

---

# Can / Am EMTP News

## Voice of the Canadian/American EMTP User Group

---

**Editor, Publisher, and Mailer:**

Thomas Grebe  
Virginia Power  
2400 Grayland Avenue  
Richmond, Virginia 23261 ; USA

**Authorized by Co-chairmen :**

Dr. W. Scott Meyer, Writer  
Dr. Tsu - huei Liu

Vol. 89-1 ; January , 1989

**Note :** The present file is a modern recreation of the original 3-column manuscript produced at Virginia Power by Editor Grebe using keyboard text (no fonts, etc.) that was supplied by W. Scott Meyer. Of course, details of the article by David Szymanski were checked with him prior to publication, and Editor Grebe saw the writing that was done for him at the end (see *"From the Editor's Desk"*). The final *"Coming Next Issue"* and *"Final Thoughts"* stories most likely were written by Editor Grebe, since Dr. Meyer has no recollection of them. Finally, Editor Grebe supplied the subscription form, and the following user group directory. During July of 1994, an optical scanner and character-recognition (OCR) software were used by Dr. Meyer to produce raw text that then was manually edited within WordPerfect to produce the present disk file. Spelling and other minor mistakes have been corrected as they were discovered. The subscription form (no longer valid) has had the blanks shortened. Finally, no clip art; and the *"Can/Am EMTP User Group Directory"* has been rotated 90 degrees.

### Table of Contents

4-Day Florida EMTP Short Course	1
4-th Annual LEC Meeting	1
Laurent Dubé to Show New TACS	3
Free Theory Book	4
New MS-DOS Version	4
Intel 80386-Based UNIX Support	5
Computation of Monte Carlo Studies	7
Student ATP Licensing	7
DEC UNIX ATP at Univ. of Illinois	8

From the Editor's Desk

8

### 4-Day Florida EMTP Short Course : April 10 - 14

The next known EMTP short course is scheduled for the week of April 10th through the 14th in Gainesville, Florida, on the campus of the University of Florida. This is to be an elementary course that will concentrate on fundamentals other than rotating machinery and control system modeling (TACS). Time will be divided between conventional classroom lectures and a laboratory in which each student will have his own 32-bit, 20-MHz, 80386-based computer running the MS-DOS version of ATP. Just as at Cal Poly last summer, students will be allowed to take the computer program and printed user documentation home with them at the end of the course (assuming they are licensable by the user group). A new feature will be a program version that does not require a numeric coprocessor, should this be wanted. Visiting faculty should include Prof. Saul Goldberg of Cal Poly, Dr. Meyer of the user group, and Mark McGranahan of Electrotek Concepts. For more information, contact the course organizer:

Dr. Dennis P. Carroll, Professor  
Elec. Engineering Department  
Larsen Hall; University of Florida  
Gainesville, Florida 32611  
U.S.A. Phone: (904) 392-0918

### 4 - th Annual LEC Meeting : October 17 - th

For the fourth year in a row, Dr. Meyer spent four weeks of fall vacation working on ATP development at K.U. Leuven in Leuven, Belgium. This is the home of LEC (the Leuven EMTP Center of the European EMTP User Group), which licenses ATP, of course. Included was Monday, October 17-th, 1988, when LEC held its 4th annual meeting.

Free ATP access by foreign EMTP user groups was agreed to unanimously by LEC members in attendance. This was in response to the report that certain user groups of the Third World had trouble raising the required foreign currency (U.S. dollars) to pay the same fee that each industrial member of Europe pays (the condition that had been offered one year earlier). There would seem to have been universal acceptance of the importance of EMTP user groups in order to establish ATP as a world-wide standard. Also, there was appreciation of the importance of treating all user groups equally. Whereas some easily could have afforded to pay, it must in fairness be noted that our own Can/Am group had been exempted from payment since the beginning in exchange for its important technical contributions to ATP. Well, it was decided that much more important than the money of five additional industrial members would be the good will and technical cooperation that should be received by LEC as a result of free ATP access to all. At least this was Dr. Meyer's observation in commanding the gathering for its decision. To non-Europeans, this makes LEC appear "purer than the driven snow" in its avoidance of commercialization of EMTP. It only serves to heighten the contrast with the insupportable royalties of DCG / EPRI .

The use of AutoCAD to assemble and display EMTP data was illustrated by LEC employees Ir. Guido Empereur and Ir. Michel Ulens using an MS-DOS personal computer (the WYSE PC 286). The audience could follow computer manipulations using a CGA projection on a big screen at the front of the meeting room. In addition to interactive data input, there are pictures of the data (e.g., for "CABLE CONSTANTS", there is a diagram showing the concentric layers). Those who criticize the user-friendliness of EMTP data assembly should take a close look at this startling development. As used by LEC, the AutoLISP feature is required, and AutoCAD must be version 9.0 or newer. More information can be found on pages 15-21 of the December issue of *EMTP News* (see "CAD superstructure of EMTP," by Guido Empereur, F. Hereygers, Michel Ulens, and Prof. Van Dommelen). Within the United States, a simplified version of such work was suggested subsequently but independently by Maurice Baker of Bell Labs in New Jersey. Mr. Baker, a former student of Prof. Tom Leskovich (Penn State at Monaca near Pittsburgh), had proposed keeping things

simpler and cheaper by avoiding the use of AutoLISP. It remains to be seen whether some cheaper CAD package could be satisfactory. The one objection to AutoCAD and AutoLISP from Autodesk, Inc., is that the software is expensive by PC standards. Unlike GEOGRAF by GEOCOMP or OS/286 by A. I. Architects, AutoCAD and AutoLISP are not readily acquired on a personal budget for home use. But they are industry standards, and they are very good.

