USING THE COMPUTER TO COMMUNICATE: AN INTRODUCTION TO COMPUTERIZED CONFERENCING

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PREFACE

The Survey Project is exploring the usefulness of computerized conferencing as a craft tool for applied systems analysis. In cooperation with IIASA's Computer Services Department it is working to 1) develop effective procedures and practices, 2) produce useful introductory documentation, and 3) facilitate computerized conferencing for IIASA scientists as part of a teleconferencing dissemination/evaluation research activity.

For readers unfamiliar with IIASA and the Survey Project we offer the following two paragraphs for a better understanding of the context in which we are exploring computerized conferencing. It is this context: IIASA's research and its researchers, that gives relevance to "using the computer to communicate."

The **International Institute for Applied Systems Analysis (IIASA)** is an interdisciplinary, nongovernmental research institute, chartered in October, 1972 upon the initiative of the academies of science or equivalent institutions of twelve nations (there are now seventeen National Member Organizations). By applying systems analysis, its staff of scientists from East and West is seeking to gain a better understanding of important contemporary problems resulting from scientific and technological development. IIASA conducts much of its research in cooperation with other research and policymaking organizations worldwide.

The **IIASA Survey Project**—a project to survey the state of the art of applied systems analysis—was established to promote the development of applied systems analysis and to disseminate its methods and approaches. The Project seeks to encourage the widespread and better application of systems analysis to problems of international relevance; to improve analytical techniques and their usefulness to decision processes; to contribute to the education in systems analysis of the expert and the interested nonexpert. To pursue these objectives it is: 1) publishing a series of books on applied systems analysis, 2) writ-

ing a *Handbook of Applied Systems Analysis* in three volumes, and 3) conducting research into the craft of applied systems analysis.

Portions of this working paper were reviewed using computerized-conferencing techniques described below. The paper was printed using a Varian electrostatic line printer driven by IIASA's PDP-11/70 running under the UNIX operating system.

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PURPOSE

This paper is a short introduction to computerized conferencing and the first of a series of documents prepared by IIASA's Survey Project with the cooperation of the Computer Services Department on the topic of using IIASA's computer to communicate. Unlike others in the series, this paper is not a cookbook on its subject, but rather an overview for people unfamiliar with the technology. It presents computerized conferencing's main characteristics, a few representative applications and basic references. For specific details on how to use computerized conferencing facilities, we refer the reader to other papers in this series, to Computer Services or to the author.

Today at IIASA it is possible to use the computer for a wide variety of people-oriented communications activities conventionally carried out by means of typewriters, scissors, glue, cardfiles, telephones, telex machines and conventional mail. It is the aim of this series to bring existing IIASA facilities for using the computer to communicate in these ways to the attention of users and potential users—particularly those unfamiliar with IIASA's in-house computer system or unfamiliar with computers of any kind.

At present using the computer to communicate involves acquiring computer skills in the following areas:

- text editing (entering and modifying textual material);
- text formatting (formatting material entered or modified by text editing: manuscripts, form letters, and the like);

- message sending;
- organizing information (bibliographies, address lists, glossaries, computer-mediated messages);
- miscellaneous "office automation" activities (maintaining appointment calendars, action notices, scheduling aids, and so forth).

Of this list, text editing, text formatting and message sending are by far the most universally applicable and readily acquired computer skills for IIASA users. The others are less well established or undergoing considerable development. By this we mean in order to edit text on IIASA's computer, produce formatted documents and send messages to other users all that is needed is a terminal, a login name and some good documentation. The other skills: data base building and office automation aid, are less straightforward, more dependent on the availablity of specialists to custom tailor them and thus more difficult to master.

Why Start with Computerized Conferencing?

An important aspect of computerized conferencing and the reason we begin this series with it, is that it illustrates the potential of the above-mentioned tools when used in concert to transform the way people communicate with one another. Also, in our opinion, computerized conferencing offers one of the best environents for non-computer experts to learn to use the computer to communicate.

From the Survey Project's point of view, this series is indispensable if we are to provide collaborating analysts with reliable working tools as part of our exploring the usefulness of computerized conferencing for applied systems analysis. For example, to use a computerized conferencing system efficiently at IIASA, we believe that one should be proficient in the use of the local IIASA editing program(s)—an early subject in this series. The Survey Project's aim is to help inform people at IIASA as to what tools are available and how to use them. We are starting with basics.

