Can / Am EMTP News

Voice of the Canadian/American EMTP User Group

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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. Editor Grebe wrote the first story. During July of 1994, the old issues published by Virginia Power were recreated in Portland using 1994 newsletter publishing standards. I.e., Dr. Meyer used Word-Perfect with two, non-threaded columns. This present issue is the fourth to be recreated, after APR89, using the same general method. Optical scanning (see JAN89) was required for the story about Salford EMTP, however, because this was rewritten in Portland after Editor Grebe had fixed his materials. It happens all the time in the news business (the front page must be redone at the last minute because of an important, late-breaking story). Spelling and other minor mistakes were corrected as they were discovered. The final issue had no clip art, so none of this is missing. Finally, the user group directory as printed was dated 10/12/89 (last update) whereas the disk file used was dated 11/06/89 (DOS DIR).

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Call for New Newsletter Editor

This will be my last issue as Editor of Can/Am EMTP News. I will be leaving Virginia Power (effective 10/20/89) and taking a position as Power Systems Engineer with Electrotek Concepts, Inc. After discussing this with Drs. Meyer and Liu, it was decided that it would be in the best interests of both parties if the role of Editor was turned over to another individual. I will be available to assist a new Editor with the next issue (January 1990). If anyone in the Can/Am EMTP User Group is interested in becoming the newsletter Editor they should contact Dr. Meyer within the next month (so appropriate plans can be made). Drs. Meyer and Liu have assured me that the newsletter will continue even if it is necessary for them to assume the responsibilities. However, it is my opinion that since they already contribute a great deal of their personal time to ATP development, it would be beneficial if another individual was to assume the Editors responsibilities. Interested individuals should have a background (or willingness to learn) in desktop publishing, specifically Ventura Publisher. It would also be desirable if the individual was sponsored by his or her company. Sponsorship would include support for the costs of reproduction and mailing.

I would like to take this time to thank Drs. Meyer and Liu for giving me the opportunity to serve as newsletter Editor. I have enjoyed working with the Can/Am EMTP User Group and I hope that my contribution has helped ATP development in some way.

An updated user group member list is included with this issue of the newsletter. The initial subscription period has ended, however interested parties may subscribe to the newsletter at any time by contacting Dr. Meyer. One subscription is all that will be needed, no need to renew each year.

Remember, if you have EMTP/ATP information that you wish to share with the user group, please contact the new editor (Dr. Meyer before Jan 1990).

If anyone would like to discuss the activities associated with being Editor please don't hesitate to call me at my new number. My mailing address and phone numbers are:

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Can / Am Co - Chairmen Thank Editor Grebe

On behalf of readers throughout the United States and Canada, the Co-Chairmen of the Can/Am EMTP User Group wish to thank Mr. Thomas Grebe for the pioneering service that he has rendered as Editor during the initial 15 months (the first five issues) of this publication. They certainly do regret the recent financial difficulties of Virginia Power that forced personnel cutbacks and reassignments, resulting in Mr. Grebe's decision to move to a consulting company. The contributions of both Mr. Grebe's personal time, and also the company printing and mailing of the final product, were appreciated by all, and will be missed. Yet, in accord with Mr. Grebe's own wishes, this is not the end of his creation. The Co-Chairmen want to assure readers that the newsletter will continue using some new editor and publisher who have yet to be selected. It is expected that the general procedures established by Editor Grebe will continue. These include the 3-column format of the printed page, quarterly publication one month after Can/Am EMTP News, and use of a special subscriber data base (designed and written by Editor Grebe using the dBase language of Ashton-Tate). The cooperation of Mr. Grebe in making a smooth transition to a new Editor (for the January, 1990, issue) is appreciated. Although Editor Grebe has not served long, he has served the Can/Am EMTP community very well, and has made a lasting contribution. In just a few months, he profoundly improved the communication of royalty-free EMTP information within North America. Can/Am EMTP history should record that not only did Thomas Grebe act as the first Editor, he also provided the critical initial inspiration and initiative. Thanks for 15 months of great service, Tom. We will miss you!

