Can / Am EMTP News

Voice of the Canadian/American EMTP User Group

Publishers and Mailers:
Kwang-yi and Kwang-chien Ger
3179 Oak Tree Court
West Linn, Oregon 97068
United States of America

Authorized by Co-chairmen :
Dr. W. Scott Meyer, Editor
Dr. Tsu - huei Liu
E - mail : atp @ agora . rain . com
Vol. 95 - 3 ; July , 1995

Table of Contents

Salford Compiler and DOS Extender 1
Improvements to Salford TPPLOT 2
News from Outside USA and Canada 3
More about Electronic Mail (E-mail) 3
CUSTOM PLOT FILE for REAL*8 6
European EMTP User Group 6
News about Laurent Dubé's MODELS 7
Schultz Demiming Utility for E-mail 8
MS Windows 95 (Coming) 8
IBM OS / 2 Warp Tested by NYPA 8
Watcom DOS Extender DOS4GW 9
Linux for free POSIX Unix 12
IREQ / Hydro - Québec ATP Interest 12
Type-59 S.M. with Scaled Network 13
.PL4 File Drives Type-25 TACS 14
Florida Short Course May 8 - 11 15
News about CABLE CONSTANTS 15
End of TACS STAND ALONE 15
BPA EMTP Theory Book in WP 5.1 16
Mohan Course : Portland, July 22 - 23 16
News about Intel Pentium 17
Miscellaneous Intel PC Information 18
Miscellaneous Small Items 18

Salford Compiler and DOS Extender

ClearWin+ is the Salford product that extends the old DOS compiler FTN77 / x86 to MS Windows and Windows 95 (also known as *Windoze 90-something* among OS / 2 Warp users). The remainder of this paragraph will be pasted from public E-mail of the Fargo list server dated July 15th. Walter Dykas at Oak Ridge National Laboratory (ORNL) in Tennessee (USA) has not forgotten about ordinary old MS Windows .... Since last week, the ATP ball is believed to be back in the court of Salford experts at the factory in England. Mr. Dykas has compiled and linked ATP FORTRAN using Salford FTN77 / x86 Version 3.0 and ClearWin+ Version 4.0, but has encountered an error upon any attempt to execute. This problem was referred to Salford experts in private E-mail dated July 6th ... Mr. Dykas wrote: "I consistently get a GPF with an address that occurs 26h after a CCOPY@ function. This GPF occurs before the main program runs, usually causing the debugger to terminate (after a warning) immediately after executing RUN77 TPWIN.EXE /BREAK". No, CCOPY@ can not be found in ATP source code, so it seems to be something the Salford software is adding, and then not satisfying at linking time. Mr. Dykas concluded: "I believe you have the source code for ATP from Scott Meyer or Gayle Collins, so you should be able to try this yourself. If not, ask me for more. What else can be done?" About ATP FORTRAN, this writer sent it to Ms. Collins by E-mail (using MS Mail "Attach") 4 months ago, and she acknowledged reception as follows in E-mail dated March 23rd: "I've received the message .... including the source code. .... I'll get that UUDECODEd and off to Salford Software." Of course, everyone hopes that Salford experts can identify some simple change or correction that would allow execution to continue. Can they? Does ClearWin+ have any value for ATP? This writer hesitates to even think about the more involved TPPLOT, if the more-nearly-universal ATP can not be handled using Salford ClearWin+.

Use of DISK or BOTH with $INCLUDE data was confusing for cases that never made it through the data assembly (e.g., due to a bad file name). Thus began

a paragraph in the preceding issue, which explained about the use of TEMP_FILE@ followed by the changing of .TMP to .LIS to satisfy ATP custom. Well, names such as F$014125.LIS are not very attractive, so more work was done to recover the input file name from the parameters of the batch file. As a result, the F$... files never should be seen for a version dated April 30th or newer. In its place should be used the appropriate .LIS file name (the third parameter of the batch input). The new code using KEYBRD was placed in DFLUSH, so is universal, and should work for any computer that allows ATP to find input parameters of a batch file. In retrospect, that preceding patch based on TEMP_FILE@ was ill-advised for a second reason: it did not solve the problem for other computers and/or compilers. A little more thought led to a better, more-nearly-universal solution.

STARTUP= is a new, optional appendage for the command line, to allow the user to point to some other STARTUP file than the local one that for years has been assumed by default. Within a batch file such as the standard RUNTP, this can be accommodated by adding two more parameters (%5 %6) to the argument string. Why two? Because MS-DOS filters out the equal sign as a separator. So, Salford EMTP is prepared to accept a single blank in place of the nominal equal sign. For example, the user who appends STARTUP=\atp\startall to a call to RUNTP will actually be using the single blank separator. On the other hand, the user who builds the appendage into RUNTP would (could) dispense with the extra parameters, and could use the equal sign. Inspiration for the generalization came from BPA's Randy Suhrbier, who was interested in use with DEC VMS. Actually, Mr. Suhrbier's ideas were even more general and radical. In time, more may come, then --- but not for all computers, perhaps. Current changes were made in simple FORTRAN that can be made to work for any system that will reveal the execution command (for Salford EMTP, COMMAND_LINE is used). Changes were confined to installation-dependent RFUNL1, so each computer can have its own treatment. In order not to forget the important idea, application to STARTUP was coded immediately for the computers of most common use (PCs running MS-DOS).

Use of LUNIT6 = 46 within STARTUP is a useful debugging technique of years past that unifies production printout and diagnostic print. But, prior to May 10th, there was a conflict with buffering of LUNIT6 output by LU6VRT > 0 (the value 32K appears in distribution by the user group). So, in RFUNL1, immediately after STARTUP is read, LU6VRT will be set to zero if it is found that LUNIT6 = 46. This simplifies life for the user. An associated reminder is this: DEBUG.LIS will contain only the initial diagnostic output --- that which precedes the prompt for a disk file name (assuming DISK or BOTH is being used). The normal .LIS file will contain all remaining output.

Standard data cases DC-3 and DC-54 have been modified to illustrate the use of CUSTOM PLOT FILE (explained in a later story). There was no reason to change the .PL4 file to REAL*8 other than a desire for one such illustration somewhere. Since DC3.PL4 was small, the demand on the hard disk is not increased much (7 Kbytes has increased to 14 Kbytes).

The mouse can be used to start Salford EMTP execution, as explained in the October, 1994, issue. But there was a problem: Salford SELECT_FILE@ did not seem to respond to mouse input. Clarification came from Prof. Mustafa Kizilcay of FH Osnabrueck in Germany by E-mail dated November 13th: *"I contacted Salford developers one year ago (we developed at Lahmeyer a user shell for our load flow and short-circuit programs using FTN77/486), and was told that the mouse support might be available with the release of V2.73. But it does not seem to be."* If any reader has newer information, he is invited to share it with others. Meanwhile, your Editor continues to use Version 2.66 at BPA. Thus far, no one has demonstrated a good reason to upgrade. The old 1992 compiler continues to perform superbly (*"if it ain't broke, don't fix it!"*).

Improvements to Salford TPPLOT

The REAL*8 .PL4 of CUSTOM PLOT FILE (see later story) can not yet be plotted using Salford TPPLOT. Who is inconvenienced by this? If anyone needs a utility such as PLOT2TO1 to convert from double to single precision, this could be supplied easily enough. But automatic recognition of precision of .PL4 files is not trivial for C-like .PL4 files. Your Editor is still thinking. He is inclined to do nothing in the absence of practical need.

COMTRADE output for signals of a .PL4 file are illustrated by the @COMTRADE command. It will be noted that the last line of disk file COMTRADE gives the output file name ending with extension .??? to emphasize that .DAT and .CFG are fixed file types as specified by the Comtrade standard. But there are cases where this is inconvenient. For example, if one is working in the same directory as the original ATP data file, and if KTRPL4 of STARTUP carries a minus sign, then a .DAT file already parallels the .PL4 file. It might seem logical enough to specify the same name for the COMTRADE output files; but if this is done, the ATP data file will be overwritten. Even if that were not the case, it might be convenient to have a distinct file type in order to manage a family of files (e.g., *.CTR) upon the completion of a massive conversion. Note that .CFG is rare enough, but .DAT simply is too common. In private E-mail dated July 11th, Walter Dykas of Oak Ridge National Laboratory (ORNL) in Tennessee (USA) made the suggestion that the input file type be used rather

than ignored. But there then would be a problem with continuity of past practice. So, rather than always use the input file type, it was decided to use it in place of .DAT only if the user specifies a new DAT=NO tag. The user later could cancel this decision with a DAT=YES tag, if he wanted. This feature became effective July 15th.

Parameter MATLAB is a new control for the RELAY subcommand of the EXPORT command. It is integer index 269 of TPPARAM.DAT that allows a change of this from default value 0 (no change from the past) to value unity (suppression of the 3 heading lines). Actually, the 3 heading lines are not suppressed, but rather are diverted to a new, parallel .HED (short for heading) file. Without those three beginning lines of labeling, the resulting output consists of pure, uniform columns of numbers, which are said to be compatible with MATLAB. The idea for this generalization came during a break in Prof. Mohan's short course (see separate story). James Wikston of Hatch Associates in suburban Toronto (Ontario, Canada), and Prof. Laurie Snyder of Hong Kong University in China, both suggested the need, which was easily satisfied. Prof. James Smith of Montana State University in Bozeman (USA) observed later that a new version of Matlab for Windows will ignore heading lines. But this information did not alter the proposal. The change was so easy, and so many MATLAB users are expected to have old copies for so long, that the idea remains valuable. The modification was made July 24th.

News from Outside USA and Canada

A printed copy of the April newsletter was mailed by BPA to 8 of its 9 primary EMTP contacts on May 24th. This was 1 day after the availability of APR95.ZIP was announced in public E-mail of the Fargo list server by Prof. Bruce Mork of Michigan Tech. As explained in the preceding issue, the copy for Korea was withheld until operation of the user group at KEPCO could be clarified.

The confusion about Korea was clarified rapidly enough, thanks to E-mail. This was the first item of "News:" from the Fargo list server on May 31st, from which the remainder of this paragraph has been pasted. *"E-mail from Korea dated May 29 has just clarified the matter. The list server would seem to have played an important role: 'I just received your mail to Mr. JinBoo Choo dated May 18, 1995, by way of professor Chulhwan Kim of Sung-Kyun-Kwan University in Suwon, Korea.' The address that was used successfully last year does seem to be invalid today: 'KEPCO Research Center was moved to new building in same Taejon Area. And Chairman of Korea ATP User Group was changed to 765kV Transmission Research Team leader, Dr. Jeong-Boo Kim on April 1st, 1995. .... The new address of KEPCO Research Center and E-mail address for Korea ATP User Group is as follows.*

Address 103-16, Munji-Dong, YuSung-Gu, Taejon 305-380, Republic of Korea
Phone 82-42-865-5410, 5418
Fax 82-42-865-5214
E-Mail jbkim@hanbit.kepcorc.re.kr
ebshim@hanbit.kepcorc.re.kr
jwwoo@hanbit.kepcorc.re.kr'

For the record, photocopy of the January and April newsletters was mailed to Dr. Kim at this address yesterday. This was by Air Mail, from BPA." As explained in the following story, Salford GIVE1 and GIVE2 disks followed by E-mail.