Our interest in basics in exploring how to use the computer to communicate does not mean that we forget the potential of advanced tools as well. Murray Turoff, a pioneer in computerized conferencing, talks in one of his papers about Vannevar Bush's early vision (1945) of computerized conferencing epitomized in a machine called MEMEX. We quote Turoff here because MEMEX expresses the potential we perceive in applying more effectively to systems analysis both existing computer communications facilities and inovative computerized conferencing techniques:

> One of the items predicted was "MEMEX" —a writing, reading, filing and communication system contained in a desk and including a screen and keyboard. This device would allow an individual to accumulate and develop his own personal library of materials. It would also allow him to compose and edit his writings. Besides allowing an individual to accomplish what then took card files, notebooks, typewriters, scissors, paper, copying machines, index tabs, graphic boards and roll top desks, MEMEX would also allow a high degree of non linearity in the structuring and association of text not possible with current linear forms such as articles and books. In essense, the electronic form of the printed word would allow our creation and use of text in manners more akin to our cognitive processes which ap-

pear to be parallel and associative in nature. (Turoff, 1977, p 3)

and also,

> For his own private files, which he uses to compose and synthesize papers, "The researcher has access to a version of Bush's MEMEX...." that "...may also serve as [a] terminal for extracting or sending items to computer systems or to other units of the same type. Costs are less than mails for communications.... Researchers have access to a couple of conference systems, probably one in their organization and one for communication with individuals elsewhere representing their primary professional peer group. These latter conference systems may be commercially offered, or they might be run by professional societies or publishing operations. If a researcher has sent in a paper it is very likely that the complete review procedure would be carried out in a computerized conferencing environment such as provided by EIES.* A paper also would have had the benefit of earlier commentary by whatever peer group the authors are commonly associated with through a conference system....

It is the Survey Project's goal to explore the possibilities of computerized conferencing within the IIASA context using available tools and not forgetting the promise of generally available MEMEX-type facilities.

SOME GENERAL CHARACTERISTICS OF COMPUTERIZED CONFERENCING

Sometimes called computer conferencing or teleconferencing, computerized conferencing is computer-mediated communication, usually among individuals who are geographically dispersed. Computerized conferencing uses one or more computers with programs and data files, terminals, and a communications network.

A conferencing system has a community of users—individuals who use the system in order to interact with one another. A conventional "conference" consists of comments contributed by participants concerning some topic of common interest. The computer maintains a record of who is participating in the discussion and who has seen which comments. Usually participants contribute to the discussion at their leisure—entering their own contributions and viewing those of others.

Computerized conferencing is a new kind of communications medium, and more than a substitute for other forms of communication. The fact that the word "conference" is in its root should not mislead one into thinking that those using the medium must participate at the same moment in time. Nor should one make simple analogies between computerized conferencing and other, more conventional means of communication—face-to-face conferences, telephone conferences, mail, or telex. Unfortunately there is no new term to characterize it that disassociates computerized conferencing from conventional means of communication and, consequently, preconceived notions of what it is.

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*A computerized conferencing system developed by Turoff. See infra.

Computerized Conferencing is about ten years old. (For a discussion of the early years of its development, see Day, 1974 and Hiltz and Turoff, 1978:43-70,380-392.) The conferencing system currently used at the Survey Project—the Electronic Information Exchange System (EIES) of the New Jersey Institute of Technology—was one of the first major systems and has only been running since 1976.

The following are some of computerized conferencing's more important general characteristics. For background and full references, see Johansen et al. (1979), Hiltz and Turoff (1978), R.H. Randolph (1977). Randolph's working paper is the most detailed IIASA publication on the subject of computerized conferencing to date; *Electronic Meetings* by Johansen et al is a thought-provoking comparison of computer-, audio-, video- and face-to-face conferencing techniques that stresses the importance of social factors and contains an excellent overview of the literature on social evaluation; Hiltz and Turoff's book, *The Network Nation*, is the most complete, up-to-date, and authoritative treatment of computerized conferencing in print. It will remain the standard work on the subject for some time to come.

- Timing: communication is usually asynchronous and people can communicate when they wish, as their schedules allow. Busy people can participate in activities for which they would not ordinarily find the time. It also eliminates problems of telephoning people who live in widely different time zones or whose phones are busy.

- Efficient communication: all communication is written. Since people read faster than they speak and since messages can be entered simultaneously by all participants, more information can be exchanged per unit of time than possible during a conventional telephone conference (Vallee et al. 1975:34.). On the other hand, people can spend as much time as they want drafting a message, considering a question, etc. Written communication tends to be terser than speech.

