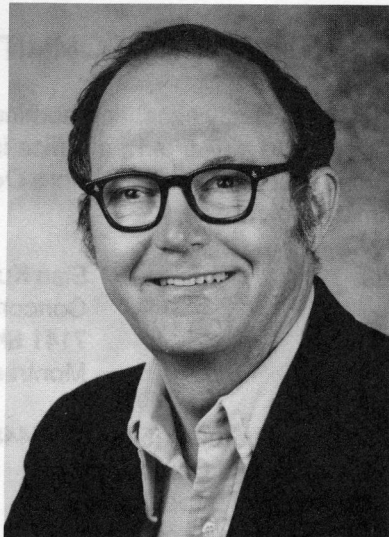
David E. Stein

Publications & Productions Awards

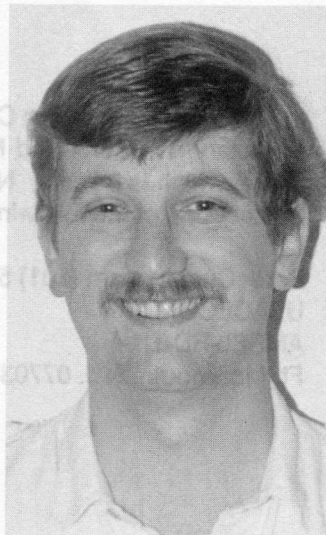Gerald J. Burke

Technical Achievement Award

Richard W. Adler

Mainstay Award

Edmund K. Miller

Founders Award

Michael Thorburn

Valued Service Award

ACES EUROPE COMMITTEE

This is a new committee to create and promote ACES activities in the European community. There is no other precedence for this committee -- we will be breaking new ground. The activities of this Committee will certainly be unique to Europe, but it may well provide a catalyst for other regional ACES Chapters.

Members and non-members from the European Community of Nations are invited to participate in the definition and organization of the ACES Europe Group. All ACES members, whether from Europe or not, willing to participate in ACES activities in Europe, please contact me at:

Dr. Ruediger Anders 049 (07553) 7349
Applied Electromagnetics Engineering
Vorder Halden 11
D-7777 Salem 1
W. Germany

HISTORICAL COMMITTEE

The functions of the Historical Committee include the gathering and preserving of a record of the professional activities and other significant events of our Society, that may not otherwise be recorded as part of the official record. This includes collecting photos and other artifacts, and first hand accounts of events relative to our Society. Please send donations of such items to:

R. Bevensee (415) 422-6787
LLNL
P.O. Box 5504
Livermore, Ca. 94550

Anyone interested in participating on this committee, please call me.

Robert M. Bevensee
Chairman, Historical Committee

NOMINATING COMMITTEE

The Nominating Committee is presently accepting nominations for ACES President, Vice-president, Secretary, Treasurer and Member at Large. The term of office is 2 years each except for the Member at Large, which is 3 years. Nominations must be received before October 15, 1989 to be considered. Please contact one of the following committee members:

Peter Cunningham (201) 544-4189
USACECOM
AMSEL-RD-TR-4
Ft. Monmouth, N.J. 07703

Stan Kubina (514) 848-3093
Concordia University
7141 Sherbrooke St. West
Montreal, Quebec, Canada H4B1R6

Michael Thorburn (503) 754-3448
Electrical and Computer
Engineering Department
Oregon State University
Corvallis, Or. 97331-3202

You may suggest any qualified ACES member to run for office or volunteer yourself. The Nominating Committee is seeking two or more candidates for each office.

Peter Cunningham
Chairman, ACES Nominating Committee

EDITORIAL ON EM EDUCATION

by

James C. Logan

The United States is in a crises at all levels in education. The crises is most acute in the sciences and engineering on which our present and future position as an industrial leader in the world so critically depends. This is not just an economic issue but it is also key to our National defense. We must find a way to attract to science and engineering the very best students our society has to offer.

I have been distressed by some recent conversations with a few faculty members from top-notch institutions. In recent years, even top-notch institutions have found it to be increasingly difficult to attract qualified U.S. citizens, as graduate students in engineering. In fact, they have even had some difficulty attracting as many qualified students as they wish from the U.S. population for undergraduate studies in engineering. Particularly hard to find are U.S. students wishing to pursue careers in electromagnetics. I suppose this is so in part because electromagnetics is perceived, and rightly so, as a very difficult subject.

One possible solution is close to the heart and sole of the ACES community. The business of ACES is the exchange of information on computer software for the solution to or modeling of electromagnetics problems. Why not employ this software in electromagnetics education? The application of computer software to illustrate electromagnetics principles can make electromagnetics much more attractive and perhaps a little easier to grasp for students. The use of computer solutions and especially illustrated by computer generated graphics can help the teacher get his point across more easily and may help the struggling student to grasp concepts in greater depths. Solutions to electromagnetic problems illustrated by computer graphics can focus the attention of today's students and capture their imaginations.