W. Scott Meyer and Tsu-huei Liu
Co-Chairmen

News About MS-DOS Version of ATP

Lahey Computer Systems announced a new Version 4.0 of its F77L FORTRAN compiler for MS-DOS in its July newsletter. ATP developers in Portland have already switched to this new product, and have distributed the resulting executable EMTP beginning with half a dozen mailings on September 23rd, 1989. A bug associated with the Version 3.0 compiler (see a later paragraph) prompted the rapid change. Later adaptation to free screen graphics for CGA, EGA, Hercules, or VGA monitors is expected to be important for the separate interactive plotting programs "TPPLOT" and "WINDOWPLT." It is hard to imagine any reason for an existing GEOGRAF user to be interested. But for anyone who has resisted the purchase of GEOGRAF drivers because of the $75 price, a free alternative soon should be available for common computer monitors. In addition, for those wanting to run the MS-DOS version of EMTP on a Weitek-accelerated, 80386-based computer, the new MS-DOS compiler should provide such support. Operation presently is being evaluated by computer expert David Szymanski using Prof. Tom Leskovich's Penn State computer. On the other hand, such usage soon should make little sense (DOS extenders that offer virtual memory management should almost always be preferable).

PKWARE's file compression software had a name change earlier this year, from the original name PKARC to the new name PKZIP. ATP developers in Portland now know that the algorithm has been changed as well, resulting in substantially improved compression ratios for the biggest of MS-DOS files, the 2.3-Mbyte TP1. Whereas PKARC produced a file just under one Mbyte, PKZIP works longer and harder (for about 5 or 6 minutes), with impressive results. Size of the output file is only 795 Kbytes. So, for MS-DOS EMTP distribution, the user group has switched to PKZIP. PKARC continues to be useful for interfacing with other computers (e.g., 80386-based Unix), however, so it should not be discarded.

MS-DOS TP1.EXE may abort after the phasor branch flows with the message "NDP Arithmetic Overflow ..." for large data cases. As explained by Lahey FORTRAN compiler expert Dan Wright on September 6th, 1989, a logic error in the Version 3.XX compiler is responsible. Within three hours of being informed of the symptoms, Mr. Wright had confirmed the trouble, and also verified that the new Version 4.0 compiler shows no symptoms of the error, which was traced to unintentional 16-bit indexing. Large data cases are the only ones affected. Relief already

has been provided by the new Version 4.0 compiler.

The use of networking and color projection of the instructor's monitor were improved mechanical aspects of the Cal Poly EMTP short course that was held in San Luis Obispo the week of July 17-21, 1989. Details are provided in the September issue of EMTP News.

"TPPLOT" and "WINDOWPLT" are the FORTRAN-based interactive plotting programs that use inexpensive GEOGRAF drivers by GEOCOMP Corporation to produce bit-mapped graphics on most popular screens, printers, and pen plotters. Several new commands have been added. The "SKIP" command allows variation of the input frequency IOUT when plotting a single curve. Exceptions to the regular omission of points include retention of the first and last point as well as all relative extrema in between. The "PL4" command now can be used with remote directories and/or disks. The same goes for the "DATA" command of "WINDOWPLT", which applies to modularized commands ".WIN" rather than plot files ".PL4". The "FILE" command now recognizes ".PL4" as the implied file type, and the previously-required leading percent sign ("%") has been eliminated. All colors now are under user control via the "SET DATA" command as illustrated by data subset number 99. Table space has been gained by the combination of what previously were two separate giant working vectors. Finally, the "CHOICE" command has been augmented to show the number of each output variable, and the "#" command allows requests for plotting by number rather than by name. More information about such changes can be found in the September issue of EMTP News, as well as the on-line "HELP" command.

GEOCOMP Corporation deserves public commendation for its support of recent EMTP short courses in Florida (April) and California (July). Licenses to use GEOGRAF plotting on all laboratory computers were granted free of all charge by Dr. Allen Marr, the President. This was for demonstration purposes during the EMTP short course only. Without this special arrangement, students would not have been able to practice on their machines what was being projected on the screen from the instructor's machine. Thank you, Dr. Marr!

VGA screen graphics using GEOGRAF drivers have been reported to work normally at Ebasco Services in New York City. In resolution, VGA is the next step above the now-old EGA standard of 640 by 350 pixels. VGA provides 640 by 480 pixels. The next logical step beyond this is "Super VGA" (see the article about Unix work of David Szymanski).

Mustafa Kizilcay's popular interactive plotting program "PCPLOT" soon should offer compatibility with C-like ".PL4" files. Mr. Kizilcay has explained that the input of plot points should be speeded substantially: "The main advantage of this (C-like) PL4 file structure is that the real and integer numbers (REAL*4 and INTEGER*4 of Lahey's FORTRAN; Single and LongInt of Borland's Turbo Pascal) are of the same binary structure ..., so reading of data will be faster. Instead of reading one byte at a time, now blocks of bytes can be read."