- Enhanced candor: computerized conferencing can enhance candor and lead to introducing a wider variety of ideas than might otherwise be the case. People, say, nonnative speakers, who are reticent to speak out at face-to-face conferences may be more willing to participate. (For them a "translation" or "editor service" can be offered whereby translators or editors screen entries before submission.) In general there is less pressure to conform, and computerized conferences tend to be democratic (Vallee and Wilson 1976:39-42,) with individuals having their say without interruption.

- Records: a complete record of all proceedings is available. Newcomers can review all that has transpired before participating. Memory alone and hastily scribbled notes need not be relied upon. Messages can be indexed, searched, organized and displayed for features of interest. Agenda-making facilities can be implemented.

- Adapability to user experience: conference systems can be designed to accomodate people with no prior experience with computers and more experienced users by using skill ratings that semi-automatically

reduce prompts and error messages as a user grows more proficient (Carter 1975:49-51.)

- Bandwidth requirements: a narrow bandwidth is adequate for communication channels and standard telephone networks may be used. A video-conferencing user needs the communications-line capacity of 100 audio users and of 400 or more computer-conferencing users. (Carter 1975:39-40.)

- Transmission in bursts: messages that have been edited on a local computer or intelligent terminal may be sent inexpensively in a burst at far higher than normal typing speed to the computer hosting the conference, thus reducing network-connect-time costs.

- Compatibility with other computer-based activities: computerized conferencing "nests" with the other things people use computers for. It permits human, conversational, interactions supporting other uses of computer resources, such as running data bases, analytical programs, and so forth (see Penniman, 1978, 29-30, and Randolph, 1977, 14-15.)

APPLYING COMPUTERIZED CONFERENCING

Some Representative Applications of Computerized Conferencing

Some computerized-conferencing applications the reader might find of interest are: an experiment in distributed management conducted by the U.S. National Aeronautics and Space Administration (Vallee and Wilson, 1976); an EIES-based information-exchange experiment among U.S. state legislative researchers (Johnson-Lenz, 1979); message sending on ARPANET (the network of the Advanced Research Projects Agency, the first and most important of U.S. computer networks for scientific computing; see Vezza (n.d.) and "HERMES Message System" for descriptions of some message-management software currently running on computer networks such as ARPANET and TELENET; for a discussion of networking by one of ARPANET's designers, see Baran, 1979.); the varied commercial applications of the Infomedia Corporation—developers of the now internationally available PLANET conferencing software—that include, for example, a public health service network for continuing education for health professionals (*Planet News*, 15, March 1979; this monthly newsletter presents an excellent overview of Infomedia's work.); the CAITR—Computer-Assisted International Team Research—activities of the East-West Center, Hawaii* (see Randolph, 1979); U.S. Geological Survey use of computerized conferencing on a wide scale (for some background to their activities see Vallee, Askevold and Wilson, 1977).

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*The concept of CAITR was elaborated at IIASA by Robert Randolph, now at the East-West Center. IIASA and EWC have a record of continuing co-operation in teleconferencing. A resources conference held by the WELMM group at IIASA had a CAITR activity enjoying links with the EWC and the U.S. Geological Survey (A. Gruebler, 1979, internal IIASA memorandum) and contact between researchers at both institutes has been regular over EIES and other teleconferencing systems.

Other centers of computer-conferencing research and development are: The George Washington University (Umpleby, 1971); the University of Michigan, where software called CONFER has been developed (Parnes, 1976); the University of Illinois (where they also call their software CONFER, see Carter, 1974); the Swedish National Defence Research Institute, that has designed a computer conferencing system called KOM (COM in its English language variant, see Palme 1978); the Gesellschaft fuer Mathematik und Datenverarbeitung, FRG, developers of KOMEX (Henne, 1979); Bell Northern Reseach, Canada. A major study of computerized conferencing with many valuable assessments and insights is the five-volume Institute for the Future (IFTF) report series, *Group Communication Through Computers*. IFTF has a broad communications reseach activity (see Communications Reseach and Publications, 1979).

Computerized Conferencing at the IIASA Survey Project: Context, Tools, Costs and Procedures

Computerized conferencing at the Survey Project reflects the institutional framework in which the Project's staff operates. To carry out its charter, the Survey Project commissions books on applied systems analysis. It solicits prospectuses, then evaluates, circulates and reevaluates them in an iterative process involving IIASA's National Member Organizations, external and internal referees. It contracts with authors for specific manuscripts and offers editing, processing and publishing support until the work appears in print. The process is the same, whether an author is at IIASA or the other side of the world. Thus, like IIASA, the Survey Project relies on communication and the efforts of others to magnify the effectiveness of its small staff.