As an Engineer, I generally provide computer models of antenna like structures as part of a much broader study of the behavior of RF systems. But occasionally, I am asked to help train new engineers in the use of computer models or provide non-engineers with an overview of the technical aspects of antennas and related RF systems. I have found that computer graphics displays of computer solutions goes a long way in providing understandable information to engineers and laymen alike. I have also quite successfully used computer software, that combines computer models (ie. computer solutions) with computer graphics, in several short courses on antenna modeling. So I can personally attest to the value of computer applications in electromagnetic education.

Our membership in ACES is a testament to our own needs for continual self education, in order to keep abreast of the newest developments. The point is that as practicing engineers or professionals in electromagnetics, we are continually involved in educational activities whether it is self education or breaking in the new hire. That ACES should make a commitment to the concept of the use of computer applications in electromagnetic education is apparent.

Other professional societies are already involved in the pursuit of computer applications in electromagnetic education (CAEME). Notably, the IEEE Antennas and Propagation Society and its Education Committee has established a CAEME Committee. The 1989 AP-S Symposium in June includes a full day workshop on CAEME in which I will participate. Under the guidance of Professor Magdy Iskander of the University of Utah, the IEEE is pursuing funding from the National Science Foundation to help support the CAEME activities, which includes the development of a catalog of useful computer programs. As President of ACES, I have given our full endorsement to this proposal. I also welcome the prospects for ACES cooperation in developing the catalog.

I pose the following questions to the ACES membership: Should ACES become involved in the development of CAEME? If so, how deeply should we be involved? ACES has already provided short courses as part of the annual Symposium and the reaction of most members is very positive for continuing this activity. Should ACES put more emphasis on CAEME in ACES sponsored short courses? Should ACES become involved with academe in development of CAEME tools? Can ACES provide a resource to academe in terms of computer software exchange and software catalogs for CAEME? Should ACES have an Education Committee?

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To answer these questions and others that may come to mind, I invite comments from the readers. Please address your comments to ACES as "Letters to the Editor". Or if you desire a less public airing of your views, you may give me a call at (619) 553-3780.

MINUTES

1989 CONFERENCE BUSINESS MEETING   21 MARCH 1989

President James C. Logan brought the meeting to order at 8:30 AM.

An election was held for an ADCOM member-at-large, replacing Robert Bevensee. Bevensee nominated Scott Ray of LLNL. Seconded. No further nominations were made from the floor. Dr. Scott Ray was unanimously elected as ADCOM member-at-large to serve a two-year period.

Logan noted that next year other ADCOM members would be up for election.

Elections by mail were approved by the ADCOM at their meeting on Monday evening. The announcement will be forthcoming to the general membership in the next Newsletter.

The Meetings Committee reported that site options for the next two annual conferences were obtained. Penn State is a possibility for 1990 and Washington State for 1991. Future sites under consideration Ohio State, Montreal and San Diego. The impact of moving the conference would be to raise the conference fees to $250 and the membership dues to $50. The Membership will be polled for comments.

Treasurer James K. Breakall presented a summary of ACES financial status:

> Total cost of an NPS-located conference is $8,600
> At Penn State it would be about $10,800
> If the conference moves from NPS, the costs of yearly mailings (now provided by NPS as part of conference support) will increase to $15,000
> Current balance in all accounts is $56,000.

Jim Logan asked for comments from the members:

> Is the time of the year when we hold conference acceptable?
> Is transportation to the west coast a factor to consider in future conferences?

Responses: Most indicated they like the Monterey meeting location
                        Raising the dues to $50 would not be a problem
                        A $250 conference registration fee would produce some difficulty

Logan asked the attendees to get actively involved in the society by working on the various ACES committees.

> Respectfully submitted,
> Richard W. Adler, Secretary

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1989 CONFERENCE BUSINESS MEETING   **24 MARCH 1989**

President James C. Logan brought the meeting to order at 8:10 AM.

ACES-EUROPE COMMITTEE

The decisions made by the ADCOM in last night's meeting were reviewed. The ACES-EUROPE Committee was formed with Roger Anders as Chairman. The purpose of the committee is to provide a focal point of ACES activities in Europe, recruit ACES members, suggest ideas and the need for an ACES-EUROPE meeting, and possibly to form a European branch of ACES.

MEETINGS

The poll of members in attendance indicated support for Monterey as the meeting place for the annual conference. Due to our infancy and growing status, the ADCOM voted to hold the '90 and '91 conferences in Monterey. The advantages of meetings elsewhere suggested we hold Workshop/Short Courses in the fall of '91 and '92 at Penn State and Washington State. This partially serves the east coast needs and provides Short Course opportunities for those who cannot make it to the spring conference.

FINANCES

Up to now, we have not had an operating budget. Money was handled on an AD HOC basis with respect to planning. All expenses were and are properly accounted for. We now have a two-year budget. ADCOM will meet and plan a five-year budget at the APS meeting in June and will serve as the Financial Committee. The preliminary budget for 1990-1991 is:

INCOME 1990		INCOME 1991
$ 1,000	Advertising	$ 1,000
30,000	Conference	30,000
300	Dividends	300
300	Journal Sales	300
17,000	Memberships	24,000
1,000	Proceedings	1,000
5,000	NEEDS Sales	5,000
5,000	Short Courses	5,000
$59,600	Total	$66,600

EXPENSES 1990		EXPENSES 1991
$ 12,000	Conference	$ 13,500
3,000	NEEDS	3,000
20,000	Journal/Editor	20,000
2,500	Newsletter	2,500
7,500	Secretary	7,500
5,000	Miscellaneous	5,000
$ 50,000	Total	$ 51,500

The budget reflects conferences at NPS, ACES paying for printing the proceedings, and does NOT include income and expenses of fall Short Courses. Also assumes membership dues increase to $35 in 1990 and to $50 in 1991.