Within England, Gayle Collins did follow her advisor from York to Hull (see preceding issue). E-mail from Hull on July 6th contained the following added details: *"My email address is now* ***g.f.collins@e-eng.hull.ac.uk*** *and my telephone at the U of Hull is 01 482 465347. I still have my E-mail account at York, so that there will be some overlap if anyone tries to reach me at the old address."* But what about a mailing address for checks to pay for printing and floppy disks? Ms. Collins continues: *"I've organized the emtp/atp account in my husband's name .... so I can still be reached by mail at the University of York as follows (for mail only):"*

Gayle Collins
c/o Dr. John Wood
Department of Electronics
The University of York
Heslington, York YO1 5DD
United Kingdom

More about Electronic Mail (E-mail)

The Korean user group was sent new Salford EMTP files using the "Attach" button of MS Mail without difficulty on June 9th and 10th. Two days were required because of the time difference, and the fact that it now is standard policy to try one disk (GIVE1.ZIP in this case) before sending a second. The address from which the request came was **jwwoo@...** (see the preceding story), which corresponds to Woo Jung-Wook.

Subscription to the Fargo list server continues to grow. As part of his general information about the service, Prof. Bruce Mork of Michigan Tech in Houghton wrote the following on July 6th: *"there are over 270 users from about 35 countries."*

The Japanese user group was sent new Salford EMTP files using the "Attach" button of MS Mail without difficulty on July 28th and 29th. The immediate need was to support Taku Noda's experimentation with disk file TAKUNODE.CCC that is produced by NODA SETUP (see the January newsletter).

Chile was first heard from by E-mail on June 8th

when an inquiry about ATP was received from Dr. Juan W. Dixon, an Associate Professor at the Catholic University of Chile in Santiago. The inquiry came from **jdixon@ing.puc.cl** in response to advertising for Prof. Mohan's short course.

What about a Web (WWW) page for ATP? Harald Wehrend of the University of Hannover suggested this last fall (see October issue). But how might it be created? Directly writing the required HTML (HyperText Markup Language) is not trivial, and the first general tool to assist the process was not cheap (Interleaf's $495 Cyberleaf). But this is changing rapidly. *"Word processor add-ons are making Web authoring"* simple and cheap according to a story by Jim O'Brien on page 583 of the May issue of *Computer Shopper*. Initial progress came when *"Quarterdeck announced that its WebAuthor tool for Word 6.0 would be available by mail for under $100."* But the story gets even better: *"No sooner had that occurred than Microsoft's Internet Assistant for Word 6.0 and Novell's Internet Publisher for WordPerfect 6.1 came out as free-bies, undercutting the whole lot. In turn, Lotus' Ami Pro and Claris' ClarisWorks also will gain Web authoring capabilities by year's end, presumably at no added cost to you."*

Los Alamos National Laboratory (LANL) in New Mexico, USA, uses Mark C. Hinrichs as its primary contact for ATP communication with the user group. Most recently (early July), Salford EMTP was updated by E-mail to **mark@lanl.gov** Upon successful completion of the two transfers (GIVE1.ZIP and GIVE2.ZIP), Mr. Hinrichs offered the following informative summary in a note dated July 6th: *"Using e-mail to send UUENCODEd executable codes has been proven to me to be a successful way of exchanging files. This is a first time for me. I did receive several warning messages from my mail-host about exceeding my allotted space, but none of the lengthy mail items was truncated. It is a little more involved than using conventional FTP protocol. However, ... sticking with UUENCODEd e-mail is probably significantly more secure on the open Internet. We must be very careful here, in that 'software sniffers' on networked machines, planted by unknown offsite hackers, are routinely found"* by LANL security personnel. Historical note: a colleague of Mr. Hinrichs at LANL is Herbert E. Konkel, the man who, at the end of 1986, first proved that real EMTP could be run under MS-DOS. Unfortunately, it would seem that Mr. Konkel has a good excuse for not writing about what he now does with ATP: *"Herb is very much interested in the ATP upgrades as he will shortly begin some modeling with respect to some weapons work."* That is a problem with a lot of ATP usage at these American national laboratories: research is secret.

3D Fax is the name for the latest innovation as facsimile evolves to meet the challenge of E-mail. It is discussed by Bill Machrone, Vice President of Technology for Ziff-Davis, on page 67 of the April 24th issue of PC Week newsmagazine. So what was Mr. Machrone's initial reaction: *"it definitely isn't 3-D and it isn't necessarily fax."* But it certainly is different. *"3D Fax uses digital compression technology to convert your documents into PCX files. They can be text, graphics, binaries, data, even sound files. ... You transmit them from your PC using your fax modem, using fax protocols instead of data protocols ... When you receive the 3D Fax file on the other end, decompression software turns it back into the original format. Now here's a twist: You can send the file to any fax machine. When you do, you get a boxed picture with black-and-white speckles as output. If you scan the image into a PC, the 3D Fax software can turn it back into the original document. ... 3D Fax's compressed, printable, and scannable format means that you can archive files on paper."* Fascinating, but is it practical? For what? 3D Fax might be a solution that is searching for a problem.

The shortest E-mail address seen so far for an individual is **ktam@vt.edu** This was used on July 10th to contact Prof. Kwa-Sur Tam of Virginia Polytechnic Institute in Blacksburg (USA).

ATP licensing has been moved on the Houghton FTP server. In public E-mail dated June 22nd, Prof. Bruce Mork of Michigan Tech wrote: *"I have placed all files related to EEUG licensing, etc., in a new subdirectory **pub/atp/license/eeug** on the FTP server. The Can/Am licensing form has been moved to a new subdirectory named **pub/atp/license/canam**. If there are any other user's groups that would like to place similar materials on the ftp server, let me know."*

"Live on the Internet" is an icon-like qualifier that is seen at the end of many articles in the May issue of *Computer Shopper*. The following explanation of this was found on page 74: *"The Computer Shopper Web Edition includes hypertext versions of selected features and columns, plus weekly articles not found in the magazine. In addition, we've included shareware downloads as well as links to other relevant sites around the globe. ... Once connected, just go to **http://www.ziff.com** and select the Computer Shopper logo from the Ziff-Davis home page."*

PC Week magazine is another Ziff-Davis publication, and it, too, places content on the Internet as explained on page 101 of the May 22nd issue. But more interesting is its use of CD-ROM: *"PC Week is available as part of Computer Select, a CD ROM published by Computer Library. Each monthly issue of Computer Select contains the full text of the most recent year's issues of PC Week and more than 60 other leading computer industry publications."* So, for really big volume, CD-ROM is more practical than the Internet. This is another good reason to embrace multi-media: to be able to receive volumes of information that would be impractical via a telephone connection to the Internet.

Scott Adams is the author of the comic strip named Dilbert that is so popular among engineers and other employees who work in large offices with cubicles and computers. The copyright is by United Feature Syndicate, Inc. This will be seen in the right margin of one panel, written vertically. In the left margin will be seen the address of the author: **scottadams@aol.com**

*"Daffodillies ..... and leeks .... and the first plane home *sob*"* is the parenthetical comment that appeared on the "From:" line of E-mail from Helen (Maniatt) of Staffs University somewhere within the United Kingdom. This was June 28th. The following week (July 3rd), the message had changed to: *"Daffodillies and leeks and no rugby for months."* Your Editor does not have a clue what this is about, but he does not mind. It is funny! Corona modeling was the real subject of inquiry.

Prof. Gérard-André Capolino now can be reached at address **capolino@lsa.u-picardie.fr** In private E-mail dated May 22nd, he explained his altered circumstances. A search of past newsletters indicates that the most recent mention of his former location (Marseilles, France) was in January of 1993. Well, Prof. Capolino now explains that he moved to the University of Picardie in September of 1994 as Vice Dean of engineering with responsibility for starting an undergraduate curriculum in electrical engineering. Where? In Amiens, a small city of some 150K inhabitants that is located about 150 km north of Paris. By European standards, the university certainly is young (25 years). But it already is large, with some 28K students. Prof. Capolino explained that his university decided in 1992 to begin teaching engineering. For those who do not know, Prof. Capolino was an expert in power electronics and rotating machinery. Of course, Vice Deans have many things more important than ATP to occupy most of their time. But it is hoped that as the program grows, those at lower levels will be able to make meaningful contributions to ATP. Prof. Capolino writes about a hope for possible formal contact with *"FH Osnabrueck in which Professor Mustafa Kizilcay has been appointed. In this way, I think that ATP will be a common denominator for student exchanges."* It all sounds very good from this side of the Atlantic. For snail mail, readers are advised to use the address: Department of Electrical Engineering LSA-IUP; 33, rue St Leu; 80039 Amiens Cédex 1; FRANCE.

Croatia of the former Yugoslavia uses **.hr** for the ending of its E-mail because the real name of the country is Hrvatska. This explanation came Prof. Srete Nikolovski of Osijek University in private E-mail dated July 17th. Your Editor was curious. Croatia is an example of those exceptional cases where the English name can not be deduced from the abbreviation.

Alan Batie, the owner and operator of Agora, was the featured speaker at a May 3rd meeting sponsored by the Oregon Chapter of the IEEE Computer and Communications Societies. The title of the presentation was: *"Sooo, you want to run a Web server?"* BPA's Fred Elliott found this announcement in a newsgroup of Teleport --- unfortunately too late to take advantage of the opportunity. Dated May 3rd, the information came from Robert Knighten of Intel's Scalable Systems Division, who uses address **knighten@ssd.intel.com** The biographical information follows: *"Alan Batie has been a software engineer at Intel for 11 years, and is currently administering Intel's corporate Web site (www.intel.com), among other Web related activities. In his spare time, he runs **agora.rdrop.com**, which he believes to be Portland's oldest public access Unix system."*

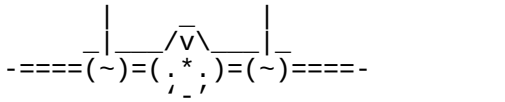
Suddenly, CompuServe is pushing direct Internet access. Late in allowing such access, presumably it now is trying to make up for lost time (and business). The June issue of CompuServe Magazine is filled with useful information. Recall that GO DINO once took kids to the Dinosaur Forum (see the July, 1993, newsletter). Well, GO FTP, GO TELNET, and GO PPP (for WWW, the Web, which is accessed as Point-to-Point Protocol) are new ways for real, heavy-duty communication with others. Anyone who might want to see a 3-dimensional, color map of Internet links of the USA (shown on page 19) is referred to disk file INMAP.GIF in the Internet New Users Forum. If this newsletter were not restricted to black and white printing, the picture would be included. About recent growth of the Internet, writer PAG states: *"Today, nine out of 10 new sites are commercial in nature, and the growth in business-oriented destinations has become explosive."*

Free Internet access in Duluth? This is what is implied by one of the entries near the start of the *Bulletin Boards* listing on page 655 of the May issue of *Computer Shopper*. Under *"Minnesota 218"* (the area code), the fourth entry reads: *"Duluth 879-0642. Echelon MLS. 6 lines, 38400. No fee, free Internet, files."* Might this possibly be paid for by real estate brokers (in that industry, MLS is the standard acronym for Multiple Listing Service)?

Thailand was first heard from by E-mail on July 27th when a note was received from Boonsarng Haraphongse of EGAT (the Electricity Generating Authority of Thailand). The initial inquiry about ATP was by FAX, to which your Editor responded: *"If you have E-mail, send a note to the user group's address ...."* Well, that is what was done, from address **spbs@email.egat.or.th** A later message clarified that, although the connection to EGAT is new, *"we do have FTP, and we are in the process of transferring files from Michigan Tech. University."*

Carl Johnson at the University of Missouri in Columbia (USA) helped Profs. Slivinsky and O'Connell acquire ATP by E-mail. The initial request came from address **johnson@ece.missouri.edu** on July 6th. It

ended with a memorable slogan: *"Through the router, off the packet switch, over the T1, ... nothing but Net!"* There also was the novel character-based logo shown below. The guy must be a pilot (looks like an airplane).