"Increasing table sizes for the MS-DOS version of EMTP" is the title of a 3-page article by Drs. Meyer and Liu in the September issue of EMTP News. Techniques that gain RAM for EMTP tables include the use of an old version of MS-DOS (Section I), user redimensioning of EMTP tables (Section II), or the omission of rotating machinery (Section III). In addition, several minor modifications have disabled little-used program features in order to gain the memory that they once occupied (Section IV).

RISC Workstations to Support ATP

The DEC RISC workstation (DECstation 3100) is being evaluated further by Richard Niska of Pacific Power and Light in downtown Portland, Oregon. Support for the EMTP experimentation is being provided by Dr. Meyer. For a report on initial testing of DEC RISC, see the article by Stefonek, Meyer, and Liu in the June issue of EMTP News. Beginning Tuesday, August 1st, EMTP FORTRAN was tested within the System Planning offices of Pacific Power. Some of the earlier difficulties with the FORTRAN compiler have already been corrected by DEC, whereas others remain. Upon learning that a corrected FORTRAN compiler was being readied by DEC, ATP researchers decided during mid-August to suspend testing until this was available. As this text is keyed on October 2nd, the waiting continues.

SPARC is the name for RISC workstations from Sun Microsystems, which were substantially evaluated using ATP during mid-September. The competent assistance of Steve Neighorn, an analyst attached to the Portland office of Sun, was indispensable to the work. Arrangements were made by an Australian ATP user, Mr. Gary Price of the Queensland Electricity Commission. Interested readers are encouraged to look in the next (December) issue of EMTP News for details. Rated at some 15 or 16 MIPS, Sun SPARCStation 330 is fast: Average simulation speed is about five times that of the Weitek-accelerated Sun-3/140 workstations that were purchased by BPA just two years ago. This probably is close to double the speed of the DEC VAX 8650. If one needs much greater EMTP simulation speed, RISC workstations that run Unix are the logical choice.

Data General Aviion should be the third RISC workstation to be benchmarked using EMTP. Rather than use a proprietary processor, Data General is one of many

vendors that base their RISC workstations on the new Motorola 88000, which is rated at 17-MIPS in its initial release. It is hoped that EMTP experimentation can be done by the end of October. Look for a report in the next (December) issue of EMTP News.

Intergraph (the "Clipper" people) should be the fourth RISC workstation to be benchmarked using EMTP. The factory in Huntsville, Alabama, has already agreed to supply the required FORTRAN compiler that would be used with existing hardware in the Portland area. The exact time for the experimentation has not yet been scheduled, however.

Even the Intel 80486 itself might be considered to be a RISC processor, perhaps. This radical idea dominates Dvorak's "Inside Track" column of the September 26th issue of PC Magazine (see page 75). Dvorak says: "Intel's Bill Howe gave a speech in Japan, in which he said, 'The 486 is a RISC processor with respect for its ancestors.'" Mr. Dvorak is anxious to test an 80486-based computer using Lotus 1-2-3, to see if there is unexpected, added speed. What about EMTP (ATP developers are interested in the first opportunity)?

Miscellaneous News from EMTP Developers in Portland

Delta-connected ZnO surge arresters can be handled by the EMTP, but only if special care is taken. This interesting fact first was signaled to EMTP developers in Portland by Gabor B. Furst Consultants of Montreal, Quebec, Canada. The problem is analogous to connectivity requirements of delta-connected tertiary windings of a transformer. See the September issue of EMTP News for details.

Eclipse Computing Solutions, Inc., is said to be the new name for the former A.I. Architects, the company that developed OS/286 (a DOS extender for the 80286). The address now given is: One Intercontinental Way; Peabody, Massachusetts 01960; USA. The telephone number is (508) 535-7510. ATP developers in Portland are considering further experimentation with the OS/286 version of EMTP, for which Spindrift utilities (needed for SPY) now are available. Only the CalComp-compatible graphics for SPY continue to be missing.