PUBLICATIONS

The Journal will be a separate publication

Respectfully submitted,
Richard W. Adler, Secretary

EM MODELING NOTES

G. J. Burke
Lawrence Livermore National Laboratory
Livermore, CA 94550

Topics of this column will be a report on running NEC-3 on a Macintosh computer and a look at some strange results from the MFIE surface model. Work continues on NEC-4, as reported in the last column. We plan to put together the modeling enhancements and a number of other items and document the code at the level that was done for NEC-2. That may be a little ambitious, but at least more complete documentation is planned than was done for NEC-3.

With the rapidly increasing power of personal computers, these devices are becoming very respectable modeling tools. Reports at the ACES conferences and in the Newsletter/Journal have described versions of GEMACS, NEC and other EM codes now available for PC's. Tim O'Hara and R. Adler gave an interesting report at the last ACES Symposium on their experiences in putting NEC-3 on some newer PC's including a 386 machine. Recently I decided that it was time to upgrade from my ten year old DEC LSI-11 with maximum memory of 64K, so I bought one of Apple's recently released Macintosh SE/30 models with 4 megabytes of RAM. I decided on the Macintosh partly because there was a good version of Mathematica, which looked like an interesting program to play with. Also, I can keep occupied converting programs that are already available for PC's. Of course one of the first orders of business was to try running NEC. The conversion went fairly easily (two evenings) and in the process I learned some of the facts of Fortran 77 from which VAX users are insulated, and which may be useful to others attempting such a conversion.

Another item of interest to NEC users resulted from a user's report of anomalous results from a MFIE patch model of an object with square edges. We have encountered similar problems before, so this time I modified the NECPLOT program, used for viewing wire structures and currents, to display the patch currents. The result was a picture of an apparent instability in the solution of the MFIE. Although we have not yet figured out a reason for the incorrect results, the value of such plots for spotting trouble is demonstrated.

NEC ON A MACINTOSH

To run NEC on the Macintosh, I got Absoft's MacFortran/020 compiler which runs on Macs with 68020 or 68030 processors. It is advertised as a complete implementation of Fortran 77 including COMPLEX*16 and many VAX and 8X extensions. A reduced version, without COMPLEX*16 and some of the extensions is available for 68000 Macs. The options to generate 68020/30 code and to use the 68881/2 floating point processors can be turned off at the users discretion. A few initial tests with the compiler showed that it generally worked all right, but produced garbage for many COMPLEX*16 results. After a call to Absoft, some patches were quickly FAX'ed out to correct these problems. Apparently this is the price one pays for buying a package that has been sitting on the shelf of a discount store rather than getting an up to date one from the source at list price. No additional problems have been encountered, which is encouraging in view of complaints I had heard about bugs in Mac and PC Fortran compilers.

The next step was to try compiling NEC-3, which went fairly smoothly after obvious VAX-specific code (subroutines SECOND and ERROR) had been removed. The subroutines READGM and READMN, which in NEC-3 read input with commas or spaces separating numbers, contain VAX code. Fortunately versions of READGM and READMN had already been written in Fortran 77 by Pete Ludwigsen at LLNL. Using these in place of the routines in NEC-3 took care of the input problems.

The code then compiled and ran and produced correct results - sometimes. At other times the same input would produce wrong results. This looked bad at first, but turned out to be due to some incompatibilities of NEC with Fortran 77, in particular with the dynamic allocation of memory to subroutines. Tim O'Hara encountered some of these problems in putting NEC on PC's. On the PC's the SOMNEC or SOMNTX programs would not run, because some local variables in subroutines BESSEL and HANKEL were initialized on the first call and then were expected to remain, after executing a return, for use on subsequent calls. We have always tried to avoid such use of local subroutine variables, and there should not be any such cases in NEC itself. However MacFortran(and Fortran 77) has still more traps for Fortran 66 or VAX programs. Variables in labeled common blocks that occur in a subroutine can also become undefined after a return from the subroutine, unless the common block occurs in a higher level subroutine or the main program. This was the cause of the erratic results from NEC.

Another problem involved the use of DATA statements. In some cases in NEC, when initialization is to be done on the first call to a subroutine, a parameter is set in a data statement as DATA INIT/0/. On entering the routine, if INIT is 0 the initialization is done and INIT is set to 1. This was probably never good practice, but it worked in Fortran 66. In Fortran 77, however, INIT may get set back to 0 when the subroutine is reentered. As a result, the code could give the correct result, but would run much slower than it should, because the initialization was being done on every call to the subroutine.