CUSTOM PLOT FILE for REAL*8

CUSTOM PLOT FILE was the request a user could make to change the precision of a .PL4 file. This was a decade and a half ago, using BPA's EMTP, in the days when IBM mainframes offered their own inferior single precision. The elderly may remember *normalized hex*, which could lose as many as 3 of the 32 bits of REAL*4 representation. This architecture, which is believed to have dated to System 360 in the early '60s, was not imitated by minicomputers sold by Prime and DEC. Nor was it copied by later microprocessor makers such as Motorola and Intel. The byte-organized structure has become the standard of the industry, but this uses normalized **binary** rather than hexadecimal. The objection to single-precision plot files was largely confined to IBM mainframes, and these already were on the way out when ATP was begun early in 1984. As best your Editor can recall, CUSTOM PLOT FILE never was used with ATP. This was prior to its re-activation on June 3rd.

The modern use of CUSTOM PLOT FILE is yet another inspiration from BPA's Randy Suhrbier, who had been doing postprocessing of ATP-generated signals. Using DEC Alpha, there was no problem with IBM's inferior single precision. But there **was** concern about possible need for more (i.e., double) precision. So, this was provided subject to several important restrictions that users should understand.

Variable L4FULL is a binary toggle that remembers the desired precision. Default value zero means single precision, and value unity means double. As with many other requests, CUSTOM PLOT FILE merely toggles this control (remember this for a second or later subcase that otherwise would not be reinitialized). Later, if there is interest, L4FULL could be added to STARTUP to allow the alternative default value (unity) that would correspond to double precision.

Negative LUNIT4 in STARTUP means that plot points accumulate in memory, rather than being written to disk at each time step. But storage used for this accumulation is single precision. So, those wanting double-precision .PL4 files must forego such storage by making LUNIT4 positive --- either in STARTUP or by means of DISK PLOT DATA (another toggle). If the user does not do this, the program will make the change. I.e., any minus sign on LUNIT4 automatically will be removed when L4FULL has value unity.

Either C-like or UNFORMATTED .PL4 files can be created with REAL*8 content. Subsequent batch-mode plotting (associated with CALCOMP PLOT and PRINTER PLOT declarations) will appear normal. But users should be aware that batch-mode plotting uses single-precision storage, so precision must be reduced as each time step is read from the disk file of LUNIT4. As a result, precision for the harmonic decomposition of signals (see the FOURIER ON declaration) can not be gained.

FORMATTED .PL4 files were not mentioned in the preceding paragraph because formatting is the same regardless of the precision. In fact, the formatting always has been done from double precision, since this is the way the output vector is assembled. More precision for the resulting .PL4 file merely requires the appropriate selection of FMTPL4 in the STARTUP file, note.

FMTPL4 was allocated only six bytes, unfortunately. This was adequate for original usage such as 8E10.0 or 10E8.0 of years past. But what about this full double precision just mentioned? The user who would like to use 3E25.15 realizes that he is short one digit. If he wanted 10 instead of 3, he would be short two. So, yet another convention must be agreed upon. One such implicit rule already has been used: any specification ending in a period was assumed to have a trailing zero (e.g., 10E10. was assumed to be a request for 10E10.0). There was no loss here because the trailing digit never was used, anyway, for optimal encoding; and for input, it was overridden by the explicit decimal points of all floating-point numbers. But now, suddenly, there are more choices. For example, for a width of 12 or more, the user might want optimally-encoded output rather than the FORTRAN E-field output that now is hard-wired in FORML4). Note the wide-open cases could be handled as 6 decimal digits. For example, from 102515 the program could construct and use the FORMAT (10E25.15) for both output and input. Any reader who wants to join in the discussion is welcome.

Eventually, batch-mode plotting, and the possible accumulation of plot points in RAM, will be switched from single to double precision. When? Probably about the time MS Window NT and its required 16 Mbytes of RAM (for good operation, according to computer expert David Szymanski) becomes accepted by the average PC user! For now, it seems best to allow double-precision .PL4 files only as a special output that can be used with separate postprocessing.

European EMTP User Group

This is a continuation of related stories in preceding issues. It documents the continuing evolution of ATP user

organization in Europe. The acronym now being used is EEUG, which indicates the *"European EMTP-ATP User Group e.V."* as formed in Hannover during November of 1994.

November 13th will be the beginning the next EEUG meeting as announced in public E-mail of the Fargo list server on July 27th. The Congress-Center in Hannover, Germany, again (as one year earlier) will be the site. *"The EEUG Meeting will consist of three main parts : 1) Technical Session; 2) Annual EEUG Members' Meeting; and 3) MODELS course. The Technical Session is open to all licensed ATP-EMTP users, whereas the Members' Meeting can be attended only by EEUG members. On the other hand, interested persons may observe this meeting as guests. On the last day of the meeting, a course on MODELS will be given by Mr. Laurent Dube, who, as developer of MODELS, will report on recent program developments ...."* Cost of the 2-day meeting is 200 DEM (German marks) for members and 300 for non-members. This *"includes 2 lunches, official dinner (Monday), coffee breaks, ..."* The MODELS course will be another 220 to 270 DEM for members or 320-400 for non-members. These ranges are based on an estimated 30 to 40 students (price decreases with class size). So how much is a Deutschmark worth these days? The connected Congress-Hotel am Stadtpark offers a single room with shower for 135 DEM/night.

E-mail now provides easier communication among all members of the EEUG Executive Board. This sign of progress came from Prof. Kizilcay in E-mail dated July 23rd. Previously, representatives from ABB and EFI were being sent messages by FAX because they were not E-mail users. Well, now all are E-mail users.

Quicken 3.0 for Windows is the money management and accounting software that is being used by EEUG to keep track of its finances. In E-mail dated July 23rd, Prof. Kizilcay wrote: *"It is a nice software with good features. At any time, a financial report can be created according to categories (e.g., total membership dues paid, costs of ATP materials, postage, etc.)."* This is another important reform compared with the former LEC (Leuven EMTP Center in Belgium): the proper keeping of records using a computer. Recall LEC had refused to disclose details of its income after being challenged by suspicious members. What excuse was given? Supposedly records of LEC were intermingled with other accounts, and could not be easily extracted. Well, Prof. Kizilcay will have no such excuse. That's the good news.

News about Laurent Dubé's MODELS

As different tasks are completed, they should be summarized in this publication. This was written in the preceding issue about Laurent Dubé's most recent contract with BPA to improve MODELS. So, let us begin the summary of progress reports as they were issued in public E-mail of the Fargo list server.

"Use of foreign models and functions" was the headline of a *MODELS Technical Note* that was broadcast from the Fargo list server on May 11th. The general information began as follows: *"A much-expanded mechanism for defining foreign models and functions in ATP/MODELS has just been installed .... Improvements are: *) Any programming language can be used for writing the foreign code (previously restricted to Fortran); for example, to use C source code, ... *) No foreign names are pre-assigned (like the old names mod001, ...); any name can be used to identify the foreign code ..... *) The details of how to access cross-language code are different among compilers; in order to provide maximum flexibility, these implementation details are not pre-coded in ATP; the user can directly modify and adapt the connection subroutines .... The purpose of these improvements is to provide more flexibility to users who need to interface ATP with other program code. MODELS has a simple built-in interface that can be used to incorporate other code into ATP without having to know the programming details of ATP's source code. External code written by or available to the user can be used directly as submodels and functions of MODELS. In addition, when a type-94 ATP component is used for connecting the model of a network component to a data case, then the description of the operation of that component can be supplied by external source code just as easily as by a model written in MODELS. This is equivalent to adding new or modified components to ATP without having to modify the ATP program."* The disk file name MOD001 was changed to FGNMOD on June 20th. The change is not only to the UTPF segment, but also to translators (only those for Salford and VAX were changed at this time).

"Defining top variables in the MODELS section" was the headline of a *MODELS Technical Note* that was broadcast from the Fargo list server on May 18th. The first paragraph began: *"It is now possible to define variables at the top of the MODELS section of a data case, in addition to the existing input and output declarations. These variables are defined outside the models of the MODELS section, and may be used for carrying values from one model to another in the data case. They are declared in VAR declarations of the form ...."*

"Use of random numbers in ATP and in MODELS" was the headline of a second *MODELS Technical Note* that was broadcast from the Fargo list server on May 18th. This concluded as follows: *"This also means that the use of the random() function in MODELS will now generate reproducible sequences of random numbers between 0 and 1. Users who want to use non-reproducible random sequences in MODELS can create*

their own foreign functions to seed and use a random number generator. This is done easily in C, because the names of the functions for doing this have been standardized, which is not the case for Fortran. The equivalent in Fortran would be different from one compiler to another. Here is how it can be done in C: ...."

"Use of MODELS with ATP STATISTICS" was the headline of a third *MODELS Technical Note* that was broadcast from the Fargo list server on May 18th.

"New nonlinear COMBINE in MODELS" was the headline of a *MODELS Technical Note* that was broadcast from the Fargo list server on May 21st. It began as follows: *"Nonlinear COMBINE groups have been added to MODELS in ATP. There are now no restrictions on the type and number of value assignments that can be made inside a nonlinear COMBINE group. Assignments can be any of the following:*

- *DIFFEQ and CDIFFEQ*
- *LAPLACE and CLAPLACE*
- *any type of assignment of the form variable:=expression*
- *any number of static and dynamic min/max limits in the group."* This explanation, like most others, ended with an illustration (ATP data).

The coexistence of TACS and MODELS in the same data case became possible around the end of June. This was announced by Mr. Dubé in public E-mail dated July 12th. Look in the next issue for details of this important development, which first was envisioned six years ago in San Luis Obispo, California, at Prof. Saul Goldberg's 1989 Cal Poly short course. Any translation dated July 5th or newer will have the new capability as illustrated by a new 4th data subcase of standard benchmark DC-30.

A new MODELS HYBRID declaration has the same meaning as the old MODELS declaration: it precedes all MODELS data for a case that involves an electric network. Beginning July 9th, the two are equivalent. Completeness was the only reason for the addition. For some two decades, there has been a TACS HYBRID declaration, so it seemed like a good idea to allow the parallel construction for MODELS. The 7th subcase of DC-68 illustrates the new usage. The 1st subcase was modified to illustrate the new MODELS STAND ALONE (see separate story about TACS STAND ALONE).

Schultz Demiming Utility for E-mail

This is a continuation of the same story in the preceding issue. Recall that Robert Schultz of NYPA (New York Power Authority in White Plains) wrote his own demiming program, but qualified its use as follows: *"my program is a quick hack, and is not expected to be used in a commercial way. I do not have access to any documentation on Mime at all (my limited implementation was deduced based on observation of mimed vs. original text)."*

Prof. Mustafa Kizilcay of FH Osnabrueck in Germany was the first to have offered a professional replacement. In E-mail dated May 22nd, he wrote the following about his two attachments: *"1) PCMIME.ZIP (MIME packing and unpacking program; all the lines in an E-mail preceding 'MIME-Version: 1.0' must be deleted); and 2) SLEEK.ZIP (A utility to wrap lines of a text file that are too long, or oppositely, to convert lines with hard returns to paragraphs suitable for word processors)."*

A second demiming program was supplied by Mr. Schultz in E-mail dated June 1st. He wrote: *"I just downloaded this freeware mime64 encoding/decoding package for os/2. It is freeware. Can't beat that! I modified the zip file to include the two necessary dll's."* This came from NYPA itself as opposed to the private service (Execnet) with which Mr. Schultz began. It seems that an attached file is sent automatically in a separate message. This was clearly documented as follows:

```
   * * * [ Notice from InterHub ] * * *
**************************************
** This message had file attachments. **
** Each file is being sent to you as  **
** separate UUencoded message.        **
**************************************
Attachments:
  MIME64A.ZIP         63,936 bytes
```

MS Windows 95 (coming)

The funniest story about MS Windows 95 can be found on page 21 of the July issue of *Computer Bits* magazine. This begins as follows: *"A fledgling consumer lobby group has announced it will file consumer fraud charges against Microsoft in all 50 states in an effort to have the sale of Windows 95 banned."* What is the nature of the complaint? *"Windows 95 will not work on computers equipped with four megabytes (MB) of memory. Martin is backing up his allegation with a recent article in The Wall Street Journal (WSJ). In the May 25th issue the WSJ writer said, 'On a 4MB machine, Windows 95 will only be effective running a single major program at one time, and the new Windows 95 versions of many of the most popular major programs, including Microsoft's key titles like Word and Excel, won't run at all' Martin alleges that 'very few' PCs in use today are equipped with more than four megabytes of memory."*

IBM OS / 2 Warp Tested by NYPA

IBM's OS / 2 is being used for the support of ATP

by Robert Meredith and Robert Schultz of NYPA (the New York Power Authority in White Plains). This is a continuation of the same story in the preceding issue.