The first DCG/EPRI EMTP customer is still being sought. Lack of any response to the inquiry of three months ago (see page 6, the bottom half of column 2 and the top third of column 3) prompted an expansion of the search to the world-wide audience of EMTP News. Only a few key statistics of the newsletter text required change for EMTP News. For example, the estimate of the number of licensed ATP sites had risen to between 225 and 250. This includes European membership of LEC, which recently surpassed the milestone of 100 (increased from about 70 one year ago). This does not count the foreign EMTP User Groups. The Latin American EMTP User Group finally has been licensed by LEC, so free distribution in the Western Hemisphere south of the U.S. border should begin soon if it is not already under way. The ATP rolls are about to swell once again.

Constant-parameter, distributed transmission lines can now be represented exactly during the phasor solution if this is what the user wants. Without a special request (see the second subcase of BENCHMARK DC-11 for an illustration), the transient model having lumped resistance (half in the middle and one quarter at each end) will continue to be used for the phasor solution. Inspiration for the recent generalization came from Robert J. Meredith of New York Power Authority (NYPA) in White Plains. Mr. Meredith had noted substantial error in his "FREQUENCY SCAN" results at high frequencies such as 200 KHz (typical of power system carrier relaying).

Laurent Dubé handled lecturing about both the old and the new TACS (now called MODELS), at the Cal Poly EMTP short course. The week of interaction with students clearly influenced Mr. Dubé's perspective. Perhaps the most important future effect on users will be simultaneous availability of both the old and the new modeling. That is, the user will be permitted to mix TACS and MODELS within the same data case (although not using MS-DOS). For the historical record, the necessary changes were designed by Mr. Dubé as he and Dr. Meyer returned to Portland together via United Air Lines Friday afternoon, July 21st.

"MODELS: a new general simulation tool in the EMTP" is the title of a 7-page paper that was submitted to IEEE PES for presentation at the 1990 Winter Power Meeting. Authors are Laurent Dubé and Drs. Guido Bortoni and Ivano Bonfonti (the latter two from CESI in Milano, Italy). The new code being described has already been distributed in ATP versions for VAX/VMS, Sun, Apollo, and 80386-based Unix.

User instructions for MODELS have been written by Laurent Dubé using Microsoft Windows to merge graphics and text. This new documentation has become the 54 pages of Section III-F of the ATP Rule Book. It immediately follows description of the old TACS, which remains. For distribution in the USA and Canada, such pages have not been added because the average reader only uses an MS-DOS computer, and MODELS is not available for that memory-bound program version. But the pages are available by special request. Users of virtual computers should be interested, of course. Illustration of MODELS is provided by six very small data subcases of the new BENCHMARK DC-68, and larger subcases probably will be added soon. Because the user instructions

are abstract, it is important for the new user to have simple illustrations. The June issue of EMTP News showed another example.

PostScript-compatible laser printers can be used with the interactive EMTP plotting programs without added royalty thanks to the imagination and experimentation of Bob Meredith of New York Power Authority (NYPA). Further information, including a sample plot, can be found in the September issue of EMTP News.

BPA's free EMTP Theory Book continues to be distributed, although the pace has slowed in recent months. Apparently most readers already have a copy. If some reader does not, he is advised to consult an older issue of the newsletter for details, for which a separate story no longer seems to be justified. Written requests from eligible parties continue to be accepted by EMTP developers at BPA, however:

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Dr. Tsu-huei Liu<R>
BPA, Route EOHC; Floor 4, S-14
P. O. Box 3621
Portland, Oregon 97208
U.S.A. Voice: (503) 230-4402
FAX: (503) 230-3212

Of course, delivery services typically require a street address. For the record, it is: 905 N.E. 11-th Avenue, with different Zip Code 97232.

SCO (Santa Cruz Operation) Unix that is compatible with AT&T's System V, Release 3, was released around the middle of September. The portability of a special, new, batch-mode (no SPY) executable EMTP version to this new SCO operating system is being verified early in October by Ms. Khin Swe of Ebasco Services in New York City. Plotting is to be done under MS-DOS using "TPPLOT" and/or "WINDOWPLT" applied to FORMATTED ".PL4" files that can be produced by the EMTP. David Szymanski is to be thanked for his contribution of essential C-language coding for the memory location function, the date, and the time. As of October 7th, there has been no report of trouble. Look in the next (December) issue of EMTP News for more observations about the batch-mode Unix version, which is distributed using two 1.2-Mbyte, 5.25-inch, MS-DOS floppy disks that are packed using PKWARE's PKARC.