The correct solution to these problems is to add SAVE statements to subroutines for variables and common blocks that must be retained. Doing so will be added to the list of projects for the next release of NEC. Fortunately MacFortran includes an option in the compiler menu to make all variable allocation static. With this option selected, NEC appears to run correctly. The double precision version was also easy to convert, using the same conventions as for the VAX. So far I have tried NEC for dipoles and arrays of dipoles including Sommerfeld ground with good results.

Running times on the Mac SE/30 using single precision were 93 seconds for 110 segments and 16 minutes 46 seconds for 297 segments. Double precision took 98 seconds for 110 segments and 17 minutes 39 seconds for 297. The reason that the single and double precision times are nearly the same is that the 68882 processor always operates in double precision. Single precision results are truncated for storage, which should result in somewhat better accuracy than single precision arithmetic. A similar relation was noted by O'Hara and Adler for the Definicon DSI-780 co-processor which uses the 68882. It is interesting to compare the time on the Mac with that for a VAX 11/785, which we often use for NEC work at LLNL. In the timing equation $AN^2 + BN^3$ for filling and factoring the matrix, the constants in seconds were as follows:

	Single Precision		Double Precision	
Mac SE/30	$A=4.3(10^{-3})$	$B=2.3(10^{-5})$	$A=4.5(10^{-3})$	$B=2.4(10^{-5})$
VAX 11/785	$A=1.6(10^{-3})$	$B=6.0(10^{-6})$	$A=3.5(10^{-3})$	$B=2.5(10^{-5})$

The time to run SOMNTX, for a Sommerfeld-ground model, was about 6 minutes on the Mac and 2 minutes on the VAX. These times for the VAX represent CPU time, so the waiting time could be considerably longer with many users on the system. MacFortran easily beat the VAX in compiling speed. It compiled and linked NEC-3 in about 2 minutes compared to 6 minutes on the VAX.

To determine the speeds of the Mac and the VAX for specific operations, I tried several timing tests for which results are shown in the table that follows. The first three tests, Add, Multiply and Divide, each executed the named operation four times within a loop. The table entries show the time in seconds to execute the loop 106 times. The fourth test involved summing A (i,j) in nested loops with i and j ranging from 1 to 100. This process was repeated 500 times. Finally, test 5 evaluated X=SIN(X)*COS(X-1) repeated 106 times. Each case included tests to avoid underflow or overflow. These tests were run for single, double, real and complex arithmetic and with and without using the 68882 coprocessor on the Mac.

Relative evaluation time for specific floating point operations on a VAX 11/785 and a Mac SE/30.

	VAX 11/785	SE/30 68882	MacFortran/020 no 68882
REAL*4			
1 Add	7.5	26.5	63.
2 Multiply	7.5	32.0	105.
3 Divide	14.9	47.0	188.
4 Sum A(i,j)	19.5	51.5	130.
5 SIN(x)*COS(x-1)	53.2	66.5	620.
REAL*8			
1 Add	10.5	26.5	121.
2 Multiply	13.5	32.0	218.
3 Divide	25.5	47.0	424.
4 Sum A(i,j)	27.5	54.0	215.
5 SIN(x)*COS(x-1)	139.7	67.0	2318.
COMPLEX*8			
1 Add	13.9	82.0	135.
2 Multiply	29.5	185.0	552.
3 Divide	184.7	312.0	1210.
4 Sum A(i,j)	50.1	132.0	154.
5 SIN(x)*COS(x-1)	298.8	355.0	3300.
COMPLEX*16			
1 Add	27.0	91.0	
2 Multiply	159.6	195.0	
3 Divide	307.2	316.0	
4 Sum A(i,J)	104.9	148.5	
5 SIN(x)*COS(x-1)	629.4	364.0	

The 68882 appears to reduce the time by a factor of 3 to 4 in single precision and 4 to 9 in double precision, and is particularly fast in evaluating functions. A standard Mac SE would probably be at least a factor of two slower than the "no 68882" times due to the slower clock speed. The VAX is relatively fast at COMPLEX*8 multiplies, and surprisingly slow for COMPLEX*16 multiplies. This apparently accounts for the Mac beating the VAX in double precision matrix inversion.

While faster and more powerful PC's are on the way, the present generation of Macintosh and 386 machines is certainly capable of some useful modeling and code development work.

STRANGE RESULTS FROM THE MFIE PATCH MODEL

The magnetic field integral equation (MFIE) used in NEC to model surfaces has always been known to have limitations. The most basic is that it can only be used to model closed surfaces. This restriction rules out its use for thin plates and shells or bodies with apertures. Since the solution of the MFIE with delta function expansion and weighting may be inaccurate for parallel plates with small separation, the patch model is also unsuitable for thin closed surfaces such as aircraft wings. Often we also are not sure whether to trust it for bodies with square edges. Nevertheless, the patch model gives very good results, with reasonable computation time relative to a wire grid model, for smooth surfaces such as spheres, and has been used successfully to model the hull of a ship with attached wire antennas (Jim Logan, NOSC.)

One factor that contributes to the uncertainties in using a patch model is the difficulty of visualizing the solution. While currents on wires can be displayed in two or three dimensional plots, no such plotting has been available for patch models in NEC. When we recently received a report, from Dr. P.E. Ljung of the Royal Institute of Technology in Sweden, of anomalous results from a patch model of a submarine conning tower with a whip antenna, we decided to extend the NECPLOT program, that makes three dimensional plots of wire structures and currents, to plot the patch currents. The resulting plots clearly show a problem in the solution for current.