Authors and reviewers are spread world-wide, east and west and until recently it has been necessary to rely exclusively on the mails, telephone, telegraph and telex for routine consultations--a situation leaving much to be desired, both in terms of cost and organizing information. An air mail letter to North America, for example, can take a week to reach its destination. Clearly alternative forms of communication are desirable. It is in this setting that the Survey Project's interest in computerized conferencing, in particular what we term computerized manuscript-conferencing, has evolved.

It should be stressed that in order to use a computerized conferencing system such as EIES, all that is required is a terminal that can connect to a communications network such as TELENET. For example, if one has a portable terminal with an acoustic coupler, it is possible in many parts of the world to simply dial a local TELENET node, insert the the telephone in the terminal's acoustic coupler and connect directly with the computerized conferencing system. This fact is important for introducing computerized conferencing on a mass scale: anyone with an inexpensive terminal can use the technology. A widely available system such as EIES--one that can be utilized over conventional telephone lines--only supports terminals that print at thirty characters per second or slower. It does not support high-speed video terminals of the kind used at IIASA. For many applications the tradeoff of terminal speed against availability is highly desirable. Slower terminal speed is a small price to pay for wide access. At the Survey Project, however, our interest in computer manuscript-conferencing--the rapid display of and interaction on large documents--draws our attention away from the simple connecting of "stupid" terminals to a system such as EIES. Rather, our point of departure is the combining of three facilities now available at IIASA:

- a UNIX operating system together with modern peripherals
- a leased-line connection to the TYMNET node in Vienna
- the EIES computerized conferencing system of the New Jersey Institute of Technology

UNIX is important for the Survey Project because it is simple and accessible to the non-computer-expert. Designed at Bell Laboratories, UNIX since its inception has been extensively used for people-oriented tasks, especially "the editing, transformation, analysis, and publication of text of all sorts" (see McIlroy, et al, 1978). At the same time UNIX provides a modern environment for scientific computing and operating-system development.

The leased-line to TYMNET/TELENET has meant an ease and reliability in communications heretofore impossible with conventional telephone connections. TYMNET is a world-wide computer-communications network with a connect point, or node, in Vienna. Through it the Survey Project accesses TELENET, an internationally available packet-switched computer communications network to which EIES is connected. The line's installation in February 1979 simplified access to remote computer facilities for IIASA staff and marked the beginning of regular computerized conferencing at IIASA. For use of the leased-line the Survey Project currently pays a flat rate of 180 Austrian Schillings (AS) per hour together with a character charge of 10 Austrian Schillings per thousand characters. This translates to approximately 25AS (two dollars) per page, at 330 words per page. Connect costs for someone typing all entries manually, that is, not sending information in bursts, average from $30 to $60 an hour in Europe compared to $5 to $8 per hour in the United States.

Specialized conferencing software—currently* the Electronic Information Exchange System (EIES) of the Computerized Conferencing and Communications Center of the New Jersey Institute of Technology—is the final indispensible component in this list. The computerized conferencing software permits the basic communications functions described earlier. At present a class one user such as the Survey Project must pay $66 a month for access to EIES.

To give the reader an idea of what it is like to use a system like EIES, we offer some appendices with supplementary information on how the system works. Appendix A contains an example of a session using EIES. For an capsule overview of the New Jersey system see Turoff and Hiltz 1978. A technical summary of EIES by Alan Leurck, one of the people who maintain it, is in Appendix C. With the author's permission, the paper was copied from EIES in New Jersey over TELENET for inclusion here.

At the Survey Project computerized-conferencing applications often focus on facilitating the preparation of manuscripts. Ultimately, in true computerized manuscript-conferencing we believe that the document itself will be a "conference." Each section of the document down to the paragraph level can be a "sub-conference" of the

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*We are looking forward to implementing computerized conferencing facilities on the IIASA computer and are working with Computer Services towards that end. At the moment EIES is the most powerful computerized conferencing software available to us.

section above it. As a user logs on, the software will tell him where any recently entered comments or new text variants are located and will display optionally and at high speed any level of the document's heirarchy. Complete manuscripts will be on-line. The conferencing system itself will, in fact, be part of a network of decentralized systems working in concert. Local systems will either update each other periodically or share computing (see COMSAT Laboratories report of 1977 for background on an experiment in linking computers via satellite at mega-bit transmission rates.) At the moment these things are not possible so we practice computerized manuscript-conferencing in a more primitive fashion. The following describes manuscript-conferencing as currently practiced in the Survey Project.

- A draft of a manuscript, for example, one of the chapters for the IIASA *Handbook of Applied Systems Analysis*, is typed using an OCR (optical character recognition) type-ball on a standard IBM typewriter and the material is read into the computer using an optical scanner and edited on a video terminal.