An IBM mainframe version of the interactive plotting program "TPPLOT" has been converted and is being tested by a third LEC employee, Ir. Koen Verstringe. It is understood that this is based on IBM graphics software named GDDM. As for required hardware, some IBM graphic monitor is being used, but the model number is not known to North American authors as this paragraph is being keyed. Look for details in the next (March, 1989) issue of *EMTP news*. In addition, there should be a report on recent changes to the REWIND statement of IBM VS FORTRAN (IBM's FORTRAN 77 compiler). The reader might ask how IBM could change something as simple as REWIND so that it would cause trouble for the EMTP. Well, the March issue should explain. The whole matter seems quite incredible to those not involved with IBM mainframe software.

The ATP Rule Book is being adapted to electronic publishing (Lotus Manuscript and Freelance programs) by a fourth LEC employee, Ms. Anne Laeremans. The meeting was informed that an estimated half of the Rule Book had already been converted, and that work on most of the remainder was under way. For those not familiar with publishing software, "Manuscript" is a powerful scientific word processor from Lotus Development Corporation, which is most famous for its product named "1-2-3." Line drawings are handled by the compatible program "Freelance." Both run under MS-DOS on any IBM PC XT-compatible computer, and they are affordable (important so that others can share the computer files). ATP developers in Portland purchased the two programs locally as a package during August of 1987 for \$499 total. Output can be produced on either inexpensive dot-matrix printers or higher-quality (and more expensive) laser printers. LEC is expected to be using the latter (it was testing different models during October), followed by offset printing of the final manuscript, of course. It is the COMETT project of the European Economic Community ("the Common Market") that is to be thanked for its financial support of this important work.

Prof. Akihiro Ametani, Chairman of the Japanese EMTP Committee (user group), spent nearly three months at K. U. Leuven as a Visiting Professor this past fall. This provided Europeans with easy access to Prof. Ametani's unique knowledge about traveling waves, particularly for cables. Some of the research and

thinking of this period are reported in Prof. Ametani's article in the December issue of *EMTP News*. See pages 4-14, which are entitled: "Further improvements of CABLE CONSTANTS and an investigation of cable problems." Both Drs. Meyer and Ametani addressed the LEC meeting as representatives of foreign EMTP user groups. It is appropriate that Prof. Ametani spoke first, since his Japanese EMTP Committee was the first EMTP user group of the world, dating back to sometime in the middle to late seventies. The Europeans were second, as an outgrowth of an organization that originally serviced only little Belgium. How times have changed!

Prof. Ametani's just-mentioned paper in the December issue of *EMTP News* contains the following introductory section (symbol "[P]" is used to mark the beginning of paragraphs 2, 3, and 4): "Already twelve years have passed since the original version of CABLE CONSTANTS was produced by this author at Bonneville Power Administration. Many problems have been made clear and solved by rewriting the code and adding new functions and capabilities. The CABLE CONSTANTS, however, still involve some problems. [P] The worst is, perhaps, the case of a negative resistance or occasionally negative inductance in a calculated result, especially when some conductors of a cable system are grounded. The problem is caused by a rounding off error dependent on the numerical accuracy of the computer used, and is further due to the nonphysical assumption that the voltages of the conductors are zero at any point along the conductors. A modification of the code as a counter-measure against the former cause of the negative resistance (or inductance), which is machine (computer) dependent, has been carried out. An explanation to the latter will be given in the text. [P] Further, a new subroutine to deal with a transposed cable has been implemented. [P] Furthermore, an approach of calculating cable parameters for cables having no circular cross-section will be explained. Also, the problem of the complex permittivity will be described in the text."

October 17th was one very, very long day. Technical contributions are summarized in the official 11-page minutes of the meeting, written by Ir. Guido Empereur and Prof. Van Dommelen. Based on signatures of an informal attendance list that was reprinted on page 1, there were at least 44 participants from 15 different countries. Page 3 shows a list of the 21 meeting documents by number, title, and author. For example, number 88-R-022 is "Vacuum Circuit Breaker Modeling at Interruption of small Inductive Currents," by W. Legros, W. Salvador, and D. Bassleer (from the "Université de Liege" in Belgium). The documents themselves total some 175 pages (88 pieces of paper). This is representative of the bundle of EMTP information that is received by our Can/Am user group twice a year, after the spring and fall meetings. We

really should do some thinking about what to do with it. Permission probably could be obtained to reproduce the documents and distribute copies to ATP-licensed parties of the United States and Canada. But who would do the copying and mailing? Those in Portland and Richmond already have their hands full, so are hesitant to make additional commitments at this time.