The conning tower was 6 meters high with a nearly flat top and vertical sides. The NEC model, shown in Figures 1 and 2, used smaller patches near the connection point of the whip. Small patches were also used in a region toward the front that represents a manhole hatch, although this could not be modeled open with the MFIE. The NEC results when the top of the tower was modeled as completely flat were clearly unreasonable. The input impedance of the whip was -191 + j1134 ohms and the near field showed an unreasonable behavior.

The imaginary part of the current in this case, drawn with the modified NECPLOT, is shown in Figure 1. The current, normalized to its maximum, is shown by arrows in the direction of flow and proportional to the logarithm of magnitude, as shown by the scale in Figure 1. For patches, the surface current density was multiplied by the square root of the patch area. Although no testing is presently done for hidden patches, the current arrows are only drawn on patches facing toward the observer. The arrows rotate about the wire axis to face the observer, but are drawn in the plane of the patches. The plot in Figure 1 shows current appearing to diverge from a point on the top near the manhole. Reducing the number of patches on the manhole from seven to four did not change the result substantially. However, when the height of the front point was reduced from 6 meters to 5.8 meters, by sloping the patches downward from line A to the front, Dr. Ljung found that the solution was greatly changed. The current, as shown in Figure 2, had a more reasonable form and the input impedance became 0.35 + j593 ohms. Another model in which only the front point was lowered from 6 to 5.8 meters, allowing some misalignment of patch edges, also gave a reasonable outward current and reasonable input impedance.
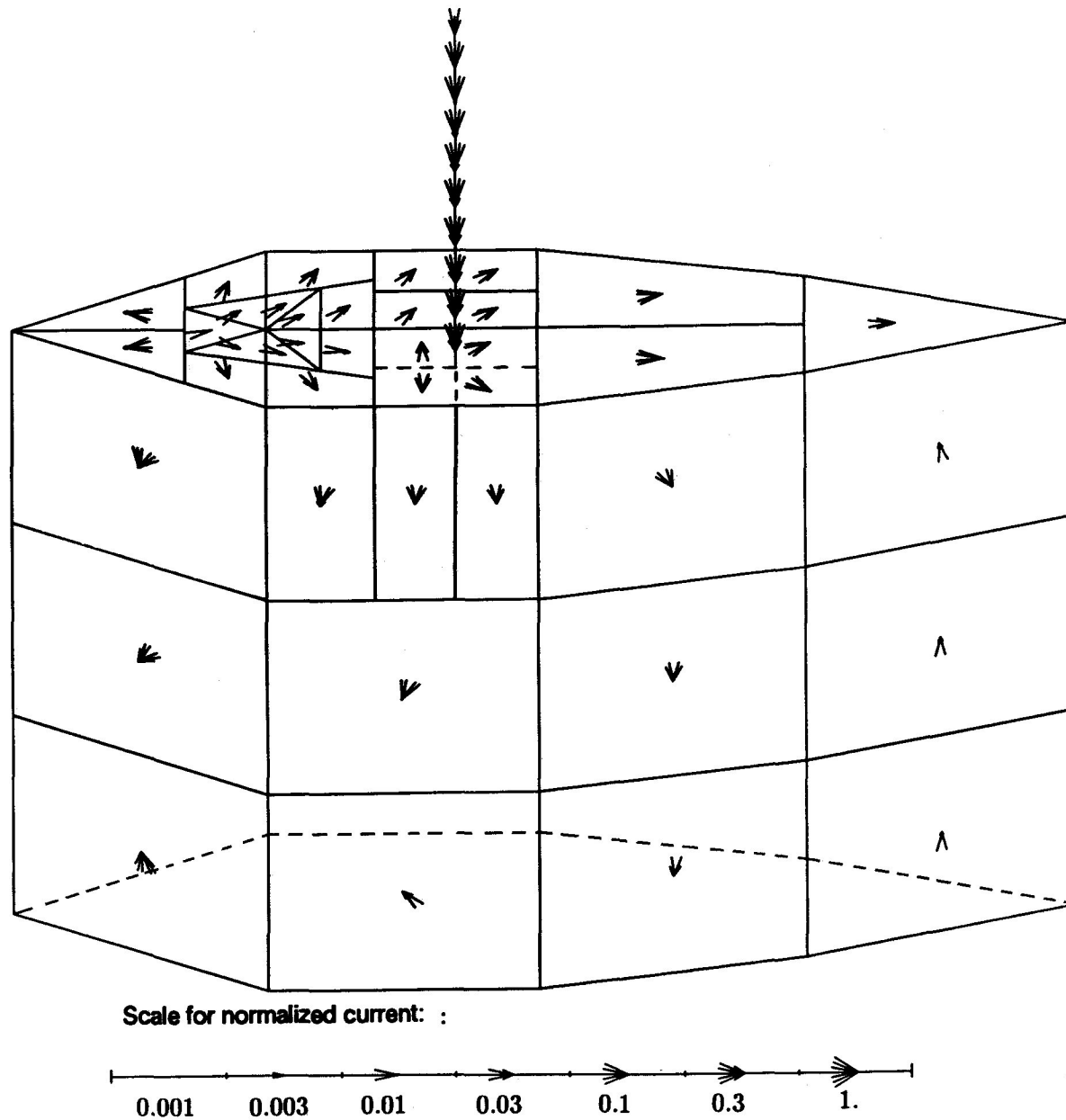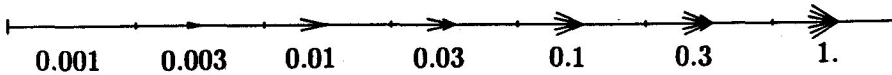
Fig. 1. Current on the conning tower at 4 MHz when the top is modeled as flat. Input impedance at the base of the whip was -191 +j1134 ohms.