"ATP for WIN NT available from NYPA" was the Subject of public E-mail from the Fargo list server dated June 14th. In this, Robert Meredith wrote as follows: *"Why not? We have the code. It took a few minutes to link it. It works. So what the heck! We announce the availability of ATP for Windows NT from NYPA, with the same enhanced plotting capability available for OS/2. Of course it's the same plotting capability; it's the same code! We've just linked the Watcom objects for a new target -- Win NT. Since there are no graphics calls in what we use for OS/2 (e.g., no SPY), it works equally well for Win NT. The drawback? No color graphics display program. That would take some work. The solution? Ghostview/Ghostscript for Windows or for Win NT can display the Postscript plot file, step through it and print selected plots - just the same as suggested for use by OS/2 users without Postscript printers. You see B/W plots as they would be printed. This is not as slick as color, but for now, perhaps better than nothing. .... Thus the OS/2 and Win NT versions of ATP from NYPA now support full-featured plotting to printers never before supported. The Ghostview and Ghostscript files needed for this use are available on the Internet from* ***ftp.cs.wisc.edu*** *.... ATP for Win NT is available by uuencoded (if our NYPA gateway keeps working) or MIME encoded e-mail from NYPA. .... (Bob Schultz and I still greatly prefer OS/2, but if you can't have the best, Win NT is still pretty good after you pour enough money into it for an editor, file comparison, tape backup w/compression, communications program, word processor, spreadsheet ....) Get the picture?"*

OS/2 Warp was installed on the Compaq/486 that is used by Dr. Tsu-huei Liu at BPA. This was June 27th through the 29th, by Bill Hagan of the BPA computer establishment. The most important discovery or consequence of the change occurred the following day, during an attempt to compile installation-dependent OS2MODS as had been used with DOS4GW (see the following story). First, the compiler could not find the two associated INCLUDE files GRAPH.FI and GRAPHAPI.FI (used throughout the Graphics Library book). Then developers could not find the files. Finally, the following sentence was located in Section 1.8.2 on page 7 of the Read Me First booklet: *"Note that only a DOS version of the WATCOM Graphics library is available."* No, this had **not** been noted! How or why should it have been? This single, inconspicuous mention seems to be confined to the section entitled *WATCOM F77^{32} Extended DOS Graphics Demonstration*. It has not been located anywhere else (e.g., within the Graphics Library book). Anyway, this discovery effectively ended work with Watcom windows and graphics. The advertised multiplatform capability seems limited to character operation.

Robert Schultz spent more than 12.5 hours of July 27th at BPA, improving the OS/2 installation on Dr. Liu's Compaq 486/33. His success was considerable. It began with an upgrade from standard VGA to 768 x 1024 resolution. This was after two abortive attempts: first using a standard IBM 8514/A driver, and then using a Compaq driver from the Hobbes FTP site. But the latter was too old (not Warp), so he acquired a Warp driver directly from a Compaq FTP site. Finally, this did work. For all of these transfers, Agora performed admirably. Once decent resolution had been obtained, Mr. Schultz rearranged icons (using VGA, they occupy too much real estate, he explained). Finally, he installed his Watcom compilation and linking scripts, and demonstrated successful compilation using OS/2 on your Editor's ATP FORTRAN that is used for DOS4GW (next story). It was quite a day, including no dinner and only a quick sandwich in the cafeteria for lunch. Summary: NYPA has given more than a pint of blood to see that ATP developers in Portland are able to use OS/2, and the recipients of this assistance are most grateful.

Watcom DOS Extender DOS4GW

Simple, ordinary MS-DOS was the next operating environment that was used to test and develop code that will be used by IBM OS/2 users. This was possible because of an unusual feature of the compiler that had been selected by NYPA : Watcom from WATCOM International Corporation of Waterloo, Ontario, Canada, can be run under either MS-DOS, or MS Windows, or Windows NT. Watcom F77^{32} is described as a multi-platform compiler. Because OS/2 computers were not yet readily available to ATP developers in Portland during March, a decision was made to use DOS for immediate testing of the compiler, which was purchased on April 5th from Provantage (one of two recommendations provided by NYPA) of Canton, Ohio, for $354 plus $13.40 for shipping and handling.

The Watcom compiler is not being recommended to others as an alternative to the Salford compiler, your Editor wants to state in unequivocal terms. While the Watcom product seems to be reliable and consistent, it has many disadvantages compared with Salford FTN77/486. The Watcom product compiles much slower (about a factor of 10), has a weaker library, and results in slower ATP execution for MS-DOS computers (using Watcom DOS4GW rather than Salford DBOS). So, there is no general recommendation of the Watcom compiler, although it does have two important advantages: 1) it is cheap; and 2) it has multiplatform (most importantly, OS/2) output. It is the choice for those wanting to run ATP under OS/2, not under DOS.

Some Japanese Intel-based PCs sold within Japan are Salford-incompatible because, by design, they are not

IBM-standard. Is it possible these might be Watcom DOS4GW-compatible? The question first was raised in public E-mail of the Fargo list server dated April 30: *"Japanese .... are asked to consider Watcom. Might Watcom ATP run under DOS on their PCs (e.g., NEC or Fujitsu) that are not IBM-standard? Chapter 21 of the Watcom FORTRAN 77(32) User's Guide mentions switch DOS16M on pages 219 and 220. Specifically mentioned are setting 1 for NEC 98-series, 5 for Fujitsu FMR-60 and -70, 14 for Hitachi B32, and 15 for OKI if800. Are these the non-IBM-standard models?"* In a private response, Gayland Bloethe of Sargent and Lundy in Chicago, Illinois, USA, questioned whether OS/2 might solve such problems. Pasting from E-mail dated May 2: *"OS/2 provides all of the functions, such as memory management, that would be performed by a DOS extender. Based on this I would assume (without using Japanese hardware) that the OS/2 version of ATP would work on any computer that was successfully running OS/2."* But your Editor remains unconvinced. In reply, he wrote: *"... it is not clear that the trouble has anything to do with memory management. Consider old, ordinary 640-Kbyte DOS, which runs both here and there. The problem is, it is not the same DOS! Obviously, Japanese want to support their own language, and this and other things have been connected differently."* What reader is certain of the status of OS/2 in Japan? Will a program that was linked here be executable there?

RUNTP.BAT is used by Salford EMTP to handle parameters. Usage is illustrated by RUN.BAT that will execute all test cases. Well, April 29, identical capability was added to Watcom ATP. This uses FGETCMD as described on page 112 of the Watcom User's Guide. Yet, initially, there was an infinite loop involving ATP output for the case of a bad file name. How Salford EMTP avoided this is unknown. In any case, universal subroutine OVER1 was fortified by added protection that solved the Watcom problem. For batch-file usage (KPARAM not zero), the user will not be reprompted for a new input file name if the first name is found to be defective. The new rejection message reads as follows: *"Halt. Bad input data file name was supplied by a batch command file. Name of file that could not be connected is: ...."*

C-like .PL4 files can be supported efficiently using the Watcom compiler, although it is a little tricky. The header is CHAR*1 (i.e, all header information is handled 1 byte at a time). The signals (floating-point numbers) are handled as one record per time step as first proposed by Prof. Bruce Mork of Michigan Tech in Houghton (see the special STARTUP switch LENREC that first was described in the January, 1994, newsletter). The original implementation was an option for Salford EMTP, recall. Now, Watcom ATP will provide the proper alignment automatically, of course. This alignment is required for Watcom use, so there is potential trouble only when a .PL4 file might be imported from some other program. The first correct C-like .PL4 was created by DC-45 on May 12th, and all test cases were using the procedure by May 14th. Readers should note that any C-like .PL4 file of Watcom ATP can be used with either Salford EMTP or TPPLOT. But, for Salford EMTP to create a C-like .PL4 file that can be read by Watcom ATP, variable LENREC of STARTUP must have value unity.

Discoveries of compilation were significant and important as universality of the UTPF is reestablished (in recent years, it has suffered). A summary follows:

1) Isolated global SAVE usage resulted in fatal errors involving COMMON. Three subroutines (DIMENS, FAULTS and XFCHEN) had to be switched to selective (i.e., explicit as opposed to implicit) SAVE. This was sloppiness of the past two years (Mr. Schultz removed all such usage during the fall of 1993 as part of his famous revolution).

2) Files such as STARTUP that are read but not modified were protected using a special Watcom modifier of OPEN statements: ACTION='READ' . This must be used along with STATUS='OLD' in place of the simpler, the single Salford STATUS='READONLY'

3) Numerous places in the program (most commonly in the MODELS code from author Laurent Dubé), an unconditional GO TO precedes an END statement. In order to suppress a warning from the Watcom compiler for each such usage, a guaranteed condition was attached to each such jump. The first example can be found at the end of MAIN00 where overlay NCHAIN is checked as follows: IF (NCHAIN .NE. -99444) GO TO 2000 For all the required modifications within MODELS, the condition IF (UNIT14 .NE. -987654) was used.

4) Unused arguments of subroutines such as LU4WRT (to write C-like .PL4 files) produced warnings about unused variables. This was reminiscent of Lahey F77L as used in 1989 and before (the MS-DOS years before Salford). So, dummy uses were added to produce clean compilations.

5) Usage of date and time in DATIME were copied unchanged from NYPA ATP FORTRAN. This was the only installation-dependent feature that was salvaged.

6) In OVER1, KODEBR was changed to LITYPE because of a subsequent warning about inconsistent COMMON lengths in SUBR1. This was because both modules were in the same disk file (each by itself would have been fine). The length of the COMMON block had been extended by an EQUIVALENCE in OVER1 .

7) User-supplied source code name FTNNNN had been used twice in the dummy interface that is provided by MODELS author Laurent Dubé --- first as a FUNCTION and second as a SUBROUTINE. Watcom objected to such sloppiness, so the second was changed to FTNYYY within FTNFUNDO (3 places).

All Monte Carlo (STATISTICS) and SYSTEMATIC data cases failed until a universal error eventually was recognized and corrected. This concerned the placement of initialization N6 = 0 within OVER12, which

precedes DO 4216 that may define it. But what if that loop was not executed? Then N6 was undefined for use in a block zeroing operation of MOVER0 below the loop. Unfortunately, that zeroing could be executed even if the loop defining N6 was not, and Watcom ATP had a value around 275 million for DC-16. There would seem to be no protection, since there was no clean termination of ATP. Instead, the computer would hang, and have to be rebooted. Well, the solution was to move N6 = 0 upward past an IF statement to S.N. 3703

Turbo table dumping by Robert Schultz seems to be fully compatible with the Watcom compiler. Initially, all test cases were solved correctly without such use (i.e., using JTURBO = 0 within STARTUP). Then binary switch JTURBO was toggled to unity, and solutions were found to be comparable. The important step was completed May 11th.