A bound copy of the Proceedings of the 17th European EMTP Meeting has been received in Portland. The 16 technical papers are preceded by an obituary of Luc Soenen of LABORELEC in Belgium, who was killed by a speedboat while swimming in the Adriatic Sea off Dubrovnik, Yugoslavia, the day before the Spring Meeting began on May 29th, 1989. The Proceedings are dedicated to Mr. Soenen, who was both well-liked personally, and also respected for his technical contributions as an EMTP user, with particular expertise in the modeling of rotating machinery. Co-Chairman Meyer worked with Mr. Soenen on problems of EMTP simulation in Leuven during each of the preceding four years (October or November of 1985-1988), and he joins his European friends in marking the sadness of the tragic accident.

Salford DOS Extender Succeeds!

The Salford DOS extender that provides virtual memory management for 80386-based computers has been proven to work correctly by ATP researcher Mustafa Kizilcay of the University of Hannover in West Germany. A detailed report should first be published in the December issue of EMTP News. Look for it!

The final serious problems were resolved by Mr. Kizilcay the week before the annual LEC meeting at which success was announced on November 6th. This is very big news. Background is provided in articles by Chun-Heng Chiang of Taiwan Power Company (Taipower) in the March and June issues of EMTP News. The significance for 80286-based computer owners is explained by W. Scott Meyer in the September issue (see the OS/2 article).

Dimensioned at 3 x default, simulation of the largest ATP test case, DC-1, is correct using just 1 Mbyte of RAM! Two megabytes are recommended, however, to eliminate paging within the time-step Loop. The demand on disk is negligible (the DOS extender is smaller than MS-DOS itself).

Both LEC and the Can/Am group are expected to support batch-mode versions of ATP using SaLford on 80386-based computers in the near future. Since any existing 80386-based computer should have enough RAM and disk, the only mandatory expense for an existing owner is for the DOS extender itself. The user group will see whether money could be saved by a group purchase (as was the case for OS/286).

A batch-mode version means no SPY, at least initially. Also, no bit-mapped graphics (it is assumed that plotting will be done using the separate TPPLOT or WINDOWPLT running under MS-DOS, with the new, universal, FORMATTED ".PL4" files providing the connection).

80386 - based Unix Work of David Szymanski

"More news about 80386-based Unix support of ATP" is the title of a 5-page article by David Szymanski in the

September issue of EMTP News. Mr. Szymanski begins with the exciting announcement of EMTP table sizing at execution time rather than at linkage-editing (binding, loading, etc.) time. The secret lies in the connection of EMTP FORTRAN to the right operating system (Unix System V, Release 3) using the right C-language coding. Lack of a FORTRAN compiler by the average 80386-based Unix EMTP user provides added value to the new, dynamic dimensioning. With the old, "VARDIM"-based procedure, the user would require the FORTRAN compiler (and linker) to change dimensions, and such software typically would cost between $500 and $1000. Now, with dynamic memory allocation, such an expenditure can be avoided. A FORTRAN compiler will not be required to alter EMTP dimensions using Szymanski's new procedure. This is an important, added benefit.

The Unix EMTP starts quickly using Mr. Szymanski's software, as the following example illustrates. Using the 20-MHz 80386 with tables sized at three times default dimensioning, the EMTP can be started and stopped in 1.46 seconds of wall-clock time. This timing was done by Unix itself, using a "timex" call prior to the EMTP execution.

Intel Erratum 21 seems to plague the 20-MHz AT&T 6386 (procured by Prof. Tom Leskovich of the Beaver Campus of Penn State) at about the same frequency as the original 16-MHz model that now belongs to Dr. Meyer. EMTP execution typically will continue without error for 4 or 5 minutes, at which point the machine will "hang," and then must be rebooted (an operation requiring several minutes). Whereas the 16-MHz machine was corrected by the installation of a "kluge card" from Ironwood Electronics, no correction has yet been applied to the 20-MHz machine. Using Weitek acceleration of the number crunching, there seems to be no problem with the reliability of EMTP execution, however.

EMTP simulation speed is proportional to the frequency of the computer clock, all other things being equal. A 20-MHz machine should simulate about 25% faster than a 16-MHz machine, and the latest 33-MHz offerings should be slightly more than twice as fast as a 16-MHz machine.

