AAPM REPORT NO. 30

E-MAIL
AND
ACADEMIC COMPUTER NETWORKS

Published for the
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REPORT OF TASK GROUP 1
COMPUTER COMMITTEE

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PREFACE

The purpose of this report is to provide readers with information regarding electronic mail and the facilities available on the computer networks that span the globe. The information ranges from an introduction for the beginner (Chapter 1) to more detailed information regarding the tools of communication that are normally available (Chapter 2) and an explanation of the various e-mail domains (Chapter 3).

In order to facilitate the exchange of data or files they may be stored in some central location that allows users from anywhere in the network to request copies of the file or files they need. The file(s) are then dispatched automatically to the enquirer. Such systems are known as file servers and usually have the ability to send copies of files in response to mail requests (Section 2.4.2). In some cases it is possible to obtain files from remote systems using a method known as anonymous File Transfer Protocol (FTP). An introduction to the FTP protocol and a sample session are included in Chapter 4.

Electronic data communication is an area abundant in acronyms as well as other terms that are sometimes difficult to comprehend. To assist the reader to overcome some of these problems a glossary of terms (Appendix G) has been included.

We are particularly indebted to Christopher Condon of BitNIC at Yale and to Bob Hanisch of the American Astronomical Society who have generously allowed us to use portions of documents they prepared and to edit them to our own needs. Both Christopher Condon and Bob Hanisch should receive full credit for Chapters 2 and 3. If you detect errors the present editor must accept responsibility and errors or omissions should be brought to his attention.

Apart from Chris Condon and Bob Hanisch, I would also like to express my appreciation to the members of the AAPM Computer Committee, Task Group #l, Marty Weinhous and Neal Tobochnik, who have assisted in the preparation of this document. In particular, Marty Weinhous has been very supportive during the editing phase.

Writing a report on this subject is a little like trying to hit a moving target with a water pistol - the technology is moving so rapidly that additions and modifications to the copy have been required continuously in order for the text to remain current. For those persons who already have access to e-mail we hope that the material contained here will not be too out of date but will assist you in making better use of those facilities at your disposal. You may wish to enrol in one or other of the mail bursters or list servers

serving the medical physics community (See Appendix A). For those readers who do not have access to e-mail and the networks we hope that this document will both encourage you and help you to seek ways in which you may become a "user". E-mail is a medium which is particularly valuable in maintaining communication with individuals in outlying areas and offers a means of providing software support to such places.

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1 INTRODUCTION

1.1 ELECTRONIC MAIL AND COMMUNICATIONS

Thousands of university computers throughout the world are interconnected by one network or another. This facility provides for message sending between users, resource sharing and long distance operation by logging on to a remote computer. Because electronic communications are relatively fast much can be accomplished without the delays engendered by regular postal services and the expense associated with frustrating games of long-distance telephone "tag".

In order to demonstrate the use of these facilities and to introduce some of the terminology let us take an example of several medical physicists who communicate by this method. Dr A from California meets Dr B from New York at the AAPM Annual meeting and finds that Dr B has been trying to use red widgets for treatment planning. This is of interest to Dr A because he has been trying to use green widgets for a similar purpose. Both Dr's A and B discover a poster by Dr C from Canada describing the use of blue widgets. When they meet, Dr C reveals that he knows of several other individuals who have been using coloured widgets for treatment planning so they agree to collaborate. Dr C does not have the names and addresses of the other widget users handy so they exchange electronic mail addresses and Dr C agrees to pass on the information to Dr's A and B when he gets back to his department.

When Dr A gets the e-mail message from Dr C he finds that one of his former colleagues, Dr D in Australia, is on the list so he sends Dr D an e-mail message to enquire what colour widgets he has been using. Very soon there is a lot of interest in widgets for treatment planning and the investigators are able to exchange their experiences. The discussion continues using e-mail but they find that to keep everyone properly informed they are sending multiple copies of each message. To avoid this problem, Dr C agrees to establish a mail burster or list server on his computer node so that anyone sending a message to "widgets" will know that the message will be automatically forwarded by the mail burster to everyone subscribing to the widget list.

The widget users realize that there might be something to be gained by sharing their discussion more widely - surely they are not the only physicists trying to use widgets? To do this, Dr B establishes a newsgroup

or discussion forum on USENET called sci.med.physics.widgets and he moderates the discussions as they continue on the widget list then posts the edited material to the widget newsgroup. This, in turn, arouses the interest of Dr P (a lot more people have become involved by now!) who is in the research and development group of a major vendor for treatment planning systems. Dr P notices that all the physicists are trying to use different coloured widgets so he enters the discussion by suggesting that perhaps it might be useful to standardise on one colour. The group then uses e-mail to work towards the specification of a white widget which they can all use and that industry might be in a positron to incorporate into future products.

Eventually the specifications are drawn up and in order to make them freely available to all Dr C places the mutually agreed specification on a file server at his site. Everyone can now access the file server and retrieve a copy of the latest white widget specifications by return mail or using a method known as File Transfer Protocol (FTP).

This example serves to demonstrate the multiple facilities available on the international computer networks. Electronic mail is one feature. List servers to facilitate discussion by many individuals is another. The newsgroups on USENET provide a bulletin board type of broadcast to tens of thousands of computers in academic institutions, government research laboratories and industry world wide. File servers act as repositories of data which can be accessed from remote sites to retrieve information. Each of these will be discussed in greater detail in the pages that follow.

1.2 SOME COMPUTER NETWORKS

Perhaps one of the best recognized (but not the largest) network in North America is BITNET ("Because It's Time" Network). BITNET connects over 1,000 hosts worldwide and connects to NETNORTH in Canada, EARN (European Academic Research Network) in Europe and ASIANET in Japan. There is a gateway (an interconnection) from EARN to JANET (Joint Academic Network) in the UK.

Another major network, Internet, owes its existence to the ARPA network first established in 1969 by the US Department of Defense. It included more than 30,000 nodes in 1987 and must include many more by now. It connects to more than 570 networks in several domains:

com - commercial organizations (i.e. DEC)
edu - educational/research organizations

gov - civilian government organizations
mil - Department of Defence
erg - other organizations

Internet is the fastest growing of the US networks and is supported by the National Science Foundation.

Both BITNET and Internet may be regarded as "academic" in the sense that they link institutions that for the most part have academic goals and do not exist for profit nor do they offer any business type activities. The American Institute of Physics offers a service called PINET (Page 30) that is also primarily academic. PINET also provides a gateway which allows subscribers to access BITNET and therefore communicate with BITNET users. A link to Internet was also added early in 1990. This service is attractive to the physicists who do not have access to a local computer node on either BITNET or Internet. CompuServe and The Source are commercial networks largely tailored to the business community. CompuServe, Telemail, and Fidonet, like PINET, have links to BITNET and Internet so that messages can be sent between the different networks. Collectively, the many interconnected networks are known as The Matrix - see Quarterman JS in the Bibliography.

In order to use these networks you need to have access to a connected computer and to an electronic mail program. Electronic mail facilities are essentially free since no charges are made for individual messages or the connection to the remote computer unless one chooses a commercial service such as CompuServe, etc. Many university computer centres are also prepared to allow individuals without university affiliation to have access to their systems - providing it is not for commercial gain.

1.3 E-MAIL

Electronic mail (e-mail) is a simple and efficient way of communicating with colleagues on campus, at other universities, and in research and teaching institutes around the world. E-mail can be used to enhance (but not replace) the conventional communications channels like inter-office memos, the post office, couriers and the telephone.

If your colleagues use the same computer as you do, then the messages are handled by the e-mail system on that machine and delivery is almost instantaneous. Delivery to remote sites requires the cooperation of many systems, but, even so, delivery is quite prompt and generally poses no additional difficulties.

You should be aware of the time involved in the delivery: e-mail is not instantaneous. Messages get from one site to other sites even halfway around the world typically in a matter of minutes to a few hours - to, at worst, a day or so.

An e-mail message resembles a standard letter. When you write a message and then despatch it the e-mail software "wraps" it in an electronic envelope which indicates the sender and receiver - as well as other information necessary to guide the message along its route. At the receiver's computer the message drops into hi or her mail box and, hopefully, the intended recipient is notified. If the recipient is not automatically notified, it becomes important that he or she scan the mail box for new mail on a routine basis.

Of course, if you can send electronic messages it is also possible to send complete files over the networks. Some networks do impose size limitations and some may not transmit binary files cleanly. In such instances, it is necessary to split files into manageable units or to convert binary files into an ASCII format (and then convert back after transmission). Files sent as binary files are transmitted using a different protocol and do not necessarily arrive in the receiver's mail box since they may not conform to the standard mail format. Section 2.3 contains more detail about sending files.

1.4 LIST SERVERS

Some mail systems allow bursting of mail to many users. If one wants to send a message to a whole community of users who have common interests one sends to:

burster-name@burster-address

When the message arrives at the burster it will be "automagically" forwarded to everyone subscribing to the list as it exists at the moment the message arrives.