The NAMED= option of INQUIRE works differently for Watcom than for Salford. The Salford code uses this in LU2REW to distinguish between a scratch (false) and a permanent (true) file. But Watcom returns "true" for both cases. Watcom does not seem to work like DEC VMS, either. But Watcom does work. So, a modification was made to use the NAME= tag along with UNIT=LUNIT2. For DC-24, this was needed to create DC24.BIN without $OPEN having this name. Then DC-40 identified a second occurrence of the same problem. Formerly universal logic in SUBR1 has been modularized in new SUBR1A to allow for these Watcom differences.

Failure to flush output buffers is a primary complaint of your Editor about Watcom DOS4GW. The previously-mentioned error with MOVE0 in OVER12 was identified very slowly primarily because DEBUG.LIS did not contain all output prior to the fault (a page fault). In fact, only part of preceding table restoration was seen, so at first it was thought that there was trouble with table transfers. But no, as more diagnostic printout was added, execution seemed to go further. Since output to the screen involves no buffer, this was more useful that WRITEs to DEBUG.LIS via unit 46.

Watcom DOS4GW is slow to start and stop a big program such as ATP. For example, using 3.0 times default dimensioning for both linking and execution, it takes about 20 seconds for the opening prompt to appear after execution has been ordered (DOS4GW TPBIG) on a 33-MHz 486. Another 10 or 11 seconds are required to halt the program (the delay between the STOP statement and the time the MS-DOS prompt reappears). Increasing the dimensioned limits to LISTSIZE.BPA as used to create Salford TPBIG, the starting time did not change noticeably, but the ending time about doubled, so it, too, was more than 20 seconds. This was using MAXMEM = 14288 (i.e., 14 Mbytes) of the 16 Mbytes available. To anyone accustomed to Salford performance, such delays represent a continuing aggravation. DOS4GW is not recommended to any user whose computer is Salford-compatible.

MODELS author Laurent Dubé has reviewed the Watcom interface to C (see preceding issue), and concluded that it is comparable (if not identical) to what Salford has done. So, neither the flexibility of user-supplied source code (including C), nor the speed to compiled MODELS, nor work on a faster interpreter (which is understood to use C rather than FORTRAN) would seem to be compromised by a switch to Watcom.

CALCOMP PLOT is the declaration for batch-mode graphics of ATP (if not inhibited by NOCALC = 1 in the STARTUP file). This was the next improvement, which first showed recognizable signs on May 19th. As initially implemented, the following is true: VGA graphics are assumed, and there is no hard copy in the form of bitmaps for printers. There also are no color bitmaps from the screen (the .PCX files that are controlled by parameter NODPCX of STARTUP for Salford EMTP). But HP-GL and PostScript copies should operate as with Salford EMTP (controlled by NOHPGL and NOPOST of STARTUP). Several minor bugs of Salford screen plotting were discovered by careful comparison with Watcom screen plotting. For example, if the first subcase of DC-4 were converted from PRINTER PLOT to CALCOMP PLOT, it will be seen that Salford EMTP does not mark the single curve of the second plot. In fact, it tried, using a garbage (undefined) character in SYMB within LINEXX. No effect was seen on the screen. Watcom, on the other hand, marked with the wrong character. Although symptoms were different, the problem was universal: because so many visually-redundant points had been discarded, the curve had too few points to be marked regularly, and curve number was not being defined. Of course, the correction was made (now, the symbol always is defined).

The use of DISK will not suppress batch mode graphics with Watcom ATP as is the case with Salford EMTP. This is because Salford EMTP avoids the screen by plotting to RAM instead (a virtual plot). But such sophistication has not yet been tried for Watcom. Any user of DISK (e.g., within RUN.BAT to exercise all test cases) is warned to keep D4FACT of STARTUP positive unless he intends to press **<CR>** after each vector screen plot.

Spy windows that look much like those of Salford EMTP were added next, as announced in public E-mail of the Fargo list server dated May 31st. *"This followed Mr. Schultz's contribution of a key ingredient: Intel assembly language to provide a conditional read of the keyboard (missing in the Watcom FORTRAN library). .... Watcom graphics look OK on a standard VGA screen, but there seems to be no way to produce a bitmap that could*

be copied to a printer (recall the LJ2 or EPSON subcommands of Salford TPPLOT). So, HP-GL and PostScript output are more valuable than ever."

That glitz HELP screen that is controlled by NOHELP was added June 9th. This, too, looks just like Salford EMTP, although content is distinct.

VECLIB.OBJ and DAMAX.OBJ are libraries from NYPA that satisfy the vector functions of H-P Unix such as VEC_$INIT, VEC_$DINIT, VEC_$ICOPY, and VEC_$DCOPY. These are used within Watcom COPYI, MOVE, MOVER, MOVE0, and MOVER0 to speed execution compared with universal FORTRAN that uses DO-loops. The use of /SC as a compilation qualifier is required as changes were made June 9th. This is for use of the stack calling convention. About this choice, Schultz wrote the following in E-mail dated May 25th: *"Stack call compile option is shown on page 65 of the User's Guide. I think it is the best way to work on a register-limited machine (as opposed to a register-rich RISC CPU) . "*

Linux for free POSIX Unix

Linux is an interesting operating system even though no one is yet known to have tried to support ATP using it. Pages 75 through 79 of the May 29th issue of *Infoworld* magazine are devoted to a review by Frank Conley. This article, entitled *"Plug and Play Linux: cheap business Unix,"* begins as follows: *"There's no such thing as a free lunch, but thanks to a Finnish student named Linus Torvalds, there is such a thing as a decent 32-bit operating system : Linux. Since Torvalds created it in 1991, the OS has seen a worldwide groundswell of enthusiasm from the curious and adventurous. Today, many versions can be downloaded for free from the Internet or purchased from a handful of commercial vendors."*

James G. ("Jay") Coleman, who works on planning software at BPA under Dr. Tsu-huei Liu, has been a recent major influence about Linux. Recently, he loaned Dr. Liu his copy of the July issue of *Linux Journal*, to which he is a subscriber. This monthly magazine of 64 pages is mostly advertising, of course. But, under the headline *"What is Linux?"* it begins on page 4 with an important explanation that follows: *"Linux is a Unix-like operating system that can run on the average personal computer. It is free, independent implementation of a superset of the POSIX specification with which all true versions of Unix comply. It is capable of running software written for many different flavors of Unix. Linux is available over the Internet from* ***sunsite.unc.edu****, ... and literally hundreds of other sites. .... Linux is the kernel, the 'core' operating system. However, 'Linux' is also used more loosely as the term for all the software which goes together to make a useable 'Unix-like' system. There are many people and organizations which put the kernel together with other software to make complete systems. Many people around the world have worked together to write Linux, under the direction of Linus Torvalds, the original author, and each holds the copyright to the code he or she has written. Linux is* ***not*** *public domain software. It is protected by the GNU Public License ..." Linux is being used today by hundreds of thousands of people all over the world. ... Linux has become a cost-effective solution to expensive Unix alternatives."* Of course, POSIX is the IEEE standard. Those not familiar with GNU are referred to the October, 1994, newsletter. About copyright, note the similarity to ATP (for which intellectual property rights remain with the person or organization that contributed the work).

So why not ATP running under Linux? What Linux user would be interested in cooperating with developers in Portland to compile ATP source code using the GNU FORTRAN compiler? It might be mentioned that Martin Jones in Nottingham, England, first proposed the idea in E-mail dated March 28th: *"The compiler will be the GNU Fortran 77 compiler, I believe."* This was after first inquiring about Unix, to which your Editor responded that the compiler was more important than the operating system in determining which translation might be the most appropriate. Well, unfortunately Martin Jones has left school (graduation?), and contact now is occasional at best. Your Editor raised the GNU question in his E-mail dated July 3rd, but has not yet received an answer from Martin Jones. For more about the GNU compiler, see the April, 1995, newsletter.

IREQ / Hydro - Québec ATP Interest

Neither IREQ nor Hydro-Québec --- both with headquarters in the greater Montréal, Québec, Canada, area --- is licensed to receive or use ATP materials. Nonetheless, such materials are in the hands of some employees, for use at other organizations (universities of the area). This is a continuation of the story that was barely begun in the October issue. Details now follow. It is important for readers to understand the complications that have resulted from DCG / EPRI EMTP commerce.

IREQ and Hydro-Québec are not alone in this ATP licensing problem, of course. They are merely the most conspicuous. Their employees have inquired about ATP more often than employees of any other DCG member or contractor, and it began years ago. Presumably the commercial study service that is run by IREQ is the most inconvenienced by unavailability of the program that is used by so many of its clients. This became a public matter when the Fargo list server broadcast E-mail dated October 4th. Robert Gauthier wrote the following from

address **gauthier@sgiserv.cdst.hydro.qc.ca** : *"Where and (from) whom can I get a copy of emtp? Which platforms are supported?"* The following day, there was personal E-mail (to Agora) saying just *"help."* Your Editor finally did respond, privately, in E-mail dated October 7th. This long explanation began as follows, after an opening introduction in French: *"The question is both simple and complicated."* Indeed it is!

Reciprocity applies to all who have engaged in EMTP commerce and have no intention of changing their ways. This was announced in the January, 1992, newsletter, in a story entitled *"ATP Available to DCG and EPRI!"* So, whenever an inquiry about free ATP comes from a DCG member, or from an EMTP Associate of EPRI such as AEP (American Electric Power in Columbus, Ohio, USA), this article is referenced. Most recently, this has been in a letter to Dr. Albert J. F. Keri of AEP dated June 20th, and E-mail to Dr. Rejean Girard of LTEE (*"a laboratory owned by Hydro-Québec"*) dated July 7th. Of course, possible forgiveness in the form of an ATP pardon also is mentioned. After all, who really believes that EMTP vendors would actually pay the same absurd royalty that they demand of others?! A possible pardon would follow the example set by General Electric in Schenectady, as explained in the July, 1991, newsletter.

The University of Wisconsin in Madison (USA) seems to have had the most difficulty with licensing for ATP use. This dates to 1990 when Prof. Fernando Alvarado refused to sign an ATP Affirmation (*"I found the language in the proposed licensing agreement most disturbing and innapropriate (sic). In fact, I have been advised by our legal counsel not to sign such an agreement."*) It can only be presumed that there has been some DCG and/or EPRI EMTP commerce on campus. As a result, a free organizational license for the Electrical and Computer Engineering Department can not be issued. But ATP **is** available to others on campus. Specifically, a license to use ATP free of charge was granted to the Wisconsin Electric Machines and Power Electronics Consortium, which was headed by Prof. Thomas A. Lipo. A condition of this use is that ATP information would not be disclosed to others on campus who were suspected of involvement in EMTP commerce via DCG or EPRI. Such difficulty with free licensing of ATP use may exist for three other universities in the world. What was done for Prof. Lipo might serve as a model for others. If a whole department can not be licensed, look for a smaller group within it that **can** be licensed.