Intel, which purchased Bell Technologies some months ago, has a contract to supply AT&T with a new line of 80386-based computers. Company information says that the new computers are to augment, rather than replace, the original 6386 product line that involved Olivetti of Italy. In addition to higher speed (25 and 33 MHz), the user now has many more choices regarding configuration. The EMTP software already developed on the old AT&T product line will execute on the new computers, of course. Mr. Szymanski is already quoting prices of the new products to prospective customers (contact him in Pennsylvania at telephone number [814] 739-2517 if interested).

Variable coprocessor speed --- independent of the central processor --- has been confirmed by Mr. Szymanski using the 20-MHz AT&T 6386. By changing crystals, the oscillator frequency (and hence coprocessor speed) is modified. But the original enthusiasm for this novel modification has been dampened in part by price decreases for 25- and 33-MHz computers.

Ethernet-based TCP/IP networking has been used to interconnect two 80386-based computers -- one 16-MHz and the other 20-MHz. Functionality of the associated software seems to be comparable to that provided by Sun Microsystems for its Unix workstations. Rather than Sun's NFS (Network File System), Mr. Szymanski is using RFS (Remote File System), but functionality of the remote file access and transfers seem to be comparable. A conventional 10-megabit Ethernet connection was chosen, which allows file transfers at a rate of about 50 Kbytes/second (actual experimental timings) --- limited by the slower (16-MHz) computer.

Weitek acceleration of EMTP simulation does seem to function correctly. But there has been mild disappointment with Weitek speed, which is perhaps one third less than had been expected. Rather than doubling the speed of EMTP simulation, the Weitek 3167 increases speed by a ratio closer to 1.5. For two simultaneous simulations, Weitek actually reduces the speed.

The X Window System of MIT produces very sharp displays on the high-resolution (1200 by 1660 pixels) monochrome monitor that is being used. As an extreme case, Mr. Szymanski tested the smallest of available fonts, named "micro," which allows an amazing 400 columns and 300 rows to be displayed on the monitor. Different fonts vary maximum screen columns between 80 and 400, and maximum screen lines between 25 and 300. Whereas Mr. Szymanski began with version X10.4 software last fall, the X Windows System has since been upgraded to version X11.2, which is a very large, sophisticated product (distribution involves 22 1.2-Mbyte floppy disks!).

A colored "Super VGA" display is being evaluated as a popular, economical alternative for those who insist on color while wanting to run EMTP using the X Window System. Whereas IBM's original VGA standard provided a resolution of only 640 by 480 pixels, this was quickly surpassed by popular manufacturers of output cards and monitors. Today, color resolution of 800 by 600 ("Super VGA") is affordable, and it provides reasonable color support for the X Window System.

The 80386 is particularly attractive now because software developed for it should run on later, much more powerful models of the Intel 80X86 series. The 80486 exists today, and according to Intel, a 25-MHz version will be available in quantity this month. Faster versions of the 80486 will follow. A recent Infoworld magazine article

by Martin Marshall is entitled "Intel 80586 to contain 4 million transistors." Several interesting quotations are attributed to David House of Intel. For example: "the 50-MHz version is expected to perform at 30 VUPS (DEC VAX MIPS)." But this is just the near future. Listen to what is to follow: "By late 1995 or early 1996, the Intel i686 will appear, containing 22 million transistors, and by the year 2000, the 100-million transistor i786 will appear, running at 250 MHz ..."

Why Not an OS / 2 Version of ATP for 80286 ?

OS/2, the abbreviation for "Operating System/2," is a registered trademark of Microsoft. Under an agreement with IBM, the OS/2 operating system was written to break the 640-Kbyte barrier of MS-DOS for IBM PC AT and other personal computers that are based on the Intel 80286 microprocessor. Compared with MS-DOS, one important advance of OS/2 is said to be its ability to execute more than one program at a time. That is, OS/2 is said to be a multi-tasking (although not multi-user) operating system. A graphical, windowing, user interface named the Presentation Manager is another widely advertized advance over MS-DOS.