- The input text containing formatting codes is processed to produce the desired output—in this case an upper and lower case, double-spaced, line-numbered working document appropriate for further editing.

- A copy of it is mailed to California to one of its joint authors for interaction on EIES.

- Comments are exchanged using conventional computerized conferencing mechanisms; line numbers simplify textual amendments.

- When iteration is necessary, amendments are incorporated in the input file and the document is reprocessed and redistributed for another cycle. When desirable, pieces of formatted output are sent via EIES to accelerate the process.

- The finished manuscript is printed without line numbers for wider circulation.

Discussing manuscripts, transmitting sections of them, integrating text processing and computerized conferencing in the same UNIX enviroment has, to date, been carried out for chapters of the *Handbook of Applied Systems Analysis* and for volumes in the Survey Project's International Series.

In addition to manuscript-conferencing exercises, the Survey Project in cooperation with other IIASA research tasks is exploring the general usefulness of computerized conferencing for IIASA research teams. We are working with IIASA's Computer Services Department to implement computerized conferencing tools on UNIX, to examine protocols for communication among conferencing/mail systems and cooperating with other IIASA research tasks in implementing the tools at our disposal (see, for example, "A Users Guide to *TC*—a Trial Message Sending System for those Cooperating with the Survey Project in Evaluating Computerized Conferencing for Systems Analysis at IIASA," internal IIASA memorandum.)

Already in its publishing and editorial functions the Survey Project has a record of facilitating authors' work within a broader mandate for reseach. We view facilitating computerized conferencing is an analogous service/research activity.

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Appendix A: Example of a Short Session Using EIES

The following is an example of a session using the computerized conferencing system EIES of the New Jersey Institute of Technology. Underscoring indicates material typed by the user at IIASA.

NJIT ELECTRONIC INFORMATION EXCHANGE SYSTEM (071279)

MICHAEL PEARSON (MIKE2,420) ON AT 10/ 3/80 6:00 AM EDT ON LINE 14
LAST ACTIVE: 10/ 3/80 4:56 AM

LIST THOSE NOW ON-LINE(Y/N)?y
14: 6:00 AM MICHAEL PEARSON (MIKE2,420)

WAITING:
1 CONFIRMATION
1 PRIVATE MESSAGE

ACCEPT ABOVE COMMUNICATIONS (Y/N/)?y
PENDING: M 5201

M 4303 RECEIVED BY EDWARD S. QUADE (EDW,347) 10/ 2/80 4:57 PM

M 5201 (980) USING SYSTEM MONITOR (EIES,100) 10/ 2/80 11:40 AM L:3

mike, all you have to do is use +MK C347CC28 which is the Modify Key
command. it's very easy and I'm going to let you do it. let me know
if you have any problems with it. remember it wants a completely new key line

INITIAL CHOICE?+cnm

ENTERING SCRATCHPAD:
1?Al,
2?I have just finished a paper I would like to publish at IIASA (the
3?International Institute for Applied Systems Analysis in Vienna, where I work)
4?called "Computer Manuscript-Conferencing: Use of Computer Telecommunicat
5?Techniques at the IIASA Survey Project." In Appendix C I would like to
6?include your EIES A TECHNICAL OVERVIEW. May I have your permission?
7?I'll mail you a draft (Varian electrostatic output, typeset with fonts) if
8?you wish. I'll send one to Murray Roxanne and Stuart too.
9?+
TO ('S/NAMES)?al,murray,roxanne,stuart
ALAN LEURCK (AL,980)
MURRAY TUROFF (MURRAY,103)
ROXANNE HILTZ (ROXANNE,120)
STUART UMPLEBY (STUART,400)
ADDRESSEES INDICATED (Y/N)?y
ASSOCIATED MESSAGE ()?
KEYS (/WORD/PHRASE/)?/may i include your paper in something I've written?
KEYS:/MAY I INCLUDE YOUR PAPER IN SOMETHING I'VE WRITTEN?/
OKAY TO SEND (Y/N/-)?y
M 5458 BEING SENT.
SENT AS:
M 5458 MICHAEL PEARSON (MIKE2,420) 10/ 3/80 6:04 AM L:8
ERASE SCRATCHPAD (Y/N)?y

MESSAGE CHOICE?++2,347
TEMPORARY CONFERENCE: IIASA (347)
THERE ARE NOW 1 MEMBERS ACTIVE.
CONFEREE STATUS (Y/N/A/O)?y
UP TO 31: MURRAY TUROFF (MURRAY,103)
UP TO 31: ROXANNE HILTZ (ROXANNE,120)
UP TO 27: EDWARD S. QUADE (EDW,347)
UP TO 30: STUART UMPLEBY (STUART,400)
UP TO 31: MICHAEL PEARSON (MIKE2,420)
31 ITEMS. CC 31 WRITTEN ON 10/ 1/80 10:54 PM

NO ITEMS WAITING.