This facility can be very useful in circulating notices of meetings, calls for abstracts or other items of interest or eliciting help when faced with problems. For example, one can "query" the net and generally within a day get several responses.

Appendix A provides more detail concerning list servers of interest to AAPM members.

1.5 FILE SERVERS

A second major facility provided by networks are file servers and name servers (sometimes called info-servers). These are repositories of information that may be accessed from remote locations to obtain files (file servers) or to interrogate name registries for addresses and phone numbers, etc (name servers).

In effect, the file server acts like a library of stored files that can be downloaded as required. The file may be retrieved by sending an e-mail message that contains the request in a specified form or by using the method of anonymous FTP (Chapter 4).

Appendix B, B.l provides more details concerning file servers of interest to AAPM members.

1.6 USENET

Systems that are connected to Internet and the UUCP network are able to access a huge number of bulletin boards, forums or newsgroups on subjects ranging from AIDS to ZOOLOGY. At last count there were more than 480 forums of which the one of major interest to medical physicists is sci.med.physics. This is an unmoderated forum and includes such things as appeals for information and the responses to those appeals as well as notices and reports of meetings.

With an appropriate NEWS program at the local node, one can register for certain newsgroups, read the postings, print them, post replies and also follow particular threads by tracing the headers.

1.7 GETTING STARTED

If you would like to establish a connection to this rapidly growing means of communication contact your local university computing centre or computer science department and ask to speak to the person designated as the Postmaster. Even if you do not hold a university appointment, most computing centres are prepared to negotiate some mechanism by which you may have an account on the system. Alternatively, you may wish to investigate the possibility of accessing PINET, the electronic mail facility operated by the American Institute of Physics (See page 30).

If you are close enough to a computer site you might be able to connect a terminal directly to a terminal line. However, the more likely possibility is that you will need to obtain a modem and then dial into a host computer whenever you wish to look at your mail. Obtaining a modem will also imply that you will need some communications software if you use a PC rather than a terminal. Most modems are supplied with bundled terminal emulator software so that your PC can look like a VT100, VT220 or VT320 so far as the host is concerned. If you do not have communications software, Kermit will almost certainly fill your needs and, although it is not public domain software, it is freely available from Columbia University, New York - see Gianone C in the Bibliography. As well as providing excellent terminal emulation, Kermit also enables file transfers between various computers. For those who have Macs, there are several communications packages available. Apart from the Mac version of Kermit there is Versaterm, Red Ryder and Tin Can, all of which seem to work well and are able to emulate a VT100 or VT220.

Once you have obtained an account and have access to the world of e-mail the next task is to learn the e-mail addresses of all those correspondents with whom you wish to communicate. If you have not already been given an address, then by far the easiest way is to pick up the phone and ask. You could try using the file server at UWO (see Appendix B) and downloading the latest edition of the nucmed directory of names. Alternatively, the AAPM Membership Directory lists e-mail addresses for some members and the number listed may be expected to increase annually. However, neither of these directories is likely to be completely up to date. There is no central registry where all e-mail users are registered, though some name servers contain names of people who have taken the trouble to register locally. Chapter 4 contains more detailed information about the various networks and the different addressing schemes.

1.8 SUMMARY

The academic and commercial computer networks span the world and provide several facilities for data communication. Perhaps the most valuable is electronic messaging between users or groups of users. File servers allow one to access large data banks and download files of interest. The news facility on Internet and UUCP consists of a multitude of bulletin boards where “netters” can exchange valuable information and discussions in a public forum.

Establishing a connection might be as simple as connecting a terminal to an existing communications port. At the other extreme, it is unlikely to

be any more complicated than connecting a PC or Mac to a modem and using dial-up facilities at a local university or college computing system. The first thing to do is to introduce yourself to the person who is designated as the Postmaster and explain your needs. The Postmaster will usually be pleased to assist you in establishing an account and learning how to use the mail system.

Another alternative is to subscribe to one of the commercial networks such as that operated by the American Institute of Physics (PINET).

2 TOOLS FOR COMMUNICATION

Extracted with permission from the Bitnet User's Guide, by Christopher Condon of BITNIC Services at Yale University, June 1989. Further editing by: Trevor Cradduck, September 1989.

2.1 FUNDAMENTALS

Most IBM systems in BITNET run VM/CMS. The Digital Equipment VAX systems usually run an operating system called VMS along with a software package called JNET which allows them to communicate via BITNET and Internet. UNIX systems use the Unix-to-Unix CoPy protocol (UUCP). We will be referring to VMKMS and VMS/JNET throughout this document.

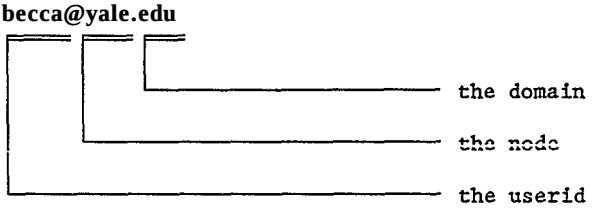
Most networks operate on a "store and forward" basis. This means that if I send something to someone in Los Angeles, the computers in the network between Connecticut and California will store and forward it from computer to computer until it reaches it's destination.

Each of the computers in a network is called a "node" and has a unique name that identifies it to the other nodes. For example, one of the mainframe computers at YaIe has the nodename YALEVM.

Your userid in combination with the name of your node is your "network address". It is usually written in the format userid@node (read "userid at node"). For example, the name of my node is YALEVM, and my userid is CONDON. Therefore, my BITNET address is cmdon&alevm.bitnet. If I know the userid@node.domain of someone in the network, I can communicate with that person, and he/she can communicate with me. The same goes for you. All you need to know are a few commands.

People in other networks have addresses similar to the BITNET addresses, but you need to specify something extra in order to get mail to them. A userid@node address is not enough, because that doesn't tell the BITNET mail software what network that node is in. Therefore, we can extend the network address with a code that identifies the destination domain.

In this example, the destination network is the Internet educational network. the code for which is edu.



Because of the variety of networks there can be no example which will show you what a "typical" address might be. If someone tells you that his network address is **condon@venus.ycc.yale.edu,** just use it like that with your mail software.

There are three basic methods of communicating via BITNET: MAIL, MESSAGE, and FILE. This chapter concentrates on MAIL and FILE. You should consult with your system postmaster for further information on MESSAGE.

2.2 MAIL

The most common form of network communication has been given a very apt name: MAIL (often called "electronic mail" or "e-mail"). The simile is a good one. Just like regular postal service mail ("snail mail"), you provide an address and text. Software for sending mail differs from site to site, so you will have to look in your local documentation for information.

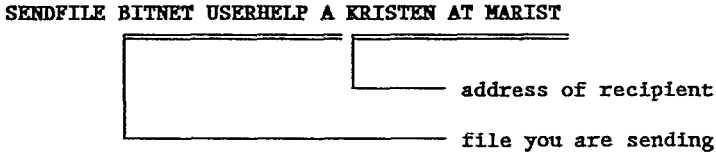
The size of a mail file is limited only by your long-windedness (however, we don't recommend that you transmit anything longer than 3000 lines). If the person at the destination address is not logged on, the message will be stored until they read it. If the links to that particular node are disconnected, your mail will be held until it can get through.

2.3 FILES

Since you send mail messages via the networks it is fairly obvious that other files can also be transmitted by similar means. The text files and programs that you store on your computer can be transmitted to users at other nodes. People on VM/CMS systems would use a syntax like this:

SENDFILE filename filetype filemode userid AT node

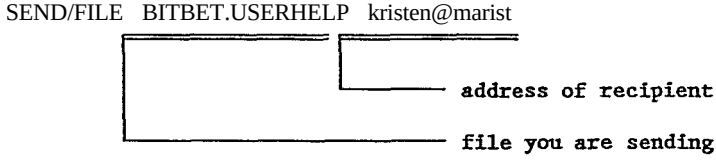
For example:



The syntax for VMS/JNET systems is quite similar:

SEND/FILE filename.extension userid@node

For example:



The file sent is stored in the "file receiver", not the mail box, of the recipient until he or she logs on. People on VM/CMS systems would use the RECEIVE or RDRLIST commands to process files sent to them in this way. People on VAX/VMS systems would use the RECEIVE command. You should check your local documentation for more information on these commands.

SEND/FILE and SENDFILE are useful for sending programs or large volumes of data over the network. However, they should not be used for everyday communication. The MAIL utilities (section 2.2) are much more accessible. It is also very important to be careful when sending binary tiles because they will usually be corrupted en route. Several programs can be used to convert binary files to ASCII so that they can be sent with

less risk of loss. In the UNIX and MS-DOS environments the most common conversion programs are UUENCODE and UUDECODE which can usually be found on publically accessible file servers such as SIMTEL20 (see section 4.3). A similar program called PKUNPAK and suitable for GAMMA-11 systems has been placed on the medical physics file server at UWO (see section B, B.l).

