Wide-Area Collaboration

Since my temperament draws me to groupware, I have read about and taught it, and tried many groupware programs. This has been interesting, but the only groupware that has really affected my work is electronic mail on wide-area networks. My "invisible college," my colleagues, are not the people in the offices down the corridor, they are people on the Internet, many of whom I have never seen or spoken with.

Personal computers and workstations have played a major role in the development of networks. When I first used the Arpanet, my terminal was a Teletype. Today it is a personal computer with vastly improved function and a far superior user interface. Furthermore, personal computers now have the power to serve as store-and-forward nodes in networks.

This column presents examples of wide-area network collaboration with Soviet colleagues. Described here will be a conference organized over the Internet and the Soviet network that made it possible.

Moscow HCI '91

Last year I received an email message from Juri Gornastaev, head of the Computer Department at The International Centre for Scientific and Technical Information (UCSTI), asking if I would be willing to cochair a conference on human-computer interaction (HCI) in Moscow.

That was a very easy question to answer! It seemed like a terrific opportunity to visit the Soviet Union, and to meet a completely new HCI research community. The interchange of ideas between Soviet and foreign researchers would certainly lead to broadened perspectives and new creativity on both sides. My expectations were fulfilled.

The conference was held August 5-9, 1991 at ICSTI headquarters. ICSTI is a major institute, with about 300 information professionals serving the former COMECON nations. They conduct research and development on information systems, provide information to organizations in member countries, and publish reports and journals.

At the HCI conference, 17 researchers from 11 nations met with approximately 75 Soviet colleagues. HCI is interdisciplinary, and like all HCI meetings, this one had great range, from reports on controlled experiments by psychologists such as Victor Andreef and Marilyn Welles to descriptions of system programs such as those of Yury Salkinder and Stephen Pemberton and Eddy Boeve. In spite of our geographic and cultural differences, there was considerable common language.

There were also differences that provided an opportunity for mutual enrichment. The Soviet participants were familiar with our literature, due in part to ICSTI's work; but, most of the visitors were not familiar with theirs. Most of us also have more

Larry Press
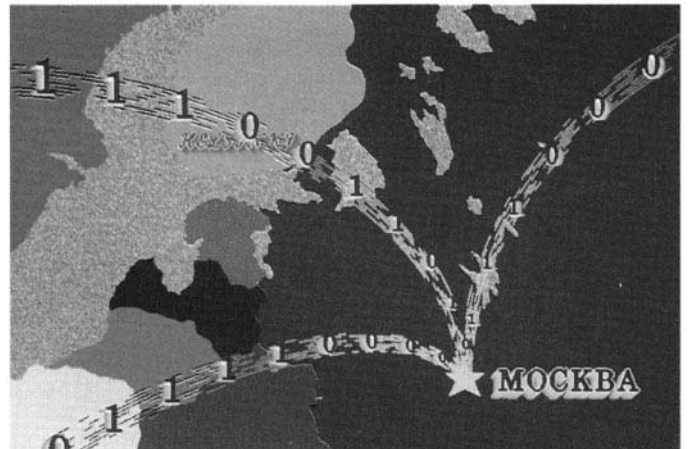
equipment than they do. The great majority of Soviet machines are small 286-based PC clones. One result of this equipment imbalance was that Soviets did not show video tape and demonstrations of research prototypes comparable to those of the visitors. ("Demo or die" is evidently not a Soviet motto).

There are also more subtle differences due to training and tradition. One paper, perhaps my favorite, illustrated this difference in the Soviet approach to science. Professor K. K. Gomoyunov, motivated by ecological concern, presented a philosophical discussion on the precision of scientific and technical language. Papers presented at American CHI meetings do not typically share his careful concern with language. The Soviets bring to their work a touch of poetry and philosophy, the craft of careful scholarship and respect for theory while we bring to ours a to-the-point pragmatic focus.

Different backgrounds can also lead to interesting cross-cultural studies. For example, one would ex-

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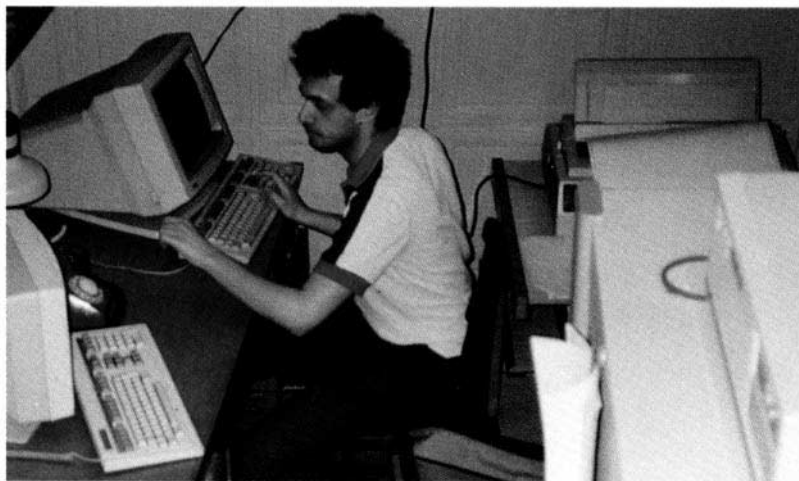
Kremvax.
This DEC VAX links the Relcom network to EUnet in Finland. Relcom consists of low-speed modems, PC compatibles, and a few VAXs—the technology is appropriate in the Soviet Union and other nations with poor communication infrastructure and scarce capital.