## **Laurent Dubé to Show New TACS at Cal Poly, July 17-21**

Cal Poly of San Luis Obispo, California, again will offer an EMTP short course this coming summer. But there will be major changes to the offering of last summer, which was reviewed in the September issue of *EMTP News* (see pages 19 and 20).

All-new control system modeling (TACS) should be unveiled to the general public by its author, Laurent Dubé, at the Cal Poly EMTP short course. This will be July 17-21, 1989, which is the week immediately following the IEEE PES Summer Meeting in Long Beach just south of the city of Los Angeles, and perhaps 200 miles south of Cal Poly). For those who may not have read Laurent Dubé's general summary in the June issue of *EMTP News* (pages 16-17), the all-new TACS has been under development at BPA expense for two to three years now. It will be much more powerful and flexible than the old TACS. The Cal Poly EMTP short course provides a unique opportunity to learn about this powerful new modeling from the author, himself.

The MS-DOS version of ATP will continue to be used, with each student having his own Tandem PC AT-compatible personal computer with EGA-compatible color graphic monitor and an inexpensive Epson dot-matrix printer. But there also should be limited use of the extended-memory (OS/286) version of ATP, which avoids overlaying and table dumping/restoring, and allows arbitrarily large EMTP table sizes (within available memory). For a description of the OS/286 version, see the article by Szymanski, Leskovich, and Pierce in the June issue of *EMTP News*, pages 6-16. Both Prof. Goldberg's home computer and his office computer will support the OS/286 version that now is being used by Laurent Dubé to develop and test his new TACS. Although it still is not known whether the new TACS can be used for practical problems within the 640-Kbyte limitation of MS-DOS, the new TACS certainly can be demonstrated using the OS/286 version. With the quality projection system, which reproduces the display of the instructor's color computer monitor on a big screen at the front of the room, demonstrations can be seen by all without difficulty.

For the MS-DOS version that all can use, the projector also would be used to illustrate interactive

observation and control (SPY). This should include GEOGRAF imitation of CalComp for vector-graphic plotting (the SPY "PLOT" command). This would give the full 480 vertical pixels for either of Prof. Goldberg's two NEC Multisync monitors. Of course, if a student brings his own copy of GEOGRAF for MS-DOS Lahey F77L, he could see 348-pixel vertical resolution on the EGA-compatible monitor of his own Tandem computer. For those who arrive without GEOGRAF, Prof. Goldberg will investigate the possibility of spontaneous, on-site delivery. The purchase would be simple enough for most using VISA or MasterCard and the toll-free "800" telephone number to GEOCOMP.

The UNIX network that ties all MS-DOS computers together should be used this coming summer (it was not last summer). Not only does this provide easier distribution and sharing of computer files, but it also should allow a demonstration of parallel Monte Carlo simulation (OPMC) for those who have such interest. That is, the preliminary, tentative response to Dr. Meyer's question in the December issue of *EMTP News* would seem to be positive, as Prof Goldberg should indicate in the next (March, 1989) issue of *EMTP News*. If a student wants maximum table space for the EMTP, he just boots his MS-DOS machine normally. The network connection merely requires a special booting, to be followed by the execution of an EMTP version that would be dimensioned smaller. It all sounds informative, interesting, and fun for those who enjoy such computer manipulations.

As for an 80386-based UNIX EMTP, one can hope (no commitment has yet be made). The idea would be to demonstrate the interactive package that by then Dave Szymanski should be marketing to the general public. For more about this, see the last paragraph of the separate article about the Intel 80386.

Questions about the course can be addressed to:

Marguerite Maxwell, Short Course Administrator  
Cal Poly Electric Power Institute California  
Polytechnic State University San Luis Obispo,  
California 93407 U.S.A. Phone: (805) 756-2319  
FAX: 756-1279

If the phone is not answered in person, a recorder should give the caller an opportunity to leave a message.

## **Free EMTP Theory Book Available from BPA**

Every serious EMTP user should have a copy of BPA's 600-page EMTP Theory Book on his bookshelf. After all, it only costs the price of a postage stamp to mail the

written request for this public-domain document that was paid for wholly by BPA. A few more details were given in the September issue of the newsletter. Because the September mention generated more than a dozen requests, no doubt some readers still are unaware, so the offer is being repeated. Written requests (yes, FAX would be acceptable) should be sent to:

Dr. W. Scott Meyer or Dr. Tsu-huei Liu  
BPA, Route EOHC; Floor 4, S-14  
P. O. Box 3621;  
Portland, Oregon 97208 U.S.A.  
Phone: (503) 230-4402  
FAX : (503) 230-3212

## **Information about new MS-DOS ATP EMTP version**

The preceding issue of the newsletter mentioned that an improved version of ATP for MS-DOS was being readied. Yes, it was available by the end of September as predicted, and some 22 users already have been supplied with such materials from Portland. Others are known to have received the update second hand. Such secondary distribution is encouraged provided the recipient is licensed by the Can/Am EMTP User Group. The same goes for copies of the ATP Rule Book.