2.4 SERVERS AND SERVICES

2.4.1 What is a Server? :

A "server" is a userid much like yours. The people who set up this userid have it running a program that will respond to your commands. This is a "server". The commands you send and the way in which the server responds to them depends on the particular program being run. The various kinds of servers are described later in this document.

You can send your commands to servers in one of two formats: MAIL or MESSAGE. Not all servers accept commands via both formats, but this information is included in the document BITNET SERVERS (Section 2.51).

People on VM/CMS systems would send commands something like this:

```
TELL userid AT node command
```

For example:

```
TELL NETSERV AT MARIST HELP
```

People on VAX/VMS systems using the JNET networking software would use this syntax:

```
SEND userid@node "command"
```

For example:

```
SEND NETSERV@MARIST "HELP"
```

Many servers can also accept commands via mail. Indeed, some will only accept your commands in that format. The syntax for the commands you send remain the same. You send mail to the server as if you were sending

the mail to a person. The text of your message would be the command. Some servers will take the command as the first line of a text message, others require it in the "Subject:" line. Some servers will accept more than one command in a mail message, others will take only one. Here is an example of a mail message sent to LISTSERV@BITNIC requesting a list of files:

```
Date:       Fri. 10 Sep 88 23:52:00 EDT
From.       Rebecca Estelle Shaw <BECCA@YALEVM>
To:         Listserv  <LISTSERV@BITNIC>

INDEX
```

There are two particularly confusing aspects of servers of which you should be aware. First, servers in the same category (say, file servers) do not always accept the same commands. Many of them are extremely different. Others are just different enough to be annoying.

2.4.2 File Servers :

You will generally send three types of commands to a file server. The first type is a request for a list of files the server offers. The second is a request that a specific file be sent to your userid. The third, and most important, is a HELP command.

The HELP command is very important because it is one of the few commands that almost all servers accept, no matter what the type. Sending HELP to a server will usually result in a message or file sent to your userid listing the various commands and their syntax.

Appendix B contains information relating to a file server serving the nuclear medicine community.

2.4.3 User Directory Servers :

User directory servers are offered for two reasons: One is to help you locate the network address of a specific individual. Another is to help you find people in BITNET with various interests. You might call them the "phone books" of the network.

There are a number of user directory servers in BITNET. Unfortunately, few of them accept the same commands or respond in the same way.

Worse, there is no guarantee that an individual you are looking for is registered on a particular user directory server. There is (as yet) no central user directory server or requirement for people to be registered in one.

2.4.4 List Servers, Forums and Digests :

List servers or FORUMS are a good example of how the utility of mailing lists has been expanded in the network environment. Let's say that you have subscribed to a forum for people interested in COBOL. How you could subscribe to such a list will be described later (See Section 2.4.6). Someone on the mailing list sends mail to a server where the list is kept. This server forwards the mail to all of the people in the forum. When mail from a forum arrives in your computer mailbox, the header will look much like this:

```
Date:       Fri. 10 Sep 88 23:52:00 EDT
Reply-To:   COBOL Discussion List <COBOL-L@METRO>
Sender:     COBOL Discussion List <COBOL-L@METRO>
From:       Ted Kord <BEETLE@JLIVM>
Subject:    No More Perform-Through-Varyings!
To:         Daniel Lawrence Shaw <DANIEL@YALEVM>
```

This looks a little confusing, but there really is not much to it. In this example, Ted Kord ("From:") sent mail to the COBOL-L list address. This server then forwarded the mail to everybody on the list, including Daniel Lawrence Shaw ("To:"). Note the line named "Reply-To:". This line tells your mail software that when you reply to the note that the reply should go to the list... meaning EVERYBODY on the list. People will in turn reply to your mail, and you have a forum. If you want to reply only to Ted Kord you would address your mail to beetle@jlivm.

This is usually very interesting, but it can lead to problems. First among these is the volume of mail you can receive. If you are in a very active forum, you can get 50 or more pieces of electronic mail in a single day. If you are discussing a controversial or emotional topic, expect more. Many people have a tendency to "flame". The speed and immediacy of electronic mail makes it very easy to whip out a quick, emotional, response, to which there will be similar replies. We advise you to take some time and think out your responses to forum postings before inadvertently starting a "flame war". The booklet: "Toward an Ethic and

Etiquette for Electronic **Mail" by Shapiro and Anderson provides some** useful comments in this regard.

Moderated mailing lists or DIGESTS provide a partial solution to the these problems. In this case, mail that is sent to a mailing list is stored rather than sent out immediately. At some point the "Moderator" for the list organizes and condenses all of the correspondence for the day or week He then sends this out to the people on the mailing list in one mailing.

The drawback with this setup is that it requires a lot of human intervention. If the moderator gets sick, goes on vacation, or quits, activity for a particular digest can come to a screeching halt.

2.4.5 Newsgroups on USENET :

Usenet is a distributed conferencing system available at Internet and UUCP sites that has a large number of newsgroups ranging over a wide spectrum of topics. Each newsgroup is similar to a FORUM or DIGEST, depending upon whether the newsgroup is moderated or not. Anyone with access to the newsgroup may read postings. Conferencing systems may implement "public/private" newsgroups as well as mark some newsgroups as "moderated".

All newsgroups on Usenet are public - anyone with access to the conferencing system may read articles posted to any or all of the newsgroups. Private newsgroups can be implemented using mailing lists as described above. Some newsgroups on Usenet are moderated - all postings in a moderated newsgroup are approved by the moderator first. Articles posted into moderated newsgroups are automatically mailed to the newsgroup moderator.

Of particular interest to medical physics is the unmoderated newsgroup called **sci.med.physics.**

2.4.6 List Servers :

The most difficult concept behind list servers is the difference between a LISTSERV and its list-ids. When you subscribe to a mailing list, you send the appropriate command to a LISTSERV. When you want to communicate to the people on the mailing list, you send mail to the list-id. For example, there is a list named LIAISON. To subscribe to this list, you would send a command to LISTSERV@BITNIC. You could then

correspond with people on that mailing list by sending mail to LIAISON@BITNIC.

LIAISON is a list-id, a "satellite" of the LISTSERV. We mention this because many people make the mistake of sending commands by mail to list-ids. This annoys people to no end and creates a lot of unnecessary network traffic.

To subscribe to a list, you would send a LISTSERV a SUBSCRIBE command, which has the following syntax:

SUBscribe listname your_full_name

In this example, Kristen Shaw is sending LISTSERV@BITNIC the command to subscribe to LIAISON:

VM/CMS: tell LISTSERV AT BITNIC SUB LIAISON Kristen Shaw
VMS/JNET: SEND LISTSERV@BITNIC "SW LIAISON Kristen Shaw"

If you misspell your name when entering a SUBscribe command, simply re-send it with the correct spelling. To delete her name from the mailing list, Kristen would enter an UNSUBscribe command:

VM/CMS: TELL LISTSERV AT BITNIC UNSUB LIAISON
VMS/JNET: SEND LISTSERV@BITNIC "UNSUB LIAISON"

Those are the basic commands you need to know in order to access LISTSERV controlled mailing lists. However, LISTSERV has a multitude of features, so we (of course) encourage you to read the LISTSERV documentation.

NOTE: If you are on a VAXcluster, you should send SUBSCRIBE and UNSUBSCRIBE commands to LISTSERV via MAIL.

2.5 SUMMARY

A number of different facilities are available for network communications. The simplest is mail, which is similar to normal mail in the sense that a message consisting of normal text is electronically "packaged" and sent to its destination where it falls into the receiver's mail box to await reading and response. If the connection between the sender and the receiver is incomplete the message is stored until it can be forwarded on its way.

Delivery of mail messages is typically within minutes but may take a few days to remote nodes on other networks.

Files (including binary files in some instances) can also be sent by the same means. In this situation the file is delivered to a receiver area from which the user must fetch it - it is not stored in the mail box. File transfer allows for the transmission of longer messages than is normally the case for mail.

Discussion groups can use the facilities of list servers to conduct multiple mailings to all individuals on the list. In that context, list servers act as mail bursters. Enrollment on a very active list server can lead to you receiving many messages per day. Usenet acts as a bulletin board for very many topics and users with access to Usenet can read any or all of the postings to the multitude of newsgroups that exist there. File servers act as libraries where data can be stored and accessed at will by remote users. Such access may be via mail or by message - the latter being essentially interactive and requiring the connection between nodes to be complete when the instruction is sent.

2.5.1 Suggested Reading :

First of all, I recommend that you look over BITNET SERVERS, the list of all the different servers and services in BITNET. Likewise, I suggest that you subscribe to NetMonth. Instructions on how to get these files are located at the end of this section. Per usual, all of these files are free.