DCG Chairman Doug Mader has revealed publicly a number of problems that have plagued DCG/EPRI EMTP development in recent years. Of course, CEA (Canadian Electrical Association) is a DCG member, so it is logical enough to look to a CEA meeting for a progress report. Dated March 28th, one such statement can be found among the printed record of CEA's recent meeting in Vancouver. This account begins: *"Version 2.1 of the DCG/EPRI EMTP is now in its fourth year of regular production use."* So much for doing anything in a timely fashion (DCG/EPRI past practice continues a decade later). About enhancements, Chairman Mader writes: *"A year ago, I indicated to this Committee that we expected to release Version 3 in mid-1994. It is now a year later and we still have not officially released Version 3 ..."* What does DCG management think of the work of EPRI? *"We have been experiencing performance problems by EPRI and their contractors which have been complicated by recent difficulties at EPRI with membership defections and loss of funding."* Proposed program restructuring *"likely .... will proceed without EPRI, which from the point of view of DCG may be a blessing in disguise. Out of courtesy, we will allow them to sit at the table as Observers but given the massive amount of resource which will be committed by those members willing to proceed, EPRI participation in the project will have to be based on a substantial share of the funding given their size and membership interest. CEA's share of the funding ($150,000) has been approved and it is hoped that the project can begin during the summer of 1995"* This comes from the man who, in 1986 and 1987, was bragging about an $8 million development project (see your Editor's exposé of DCG/EPRI hypocrisy in the March, 1988, issue of LEC's journal, which was named *EMTP News*)! So now $150K is *massive* for CEA? This would seem to be yet another sign that these people have fallen on hard times. Not only have they failed commercially, technically, and politically during an 11-year period, but now (actually, years ago) their money has run out. As your Editor wrote to Dr. Keri of AEP, *"these must be difficult times for anyone who has tied his EMTP boat to EPRI."*

Current thinking about ATP pardons is that the offer would be withdrawn forever after 3 or 4 important power companies might have accepted. I.e., if and when the DCG/EPRI EMTP boat might sink, there is no intention of rescuing **all** survivors. Another point: ATP pardons would not be offered more than once per year (*"accept it now or look for another opportunity next year"*). Finally, it is important to reiterate that offers made in the past can be withdrawn at any time without notice or reason. No person or organization that has participated in EMTP commerce has any *right* to any ATP pardon. End of summary. Any ATP developer who might object to such policy is asked to discuss his ideas openly. If there were enough interest, public E-mail (Prof. Bruce Mork's Fargo list server) might be used.

Type-59 S.M. with Scaled Network

Dr. Gary Thomann of Power Technologies (PTI) in Schenectady, New York, informed subscribers of the Fargo list server that it is possible to scale electrical network voltages and currents by 1000 (kilo) for cases

involving the Type-59 S.M. (synchronous machine). In public (for ATP-licensed users) E-mail dated June 14th, he wrote: *"Since most utility engineers use kV, it is often desirable to use the kV, kA, MVA convention in simulations. I used the kV convention in EMTP for several years, including Type 59 machines."* This was in response to your Editor's public E-mail inquiry earlier that same day, asking whether such use was possible.

But what among Type-59 input data does one scale? Study of Chapter 8 of the ATP Rule Book leaves plenty of uncertainty. Quoting from Dr. Thomann's advice: *"It is true that the synchronous machine model has a strange combination of units for entering information. Some of the information is only for establishing the machine base, so no scaling is needed. A lot of the other information does have to be scaled, and I had some weird units (one entry was in E+12 of something). The first time I tried to do the scaling I made a mistake and modeled a machine with a rotor mass larger than the earth. It was very stable. Finally, however, I got everything right and used the model for a couple of years. However, it was enough of a hassle to use (along with a couple of other problems in using the kV convention within EMTP), that eventually I just went back to using plain old volts."*

So, even the best of users found scaling of Type-59 data to be non-trivial. It is not necessarily recommended for those building a complete data case from nothing. But this is seldom done in practice. Much more common is to modify some existing data. The need for scaling at BPA arose for such a reason. Your Editor explained this as follows in his public plea for help on June 14th: *"Many years ago, it seems that some EMTP users established the habit of punching source voltages in kV rather than in volts. Currents then would be in kiloamps. If there were static nonlinearities (e.g., saturable reactors), these would be scaled appropriately, of course. All was well, it seemed, as long as rotating machinery was not being modeled. Now, decades later, other users want to add rotating machinery, and it is not obvious how this might best be done without changing any network data."*

59KILOVI or 59NOKILO are new special requests in columns 1-8 immediately preceding any Type-59 S.M. component. Beginning June 17th, this will turn scaling on or off, respectively. What scaling? Only that of input data for the Type-59 S.M. The concept is simple enough: The two declarations just mentioned toggle between the choices of scaling and not scaling. Of course, the default (the implied beginning value) is NOKILO, which means no change from years past. But if KILOVI is in effect, input data will automatically be scaled internally according to rules that came from Dr. Thomann by private E-mail on June 14th. This allows unscaled Type-59 data, which might be modularized ($INCLUDE use) in a data base, to be used with a scaled network.

Consider the units of Type-59 S.M. variables. When network voltages are in kV rather than in Volts, 1) shaft torques and rotor currents are scaled by 1.E6; 2) armature voltages and currents, and mmf (MFORCE) are scaled by 1000; and 3) rotor angles and velocities, and mmf angle, remain unscaled. This is illustrated by a new 3rd subcase of DC-53, which is a scaled version of the second.

Saturation of the Type-59 machine should not be used with a scaled network until validity can be demonstrated. It appears to developers in Portland that saturation is not independent of scaling. Someone familiar with Type-59 equations will have to study this detail carefully, and adjust the algorithm to be independent of units.

.PL4 File Drives Type-25 TACS

A new TACS source having type code 25 (read from columns 1-2) can be set equal to any variable of a connected .PL4 file. What connected file? The one that is declared by a generalized POSTPROCESS PLOT FILE (PPF) request within a TACS HYBRID data case. The idea came from BPA program users Randy Suhrbier and James Randall. On June 23rd, they were disappointed to learn that the old PPF request could not be used with an electric network. Yes, TACS STAND ALONE **was** required, as illustrated by DC-46. But why? Why not allow TACS HYBRID and a new source that could be connected to any particular variable of interest?

The PPF declaration has changed. The old one included only one variable (the frequency), which could be keyed in either fixed- or free-format. But for use with TACS HYBRID, a separate I/O unit number LUNPPF was needed, and a new .PL4 type code L63TYP also was added. Finally, the free-format alternative, which would have become increasingly complex, was dropped. The default value of LUNPPF is 63, which explains the origin on the final name. L63TYP has default value one, which corresponds to an UNFORMATTED .PL4 file. The first variable (the frequency at which the .PL4 file is to be sampled) has been renamed MULPPF (the multiplicity of sampling). Documentation of the columns for all three controls can be found on a comment card in DC-46 beginning June 26th.

The default choice of L63TYP may seem strange in light of the superiority of C-like files (type 3) for Salford EMTP. Alternatively, why not make those universal FORMATTED files (type 2) the default? There is one advantage of UNFORMATTED files: they allow double precision of CUSTOM PLOT FILE (see separate story) more easily than C-like files do. The precision of an UNFORMATTED file is handled automatically. Such is not the case for C-like files, which are assumed to be single precision for the initial implementation.

Standard benchmark DC-46 illustrates the change

that might be required to a TACS STAND ALONE case. The PPF declaration has been made fixed-format. By setting LUNPPF equal to LUNIT2 (as defined in STARTUP), the $OPEN statement connecting the input .PL4 file could be left unchanged. Normally, to agree with TACS HYBRID, the default unit LUNPPF = 63 would be used. Finally, a second subcase has been added to illustrate the same simulation using the new Type-25 TACS sources. A dummy electrical network was added to create TACS HYBRID use. Both subcases assume standard C-like files for Salford EMTP use.

Florida Short Course May 8 - 11

Prof. Dennis Carroll's 4-day EMTP short course was given May 8th through the 11th at the University of Florida in Gainesville. There were 10 students, and Prof. Carroll was assisted throughout the effort by Dr. Kurt Fehrle and doctoral student Yin Yuexin.

Prof. Carroll provided the following summary in private E-mail dated May 16th: *"The course seemed to be a success. The notes were the best ever, with new sections added on switching and lightning surges, electronic motor drives and power electronics, and MODELS. We probably could have used more time (maybe a full 4 days and nights), since we seemed to run over in several sections. Overall, I think the 10 students were satisfied. Each student had a Gateway 486-66 with excellent color monitors. All course data files ran quickly and smoothly, with no problems reported in PCPLOT or TPPLOT. .... We are encouraged to offer a similar course again if we can get enough students. ... The three of us (Fehrle, Carroll, Yin) seemed to be able to handle a group of this size without any problems. By the way, Yin is developing into a fine lecturer. He did an excellent job on the Universal Machine and power electronics sections."*

Private telephone conversations with Yin and Fehrle have confirmed this optimistic assessment. Apparently all were pleased, including students. Dr. Fehrle observed that the evening laboratory sessions quickly shifted from textbook problems to real-world, industrial-strength modeling that was brought by students. This would seem to be a clear advantage of a smaller group: adaptability. The new, reduced format might even be better for learning than the original, bigger format. Lack of a user group representative was not a problem for licensing: Prof. Carroll was authorized to sign AFFIRMATIONs after a list of students had been provided by E-mail. Lack of an Electrotek employee (Tom Grebe) was good for purity of the operation (isolation of ATP-unlicensed persons).

News about CABLE CONSTANTS

CABLE CONSTANTS is used by the second subcase of benchmark DCNEW-6 within the JMARTI SETUP computation. This was added to illustrate the usage of CESI's Dr. Ivano Bonfanti (see the April, 1994, issue). Validity first was questioned when Macintosh (Stu Cook of JUST Services) and Watcom (your Editor) answers resulted in a fit having a different order (11 vs. 13 for Salford EMTP). BPA's Dr. Tsu-huei Liu then turned to VAX/VMS, which had not previously been used due to an oversight (the VAX DCN6.DAT file was not updated as it should have been). Surprisingly, DEC VAX/VMS EMTP died on a division by zero during the frequency scan of CABLE CONSTANTS. On May 12th, Dr. Liu traced this to roundoff-level differences above S.N. 3100 within CCEIGN. Complex numbers of magnitude around 1.E-19 were being manipulated. These may underflow to zero during division because of apparent multiplication by the complex conjugate. Are there any other good reasons to prefer CABLE PARAMETERS, or avoid VAX?

CABLE CONSTANTS was discovered to be using an undefined variable SPDLGT for the speed of light for those cases (actually, modes) where the eigenvalue calculation yielded a result greater than the speed of light. This was in CCEIGN as discovered and corrected by BPA's Dr. Tsu-huei Liu on June 23rd. Using Salford EMTP, a zero value was seen in the velocity column of some rows of the modal table of the .LIS file for a case that was being pursued for Marc Knapp at the University of Stuttgart in Germany. See "News:" dated June 26th.

DIAGNOSTIC printout was copied from old CABLE CONSTANTS to new CABLE PARAMETERS by BPA's Dr. Tsu-huei Liu in preparation for work with Taku Noda on his new frequency dependence (see the January issue). A list of those subroutines of Prof. Akihiro Ametani's code that were so improved on July 7th is as follows: CBLPRE, ZYMX, PRCON, SCZ1, SCZ2, PTZ1, PTZ2, SKIN, ZEGEN, CYMTRX, SIMP, and TRANS. These are the modules that were recognized as having essentially the same functions in the two codes. Not surprisingly, adaptation was involved because some variable names were different.

End of TACS STAND ALONE

Users of TACS STAND ALONE are to be assured that their data will continue to remain compatible with ATP despite the fact that TSA code has been removed from the program. What has happened is simple enough: Internally, ATP converts TSA to TACS HYBRID as the remainder of this story will document. Finally, analogous to TSA, a new MODELS STAND ALONE has been added for parallelism and completeness.

SSTACT is the subroutine from which simulation code for TACS was removed. This code represented a duplication of what is used within the time-step loop for

a TACS HYBRID case. For computers with overlaying, which was universal 20 years ago, the duplication made sense. But for the fully-virtual architecture that is used for all common machines (including 386-based PCs) today, the duplication is an anachronism that has outlived its usefulness. Removal of the SSTACT simulation code made for a smaller program, and simpler logic within SSTACT. It also eliminated the need to keep the two blocks of simulation code identical. Finally, it provides START AGAIN capability for TSA without the risks that would accompany those unusual changes that had been proposed by LEC (see the January, 1994, issue).