GEOGRAF is the name of the GEOCOMP software that provides vector-graphic output for either monitors, pen plotters, or printers (both dot-matrix and laser, with maximum resolution of the device). It comes from:

GEOCOMP Corporation  
66 Commonwealth Avenue  
Concord, Massachusetts 01742 U.S.A.  
Phone: 1 (800) 822-2669

But for a reader to use such vector-graphic plotting of ATP, GEOCOMP requires that the user be licensed (\$75 for the first MS-DOS computer of use). The choice among all possible display devices is made by the appropriate selection of drivers. Prior to EMTP execution, the MS-DOS ATP user should select one screen driver and one printer/plotter driver from the numerous choices that are provided on the GEOGRAF Utilities Disk. A menu-driven program named DRIVERS.EXE simplifies this process. If the reader has any question about compatibility of his particular computer, he is advised to check with the factory (note the toll-free telephone number). Also, The user group is keeping records of information about compatibility. For example, your newsletter editor can report success with an 8-pen H-P 7550A plotter at Virginia Power, and Robert Zavadil provides a similar favorable report for an IBM 7372 pen plotter that he uses at Nebraska Public Power District (NPPD). So, readers, help other potential users by sharing your experience via ATP developers in Portland.

How about "window plotting?" A month or so ago, Mr. Zavadil described his need for two plots on the same piece of paper. After reviewing Section I-L-2 of the ATP Rule Book at the request of Portland developers, he agreed that the existing ATP-compatible program WINDOWPLT should satisfy his needs. Well, as this text is being keyed Christmas day, Dr. Liu is at home debugging the MS-DOS conversion of WINDOWPLT. Just as for batch-mode vector-graphic plotting of TP2.EXE, this uses GEOGRAF. Most likely, conversion of the more-general, single-window, interactive plotting program TPPLLOT will follow. Look for a progress report in the next issue. If MS-DOS ATP users have not yet purchased a GEOGRAF license, more incentive is on the way. There is even the possibility of continued GEOGRAF use after subsequent upgrading to an 80386-based computer, since MS-DOS programs using MS-DOS GEOGRAF should be executable as a task under UNIX. Dave Szymanski is experimenting with this now.

The MS-DOS version of ATP requires only 3 high-density (1.2-Mbyte) disks thanks to the excellent and inexpensive file - archiving product named PKARC from:

Pkware, Inc., Suite 205  
7545 North Port Washington Road  
Glendale, Wisconsin 53217 U.S.A.  
Phone: (414) 352-3670

Note the modified street address and postal code (compared with three months ago). Recipients of the ATP materials may use PKARC for their own personal use, too, thanks to the generosity of PKWARE President Phil Katz, to whom all should be grateful. PKARC certainly has simplified life for those who distribute the MS-DOS version of ATP. It is most useful with high-density (1.2-Mbyte) disks, of course, since then the EMTP distribution avoids use of the BACKUP command of MS-DOS. For just 3 disks, standard, inexpensive, mailers for floppy-disks can be used, which is a big help. For those unfamiliar with the latter economics, MEI/Micro of Columbus, Ohio, sells printed cardboard floppy-disk mailing "envelopes" for 23 cents each when purchased in lots of 50. Including the three floppy disks, the total weight is just under 3 ounces, so the First Class U.S. postage is a mere 65 cents. This is so attractive compared with the mess and expense of low-density disks that serious consideration is being given to a discontinuation of low-density service. What low-density user could not locate a nearby high-density drive to perform his own conversion? Even if a few hardship cases existed, they could be serviced by someone else. What are your thoughts, readers?

Ir. Mustafa Kizilcay of the University of Hannover in West Germany did describe the most recent improvements to his interactive plotting program in the September issue of EMTP News. Any reader who is uncertain about the value of recent changes is referred to pages 2 and 3. Of course, the Can/Am EMTP user group has switched to the

enhanced package, and this includes Mr. Kizilcay's revised user instructions, which have been distributed since October along with copies of the ATP Rule Book. Whereas most ATP users have not yet seen the revised documentation, they probably can discover how to use new features without it. For example, the new version has enhanced on-line instructions. Nonetheless, a printed copy of the 10-page user instructions will be provided to any licensed ATP user upon explicit request.

DCN3.DAT is a "MARTI SETUP" data case that has caused trouble in Europe for unknown reasons. Why the trouble is being observed only now (1988 rather than 1987), and why only Europeans experience the trouble, is unknown. The symptoms are as follows for the WYSE PC 286 of LEC. The embedded "LINE CONSTANTS" data case never completes. The last-read frequency card is the one for logarithmic looping over all frequencies. Every couple of seconds, the disk light is seen to flash, presumably as results for another frequency are being written to disk. After 30 seconds or a minute of this, the disk light stops flashing and all other activity of the computer ceases. The computer is locked. With no hardware reset switch, power to the WYSE PC must be cut to regain control. If any one within North America has experienced such trouble, he is advised to contact the Portland experts. A correction exists, although it will not be distributed unless and/or until trouble is reported by others. For the record, Dr. Liu's home computer experiences no such trouble, and neither does a 10-MHz AST Premium running MS-DOS version 3.2.