Below are listed some files from the NETINFO FILELIST on LISTSERV@BITNIC which will provide further information on some of the topics presented above. You can get them by sending the following command to LISTSERV@BITNIC via mail or interactive message: SENDME filename filetype. For example:

```
SENDME MAIL MANNERS
```

BITNET CHARTER - The original BITNET Charter.

BITNET OVERVIEW - A short document explaining the purpose of BITNET.

MAIL MANNERS - Must reading!!!! This document explains the dos and don’ts of using electronic mail in BITNET (or any other network for that matter!).

INFOREP LISTINGS - Each BITNET site has a person who is responsible for distributing information about the network and helping out users (the Inforep). If you don't know who your Inforep is, this document will tell you.

LISTSERV LISTS - A list of all the different mailing lists available via the BITNET LISTSERVs.

To receive the latest version of BITNET USERHELP, send the following command to NETSERV@BITNIC, LISTSERV@MARIST, or LISTSERV@CMUCCVMA via mail or message:

GET BITNEZ USERHELP

Likewise, you can get the latest version of BITNET SERVERS by sending one of those servers the command GET BITNET SERVERS.

If you want to get updates to BITNET USERHELP and BITNET SERVERS automatically, subscribe to NetMonth magazine, 'The Independent Guide to BITNET: It is, of course, free. To subscribe, send the following command to LISTSERV@MARIST:

SUBSCRIBE NETMONTH your_full_name

For example:

SUBSCRIBE NETMONTH Danny Shaw

Addendum: In September, 1989 the administrative activities of BitNet and CSNet were combined under a new organization called the Corporation for Research and Educational Networks (CREN). This was a purely administrative change and the BitNet and CSNet networks continue to operate as before.

3 USER'S GUIDE TO NETWORKS

Electronic mail guide, based on original version by Chris Been and Ralph Martin of Royal Greenwich Observatory. Edited by: Bob Hanisch, Peter Shames, Peter Boyce, Oct 1988. Reproduced with permission and further editing by: Trevor Cradduck, September 1989.

3.1 INTRODUCTION

In order to send electronic mail it is typically necessary to know the user name of the addressee, the name of the machine on which he or she is working (the host), and the name of the network to which the machine is connected (part of the domain). This information may be obtained from the addressee, or from the directory of addresses for AAPM members. Because there are several different networks in wide use, a lot of electronic mail has to cross from one network to another via gateway machines or relays. These are computers that are connected to two or more different networks and which accept mail from one network and forward it onto another network Many of the mysteries of electronic mail have to do with determining the syntax needed to send mail through such relays.

Users are warned that the information given in this guide cannot be guaranteed. In particular, the relay machines between the various networks tend to change, sometimes with little or no notice.

3.2 NETWORK DESCRIPTIONS

The computer networks in most common use by medical physicists in North America are Internet, BITNET, UUCP, and Telenet (a commercial network managed by GTE). In addition, medical physicists world-wide have access to a number of other networks, such as JANET in Britain, EARN in Europe, INFNET/ASTRONET in Italy, ACSNET in Australia, and the international packet-switched networks based on the X.25 protocol. Each of these networks will be described below. A number of other networks that may be encountered are mentioned in the Glossary.

Mail delivery times will vary from network to network; yielding mail delivery times between a few minutes and a few days, and if the mail does not go through immediately they will try again several times before returning the mail to the sender.

Different networks use different protocols, or data encoding schemes, for the transmission of information. Some of these protocols are open standards, such as TCP/IP, and some are proprietary to certain manufacturers (such as DEC's DECnet). As a result, there is often no one simple way to specify a mail address. There is no equivalent to the standard telephone number, although there are 'standard' ways of specifying electronic mail addresses.

As far as the user is concerned, electronic mail/data communications lines are essentially error free; complex error checking and error correcting procedures are defined in the standards, and are carried out by a combination of hardware and software.

Note on case sensitivity Most electronic mail addresses are not case sensitive. As a matter of convention, electronic mail addresses on computers running the UNIX operating system tend to be given in lower case (e.g., on the UUCP and Internet networks), and addresses on VMS machines tend to be given in upper case (e.g., on the SPAN network). This is a tendency, however, not a strict rule. One should be careful with UUCP addresses in particular; users are advised to follow the case specifications carefully, since the address hostl!host2!user is not the same as hostl!host2!User.

For more information about computer networks, readers are advised to refer to the Bibliography.

3.2.1 Internet/ARPA :

The Defense Advanced Research Project Agency (D)ARPA network was initially set up by the U.S. Department of Defense in 1969. It is now a part of Internet, which uses TCP/IP (Transmission Control Protocol/Internet Protocol) communications and includes over 30000 hosts (1987) and more than 570 networks in several domains:

com - commercial organizations
edu - educational/research organizations
gov - civilian government organizations
mil - Department of Defense
erg - other organizations

Most Internet network sites that medical physicists communicate with will be in the EDU domain (universities, research labs). The old ARPA domain has been phased out, and addresses ending in .ARPA were no longer valid after December 1988.

There are additional domains for countries outside the **USA,** *e.g.,* **UK** (United Kingdom) and **AU** (Australia). **Internet** includes some transcontinental and transatlantic satellite links **(SATNET).** Typical delivery times on **Internet** are of order of a few minutes.

In **Internet** individual computers are assigned addresses within a hierarchical system. Thus, the users will generally need to specify the alphanumeric name of the host when sending mail or doing a remote login. These names all have at least two components **(SITE.DOMAIN),** and may have several fields separated by periods preceding the domain, e.g.,astro.as.utexas.edu. These fields can generally be interpreted as a hierarchy -- machine, (subnet,) campus, domain.

Additional information about **Internet,** including more detailed user's guides, can be obtained by logging in to the Network Information Centre (NIC):

```
telnet nic.sri.com
```

Follow the instructions to peruse the menus and other information that is available. Once you have found a file of interest, you can copy it from the NIC to your local computer by using the FTP (file transfer protocol) program (Chapter 4).

Internet is the fastest growing of the United States networks and presently is supported by **DARPA,** the National Science Foundation, NASA, the Department of Energy, and the United States Geological Service. NSF has the mandate to support national networking for the scientific research community.

Further information about **Internet** sites, services, and campus and regional coordination can be obtained from the **NSF** Network Service Centre (nnsc@nnsc.nsf.net). Sites or facilities wishing to connect should send their postal address to the Program Office (dncri@note.nsf.gov). On-line information about **NSF** sponsored network services and facilities can be obtained from the NNSC. Mail a message to info-server@nsc.nsf.net that contains the lines:

```
REQUEST: NSFNET
TOPIC: HELP
```

Other topics **(WHAT-IS-NSFNET, SITES, COORDINATORS,** NETWORKS, etc.) are also available and may be requested on successive lines.

3.2.2 UUCP/USENET :

The **UNIX** to **UNIX CoPy** network **(UUCP)** includes of order 7000 hosts, most running the UNIX operating system. The network mostly uses simple dial-up modem connections, with **TCP/IP** network connections where possible. The first links were made in 1978 at Bell Laboratories. Each host pays for its own links, which are generally low-speed (1200 and 2400 baud) and low-cost. Administration is minimal. Typical delivery times are of order days.

UUCP host-names are non-hierarchical. Some examples are **aardvark, edison, groucho, kludge, tukey, yoyo,** and **zyx.**

The **UUCP** network is unusual in using explicit source-routing, in which addresses of the form **hosta!hostb!host!user** are interpreted as a route along which the message must be sent in order to reach **user** at **host.** A few central hosts are known, reasonably reliable forwarding machines; use of these hosts in **UUCP** addresses makes the routing information shorter. An example of an address is: MCVAX!ENEA!ASTOL!user (Lund Observatory, Sweden). The ellipsis should be replaced by whatever routing information is needed (if any) to get the message as far as the host name which follows them. The trick in making successful use of UUCP is to be able to determine a routing path from your machine to another machine (as if you had to tell Ma Bell or **MCI** how to route your phone calls!). Some sites have software that can provide routing information; if you cannot provide the full route, the program will try to determine a route for you automatically.

There are a number of UUCP-related networks: EUNET in Europe, **JUNET** in Japan and **ACSNET** in Australia. All the European backbone sites are connected to MCVAX in Amsterdam, which also connects to **SEISMO,** the main routing node in the **USA.** Examples of other backbone sites are MUNNARI in Australia (Melbourne) and UUNET in the United States. From the Internet mail can be relayed through UUNET.UU.NET.

For more information about **UUCP** send a message to info- server@sh.cs.net with the text:

REQUEST: INFO
TOPIC: USENET MAP
TOPIC: ML-3

3.23 **GTE Telenet and CompuServe :**

Telenet is a commercial network with a mail service run by **GTE.** A number of scientists are on this network, particularly the oceanographers and the **VLBI** crystal dynamics community. Telenet has a large number of local telephone numbers and with a modem and a PC a user can connect to the network from nearly anywhere in the United States. Users are not dependent upon their institutions being wired up to one of the major networks. Telenet charges a fee based on the connect hours used.