The user of TSA will notice that any program created after July 2nd will convert his data automatically to TACS HYBRID by the internal addition of the six following lines (truncated on the right):

```
   DUMMY                          1.0 { 1-ohm resis
 BLANK  card ending dummy branch that ATP added
 BLANK  card ending switches (none) that ATP ad
 11DUMMY          1.0 { 1-volt battery applied
 BLANK  card ending dummy source that ATP added
 BLANK  card ending output requests (none) that
```

These will be inserted between the blank card ending TACS data and the first batch-mode plot card (if any).

MODELS STAND ALONE and MODELS HYBRID are new declarations that do for MODELS what the corresponding declarations of TACS have done for two decades. The same five extra data cards just illustrated for TSA will be seen in any MSA solution, too. There is no difference between the old MODELS and the new MODELS HYBRID declaration. The latter was simply added to parallel the choices that are offered by TACS.

/MODELS is a new sorting declaration that can be used in place of /TACS for data sorting by class. The blank card ending such data, which is used to position the insertion, also can use key word MODELS rather than TACS. Of course, MODELS is aesthetically better for cases that have no TACS data, so the change has been made to the 2nd subcase of DC-33. Also, if both TACS and MODELS data are involved, the user should be assured that all /MODELS data will be placed before the first /TACS data. I.e., a new class has been added.

The type or class of all output variables changes as a result of the elimination of TSA, it should be noted. With no electric network, TACS variables were treated like node voltages: identified by a single name. But as part of TACS HYBRID, the same signals have become branch currents (identified by a pair of names, with the first being TACS). This will be in .LIS and .PL4 files. But there is no problem with batch-mode plotting, which will continue to honor the old Type-4 (node voltage) plot requests. Alternatively, Type-9 (branch current) requests can be used, if these are preferred.

Optimal encoding of the columns of numbers that are printed within the time-step loop is the dominant change in appearance of .LIS files for TSA simulation. This is an important gain, which includes variable precision. The separate table of TACS extrema is replaced by the usual table of extrema of electric network simulation, of course.

JSTAND is the new binary flag that precedes changes associated with the new TSA code. The serialization WSM95JUL was used. Finally, to find all code that is associated with POSTPROCESS PLOT FILE of TSA, look for MULPPF. This information is offered mainly for the historical record, to allow easy location later.

BPA EMTP Theory Book in WP 5.1

The 700-page EMTP Theory Book of BPA has been converted to WordPerfect 5.1 storage from the crummy, old, paper copy that was submitted to BPA in 1987 by its contractor, Hermann Dommel. The present mention is a continuation of the story in the January issue.

Kwang-yi Ger, the daughter of Drs. Tsu-huei Liu and Kai-hwa Ger, did all the non-table text (including all equations) with some help from her mother, recall. Now, Kwang-chien Ger, the younger son, has completed the operation by adding all figures as .TIF bitmaps. Both high- (300 dpi) and low- (75 dpi) resolution copies were produced, and then included by WP5.1 to convert to equivalent, compressed .WPG files. The .WPG files are stored externally, and there are two sets. Compressed sizes of these are 2763 and 531 Kbytes, respectively. After unzipping, these become 7091 and 1091 Kbytes.

Improved resolution of some figures is a result that may surprise the average reader. Normally, creating a bitmap from an original results in distortion that includes loss of resolution. But what if the original already involves substantial distortion, typically due to substantial photoreduction? Using a photocopy machine, there is no way to recover the lost resolution. But with computer scanning, human intelligence can be applied in the form of graphical editing of the bitmap. The H-P software that allows this is *HP Paintbrush*, which Kwang-chien has been using effectively on some figures such as 6.33 and 12.1. If some figures look significantly better than the original printed copy that was submitted by contractor Dommel, it is because they have been improved!

Mohan Course : Portland, July 22 - 23

Prof. Ned Mohan of the University of Minnesota did give his portable EMTP short course immediately prior to the 1995 IEEE PES Summer Meeting here in Portland, Oregon. Attendance once again was excellent: 37 paying students.

A Saturday evening (19:00 to 21:00) lecture about FACTS (Flexible AC Transmission Systems) was not

mentioned in the original course advertising. But it was announced in public E-mail of the Fargo list server on May 7th. About this addition, Prof. Mohan was quoted as follows: *"This session will introduce advanced techniques for Power Quality solutions and the proposed means for flexible ac transmission systems (FACTS). This session is intended for those who are new to such power electronic applications. It will serve as a review to those who have been working in this field."*

ATPDRAW was better covered this year than last. This began with Prof. Riaz, using an old version --- proving that mere mortals can use the program. This was followed by author Hans Kristian Hoidalen, who lectured about, demonstrated, and answered questions about the latest update (which he brought with him, and which was made available to all students). Again this year, Mr. Hoidalen's presentation ended with sustained applause.

Intelligence of the discussion of various aspects of lectures was noteworthy this year. An illustration was provided by the exchange among developer Laurent Dubé and users Laurie Snyder and James Wikston during Prof. Mohan's explanation of TACS- or MODELS-controlled switching as an approximation to what happens physically in bridge circuits involving thyristors. Naturally, the course ran farther behind schedule than in past years. It was an exhausting experience. Both nights, your Editor left the hotel around 22:30 to catch a city bus home.

The free Can/Am user group meeting began at 17:30 on Sunday, July 23rd, following the end of Prof. Mohan's course. The one student with a DCG connection (Hydro-Québec) was invited publicly to attend, but he did not.

The first of three prepared presentations was by Robert Schultz of NYPA (New York Power Authority in White Plains). This involved color projection from his own 75-MHz, 486-based, laptop computer that ran ATP under three different operating environments: OS/2 Warp, Windows NT, and MS Windows 3.1. This was based on Watcom compilation and linking as explained in a separate story. All three versions simulated DC-1 at respectable speeds (30 or 31 seconds in the time-step loop). The Ghostscript and Meredith interpreters of PostScript also were demonstrated, and hard copy illustrated NYPA's ability to pack 4 PS graphs onto one piece of paper.

Prof. Juan Martinez Velasco of Universitat Politecnica de Catalunya in Barcelona, Spain, provided the second presentation. This involved many transparencies that summarized his creative use of Laurent Dubé's MODELS to control a single Type-94 branch of the electric network. Three different simulations were treated: 1) the non-ideal diode; 2) arcs and circuit breakers (including restrike); and 3) relays. Discussion centered on what multiphase capability (promised by author Dubé) might allow.

Finally, Prof. Bruce Mork of Michigan Tech in Houghton reported on several topics of ATP interest with which he recently has been involved. These included his E-mail services, his ongoing research into transformer modeling (the nonlinearities), and nonlinear frequency scan (which he has chosen to call frequency sweep).

Concerning ATP distribution, 33 copies of the set of three Salford EMTP disks had been prepared ahead of time by Dr. Liu, and only about three sets remained at the end. Of course, some students such as Prof. Jim Smith of Montana State University in Bozeman had their own computers, and they returned the floppy disks after copying contents onto their hard disks. Dr. Liu also did a big business in paper. Twelve persons paid for Rule Books, and 10 copies were delivered. Of the 2 copies remaining, one was to be mailed to Canada and the other was picked up later at BPA by a Japanese visitor. Disks were donated by a party that prefers anonymity.

News about Intel Pentium

"Intel .... is expected to ship between 25 million and 30 million of the processors (Pentium) this year" according to a story that begins on page B14 of the July 18th issue of *The Oregonian. "In the first quarter, Intel said revenue from Pentium processors exceeded sales of 486 chips for the first time. The company said it expects unit shipments of Pentiums to surpass 486 shipments later this year."*

The NexGen Nx586 is an alternative to Intel Pentium that is being taken more seriously in recent months. *"Compaq/NexGen deal spurs Pentium price drops"* is the headline of a story on page 49 of the July issue of *Computer Shopper*. It seems that Compaq announced during March that it would offer Pentium-class computers that are based on the Nx586. This announcement was *"one in a series this year that has driven Intel to slash existing Pentium prices and ramp up production plans for faster microprocessors, including a 150MHz Pentium and 133MHz P6."* ... As for price, NexGen says that it *"will always offer an approximately 20 percent price/performance advantage over Intel CPUs."*

Avoidance of the 60- and 66-MHz Pentium choices is common advice today. Why? Those initial alternatives now are different in that they require higher voltage (5 volts) and generate more heat than the faster models. Avoidance of the 66- and 100-MHz alternatives is a more complicated issue, but was explained by Bill Howard on page 95 of the May 30th issue of *PC Magazine*. The following has been extracted from an E-mail copy that was provided by Laurent Dubé on June 10th: *"The CPUs run at 1.5 times bus speed, and 66-MHz bus designs are rarer than 60-MHz designs. You also need faster (costlier) static RAM for the 100-MHz Pentium's CPU cache. When Intel develops fraternal-twin CPUs -- 60*

and 66, 90 and 100, and now 120 and 133 MHz -- the second one arrives just in time to be upstaged by the next iteration. Next stops are the Pentium/150 and then the next-generation P6 at 133 MHz."

The AMD 486 is expected to represent a continuing, viable alternative to Intel Pentium for many months. A short story on page 14 of the June 5th issue of *Infoworld* magazine has the headline *"AMD wins speed race with its 120-MHz 486."* Intel may not want faster 486s, but AMD certainly does! *"According to AMD, the performance of the Am486 120 will surpass that of a 75-MHz Pentium. .... Total 486 shipments for AMD in 1995 should exceed 12 million, officials said last week."* So, who is using AMD processors? DEC, HP, NEC, Compaq, Acer, etc. No longer are name brands restricted to *"Intel inside."*

Multimedia is to be supported by on-board logic of future Pentiums. This according to a short story on page B12 of the July 18th issue of *The Oregonian.* The final paragraph summarizes the likely end result: *"Competitors worry Intel might include more functions on its chip, elbowing aside makers of computer accessories such as sound cards."* Probably. Remember the once-significant business of coprocessors? The Intel announcement only mentioned enhancements *"that would increase the video and audio capabilities of Microsoft's new Windows 95 operating system."* But all seem to understand where the Intel juggernaut is headed (audio and video are included).

Miscellaneous Intel PC Information

Software piracy is common around the world. According to a short summary on page 1B of the April 11th issue of *USA Today* newspaper, *"about 25% of personal computer software in use in the USA is pirated, estimate software makers, who lost $8 billion to pirates worldwide in 1994."* But is this American statistic bad on a world-wide scale? Not compared with China (98%), Russia (95%), Thailand (92%), etc. But what is this nonsense about $8 billion? The reader is to believe that all software in question would have be purchased legally, if it had not been stolen? This is preposterous. Your Editor's guess is that economics and usage would be quite different in the third world if all copyright laws were respected everywhere. One good result of piracy is that much American software has been made the standard of the world. This is not bad --- being able to exchange WP 5.1 files, or Salford EMTP, with anyone in the world.

If TM indicates a trademark, what does this SM stand for? This question in the preceding issue was answered by Doug Selin of Arizona Public Service in Phoenix (USA). In private E-mail dated June 19th, he wrote: *"SM stands for a Service Mark, which is defined by Webster as 'a symbol, word, etc. used by a supplier of services, as transportation, laundry, etc., to distinguish his services from those of competitors: usually registered and protected by law: cf. Trademark'."* Ok, so now what is the legal distinction between TM and SM (one question leads to another!)?