William Roettger, a power systems consultant located in Naples, Florida, has pioneered the use of RAM disk to speed execution of the MS-DOS version. This is for program tables of I/O unit 2, as has been described in Section I-F-2 of the ATP Rule Book (which is distributed on computer disk as the READ\_ME.DOC file). Unfortunately, Mr. Roettger does not yet have enough extra RAM to include program text, so testing with BLOCKD51.BIN in RAM disk has yet to be tried. If a reader is interested in this second test, and if he has a computer with 1.25 Mbytes or more of RAM, he is encouraged to contact ATP developers in Portland about the matter.

Remember that updated computer disks for the MS-DOS version of ATP are available to existing, licensed, ATP users for ten dollars in U.S. currency. As before, checks should be made payable to "Tsu-huei Liu." It is Tsu-huei's home computer (a genuine 6-MHz IBM PC AT running MS-DOS version 3.0) and kids who continue to provide the fine service.

**Intel 80386 Based 24hr xepoprt**

Since the first report of three months ago (see pages 28-33 of the September issue of *EMTP News*), more information can be provided about Intel 80386-based computers for support of the ATP version of EMTP using Unix with virtual memory management ("paging"). Included is news about the coordination of hardware and software for the general public.

Readers should be informed that the Zenith 386 of three months ago no longer is being used as an EMTP test vehicle. It has been replaced by a 16-MHz AT&T 6386 that presently is owned jointly by Prof R. Thomas Leskovich of Penn State at Monaca (near Pittsburgh) and Dr. W. Scott Meyer. The author has been ordering hardware and software to configure the system optimally for ATP use. Included will be extremely high-resolution bit-mapped graphics, SPY, and scrollable windows. For years, Apollo Computer has offered Motorola hardware and its own software (the Aegis operating system and associated FORTRAN compiler) for quality support of ATP. Now the hope is that such 3-window capability (see Section XVI of the ATP Rule Book) can be provided more economically using Intel 80386-based hardware and standard Unix software. The ability to execute MS-DOS as well as Unix is a fringe benefit of the use of an Intel microprocessor.

No longer is it believed that an Intel 80386 microprocessor generally is slower than a Motorola 68020. Or, more accurately speaking in terms of the coprocessors that dominate EMTP number crunching, no longer is it believed that an Intel 80387 is slower than a Motorola 68881. The last paragraph on page 30 of the September issue of *EMTP news* might have created such an erroneous impression. The 16-MHz Zenith 386 that first was used was a little slow, but the 16-MHz AT&T 6386 certainly is not. For 4 of the 5 speed trials that customarily measure simulation speed (BENCHMARK DC-3, DC-26, DC-35, DC-38C, and DC-41 of BENCH.DAT), the 16-MHz AT&T 6386 beat the 16-MHz Sun-3/140. Conclusion: One does not need to pay the higher-prices of Motorola-based Apollo, Sun, H-P, etc., in order to obtain maximum performance from 32-bit workstations. Intel 80386 and generic Unix deliver!

About Intel Erratum 21, it can be reported that the AT&T 6386 purchased on 5 October 1988 demonstrated the now-infamous trouble of EMTP execution "hanging." This was corrected using a different kluge card, this one from Ironwood Electronics. Another report of success with a kluge card comes from Keith Adamson, whose 20-MHz COMPAQ recently was hardware-corrected by a COMPAQ dealer using a card that bears the manufacturer's name. Mr. Adamson reported by telephone on November 23rd that symptoms of Erratum 21 have disappeared since the retrofitting that was done at factory or dealer expense. While less than satisfying, such external corrections seem to be necessary a little longer.

Corrected Intel microprocessors should bear serialization such as "80386 dx-16" for a 16-MHz version. The "dx" would be replaced by "sx" for the new, cheaper alternative having a 16-bit bus, and "16" would be replaced by "20" for 20-MHz versions. But supposedly such chips might not be available to the general public before the end of the year.

A special output card and monitor have been purchased in order to provide very high-speed and high-resolution graphics and windows for the AT&T 6386. Included is a special microprocessor and dedicated memory for each pixel of the screen. There will be many pixels, too, even for those accustomed to using Apollo or Sun workstations. The monitor that was chosen offers a resolution of about 1200 by 1600 pixels (compare with 800 by 1024 pixels for the "old" Apollo as used by BPA). Even the newer Apollo DN3000 of LEC, or SUN-3/140 of BPA, only has 1024 by 1280 pixels. Lower-resolution color such as the 480 vertical pixels of VGA also is possible, so ATP developers are not restricting themselves to monochrome, either.