CONFERENCE CHOICE?--
NO MESSAGES WAITING.

MICHAEL PEARSON (MIKE2,420) OFF AT 10/ 3/80 6:05 AM

TIME USED: 0: 5
CUMULATIVE: 46:50
ALLOCATED: 60: 0

201 25C4 DISCONNECTED 4:56 36 24

Appendix B: Excerpts From a Computer Conference

The following conference comments were taken from an EIES-based conference (C887) which talked about the implications and possibilities of international computerized conferencing. C887 was established to aid EIES-users who were planning to attend the Berlin meeting of the World Futures Studies Federation May 8-10, 1979. The comments, I think, make interesting reading in their own right. I've added a few footnotes for clarity and corrected typographical errors in the text. Note that these are selected comments that together represent a single thread of discussion. A regular participant in this electronic conference would have seen all comments entered between the comments 163 and 172.

The discussants here include: Anthony J.N. Judge, Union of International Associations, Belgium; Peter and Trudy Johnson-Lenz, Lake Oswego, Oregon; Joseph P. Martino, University of Dayton; Robert H. Randolph, Resource Systems Institute, East-West Center, Hawaii; Murray Turoff, New Jersey Institute of Technology. Note the geographical relationships involved. These individuals were in Belgium, Oregon, Ohio, and New Jersey at the time they carried out their disscussion—a discussion later edited on a computer in Vienna for inclusion in this appendix.

C887* CC160† ANTHONY J N JUDGE (TONY,887)‡ 4/ 7/79 12:44 PM L:11§
KEYS:/CONFERENCING MESSAGING IN BERLIN/

ON THE POSSIBILITY OF FAILURE DUE TO LACK OF CC** INPUT FROM OUTSIDE BERLIN DURING THE CONFERENCE, MY THOUGH IS TO ENCOURAGE PARTICIPANTS ON-SITE TO MAKE USE OF THE FACILITY WHILST THERE TO MAKE CONTACT WITH EACH OTHER, WHEN THEIR AGENDAS DO NOT MATCH, AND TO MAKE CONTACT WITH OTHERS OUTSIDE BERLIN FOR THEIR OWN PURPOSES.
EVEN IF THE CC WAS USED AS A SOPHISTICATED MESSAGING SYSTEM, MUCH WOULD BE ACCOMPLISHED. IT IS A PITY THAT PARTICIPANTS COULD NOT BE GIVEN SOME KIND OF SECOND-ORDER ID SO THAT THEY COULD SEND AND RECEIVE MESSAGES. BUT I GUESS THIS IS JUST NOT PRACTICAL WITH 200-500 PARTICIPANTS AND THE CURRENT ID CAPACITY OF EIES. HOWEVER, I AM ASTOUNDED AT OUR INCAPACITY AT MEETINGS TO GET BEYOND THE MESSAGE BOARD SYSTEM...HOW NON-TECHNOLOGICAL CAN ONE GET ?

C887 CC161 MURRAY TUROFF (MURRAY,103) 4/ 8/79 11:57 PM L:15
KEYS:/MASS ACCESS/
A: 160††

We are setting up something we call public access slots. Initially they are intended for a large number of readers of a journal that group 54 intends to write on-line. There will be two such public slots that up to 1000 people can use and it will keep track of what they have or have not read and allow them to make comments but only one person per slot can be on at any time. So in principle this type of ability could better service a meeting. But the problem is that we cannot allow too many of these to exist with out degrading the service to users, especially since they might be used throughout the day.

However, a new announcent in computer hardware from INTERDATA makes our current machinery rather obsolete. Hardware to run EIES with 8 times the power of our current hardware now costs less than $100,000.

This is one-half what we paid for EIES hardware when we started four years ago. Just a reflection on the rate of advancement in this field.

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*C887 is the number of the conference.

†CC160 is the number of the conference comment. One hundred fifty-nine comments had been entered in this conference prior to this one.

‡TONY is the nickname Judge has on EIES. His access number is 887.

§This is the number of lines in the comment.

**Abbreviation for computerized conferencing.

††References the comment CC160 above.