120-Mbyte floppy disk drives could be available in COMPAQ PCs before the end of the year. So says a story on page 72 of the July issue of *Computer Shopper. "Compaq Computer Corp., 3M Corp., and Matsushita-Kotobuki Electronics Industries have joined forces to introduce a 120MB floppy drive, due in Compaq PCs by Christmas."* More important than low price would seem to be compatibility with the past: *"The Matsushita-built drive will be backward-compatible to those older 720K or 1.44MB floppies."* The logical use would be to replace tape as a backup medium. Cost (*"estimated at $200"* per drive) would be comparable. Curiously, this does not explain Compaq's interest, *"which involves another angle: simpler software installation for the consumer market."* But CD-ROM already provides this, so it is unclear how many others might follow Compaq. Some have suggested that Compaq merely wants to be different *"because the company can't compete on cost with Dell and Gateway."*

Lotus has been acquired by IBM in a bold move to regain lost ground in the PC world. Writing an Editorial on page 65 of the June 19th issue of PC Week magazine, Stan Gibson concludes as follows: *"PC Week believes the acquisition is a good thing. Lotus was going nowhere. IBM has for years been at an impasse in applications, particularly networked applications. Users need a strong alternative to Microsoft. IBM-Lotus could be it."* The size of the deal is about $3.5 billion (i.e., huge).

"Kodak's open PhotoCD policy brings on competition, low prices" is the subheadline of a story on page 52 of the July issue of *Computer Shopper*. This follows the headline *"Low-cost digital pictures by Christmas."* The introduction explains that *"Kodak is letting third-party vendors build royalty-free encoding and decoding capabilities for the PhotoCD Image Pac format into their applications. This means PC users will now be able to read and write PhotoCD images from their desktops, just as they can with JPEG or TIFF images today."*

"Windows, Warp take bite out of Apple" is the title of a column by Dan Farber on page 110 of *PC Week* magazine. *"The problem for Apple today is that what the Mac can do better than Windows is becoming less apparent .... IT managers are under increasing pressure to justify investments in a Macintosh platform that is now less distinct or brimming with unique software than in past years."*

Miscellaneous Small Items

Cooper Power Systems contributed an interesting

paper about ATP use to the April issue of IEEE Computer Applications in Power. See pages 15-19 for *"Digital models simulate physical test facilities"* by Dr. Ljubomir A. Kojovic and Ronald D. Willoughby. The subtitle states: *"To validate models, physical laboratory tests must be performed on actual apparatus and compared with their digital counterparts."* Unlike Gunther and Grebe of Electrotek Concepts (see the July, 1993, newsletter), Dr. Kojovic of Cooper does understand and acknowledge that ATP was available on small computers years ahead of EPRI's work: *"(Today, EPRI also has a version of EMTP that runs on the PC)."* But there is a mistake about the origin. The authors write: *"ATP was developed by the user community as an alternative to EMTP to make use of IBM-compatible personal computers (PCs) running MS-DOS."* No. ATP is not an alternative to EMTP. Rather, ATP **is** EMTP --- as much so as any other version. ATP began from the public domain code of BPA during early 1984, and has evolved ever since. Today, as stated at the beginning of the user group's form letter LICENSE.ZIP, ATP is the most widely used version of EMTP. Of course, the first letter of ATP does stand for *alternative*. From the beginning, the goal of ATP was to provide EMTP users with an *alternative* to the attempted commercialization of DCG and EPRI.

FAULTS TO GROUND would ignore $UNITS if it appeared before the first branch card. This was prior to May 9th when a correction was made to satisfy BPA's James Randall, who first illustrated the problem. Previously, it was data beginning with the first branch card that was repeated for each fault after the first. Now, it is all data following the final miscellaneous data card (or extension to them), or following the last TACS data card, or following the last MODELS data card --- whichever is last. The difference consists of comment cards and $-cards such as $UNITS that might immediately precede the first branch card.

Critical Damping Adjustment (CDA) was mentioned last time. For the record, as of mid-July, there has been no response at all. That's the good news: no need to write about the subject --- at least for now.

A free-wheeling diode poses a challenge to modeling according to public E-mail of the Fargo list server on May 22nd. Prof. Laurie Snider, writing from E-mail address **snider@hkueee.hku.hk** at Hong Kong University, asked: *"Is there a hassle-free way to model a free wheeling diode? For example, a dc source feeding an inductive load through a controlled switch, with a free wheeling diode across the inductor. When the switch opens the free wheeling diode won't conduct until the next time step - and that's too late."* An answer came from Bennie Steyn of Spoornet (Signals) in South Africa later that same day. The following is pasted from list server mail from **b.m.s@vines.tnet.co.za** *"The problem mentioned with the commutating diode is a common one in the EMTP. It is not solved 'hassle free', but it is possible to solve. The solution is to .... model the diode as a controlled switch in TACS or MODELS. I saw this the first time in a data case from Prof. Mohan. The current in the diode and the state of the switch must be fed back to TACS and used in conjunction with some logic to generate the control signal for the diode."* An example (ATP data) followed --- taken from a *"module to simulate the operation of locomotive chopper."* As for Prof. Snyder's location, Hong Kong is a switch from Singapore during several preceding years. For the record, this is the same person who, along with Prof. Dennis Carroll in Florida, first benchmarked Salford EMTP using a 486. That testing was performed in Vancouver (Canada), as mentioned in the April, 1991, newsletter.

Free printed copies of the 20-page April newsletter were mailed by First Class (air) to 9 Canadian and 71 American addresses on June 5th.

DATA BASE MODULE is the request to execute the supporting program that will create a disk file for $INCLUDE usage in case of arguments. LIMARG = 35 was the fixed limit on argument usage prior to its expansion to 85 on May 8th. Glenn Wrate, a doctoral student at Michigan Tech in Houghton, first issued a public request for help with LIMARG by E-mail of the Fargo list server dated May 4th. He then supplied his input data, in order that your Editor could convince himself of the need. So, the expansion of local storage in SATURA was made (no problem). Curiously, a comparable inquiry was made privately late last year. On December 2nd, Tom Grebe of Electrotek Concepts had telephoned to inquire about such ATP trouble that had been observed by a European student of an Electrotek course. It seems the data posed no problem for the DCG /EPRI EMTP with which Mr. Grebe was involved. Your Editor responded that he would make the correction, but only after data had been supplied to demonstrate the problem, and after that data had been determined to be practical. Mr. Grebe agreed to relay this offer to the ATP user in Nottingham, England. No further information on the subject or problem ever was received, however.

WordPerfect 6.0 for Windows was added to the 486 that is used by Dr. Tsu-huei Liu at BPA. This was October 18th. Note carefully that the new WP product was **added**; it did not **replace** the old WP5.1 that your Editor continues to use for these newsletters, or that is being used for Rule Book chapters, or the Theory Book (see separate story). The new (6.0) is supposed to be compatible with the old (5.1), so the old is expected to remain the ATP standard for years to come. Of course, some authors may use the new program to create old data files (an output alternative). Recall that Vernon Buerg's shareware LIST on the GIVE2 disk of Salford EMTP distribution has been recommended for years as a way to search the entire family of newsletter files for some character string of interest. Well, LIST provides another

good reason not to change. For files of vintage 5.1, the newsletter columns are read easily enough. But for a 6.0 file, each blank space seems to have been replaced by Ç, making for a bad visual effect. So, WP5.1 remains the ATP standard.

Octave is the name of a attractive alternative to Matlab according to Tom Short of Power Technologies (PTI) in Schenectady, New York. Writing from address **ta.short@pti-us.com** on June 22nd, he informed the hundreds of subscribers of the Fargo list server as follows: *"There is a good alternative to Matlab called Octave. It is Matlab-compatible with some nice extensions. The plotting is through Gnuplot, and although it is not as good as Matlab, it is still pretty good. It reads and writes Matlab data files and works well with the PL4MAT utility to read ATP output. It is great for post-processing of ATP output. Unfortunately, there isn't a DOS version yet. .... There are versions for OS/2 and many unix versions. It is freely available with source under the GNU license. Here is where to get it .... In the last Can/Am newsletter, Gayle Collins was interested in interfacing Matlab with ATP to use Matlab for controllers. Octave might be a viable alternative, since it comes with source. The only problem would be getting it to work with the same compiler as ATP. Octave is written in C++ using the GNU compiler, and it also uses some Fortran math libraries. I don't know of a compatible Fortran/C++ compiler combination which already works for both ATP and Octave."* What do other readers know?

PL42MAT is of interest to Massimo Ceraolo at the University of Pisa in Italy. In public E-mail of the Fargo list server dated July 4th, he explained that the author of PL42MAT, Raffaele Salutari, was changing jobs, so did not have *"time for fixing possible problems."* That is the bad news. But the very good news is that Mr. Ceraolo has offered to help: *"I think that I can engage myself in revising the code and fixing a problem that could be detected, if a data case producing a .PL4 with which PL4TOMAT does not work properly is made available to me. Only, I cannot give guarantees about the speed of response."* The address to which any problems can be reported is **ceraolo@dsea.unipi.it** But is there really any problem other than pilot error by users? From public E-mail on the subject, it is not clear. Any reader having proof of trouble is advised to send this to Pisa for a definitive, independent evaluation.

An IEEE PES task force on relay modeling is headed by Arvind Chaudhary of Sargent and Lundy, a consulting company in Chicago, Illinois, USA. In E-mail dated July 6th, he clarified your Editor's public inquiry about this subject as well as Dr. Robert Wilson's present E-mail address. Former Prof. Wilson has left the University of Wyoming and now can be reached at **bwilson@wapa.gov** within the Western Area Power Administration in Denver, Colorado, it was learned. What task force? The one authorized by Dr. Albert Keri's Working Group on electromagnetic transients --- the one with the imprecise name (*"Modelling and Analysis of System Transients Using Digital Programs"*). Why imprecise? Because this name logically would include transient stability and long-term (e.g., 10-minute) dynamic simulation, but the group seems to have little such broad focus. Not only is the name *electromagnetic* missing from the group name, so is *electrical*. From the group name, those who model the weather, or classical mechanics (gravitational forces) could be included; but they do not seem to be. Such are IEEE (or DCG/EPRI) politics, it would seem.

6 null bytes rather than 6 blank bytes were found in the compressed header of a .PL4 file by BPA's Randy Suhrbier. This is a continuation of the story about NEWPL4 in the preceding issue. June 16th, HEADL4 was modified to load TEXVEX(1) with blanks (previously, a spelling error left this undefined). No consequence of the oversight was ever observed. The blank content seemed never to have been used.

DESTRO is the name of a commercial alternative to ATPDRAW as mentioned in the July, 1993, newsletter. The subject is mentioned again because of E-mail from the developer. May 22nd, both Agora and BPA received a letter from **diastava@vms1.nce.ufrj.br** that began as follows: *"I am sending this mail because in the last two years I have been managing a group that has been developing a PC-based graphical interface to generate ATP input file, named DESTRO. .... After some improvement in the software we are almost finishing it, and we thought it is time to present it to some people."* This was from Maria Cristina Tavares, who offered a free demonstration disk (never received).

A trade school has shown interest in ATP. Dated July 7th, E-mail from **armond@soho.ios.com** contained the following statement by Armond Badkerhanian *"I am an Electronics Engineering Technology instructor at ITT Technical Institute, Van Nuys, California. We are one of the 54 schools that the ITT Corporation operates nationwide. We offer Associate and Bachelor of Applied Science Degrees. I would like to utilize the ATP software in my power courses."* Of course, ATP usage is common at American universities. But is ATP use manageable at the less-theoretical level of trade schools? Your Editor has his doubts. Time will tell.

Taku Noda of Doshisha University in Kyoto, Japan, is expected to spend 4 weeks working at BPA later this summer. This will be to improve the ATP implementation of his frequency-dependent modeling for lines and cables. Like his advisor (Prof. Akihiro Ametani) last summer, Mr. Noda will not be paid a salary, but will have his travel and living expenses reimbursed. Work might begin the last week of August and run through all of September with a 1-week break for Prof. M. T. Correia de Barros's IPST'95 conference in Lisbon, Portugal (look for more about this in the next issue).