We do not have an explanation for the current reversal at this time. The cross-product terms in the kernel of the MFIE seem to suggest such a reversal when only the interaction of adjacent patches at an outside edge is considered. The kernel also is zero for interaction between patches on a flat surface such as the top of the tower. Still, the correct result should be obtained when all interactions are taken into account as is done in NEC. We had encountered similar problems in modeling a cylinder with attached wires as in the example in the NEC-2 manual. The results shown in the manual are in good agreement with measurements made at the Technical University of Denmark. Currents on the cylinder, displayed with NECPLOT, look reasonable.
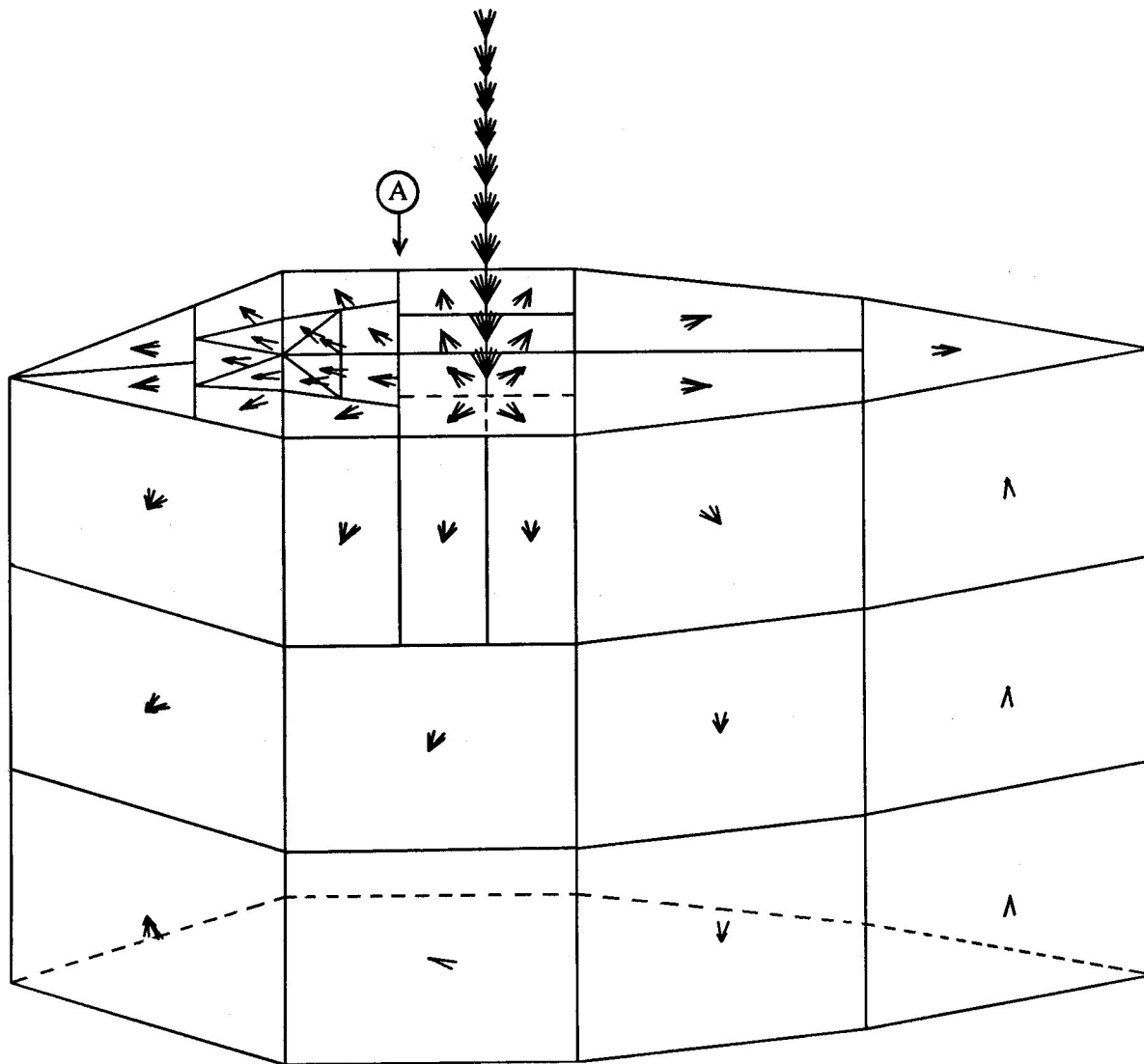
Fig. 2. Current on the conning tower when the top slopes from a height of 6 m to the right of line A to 5.8 m at the point on the front. Input impedance was 0.35+j593.