C887 CC162 JOSEPH P. MARTINO (JOEM,300) 4/ 9/79 11:02 AM L:15
KEYS:/TECHNOLOGY AT CONFERENCES/
A: 160

Tony's comment in 160 about message boards and lack of use of technology reminded me of my semi-annual observation at the meetings of the Operations Research Society. There one can see all the queueing theory experts in the country lined up to register at the convention hotel. Surely there must be be a better system than that mob scene at a convention hotel, but technical societies never seem to utilize their own technology at their meetings. As a further example, consider the projection facilities available for the almost universally-used viewgraphs at convention hotels. The screens are too small, the projector has to be placed in front of the audience where it blocks the view of the screen, and the speakers are seated at a row of tables in the front of the audience, with their backs to the screen. Why doesn't anyone learn from one meeting to the next how to arrange a session room?

C887 CC165 ANTHONY J N JUDGE (TONY,887) 4/ 9/79 2:08 PM L:12
KEYS:/INCONSISTENCY OF MEETING ORGANIZERS/

THANKS JOEM FOR YOUR CC162. IT IS A BEAUTIFUL EXAMPLE WHICH I SHALL NOT FORGET. I HAVE REACHED THE POINT OF GENERALIZING SUCH EXAMPLES INTO JUDGE'S FIRST LAW: THE BLINDSPOT OF A SPECIALIST IS THAT WITH WHICH HIS DISCIPLINE IS CONCERNED AS APPLIED TO HIS/HER OWN AREA. FOR BERLIN WE WILL DO THE BEST POSSIBLE. WE HOPED TO DEVELOP A NEW KIND OF MESSAGING SYSTEM WITHIN AND BETWEEN SESSIONS AND MESHED INTO THE CC ACTIVITY...BUT I AM NOT SURE THAT IT HAS SUFFICIENT PRIORITY UNDER THE CIRCUMSTANCES. AM HOPING TO MOVE ON THAT FOR THE SGSR* LONDON MEETING IN AUGUST. WORST OF ALL YOUR COMMENTS HAVE NO LEGITIMACY WITHIN ANY DISCIPLINE. I SAW VERY BAD APPLICATION OF SOCIOLOGY AT THE INTERNATIONAL SOCIOLOGICAL ASSOCIATION CONVENTION IN UPPSALA IN 1978, ETC. STILL WE ARE SLOWLY BECOMING AWARE.

C887 CC167 ROBERT H. RANDOLPH (RHR,309) 4/ 9/79 4:05 PM L:8
KEYS:/MESSAGE BOARD/REMOTE PARTICIPATION/APPROPRIATE TECHNO
A: 165

Although I certainly agree that conventional conferences could do with some improved internal communication systems, I wonder whether using a global computer network and a computer in New Jersey as a substitute for a message board in Berlin would strike most participants as a particularly "appropriate" use of technology. Whereas, not to belabor the point, using all this high technology to permit remote participation would, I think, seem worthwhile even to observers otherwise inclined to be sceptical

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*Society for General Systems Research.

C887 CC173 PETER+TRUDY JOHNSON-LENZ (1 T,118) 4/11/79 2:04 AM L:50
KEYS:/COMPUTER-BASED CONFERENCE FACILITATION/POTENTIALS/
A: 161

COMPUTER-BASED CONFERENCE FACILITATION

We have been interested in the potentials for using computers to facilitate the exchange of information at face-to-face conferences for some years. We have developed some simple techniques which can be used. A paper by us on such conference facilitation has been published in Tony's TRANSNATIONAL ASSOCIATIONS journal a few years ago. Basically these methods use the computer to: (1) bring people together with similar/complementary interests and points of view, and (2) allow messaging between interested parties without having to meet in the same physical place.

We agree with Robert Randolph, in CC167, that using EIES to facilitate the Berlin conference is rather absurd and inappropriate. The telecommunications cost alone is prohibitive. But given that the EIES system will be available at the Berlin meeting, and that it is capable of much of what might be helpful in terms of conference facilitation, we are going to find it irresistable to demonstrate what is possible. We do not want to plan to offer unlimited message exchange for conferees, since this would be both expensive and require too much preparation. We would like to demonstrate some of the principles, however.

We are glad Murray mentioned the dropping price and increasing power of the EIES hardware in his CC161. Consider, for example, what might be possible with a machine like that. If the Berlin conference center were to purchase their own EIES-type hardware and software and set up a system in Berlin, it could be used for facilitating registration, getting together, decision- making, etc. at conferences. There would be no transatlantic charges for such a local exchange process. Furthermore, the system being a version of EIES could be an international repository for electronic conferences and exchanges of all sorts. Thus, they would be getting not only a local conference facilitation system, but could integrate local activities into a vast, ongoing international network.