It is possible to send mail from **BITNET** or **Internet** to a user on Compuserve. User ID's on CompuServe have a numeric format - two numbers separated by a comma. For example, 72115,2222. This comma would confuse mail systems everywhere else, so a period is substituted. Therefore, if someone tells you that they have a user ID of 72115,2222 you would address your mail to:

72115.2222@cmserve.com

└———— **Note period rather than comma.**

Unfortunately your mail system may not know the location of the gateway to CompuServe, in which case you have to name it explicitly. In this case, you would type the address like so:

72115.2222%compuserve.com@saqqara.cis.ohio-state.edu
(all one line)

From the CompuServe side, the user would use their EasyPlex mail system to send mail to someone in **BITNET** or **Internet.** For example, to send me mail at my **BITNET** ID, you would address the mail to:

>Internet:trevorc@uwovax.bitnet

or to my **Internet** ID:

>internet:trevorc@uwovax.uwo.ca

There is no charge to CompuServe customers to either receive or send mail to **BITNET** or **Internet.**

3.2.4 Connection to MCI Mail:

An experimental Internet<->MCI Mail Gateway mail system is being developed by the Corporation for National Research Initiatives (NRI), a non-profit research organization (November, 1989). NRI is currently researching interconnecting various mail services. Currently, there is no charge for sending mail from the Internet to MCI Mail. In order to send mail to users on MCI Mail, use one of the following addresses:

accountname@mcimail.com
ci_id@mcimail.com
full_user_name@mcimail.com

For instance, user David Ely has a mailbox on MCI Mail. You could send mail to him via either dely@mcimail.com or 379-3286@mcimail.com or David_Ely@mcimail.com.

Users on MCI Mail can also send messages to the Internet. At the "Command:" prompt, type "create <carriage return>. Then the user performs the following: (NOTE the "To:", "EMS:" and "MBX:" strings are prompts provided by MCI Mail.

Command: create <return>
TO: David K. Ely (EMS)
EMS:INTERNET
MBX: dely@NRI.Reston.VA.US

This address is translated to:

"David K. Ely" <dely@NRI.Reston.VA.US, by the Gateway.

Mail sent from MCI Mail to the Internet is charged by MCI Mail. One final note: NRI states that you should feel free to use the gateway as often as you wish, but be forewarned: As of 1st November, 1989, the gateway is still not considered fully operational; sometimes mail will be delayed (usually less than 24 hours.)

3.2.5 Connection to TELEMAIL:

The following material has been taken from an article "Mail Forwarding Between Telemail and the Internet Using Commercial Mail Relay (CMR)" by Ann Westine and Chloe Holg as it was published in NetMonth magazine, 'The Independent Guide to BITNET', February, 1990.

The Commercial Mail Relay (CMR) has replaced an earlier system known as the Intermail system. The CMR may be used for transmitting e-mail between Internet and the users of Telemail. It may be used in either direction.

Messages to be forwarded are sent to the CMR mailbox on the system ISI.EDU.CMR operates a program to service mailboxes in both the local ISI.EDU and destination mail systems. When the right forwarding information is supplied, either in the Internet header "To:" field, or at the beginning of a message, the program forwards those messages to the other mail system to the appropriate mailboxes.

The mailbox is called TELEMAIL@WIERMAIL.ISI.EDU" in Internet and "[INTERMAIL/USCISI]TELEMAIL/USA" on the Telemail system.

* SENDING MAIL TO TELEMAIL:

In order for a message to be delivered from Internet to a mailbox on a Telemail system the Internet Relay-Style addressing format is used. Simply type the Telemail mailbox in the Internet header:

user-mailbox%TELEMAIL@ INTERMAIL.ISI.EDU
(for TELEMAIL/USA only)

For example:

JOHNDOE%TELEMAIL@ INTERMAIL.ISI.EDU

USER-MAILBOX/ORG]SYSTEM_BRANCH/COUNTRY%TELEMAIL
@INTERMAIL.ISI.EDU
(all one line, for all other Telenet systems)

For example:

[JDOE/NASA]NASAMAIL/USA%TELEMAIL@ INTERMAIL.ISI.EDU

***SENDING MAIL FROM TELEMAIL:**

The following is an example of how to send a message to user1 on BITNET and user2 on Internet. First, send a message to the CMR mailbox in Telemail called "[INTERMAIL/USCISI]TELEMAIL/USA". Then add the ARPA forwarding information at the beginning of the text of the message. A typical Internet address is in the form (user@host.domain). Addresses are separated by commas (not spaces). Note, when sending mail to BITNET, or UUCP, you must type "Forward: ARPA". not "Forward: BITNET" or "Forward: UUCP.

Example:

```
----------------------------------------
To:[INTERMAIL/USCISI]TELEMAIL.ISI.EDU
Subject:TestMessage

Forward: ARPA
To: userl@UWOVAX.BITNET
Cc:user2@UWOVAX.UWO.CA

Hi,

This is the text of a test message from Telemail to BITNET
and internet.

  --- Fred
----------------------------------------
```

"Forward: ARPA" signals the beginning of the forwarding information and tells the forwarding program that this is mail for the ARPA-Mail system. On the next line, "To: userl@UWOVAX.BITNET" specifies the mailbox that it will be delivered to. The "To:" line is required to deliver the message.

* NOTES FOR BITNET USERS:

Some systems in the BITNET world treat square brackets, "[" and "]", as special characters. On these systems, a square bracket that is used in an address must be quoted through the use of a preceding backslash, "\". For example:

```
\[GORDON/OMNET\]MAIL/USA%TELEMAIL@INTERMAIL.ISI.EDU
```

Full documentation on the Commercial Mail Relay can be requested from: INTERMAIL-REQUEST@ISI.EDU.

3.2.6 Connection to FIDONET :

The following material was taken from an article by David Dodell which appeared in the BITNET News.

FidoNet is fully coupled into the Internet. You do not need to know any specified gateways, just address your message correctly into the fidonet.org domain, and everything will be routed automatically. FidoNet addresses can be addressed in the basic format of

FirstName_LastName@fzz.nxx.zyy.fidnet.org

zz= FidoNet Node
xx= FidoNet Network or Region
yy= FidoNet Zone (presently only 1 to 4 are valid)

Therefore, as an example, my name is David Dodell, residing at FidoNet address 1:114/15. My FidoNet Internet address is:

David_Dodell@f15.n114.z1.fidonet.org

Now, how do you go from a FidoNet node to an Internet style address? Just as easy, however, you need to find a gateway on FidoNet first, since there is no automatic routing to Internet gateways at this time. For example, you could use my gateway at 1:114/15.

You would send a message to the user “uucp” at 1:114/15

In the first line of the text, you put the Internet style address, followed by 2 returns, ie:

The addressing is of the form:

To: user@site.domain

For example, to send to my BITNET account of ATWlH@ASUACAD, The FidoNet message would go to “uucp” at FidoNet address 1:114/15.

The first line in the body of the message would be:

To: atwlh@asuacad.bitnet

3.2.7 PINET:

The American Institute of Physics has redesigned PINET, its physics information network. In addition to listings of jobs, and an electronic publication catalogue (with on-line ordering), the new system offers expanded services and capabilities designed to keep pace with the changing computer network environment.

Significant improvements include a comprehensive searching capabilitv of advanced and published abstracts of all HP's and its Member Society (including AAPM) publications, and combining of its PIMAIL electronic mail service into one network system. AIP's connection as a BITNET node, which is available through PINET, provides users access to a broader segment of the physics community.

The expanded service, is widely available to the science community and operates at baud rates from 300 to 9600 via a toll-free 800 telephone number in the United States and Canada for a modest connect charge.