However, when more patches were used on the cylinder, the current reversed direction at the edge.

To determine the correct solution for the conning tower we need some measurements or results from a different numerical model, such as a wire grid or one of the EFIE patch codes. Also, more could probably be learned from playing with the MFIE model and checking convergence. At least these results show the usefulness of current plots in spotting unreasonable behavior of current. We now distribute the wires-only version of NECPLOT with all NEC tapes for VAX computers. The current plotting capability, in some form, would be a useful addition to IGUANA. NECPLOT is based on DIGLIB which is a public domain graphics library developed by Hal Brand at LLNL. It is written in Fortran and runs on VAX/VMS systems and on SUN workstations under UNIX. I am now working on converting it to the Macintosh, and have been told that it has been converted for PC's running DOS. NECPLOT uses only MOVE and DRAW operations and scaling, so could easily be converted to other graphics systems.

THE 6TH ANNUAL REVIEW OF PROGRESS IN APPLIED COMPUTATIONAL ELECTROMAGNETICS

AT THE NAVAL POSTGRADUATE SCHOOL
MONTEREY, CA 93943

MARCH 19 - 23 1990

Sponsored by: The Applied Computational Electromagnetics Society and DOD/USA ECOM, USAISESA, NOSC, DOE/LLNL. In cooperation with: The IEEE Antennas and Propagation Society, The IEEE Electromagnetic Compatibility Society, and URSI Commissions A and B.

"LINKING ELECTROMAGNETIC CODE DEVELOPERS AND USERS"

The purpose of this Sixth Annual Review is to provide a forum for information exchange among practitioners of applied computational electromagnetics. Contributions by both users and developers of electromagnetic computer modeling codes are solicited, addressing topics pertaining to experience gained in practical applications. The Review will highlight topics related to the design, selection, performance, and implementation of current and emerging electromagnetic modeling codes and techniques.

SUGGESTED TOPICS INCLUDE

Codes, Modifications, and Applications
    Moment Methods
    Finite Elements and Finite Differences
    Spectral Domain Techniques
    GTD and Asymptotic Techniques
Graphical Input/Output Issues
Code Validation
New Mathematical Algorithms

APPLICATIONS INCLUDE:

Antenna Analysis
Electromagnetic Compatibility
Electromagnetic Interference
Scattering
MMIC Technology
Microwave Components

1990 Symposium Program
Committee Chairman:
Dr. Scott Ray
Lawrence Livermore National Laboratory.
P.O. Box 5504, I-156
Livermore, CA 94550
(415) 423-0435

Conference Administrator/
Local Arrangements:
Richard W. Adler
Naval Postgraduate School
Code 62AB
Monterey, CA 93943
(408) 646-2352

President ACES:
James Logan
Naval Ocean Systems Center
Code 822
San Diego, CA 92152
(619) 553-3780

Vice President ACES:
Stanley Kubina
Concordia University
7141 Sherbrooke Street West
Montreal, Quebec, Canada H4B 1R6
(514) 848-3093

Prospective Authors are requested to submit a one-page abstract of their presentations by January 6, 1990 to the Program Committee Chairman. A camera-ready summary of the presentation will be required later.

THE APPLIED COMPUTATIONAL ELECTROMAGNETICS SOCIETY

ANNOUNCES

A CALL FOR CANONICAL PROBLEMS

IN COMPUTATIONAL ELECTROMAGNETICS

FOR A SPECIAL ISSUE OF THE ACES JOURNAL

A set of canonical problems will be offered to the ACES membership. Interested members may attempt to solve problems of their choice and compare their solutions and techniques -- OLYMPICS-STYLE.

The OBJECTIVE is to compare the effectiveness of numerical techniques and particular computer codes -- as implemented on various machines -- involving various problems. Foe each problem, papers will be written and published in a special issue of the ACES JOURNAL. (In some cases, these papers may be a team effort by all participants in the solution of a particular problem).

Each attempted and submitted solution will specify (as applicable) the meshes, input variables, number of unknowns, computational method (FDTD, perturbation methods, hybrid methods, etc.), basis functions, solution technique (Gaussian elimination, LU factorization, single-value decomposition, etc.), a'priori assumptions/simplifications, the solution time, and the memory used -- as well as the code and machine used. It is anticipated that a "revised" ACES Modeling Short Note form will be used for this purpose. Furthermore, for each problem, we shall attempt to standardize the graphs and other outputs.

EXAMPLES OF CANDIDATE CANONICAL PROBLEMS INCLUDE:

* Transient coupling into a box with imperfectly conducting metallic walls, with a wire connecting the top and bottom of the box.

* Transient coupling into a box with advanced-composite (anisotropic) walls, with a wire connecting the top and bottom of the box.

* Penetration of EM fields into biological material forming a canonical shape, with canonical organ placement.

* Scattering from a canonical object buried in a uniform half-space of imperfectly conducting material (useful for nondestructive evaluation, and geophysics).