One reason not to work on an EMTP version for OS/2 is that 32-bit Intel hardware provide formidable competition. The economics of Intel's 80386SX microprocessor should be particularly favorable for the EMTP, since transient simulation generally is coprocessor (rather than I/O) bound. The SX is a true 32-bit microprocessor having the price ($89 for a 16-MHz 80386SX) and external connections (including a 16-bit data bus and 24-bit address bus) of the 16-bit 80286. Contrary to early expectations, OS/2 is not compatible with the average, existing 80286-based computer, which is short of the necessary RAM. The latest word is that 4 Mbytes of RAM are required for the execution of meaningful programs under OS/2. This is a critical detail: a hardware upgrade of the average 80286-based computer would be required before OS/2 could be used to support EMTP. Rather than increase the RAM to 4 Mbytes or more for OS/2, it might be better to replace the "brain-damaged" 80286 by an 80386. See page 105 of the August, 1989, issue of PC Magazine for more information. Using the 80386 and virtual memory, there would be no practical limit to the dimensioning of EMTP tables, of course. Since no 80386 or 80387 is rated less than 16 MHz, there should be a substantial gain in processing speed, too, for the average user.

It appears that Version 2.0 of the DCG/EPRI EMTP should eventually be available in an OS/2 dialect. Quoting from the July, 1989, issue of DCG/EPRI's EMTP Review: "EMTP Version 2.0 is currently being converted to the PS/2 computers. All functionality of a mainframe version of EMTP will be available on the PS/2. Therefore, the user can decide to run various portions of study work on the OS/2 and others on the mainframe ..." Well, it is hard to imagine a statement that involved more confusion between computer hardware (PS/2) and software (OS/2). Also to be criticized is EPRI's failure to explain that the cheaper (8086-based) models of PS/2 can not support OS/2, so are fundamentally incompatible with any OS/2 version of the EMTP that might be offered. Regarding technical merits of the EPRI project, those on the outside can only speculate at this time. The article in EMTP Review was devoid of specifics about EMTP table sizes, simulation speed, required RAM, etc. OS/2 does provide some sort of memory management, but this does not appear to be as general or effective as conventional demand-paged virtual memory management. History has taught us that there is reason for considerable skepticism about all things related to OS/2. For further discussion, read the 4-page article by Dr. Meyer in the September issue of EMTP News.

5-Day Florida EMTP Short Course : March 19 - 23 , 1990

Prof. Dennis Carroll of the University of Florida in Gainesville once again is planning an EMTP short course using a mixture of 80286-based and 80386-based personal computers that run MS-DOS. Improvements to his successful offering of this past April are several. First, there is the earlier date (March 19-23), which has two advantages: Not only is sunny Florida more attractive while the ground remains frozen in the northern USA and Canada, but also, this scheduling eliminates sharing of the computer laboratory with regular university students during evening hours. A second improvement is an extra half day (Monday morning) for those who want more detailed introduction to computers (the use of MS-DOS, PCWRITE, etc). The course is to begin at 08:00 AM rather than noon on Monday. A third improvement is the addition of instruction about control system modeling (both TACS and MODELS) by its author, Laurent Dubé. A fourth improvement should be the demonstration of some EMTP version for the 80386 that uses demand-paged virtual memory management. Although not all other faculty positions have yet been filled, it is known that Dr. Meyer has agreed to return, and that an expert from the large network studies operation of CESI (located in Milan, Italy) has agreed to participate. For more information, contact Prof. Carroll at telephone number (904) 392-0918.

2-day EMTP Short Course in Minneapolis during July

July of 1990 will see a new, shorter EMTP short course. This one will be offered by the University of Minnesota in Minneapolis, both before and after the 1990 IEEE PES Summer Power Meeting (which is to be held in Minneapolis). The two-day course, relying mostly on MS-DOS computers for laboratory experimentation, is scheduled for Thursday noon through Saturday noon, both before and after the week of the PES meeting (the double presentation conditioned on sufficient enrollment). Prof. Ned Mohan, the author of a power electronics textbook that recently was published by John Wiley, is the course organizer. He indicates that instruction is to be general, offering a broad, introductory-level overview of EMTP capability with emphasis on the ATP version for MS-DOS personal computers. Dr. Meyer has agreed to participate in Minneapolis much as he already has at courses in Florida and California. Location and timing were specially chosen to accommodate registrants of the IEEE meeting, which ends Thursday morning, July 19th. The resulting travel or layover on Saturday allows cheaper airline tickets, of course. The EMTP short course will be held on the engineering campus of the university, which is about a mile and a half from the IEEE meeting downtown. A city bus provides easy connections. The registration fee for the course has been set at $575. For additional details, contact the course coordinator, Lori Graven, at telephone number (612) 625-9023. Detailed technical questions probably should be directed to Prof. Mohan himself. A recorder usually answers (612) 625-3362 if Prof. Mohan does not personally answer before the start of the fourth ring.

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