To get more information on PINET's services contact PINET Administrator, American Institute of Physics, 500 Sunnyside Blvd. Woodbury, NY 11797 (tel. 516-349-7800 Ext: 441/FAX 516-349-7669)

You can send mail to PINET users from BITNET by addressing the mail to:

user@aip.bitnet

Users on PINET are usually assigned their initials as their user ID *so* that John B. Doe would be:

jbd@aip.bitnet

From the PINET side a user there can send you a message by addressing it to:

user@usernode.bitnet

Similarly you can send mail to **PINET** users from **Internet** by addressing the mail to:

user@pinet.aip.org
(the Telnet gateway is at 192.58.150.2)

How to access PINET:

- Set communication parameters:
  Modem 300, 1200, 2400 &9600 baud
  Duplex Full/Stop Bits 1
  Data bits 7/Parity Even
  ASCII Code Standard
- Make sure CAPS LOCK key is OFF. Login entries must be in lower case.
- Dial 1-800-72-PINET
- DO NOT press any key, wait for **login:**
- Type **new** and press **<CR>.**
- An introductory menu will provide further details about PINET's connect rates, services and categories of membership, along with on-line registration instructions. *(There is NO CHARGE to view this information)*
- If you wish to register, select #1 and press **<CR>.**

From the PINET side a user there can send you a message on Internet by addressing it to:

user@usernode.domain

For further information contact:

admin@pinet.aip.org or admin@aip.bitnet

3.2.8 LUNIS:

A network that was established commercially on CompuServe and known as The Nuclear Network (TNN) has been replaced by a free system operated by Loyola University, Chicago know as LUNIS - Loyola University Nuclear Medicine Information System. This system is accessed

by dial-up modem and, since it is based on a VAX computer, many of the commands will be familiar to **VAX** users. The best terminal emulation to choose is the VT100 but others are possible. The facilities available will be e-mail, bulletin board services and image exchange. For details concerning sign up potential users are requested to call the Department of Nuclear Medicine, Loyola University at (708) 216-3779 or FAX (708) 216-5813. Subscribers will be given an access code and password, and sent a manual of instructions. A connection between LUNIS and **BITNET/Internet** will be established in the near future (Spring, 1990). It is hoped that an 800 number can be financed in the future to allow persons to make long distance access freely.

4 FILE TRANSFER PROTOCOL

The File Transfer Protocol (FTP) is a mechanism whereby you can login to a remote computer and obtain files that are available there to be transferred to your local account. You can look at the directory of files that are available to you and can then ask the remote site to send you copies of those you select. This is much like a tile server except that you are logged in to the remote site (so the connection between sites must be complete) and you issue commands directly rather than sending them by mail (or message).

4.1 FTP COMMANDS

As in the case of most computer programs, the command HELP provides a description of the actions that may be performed. These actions may differ between the local and remote systems so that it might be advantageous to issue the HELP command to the remote site in order to determine what commands are appropriate there. The following commands pertain to the FTP program available on UWOVAX. Other systems will differ. For example, the commands to make a connection to a remote site and to logon are "OPEN" and "USER" under UNIX, but the HELP command will usually supply the necessary information required to use the program.

FTP>help
The HELP command prints on-line help for the FTP user program. The argument to HELP selects the particular FTP command about which help is desired. In addition to the FTP commands, several control characters can be typed while file transfers are in progress:

Control-A shows the progress of a data transfer.
Control-G aborts a file transfer and returns to FTP command level.
Control-P spawns a new command interpreter

FTP>help ? one of the following:

BELL BYTE	CONFIRM	CONNECT
EXIT HASH	HELP	LCD
LDIR LIST	LOCAL-CD	
LOCAL-DIRECTORY		
LOCAL-PWD	LPWD	OPEN PUSH
QUIT RETAIN	SET	SPAWN
TAKE VERBOSE	VERSION	

For example:

FTP > help bell
The BELL command turns ON or OFF a feature which causes the terminal to ring when all the operations in a multiple-operation command have completed. The default argument for BELL is TOGGLE, which turns this feature ON if it was previously OFF and turns this feature OFF if it was previously ON.

4.2 SAMPLE SESSION

The following text is a sample log of a session used to obtain a file from a remote site. Comments have been added after the ";" to clarify the actions taking place:

```
FTP>con nl.cs.cmu.edu              ;Open a connection to
                                   ;nl.cs.cmu.edu
Connection opened (Assuming 8-bit connections)
<NL.CS.CMU.EDU FTP server (Version 4.105 of 18-Jun-89
19:22) ready.
NL.CS.CMU.EDU>log anonymous        ;Login anonymously
<Guest login ok, send ident as password.
Password:                          ;Password not echoed
<Filenames can not have '/..' in them.
NL.CS.CMU.EDU>cd /usr/mlm/ftp      ;Change the remote
                                   ;directory
<Directory path set to /usr/mlm/ftp.
NL.CS.CMU.EDU>dir                  ;Obtain a list of files
                                   ;from the specified
                                   ;directory.
                                   ;Note that this is a UNIX
                                   ;system. List follows -
<Opening data connection for ls (129.100.2.13,1399).
total 850
-rw-r--r--  1 mlm   nlp       607 Mar 31 12:35 README
-rw-r--r--  1 mlm   nlp     48242 Jul  1 23:26 const.tr
-rw-r--r--  2 mlm   nlp    155053 May 30 10:38 fbm.tar.Z
-rw-r--r--  2 mlm   nlp    155053 May 30 10:38
fbm094.tar.Z
-rw-r--r--  1 mlm   nlp     69141 Feb 21 04:44 pbm.tar.Z
drwxr-xr-x  2 mlm   nlp       512 Mar 25 06:42 rasters
drwxr-xr-x  5 mlm   nlp      1024 Dec 14  1988 rgm
-rw-rw-r--  1 mlm   nlp    128308 Jun 14 20:42 tiff.tar.Z
-rw-r--r--  1 mlm   nlp     10330 Jun 16 14:08
tiff2fbm.dist
-rw-r--r--  1 mlm   nlp    260151 Apr  3 18:01 utah.tar.Z
<Transfer complete.
NL.CS.CMU.EDU>get README           ;GET the file README
```

```
  To local file: README.FTP      ;and put into README.FTP
<Opening data connection for README (129.100.2.13,1401)
(607 bytes).
<Transfer complete.
NL.CS.CMU.EDU>DISCON       ;Finished, so DISCONNECT
FTP>quit                         ;and QUIT the FTP
$                                ;$ prompt of local system
```

4.3 SIMTEL20

One valuable resource for many programs and files is located in New Mexico and is known as SIMTEL20. The full name for the system is: WSMR-SIMTEL20.ARMY.MIL and its Internet numeric address is 26.2.0.74.

The directories available for anonymous login at SIMTEL20 are too numerous to list here but for those persons interested in MS-DOS files it is best to obtain a listing of the directory PDl:<MSDOS.FILEDOCS>. In addition, the files PDl:<MSDOS>FILES.IDX and PD2:<MSDOS2>FILES.IDX are updated on a daily basis. These are comma-delimited files, without descriptions, of the MSDOS and MSDOS2 directories respectively.

Readers should be forewarned that SIMTEL20 is an extremely busy system and it is very difficult to gain access except in non-peak hours during the night or at weekends. Nevertheless the system does archive many useful programs and can be well worth the effort (and frustration) entailed in establishing a connection. Care needs to be exercised in transferring binary files. The commands "BINARY" or "TENEX" need to be given prior to “GETting” a file from SIMTEL20 if corruption of the file en route is to be avoided. Directories and ASCII files can be obtained without such precautions.

WSMR-SIMTEL20.ARMY.MIL can also be accessed by LISTSERV commands from BITNET via LISTSERV@NDSUVMl, LISTSERV@RPIECS, LISTSERV@FlNTUVM and, in Europe, from EARN TRICKLE servers. Send commands to TRICKLE@<host-name> (example: TRICKLE@TREARN). The following TRICKLE servers are presently (April, 1990) available: AWIWUW11 (Austria), BANUFSll (Belgium), DKTCll (Denmark), DB0FUBll or DTUZDVl (Germany), IMIPOLI (Italy), EB0UB0ll (Spain), TAUNIVM (Israel), and TREARN (Turkey).

If you are unable to access SIMTEL20 via Internet FTP or through one of the BITNET/EARN file servers, most MS-DOS SIMTEL20 files,

including the PC-Blue collection, are available for downloading on the Detroit Download Central network at 313-885-3956. DDC is a networked system with multiple lines that support 300, 1200, 2400, and 9600 bps (HST). This-system is a subscription system with an average hourly rate of 17 cents per hour. It is also accessible on Telenet via PC Pursuit and on Tymnet via Starlink outdial. New files up-loaded to WSMR0-SIMTEL20 are usually available on DDC within 24 hours.

4.4 ACCESSING FTP FROM BITNET

FTP is an Internet function and only those nodes on Internet can use FTP in a direct manner. Bitnet user can also access FTP servers through the file server BITFTP located at Princeton University. To use BITFTP, send a mail message containing your FTP commands to **bitftp@pucc.bitnet** The first command to BITFTP must be "FTP" or "HELP".

The recommended syntax for FTP requests is:

```
FTP hostname
USER username password
<other FTP subcommands>
```

BITFTP implements a subset of the FTP subcommands provided in IBM TCP/IP and uses the same syntax Therefore, you may find it useful to obtain the "IBM TCP/IP for VM Command Reference Manual", IBM order number GC09-1204.

The files you request will be sent to you in NETDATA format. You will also receive a mail file containing a log of your FTP session. In that mail file, entries prefixed by ">" are your original commands; those prefixed by ">>" are your commands as interpreted by BITFTP and passed to the FTPSERVE, those prefixed by ">>>" are messages from FTPSERVE, and those prefixed by ">>>>" are completion messages from BITFTP.