* Antenna radiation in the presence of an advanced-composite ground plane.

* Transient/steady-state scattering from a perfectly conducting cube.

* Transient coupling into a box with an aperture in perfectly conducting walls.

HOWEVER, WE NEED ADDITIONAL PROBLEMS IN THE FOLLOWING AREAS:

Antennas (and their EM environments)   Radar cross section

Networks; microwave components   Shielding, radiation hazards, and EMP

Static Fields   Power Transmission

EM machines and devices   Charge transport

Dielectric and Magnetic materials

TO SUBMIT OTHER CANONICAL PROBLEMS OR FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

Harold A. Sabbagh
Special Guest Editor
Sabbagh Associates, Inc.
4639 Morningside Drive
Bloomington, IN 47401

DEADLINE for CANONICAL PROBLEM SUBMISSIONS is November 15, 1989.

ACES SOFTWARE LIBRARY

CURRENT INDEX OF ITEMS IN LIBRARY:

Item#	Description	Computer
002	MININEC2F frequency sweep	IBM-PC
003	ENHANCED MININEC2 double ARRAY size to 20 wires, etc.	IBM-PC
004	ENHANCED MININEC2	IBM-PC
005	THIN WIRE MININEC2	IBM-PC
006	NEC2	DEC VAX
007	NEC3 buried wires	DEC VAX
008	NEEDS 2.0 (MININEC3.13, IGUANA 5.4, GRAPS 2.0, NEC81 2.2)	IBM-PC/XT or AT
009	MININEC3.13, GRAPS 2.0	IBM-PC/XT or AT
011	NAC-3 ver. 1.3 Thin-wire code	IBM-PC/AT or XT
012	SIGDEMO	IBM-PC
013	Misc BASIC programs RF Designers Toolbox	IBM-PC
014	AT-ESP OSU EM Surface Patch Code	IBM-PC/XT or AT
015	VMAP 2-D vector field plot	IBM-PC
016	DRESP,DRESV2 Dielectric resonators, field distribution plots	IBM-PC
017	NEC-AM AM Broadcast array design	IBM-PC/XT or AT
018	RF65FT v2.0 RF power density for FM/TV via FCC OST BULL.65	IBM-PC/XT or AT

ANNOUNCING

"THE NUMERICAL ELECTROMAGNETIC ENGINEERING DESIGN SYSTEM"

NEEDS 2.0

(AVAILABLE only to ACES MEMBERS)

An upgraded version of the integrated, menu driven PC software package combining:

MININEC3.13

NEC81 2.2 (NEC-2 with SOMNEC)

IGUANA 5.4

GRAPS 2.0

ANTMAT 87

MININEC3.13

The latest version of MININEC, which includes geometry and impedance file-saving.

NEC81 2.2

A Microsoft FORTRAN 4.1 version of NEC-2 featuring 90 segment in-core solutions for faster runtime, new plotting output file options, a helix generator which will build flat spirals, and a selective move card option. (Still under development, but faster, more accuracy and more capability than the NEC-2 PC from NEEDS 1.0). (NGF files are currently limited to 180 segments in version 2.2, but non-NGF use of 300 segments is supported).

IGUANA 5.4

The Integrated Graphics Utility for Automated NEC Analysis partially automates the data entry process for NEC2 and MININEC3. The most painless way to learn the input data setup for NEC. This version improves file handling, allows the use of a mouse to replace the digitizer if desired, and surface patch construction in the model maker.

GRAPS 2.0

A simple rectangular, polar, Smith Chart and 2D contour (new addition) plotting package.

ANTMAT 87

The latest version of the ANTMAT broadband antenna matching program with Smith Chart displays.

DOCUMENTATION

User Manuals for all four programs, and ANTMAT are supplied as part of the NEEDS 2.0 package. An update package which brings NEEDS 1.0 up to NEEDS 2.0 contains new IGUANA, GRAPS, and ANTMAT manuals and revisions for the NEC manual. The MININEC3 manual remains the same).

SOFTWARE

Ten 5 1/4" 360k floppy diskettes supplied.

CONFIGURATION

Required: IBM PC-XT/640K RAM   Optional: Graphics compatible dot-matrix printer
           CGA graphics   (Ex: Epson compatible or HP ThinkJet are
           Math Co-Processor   specifically supported)
                                              HPGL - compatible pen plotter
                                              Microsoft Mouse (bus version)
                                              Parallel and 2 serial ports
                                              Graph-Bar Sonic Digitizer

COST:

1. $140 to ACES members only. Foreign members add $25 . Bank drafts (which must be drawn on a US Bank, showing a US address and routing numbers) or International Money Orders only. Make checks payable to The Applied Computational Electromagnetics Society. Update from NEEDS 1.0: Includes new documentation pages for 3-hole or spiral-punched manuals plus 10 new diskettes. $65. Foreign members add $15. (Current membership required).

2. Updated diskettes for NEC81 will be automatically shipped to all registered NEEDS 2.0 users as fixes to the NGF option are completed.

Order from: Dr. Richard W. Adler
                Code 62AB
                Naval Postgraduate School
                Monterey, CA 93943