Cheap, large, high-speed disks are one of the advantages of the Intel 80386-based alternative. In order never again to be short of space for files (famous last words!), a disk larger than 300 Mbytes was purchased. Not only does the device have huge capacity, but it also is very fast: The average access time is close to 15 msec. For those wanting even more disk space, a representative of the manufacturer recently advised the author that the maximum capacity soon will be doubled. This is without any increase in physical dimensions, and with less than a doubling of the price (there is economy of scale). There no longer is any good reason for an 80386-based computer to be short of disk space.

Tektronix-compatible graphics are available free of charge in Unix, so it is natural to consider these for possible plotting of the 80386-based Unix version of ATP. But is such programming worth it? How many persons could or would use such capability? How many users now have Tektronix 4014-compatible terminals? Or, how many would consider acquiring such an output device? It is to be emphasized that the Tektronix alternative would not yet help to produce paper copies of plots, however, since it is unclear how to use anything other than screen drivers at the present time. Only if the Tektronix-compatible terminal had its own hard-copy unit would a paper copy be available via a Tektronix interface.

Parallel Monte Carlo simulation was described by Dr. Meyer in the December issue of *EMTP News*. The author can confirm that the Unix he is using should provide the required networking and remote file access. Yet, it is to be emphasized that this is just a theoretical evaluation. Until the author actually has two machines available in his shop at the same time, no experimental confirmation is possible. For any heavy user (e.g., BPA) of Monte Carlo

studies, this is a critical detail. A network of 80386-based computers running Unix should provide incomparable value for such heavy usage.

Can one purchase an 80386-based computer with Unix and the ATP version of EMTP (including SPY with windows) already installed? Well, in addition to being a computer consultant, the author is a computer reseller who has offered specially-configured 80286-based (PC AT-compatible) Unix systems in the past, and now is working to fill the void for those wanting the ideal 80386-based system for EMTP simulation. Of course, ATP remains royalty free, so it is not a question of selling the EMTP itself. But hardware and other system-level software should be carefully selected. Also, for maximum flexibility and productivity of the user, installation-dependent modules of ATP should be specially configured for the hardware and system-level software. Scrollable windowing for SPY is considered to be an important detail. Others include bit-mapped graphics for both batch mode and SPY, and hard copy of vector-graphic plots using common dot-matrix and laser printers. All of these are details to which the author now is attending.

Regarding price, the author plans to offer 80386-based systems, with ATP installed, as cheaply as the average national computer store (e.g., Computerland, Businessland, Sears, etc.) would sell the same systems without any EMTP considerations. Although most customers are expected to be in the United States, it is hoped that export to Canada should not be prohibitively complicated. One advantage of the AT&T 6386 is that warranty service can be performed locally in many cities across the land. For those companies that might want personalized, on-site assistance with the initial installation and use of both the new computer and its ATP software, either the author or one of several experienced colleagues would be willing to consider such extra consulting work.

Is there significant demand for just the ATP software and associated Unix operating system and utilities, separate from the 80386-based computer hardware? For example, this could be from those who already own 80386-based computers from COMPAQ or IBM (PS/2 Models 70 or 80). It also could be from companies that insist on buying genuine IBM hardware (common past practice for important segments of the electric power industry). While the author is not encouraging such retrofitting or modification of hardware different than what he already has selected, neither is he refusing absolutely to consider such possible work. But with well over a hundred different suppliers of 80386-based computers, and many possible combinations of disk, memory, output cards, controllers, etc., it is impossible to generalize. The author can only indicate his willingness reluctantly to consider the possible merits of each case individually in response to direct inquiries from interested readers.

Contributed by:

David B. Szymanski  
13821 Route 8  
Wattsburg, Pennsylvania 16442  
U.S.A. Phone: (814) 739-2517

## **ATP licensing of students by schools : 2 possibilities**

It was while responding to an inquiry from Queens College in Kingston, Ontario (Canada), that the licensing of students to use ATP was more thoroughly considered. The following policy seems fair, and workable. If a copy of the computer program or its associated documentation (e.g., ATP Rule Book) is to be given to a student, then that student requires formal registration (the ATP "AFFIRMATION"). On the other hand, if there is no such transfer of the program or its associated documentation, then students could be covered by the site license of the school. Note that there is no reduced requirement of nonparticipation in EMTP commerce, however, for this second case. The only difference is that the school accepts responsibility for the eligibility of the student if the site license is used, whereas the Can/Am EMTP User Group has this responsibility, based on a written affirmation by the student, in the case of an individual license for a student. If there are any questions, contact ATP developers in Portland.

## **Parallel Computation of Monte Carlo Studies**

Microprocessor-based workstations are sufficiently speedy for nearly all single, individual EMTP simulations. But are they fast enough for the multiple simulations of Monte Carlo studies (the EMTP "STATISTICS" feature)? In the past, certain production users declared the need for a faster computer in order to perform Monte Carlo simulations in timely fashion. But such logic no longer is correct for the ATP version of EMTP. More computer resources might still be needed, but no longer is it necessary that computational power be concentrated in a single computer.