If BITFTP is unable to connect to the host you specify, it will send you mail after the first attempt, but will keep trying at intervals over three days. The only additional mail files you will receive will be when the connection is made successfully or when BITFTP gives up after three days.

A. MEDICAL PHYSICS LIST SERVERS

Apart from the many list servers available on BITNET nodes and the newsgroups on Usenet, there are several list servers which are of special interest to medical physicists. PINET (Section 3.2.7) also offers comprehensive bulletin board type functions.

A.1 RADIATION THERAPY

A list server primarily intended to serve the radiation therapy community is medphys@godot.radonc.unc.edu which is maintained by George Sherouse at the University of North Carolina. To send a message to all members of that list you send a mail message to medphys@godot.radonc.unc.edu If you want to be added to the list you should address your request to:

medphys-request@godot.radonc.unc.edu

A.2 DIAGNOSTIC RADIOLOGY

radsig@oly.acs.washington.edu, maintainedby Alan Rowberg at the University of Washington in Seattle, serves the interests of physicists in diagnostic radiology. The group is initially being sponsored by the Department of Radiology at the University of Washington and AAMSI PSG-22 (Radiology). The following material has been provided by Alan Rowberg:

You can do three different things with RADSIG, in addition to receiving mail that is automatically sent into your computer mailbox.

1. Send a message to Alan Rowberg for inclusion in the newsletter, or ask a question about using RADSIG. You may reach him on BITNET:

rowberg@uwalocke.bitnet

or on Internet:

rowberg@locke.hs.washington.edu

2. You can send a message to the RADSIG mailing list. This message will be received by a host computer in Seattle, and distributed as individual messages to all the people who have subscribed to the RADSIG mailing list.

Accomplishing this distribution is as simple as sending mail to the RADSIG address. RADSIG appears as a mailbox, just as any user's mailbox, and may be using on BITNET:

radsig@uwavm.bitnet

or on Internet:

radsig@oly.acs.washington.edu

3. Finally, you can send mail to LISTSERV, which is the program that serves the mailing list. This program will allow you to add your name to the list, to delete your name from the list, or to obtain a list of all the members of RADSIG. To do this, you simply send BITNET or Internet mail to LISTSERV, with the contents of the first line of the mail message being a command, such as HELP, beginning in the first column of the body of the mail message.

The BITNET address is:

listserv@uwavm.bitnet

and the Internet address is:

listserv@oly.acs.washington.edu

A list of possible commands is obtained by sending the HELP command to LISTSERV. You can see who else is on the list by sending the REVIEW RADSIG command. Each command takes l-2 minutes to execute.

On a VAX, the commands are:

$ SEND LISTSERV@UWAVM HELP

$SEND LISTSERV@UWAVM REVIEW RADSIG

When the file comes back use $ RECEIVE *, then you can type the file out.

On an IBM VM system the commands are:

TELL LISTSERV AT UWAVM HELP

TELL LISTSERV AT UWAVM REVIEW RADSIG

A3 NUCLEAR MEDICINE

A nuclear medicine specific list server is maintained at the University of Western Ontario and goes by the name of nucmed@uwovax.uwo.ca Like MEDPHYS and RADSIG, this is an open mailing list and you may contact everyone on the list by sending a mail message to the above address. If you wish to be added to the nucmed mail burster send a mail message including your name, postal address, e-mail address, phone and FAX numbers to:

nucmed-request@.uwovax.ca

A.4 USENET SCI.MED.PHYSICS

Although it is not strictly a list in the same sense as the list servers mentioned above it is worth pointing out that a newsgroup called sci.med.physics does exist on UseNet. Those who have access to UseNet may register with this newsgroup and will then be able to review all postings to the newsgroup. The newsgroup is not moderated although it was originally established by Steven Balter of Chicago. The number of postings to this news group has tended to be low, averaging about one per week Those postings that are of interest are extracted for the nucmed list server and, similarly, some of the postings to nucmed are posted to the sci.med.physics newsgroup.

B. NUCLEAR MEDICINE FILE SERVER

A file server which includes files specific to nuclear medicine is located at the University of Western Ontario. It may be accessed by electronic mail by sending a message to service@uwovax.uwo.ca and placing the item requested in the Subject: line. HELP provides instructions concerning use and LIST gives a list of all the files stored on the file server. In the nuclear medicine section of the server you will find a number of files including a directory of over 200 persons and their e-mail addresses. This directory includes a number of persons associated with nuclear medicine. The others are engaged in other areas of medical physics. There is also a short version of the same file which contains only names and e-mail addresses. Other files on the file server include a copy of the Interfile keys which constitute a standard file format for the interchange of image files between systems from different vendors; some records of the discussions that lead to this Interfile format have been archived on the server; some program source code; and reports of meetings which have some medical physics interest. The same file server is used to post items related to the AAPM Computer Committee and the Computer and Instrumentation Council of the Society of Nuclear Medicine. You are welcome to submit material for inclusion on the file server; it should be sent to:

TREVORC@UWOVAX.UWO.CA.

This file server is maintained by the Network Information Centre (UWONIC) personnel at the University of Western Ontario. Financial support for the medical physics portion of the file server is provided by the University of Western Ontario Faculty of Medicine, the International Atomic Energy Agency (T/C 4235/R2/RB) and the Computer and Instrumentation Council of the Society of Nuclear Medicine.

B.l ACCESS BY MAIL

In order to obtain one of the files stored on the server, send a mail message to SERVICE@UWOVAX.UWO.CA and place the filename in

the Subject: line of the message. For example: if you require a list of the current medical physics files your message will look like the following:

From: Trevor Cradduck <TREVORC@UWOVAX.UWO.CA>
To: SERVICE@WCOVAX.UWO.CA
Date: Tue, 11 Jul 89 14:10:53 edt
Subject: PUB: [NUCMED]MEDPHYS.LIST
Message-id: <0616169453@uwovax.uwo.ca>

There is no need to place any text in the message - it will, in any case, be ignored by the file server.

B.2 ACCESS BY FTP

Users who are connected via Internet may access the file server using anonymous FTP (File Transfer Protocol). The Internet address of the UWO system is hydra.uwo.ca or **129.100.2.13** and the directory you will want to access is **pub: [000000.nucmed].** Using FTP you establish a connection via the network and log on to UWOVAX as an anonymous guest. This gives you restricted privileges to look at directories and download selected files.

B.3 LUNIS

A service provided by Loyola University, Chicago allows users access to a bulletin board service and e-mail facilities as well as a library of other nuclear medicine related files. This system is called **LUNIS.** It is intended primarily to serve the needs of the non-academic community. Access is by dial-up telephone to the Chicago based computer (see Section 3.2.8 for sign up details). Connections to **BITNET** and **Internet** are contemplated for 1990 and it expected that an 800 number will allow long distance users freer access to this system which replaces the The Nuclear Network (TNN) operated by Proclinica on CompuServe.

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G. GLOSSARY

!:%/@\- - Delineators used in electronic mail

ACSNET - The Australian Computer Science Network includes over 300 hosts (1986) and caters to a mix of academic and commercial clients.

ANONYMOUS FTP - See FTP.

ANSI - American National Standards Institute, a nonprofit, nongovernmental organization supported by more than 1000 trade organizations, professional societies, and companies, which serves as the USA's representative to the International Organization for Standardization (ISO). ANSI issues standards for everything from screw threads to magnetic tape formats. ANSI standards relevant to data communication includes the ASCII specification.

ARPANET - Advanced Research Projects Agency Network - a government sponsored network originally closely associated with the US Department of Defence but which has more recently been separated into several different DOMAINS - edu, mil, gov, corn and org.

ASCII - An abbreviation for American Standard Code for Information Interchange, consisting of 128 7-bit binary codes for upper and lower case letters, numbers, punctuation and special communication control characters. Eight- or nine-bit codes of which the first 128 characters correspond to ASCII are called Extended ASCII, the additional characters are used to provide graphic characters for non-roman alphabets, special screen effects, etc.

ASTRONET - part of INFNET

AUSEANET - microelectronics network, S.E. Asia and Australia

BITNET - Because It's Time Network - A user-formed network consisting originally of mostly IBM mainframe computers, but now encompassing a large range of systems throughout the United States and linked to other similar networks such as NetNorth and EARN.

BITNIC - BITNET National Information Center.

BRIDGE - A device that links two widely separated LOCAL AREA NETWORKS so that they appear to be one network spanning a large geographical area.

BYTE - 8 bits (a character usually occupies one byte)

CDNNET - The Canadian Universities' X.400 network includes approximately 65 hosts.

CERN, CHUNET - Swiss EANs

com - ARPA Internet network for commercial clients

COMPUSERVE - A commercial computer network offering a wide range of services including bulletin boards, E-mail and commercial services such as hotel/airline reservations and shopping by computer.