The public access slots that Murray is talking about can be easily implemented in INTERACT*. The more powerful generation of new INTERDATA hardware could support several information booths at the conference center which would always be up and running to accept messages from conferees which could be sent to other conferees or around the world, whichever was appropriate! Furthermore, high-level information mapping and structuring systems could be developed that would organize this overwhelming flow into a multi-dimensional data structure in the computer that could be accessed by varieties of people coming at the information from many different perspectives. There is tremendous potential here...

Now, to be sure, there would be costs in excess of the $100,000 for the hardware. First there is the cost of the EIES software itself. Second there are staffing and maintenance considerations. Finally, there would be some expense for tailoring the system to the local situation and for developing whatever information mapping systems were desired. Thus, for several hundred thousand dollars and a year or so of development time it could be done.

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*INTERACT is a programming language available on EIES. See Appendix C.

So, even though we do not think it appropriate to facilitate the Berlin conference using EIES, we fully intend to discuss these potentials and demonstrate what we are talking about with anyone who is interested in Berlin.

Appendix C: EIES – A Technical Overview by Alan Leurck

The system consists of two Interdata 7/32CII minicomputers, each connected via a separate disk controller to two CalComp T-300 disks and a shared memory system containing 256 thousand bytes. Each drive has a capacity of over 300 million bytes, thus giving a total disk capacity for the system in excess of 600 million bytes. Only one of the minicomputer systems is used to operate EIES. The other is used to support the NJIT Computer and Information Science department educational and research activities. In the event of a hardware failure on the EIES main processor, the other processor may be used to support EIES with only a small degradation in service. The EIES processor has 512 thousand bytes of local core memory and 32 thousand bytes of shared core memory. The other processor has 256 thousand bytes of local core memory and 224 thousand bytes of shared core memory. The 7/32CII minicomputer has a 32 bit word structure and may address over a million bytes of core directly. EIES is a modular design with respect to the overall capacity of the system. The number of users supported by EIES may be increased by any one of three hardware augmentations independently or in combination. The first two of these involve no software modification. Since a single on-line user requires about 4500 bytes of core memory, the simple expedient of increasing the size of core will increase the number of users the system can support for simultaneous access. The second alternative is to utilize the INTERDATA 8/32 which is four times the speed of the 7/32 but fully compatable with respect to operational software. This would allow more users with some disk swapping of user workspace and/or faster response for lower priority functions such as searching. The basic EIES design allows for a membership of 900 users; however, by dedicating a second 7/32 or 8/32 processor tied to the first through the shared memory architecture of the INTERDATA system it would be possible to either double membership capacity or add the second machine in a slave capacity for specialized data base and computational support to EIES users. This latter expansion option would require further software development work.

Currently the system may be accessed through two means. The first method is through Telenet. EIES is hooked into the Telenet network through a high speed data line through which all the Telenet users of EIES are channeled. EIES is able to support up to thirty-two users through the Telenet network. The other means of accessing EIES is through any one of the eight local telephone numbers in Newark.

The software is based on a sixteen level priority scheduling system. Within each level the users are serviced in a round robin manner. Users are shifted up and down the priority scale based on the load they are placing on the system. Those users who are just printing or editing will migrate up to the high priority levels while those who are doing large searches will migrate to the bottom levels. Each user relinquishes control of the system every time an I/O is executed. The I/O routines pass control to the scheduler which then chooses the highest priority user not waiting for an I/O to complete. In order for those users who are doing time-consuming tasks not to dominate the system, the EIES software contains virtual I/O calls which will allow the other users to be scheduled. The net effect is that one user is rarely aware of the presence of any other users on the system.

The EIES system is mainly written in structured Fortran and is written as if only one user were using the system. All of the user dependent data are placed in named common (the term for the method by which computer programmers can provide access to the same piece of storage via several different routines). A special program is run between the output from the Fortran compiler and the input to the assembler. This special processor modifies the code by grouping the user-dependent named commons into one area and modifing the calling and return sequences in the modules to call special routines that will allow the modules to be shared by all the users. When the scheduler readies a user for running it changes the pointer to the user-dependent data from the currently running user to the new user being scheduled. Thus the Fortran routines are literally fooled into believing they are still servicing the same user.

EIES also has available a specialized programming language called INTERACT which is tailored to the design of specialized programs for regulating, tailoring, modifying and controlling the communications process between the individual user and the basic EIES software system. This means that specialized interfaces, data structures imposed on free texts, questionnaires, simulation-games and other features may be tailored as subsystems in EIES for either individual users or groups of users. This latter capability is significant for utilization of EIES as a laboratory for studying the cognitive impacts of information exchange systems in an empirical manner.