With flexibly-networked computers such as Ethernet TCP/IP-connected Sun workstations, Apollo Aegis Domain, or DECnet-connected DEC VAX / VMS computers, a Monte Carlo study can be distributed in any proportions among as many machines as are available for the solution. The only restriction to this is an obvious one: the division must involve integer numbers of energizations, with the minimum being unity. Each computer of such an allocation usually will create a separate output file that will

be available for statistical tabulation once the partial Monte Carlo simulation is complete.

Two or more such partial results easily can be concatenated to produce statistical tabulations of the union at any later time using the "START AGAIN" and "LOAD MORE SHOTS" features of ATP. A central disk file named PARALLEL.LIS keeps summary statistics associated with all such partial solutions, and this can be interrogated at any time using the "OBSERVE PARALLEL MONTE CARLO" request of ATP -- OPMC in its abbreviated form. Even without flexible networking, Monte Carlo studies can be solved in pieces. One can even use two or more different brands of computers, and different operating systems to produce the different partial solutions. However, the interactive monitoring and control of OPMC will not bridge such a gap (it only monitors the operation within one network at a time).

Most of the preceding paragraphs came from the summary section of a 7-page article in the December, 1988, issue of *EMTP News* (see pages 43-49). Entitled "Parallel computation of Monte Carlo simulations using the ATP version of EMTP with flexibly-networked computers," this paper is authored by Dr. Meyer. It is based on development that was done while working in Leuven during the month of October. Readers are referred to *EMTP News* for details, except for an important last-minute detail. As a result of further refinement, Apollo now supports parallel Monte Carlo usage as rigorously as DEC VAX/VMS does. That is, no longer is there any possibility of failure due to Aegis allowing two programs to access the same file at the same time. Apollo receives a clean bill of health.

## **DEC Unix ATP use at University of Illinois**

"DEC VAX Unix testing of ATP EMTP at University of Illinois" is the title of a 2-page article by Bernard C. Lesieutre and Professor Peter W. Sauer of the University of Illinois in Urbana. This can be found on pages 25 and 26 of the September, 1988, issue of *EMTP News*. The opening paragraph of this report reads as follows (next paragraph):

This past summer, two projects concerning the ATP version of EMTP were undertaken by the Power and Energy Systems Group at the University of Illinois. Testing of the EMTP on DEC VAX computers that run the UNIX operating system was the first project, for which a summary will be found in succeeding paragraphs. The EMTP testing of Cray XMP and Cray II supercomputers --- among the fastest machines in the world --- is just beginning, so results of this second project must await

some future report.

Unix is coming, even for DEC VAX computers, whether users like it or not. Universities have favored Unix since its beginning, because of its flexibility, so such usage in Urbana is no surprise. On the other hand, VAX users of the power industry thus far have stayed with DEC's proprietary operating system, VAX / VMS, almost without exception. Well, that seems bound to change. Preliminary information indicates that DEC's next work station, manufactured by MIPS, will run only Unix. As present-day VAX/VMS users begin to accommodate Unix, the EMTP work in Urbana should take on added importance.

Yes, Cray supercomputers do support ATP, although it has yet to be shown that this is cost effective for the average user. It is hoped that Urbana researchers can report their findings to the general public before long.

## **From the Editor's Desk**

The December issue of *EMTP News* notified EMTP users around the world about our North American newsletter. See pages 50 and 51. One page of background explanation by the author preceded photocopy of the cover page of our initial edition (dated September, 1988).

Readers are encouraged to return the subscription forms for this publication. Eventually, there will be a deadline after which only registered parties will continue to receive issues. The truncation was not made after the September issue because it is well known that several important and interested parties simply have failed to respond to the request for registration. Well, "an offer this good can't last forever," so subscribe now!

FAX (telephone facsimile) is being used increasingly within the United States, and the same probably is true for Canada. Note that a number for me at Virginia Power is shown above. The author knows from personal experience that Drs. Meyer and Liu have a machine close to their working area at BPA in Portland, Oregon, and that the number for this is: (503) 230-3212. Finally, FAX to LEC in Leuven, Belgium, should include Prof. Van Dommelen's name and address, and can be sent to: 011 - 32 - 16 - 221 - 855. In the future, we will try to include FAX numbers along with voice telephone numbers and addresses of persons concerned with royalty-free EMTP versions.

EARN and BITNET are the names of computer networks. Have readers heard of these? Would they know how to use them? The possibility of exchanging electronic mail about EMTP was first raised within the user group by William Roettger, a power systems consultant located in

Naples, Florida. LEC responded that the network named EARN is widely used by universities in Europe, and that we in North America are supposed to have access to EARN via some other network named BITNET. But thus far, Dr. Meyer has been unable to learn anything from the BPA computer establishment (there has been no response to his November 4th request of the "help desk" within the BPA Computer establishment). While FAX is very good for words and pictures, it is deficient for EMTP data because it is not computer readable. EARN is said to involve error correction, so is ideal for sending small EMTP data cases or other computer records. Can readers shed any light on the subject?

It is hoped that this newsletter can handle small questions and problems about ATP much like a bulletin board. Items of interest can be sent to either Portland or Richmond. If the Editor or other Can/Am user group staff can answer questions themselves, they will do so. If not, questions will be passed along to subscribers.