COSAC - French research network (≈ 27 hosts)

COSINE - Cooperation for Open System Interconnection Networking in Europe.

CREN - Corporation for Research and Educational Networking - an administrative amalgamation of BitNet and CSNet established in September, 1989.

CSNET - Computer Science Network - a large mid-level wide-area network linking major computer science departments; includes many hosts in the USA and at international sites.

DARPA - Defense Advanced Research Projects Agency - the new version of ARPA.

DDN - Defense Data Network = ARPANET + MILNET + MINET + DISNET

DECnet - proprietary networking protocols developed by DEC for PDPll, VAX

DESTINATION NODE - A NETWORK NODE to which a message is addressed.

DFN - German EAN -- Deutsche Forshungnetz, W. Germany

DOMAINS - Refers to a fully qualified NETWORK ADDRESS name composed of a string of one or more subdomains separated by a period, ending with a top-level domain. Examples of top-level domains include edu, com, gov, mil, net, au, ca, and uk Examples of fully qualified domain names are nnsc.nsf.net, relay.cs.net and uwovax.uwo.ca.

DRENET - ARPANET-like Canadian military network

DS-0 - International term for 64-Kbps digital data service.

EARN - European Academic and Research Network - a user-formed network similar to BITNET but based in Europe.

edu - ARPA Internet network for academic/research clients

ESANET - European Space Agency Network

ESnet - Energy and Sciences network - a government sponsored network linking the DOE Energy Research programs and replacing the High Energy Physics Network (HEPnet) and the Magnetic Fusion Energy Network (MFENET). Use of this network will be restricted to DOE sponsored projects.

ESPIN - European Space Information Network (part of SPAN)

EUNET - European affiliate of UUCP

EUUG - European UNIX Systems Users Group.

FIDONET - cooperative network in United States (≈ 1000 hosts)

FILE SERVER - A remote node where files are stored and may be accessed for downloading to a local nodes.

FNET - French UUCP network -- part of EUNET

FTP - File Transfer Protocol which allows transfer of files form one NODE to another over a NETWORK ANONYMOUS FTP allows a user at one NODE to login at a remote node, even though he may not have an account there, and to obtain copies of files for which privilege to read has been granted (part of ARPA file transfer protocols).

GATEWAY - A special purpose NETWORK NODE that enables different networks to communicate by converting the functions and messages of one network into functions and messages recognizable by the other network. A gateway serves the same function as a language translator, who enables persons speaking different languages to communicate.

HEPnet - High Energy Physics network - a government sponsored network linking many DOE Energy Research Labs but being replaced by ESnet.

HOST - Any NETWORK NODE that a user can access for processing power, information files, and applications. Hosts are general purpose nodes that are not designed to perform network-specific functions.

INFNET - Italian DECnet

INFO-SERVER - A computer with the software to allow it to automatically respond to a set series of questions from users. A user normally sends electronic mail to the info-server in a set format asking for information on the network or a network user. The info-server responds with automatic electronic mail providing the information to the requestor.

IP - Internet Protocol, basis of ARPA protocols

IRIS - Spanish BAN

IRL - Irish EAN

IS0 - The International Organization for Standardization, a voluntary international group of national standards organizations, including ANSI, that issues standards in all areas, including computers and information processing, and whose technical committee also maintains liaison with CCITT.

IS0 **Standard 8859** - An IS0 standard specifying a series of S-bit computer character sets that include characters from many languages. These include the IS0 Latin Alphabets 1-5, which cover most of the written languages based on Roman letters, plus special character sets for Cyrillic, Greek, Arabic and Hebrew.

JANET - Joint Academic Network - United Kingdom academic network linked to EARN and BITNET. The UK Joint Academic (X.25) Network

includes approximately 1000 hosts. All UK universities and most polytechnics are connected.

JUNET - Japanese UUCP-like research network (≈ 160 hosts)

KEK - a Japanese network

KERMIT - A standard protocol with error checking facilities to enable transmission of data from one computer to another. Kermit usually exists as a stand-alone program on many computer systems and has many terminal emulation features.

LIST SERVER - A program that is accessible by users on a NETWORK which allows the user to send a command to the system upon which the LIST SERVER resides and obtain a copy of the requested file in response to that command. See also INFO-SERVER

LOCAL AREA NETWORK (LAN) - A NETWORK spanning a limited geographical area, such as a building or cluster of buildings, and using high-speed BUSes for data transfer.

LUNIS - Loyola University Nuclear Medicine Information System; a privately run bulletin board and e-mail system organized for the nuclear medicine community and based at Loyola University, Chicago.

MAINFRAME - Commonly used to mean a big computer, as distinct from a minicomputer or microcomputer. Usually implies a large time-sharing system.

MILNET - USA defense network (part of ARPA Internet)

MINET - European hosts on MlLNET

MODEM (MOdulator-DEModulator) - A device which converts digital (computer) data signals into analog signals and modulates them for transmission of data over telephone lines. Another modem on the receiving end then demodulates and redigitizes these signals for another computer's use. Telephone modems most commonly transfer at rates of 300, 1200 or 2400 BAUD (bits/sec). Some modems can transfer at 9600 Baud though error free transmission at such data rates are best done using dedicated or FIXED LINKS. With sophisticated error trapping techniques,

some modems can even operate at 19,200 Baud. Many modems use the **HAYES MODEM PROTOCOL** for control of their operations.

NAME SERVERS - A directory which may be interrogated from a remote site to obtain data concerning individuals registered on a list.

NCC - Network Control Center, provides a control center for the network itself.

NCP - Network Control Protocol (DECnet)

NCSANET - National Center for Supercomputing Applications Network - a mid-level wide-area network.

NEMA (National Electrical Manufacturers Association) - An organization of manufacturers which develops guidelines for the specification of equipment and recommends standards for interconnection.

NETNORTH - The Canadian academic and research network that forms the Canadian branch of the **BITNET.**

NIC - Network Information Center, provides an information center for the users.

NL - Dutch EAN

NOC - Network Operations Center, provides a control center for the network itself, the same as a Network Control Center.

NORDUNET - Nordic network

NRNet - National Research Council Network - Canada

NSFNET - National Science Foundation Network which was originally a government sponsored network acting as a back bone to link the major super-computers in the United States, but which has evolved into a general-purpose internet for research and scientific information exchange. A number of mid-level wide-area networks are connected directly to the NSFNET.

NUCLEAR NETWORK - A user forum associated with nuclear medicine originally based on COMPUSERVE now replaced by LUNIS.

OSI - The Open System Interconnection reference model of the ISO, a commonly used basis for network design.

OSIRIDE - Italian EAN

PACNET - Pacific hosts network

PDN - See Public Data Network

PINET - Physics Institute Network

PSDN - Public Switched Data Network, as in commercial firms such as CompuServe, Telenet, and Tymnet.

PSTN - Public Switched Telephone Network, such as the local telephone company.

PTT - International name for telephone companies, often state owned. Stands for Postal, Telephone and Telegraph.

PUBLIC DATA NETWORK - A network providing access, on a subscription basis, to widely scattered and diverse services. TELENET, TYMNET and DATAPAC are examples.

RED RYDER - A communications program for Mac computers.

RELAY - computer providing message transfer and translation services between dissimilar networks.

ROSE - ESPRIT-funded project - Research Open Systems for Europe

SDN - South Korean cooperative network (≈ 100 hosts)

SERVER - A program, or intelligent device, that provides specified services to users, or 'clients', in response to requests, usually over a communication line or network See also PILE SERVER, LIST SERVER and NAME SERVER.

SMTP - Simple Mail Transfer Protocol (ARPA)

SPAN - Space Physics Analysis Network - A government sponsored network originating from NASA and the Goddard Space Plight Center.

STARLINK - UK astronomy DECnet

SUNET - Swedish EAN network

SURF - Dutch network

SWITCH - Swiss network

TCP/IP - Transmission Control Protocol, used by Internet

TELEMAIL - Telenet mail services

TELENET - A public PACKET-SWITCHED commercial network service (PSDN) owned and operated by GTE in the United States.

TIN CAN - A communications program used on Mac computers.

TNN - The Nuclear Network - see NUCLEAR NETWORK.

UNINETT - Norwegian EAN

UNIX - An operating system developed at Bell Research Labs and used in many Computer Science Departments. The message handling and E-mail facilities of UNIX have been used as model in many other systems.

UREP - Protocol used by BITNET.

USENET/UUCP - A network of inter-connected UNIX computers which maintains bulletin boards or newsgroups on a wide range of subjects. UUCP is the communications protocol by which UNIX systems transfer data.

USENET - alternative name for UUCP network

UUCP - Unix-to-Unix CoPy network - the protocol by which UNIX systems transfer data.

UUNET - UNIX to UNIX Network - see USENET.

VERSATERM - A terminal emulation program.

I. INDEX