Questions, comments and concerns may be sent to:

Thomas Grebe, Editor  
 Virginia Power  
 2400 Grayland Avenue  
 Post Office Box 26666  
 Richmond, Virginia 23261  
 USA FAX: (804) 257-4826  
 Voice phone: 257-4794

## Coming Next Issue

As previously mentioned, the newsletter staff would like to invite user group members to share their experiences and problems with the rest of the group. This will be done with several new sections of the newsletter. First, an announcement section in which users may inform the group of EMTP related upcoming events (such as the Florida seminar). Second, a question and answer section where users may request assistance in any related ATP / EMTP area. Finally, a "letter to the editor" section where users can express their opinions and share their discoveries (such as ways to improve the newsletter and use of additional RAM to increase execution).

## CAN / AM EMTP USER GROUP DIRECTORY

Name	Title	Company	Phone	Primary Area(s) of Study
Dr. Scott Meyer	Co-Chairman	BPA	(503) 230-4404	Program development and maintenance
Dr. Tsu-huei Liu	Co-Chairman	BPA	(503) 230-4402	Program development and maintenance
Thomas Grebe	Engineer/Editor	Virginia Power	(804) 257-4794	System protection, Capacitor switching
Dr. Dennis Carroll	Professor	University of Florida	(904) 392-0918	HVDC, Power electronics, switching surges
Robert Zavadil	EE/High Voltage Protection	Nebraska Pub. Pow. District	(402) 563-5464	System transients and harmonics
Victor Rojas	Electrical Associate Engineer	Los Angeles Dept. of Water and Power	(213) 481-6326	ac/dc interaction
Herbert Konkel	Electrical Engineer		(505) 667-7718	Electrical systems

Information may be sent to the editor in several different formats. If the item is "small", either fax or mail could be used. However, if the item contains a great deal of information a standard ascii text file on a low density floppy disk would be appreciated.

## Final Thoughts

The newsletter staff (Co-Chairman and Editor) feel that to have a successful newsletter participation by the user group members is essential.

*It is important to remember that the newsletter was created so a free exchange of ideas and information could be shared by users of the ATP program.*

If you wish to continue to receive the CAN/AM EMTP Newsletter be sure to return this subscription form

### SUBSCRIPTION INFORMATION

Date: \_\_\_\_\_  
 First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_ Title: \_\_\_\_\_  
 Initials: \_\_\_\_\_  
 Company: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ Country: \_\_\_\_\_  
 Do you wish to have your name printed in a user group directory? (Yes / No)  
 Would you be willing to respond to EMTP related questions in your specified area(s) of study? (Yes / No)  
 Computer system(s) used: \_\_\_\_\_  
 Operating system(s) used: \_\_\_\_\_  
 Primary area(s) of study: \_\_\_\_\_

Dr. Rambabu Adapa	Staff Engineer	McGraw-Edison Power Systems	(412) 873-2287	Capacitor, xfmr, and line switching, hvdc
William Roettger	Sr. Electrical Engineer	Roettger Engineering	(813) 774-7051	Transmission lines, TRV, machines, TACS
John Reckleff			(614) 766-5037	Circuit breakers
Bob Hasibar	Chief, System Analysis Section	BPA	(503) 230-3808	head of EMTP study section
Fred Elliott				Transformers
Jamie Austin	Systems Engineer	Pacific Power & Light Co.	(503) 464-6381	Capacitor switching
Steve Tourian	Senior Engineer	Consolidated Edison	(212) 460-4700	General overvoltage
Steven Ashmore	Electrical Engineer	Hatch & Associates	(514) 861-0583	Industrial power systems
Robert Meredith	Electrical Engineer	New York Power Authority	(914) 681-6651	Transmission switching, Harmonies
Dr. Reza Iravani	Assistant Professor	University of Toronto	(416) 978-7755	Dynamics of AC/DC systems
Daniel Durbak	Senior Engineer	Power Technologies	(518) 374-1220	Transmission systems
Narayan Dravid	Electrical Engineer	NASA	(216) 433-2733	Space station power systems
Alexander Schneider, Jr.	Senior Engineer	Commonwealth Edison	(312) 294-2776	Analysis of system problems
Mark McGranaghan	Mgr. Power Sys Products	Electrotek Concepts	(615) 675-1500	Capacitor and line switching
Stuart McKay	Graduate Student	Queen's University	(613) 545-2925	Transients and power system components
Vijay Sood	Professor	Concordia University		HVDC transmission
Walter Hinman	Senior Sales Engineer	Dowty RFL Industries Inc.	(201) 334-3100	Protection relaying/communications
Dirk Smith		GeoComp	(503) 369-8304	Geograf supplier
Clifford Diamond	Electrical Engineer	CCDiemond - Consultant	(503) 222-2109	Stray ground voltages
Dr. Adel Sharaf	Professor	UNB - E.E. Dept.	(506) 4534561	Power systems / power drives
Haukur Asgeirsson	Senior Engineer	Detroit Edison	(313) 237-8789	

Can/Am EMTP User Group - Last Updated: 1/10/89