pect attitudes toward cooperation as opposed to competition to be different in the Soviet Union than in the U.S. As Jonathan Grudin, Lynn Markus and others have noted, willingness to cooperate is a key variable in determining the success of groupware. Are Soviets more likely to cooperate, given their socialist background? Might they be less willing due to the need to play sophisticated bureaucratic games rather than those of more impersonal market-mediated competition? Cross-cultural research should yield insights and generalizations.

The conference also produced some concrete effects. Marylin Welles is planning a study of the effect of the location of events on air traffic control displays, inspired by one of the Soviet papers. Several Soviets are seeking post doctoral fellowships, visits have been planned, curricula, papers, software, and bibliographies exchanged, and Moscow HCI '92 is in the works.

This meeting could not have occurred without computer networks. From Juri's initial email message to the drafting and broadcasting of the call for papers, to the final arrangements for visas and travel schedules, the entire meeting was organized over networks. It is a compelling example of the value of global communication infrastructure.

Soviet Networking

Snyder, Jarmoszko and Goodman [1] and Dyson [3] have described the history and status of Soviet networks. Between them they mention seven carriers including Sprint™

and a network of about 60 Fidonet bulletin boards. The only network, however, to provide domestic and international connection, and market its service for rubles was Reliable Communication (Relcom), operated by the Demos Cooperative. I decided to visit Demos, and initiated contact with them by posting a message to a Usenet news group—another example of the network at work.

Since 1982, Demos has distributed its own version of Unix™ in the Soviet Union. Initially they built a small network in support of their users, but it became clear there was pent-up demand for communication outside their customer base, so Relcom was formed with the cooperation of the prestigious Kurchatov Institute of Atomic Research. Relcom became a commercial enterprise in April 1989, and established a link to EUnet through Helsinki, Finland on August 22, 1990, thereby connecting the Soviet Union to the rest of the world.

By the first anniversary of that connection (the day the Soviet coup ended), Relcom had spread to 70 Soviet cities from Leningrad in the West to Vladivostok in the East, and 395 organizations were using it—universities, research institutes, stock and commodity exchanges, news services, high schools, politicians, and government agencies.[1]

[1]Relcom and other Soviet enterprises are already working in a free market. For example, Galuszka and Kranz [2] state that there are some 300 commodity exchanges operating in the Soviet Union with goods ranging from sugar and oil to PC-compatibles. The high prices are out of the range of most private citizens, but that is the price of moving into a market economy.

The dial-up line to Finland now handles about 30 megabytes of two-way traffic daily.

Since free communication is incompatible with repressive dictatorship, Relcom would have been prohibited in the past. Gorbachev's Glasnost made Relcom possible, and it quickly became a significant segment of the Soviet communication infrastructure. Relcom repaid Gorbachev during the coup by helping save his job and perhaps his life. (See Sidebar: "Relcom During the Coup" this issue.)

Part of Relcom's success is because the postal and telephone services in the Soviet Union are poor, making email attractive. Another element of its success is that it uses low-cost, appropriate technology. Relcom's primary technologies are dial-up phone lines and personal computers. Of the 395 machines in its net map file, only seven are VAXes or "Vax-like," 17 are 386-based PCs, and most of the remainder are 286-based PC clones. The final element in its success is the Demos people. They are very skillful as technicians and as entrepreneurs (Demos is 100% free enterprise), yet they are different from their counterparts in the U.S. They are more idealistic and less competitive. If they were in the U.S., my guess is they would either be computer science graduate students or yuppies.

Relcom may be a good model for other nations with poor telephone and postal systems, little capital,

Relcom During the Coup

During the recent coup in the Soviet Union, Jonathan Grudin, I, and others over the net relayed news and encouragement to the Soviet Union. There was also two-way traffic on the talk.politics.soviet (TPS) Usenet news group. The following are sample postings to TPS and excerpts from email messages I received from Demos (unless otherwise noted). Vadim and Polina Antonov are married, and are members of the Demos Cooperative.

Posted to TPS shortly after the coup began:
Oh, do not say. I've seen the tanks with my own eyes. I hope we'll be able to communicate during the next few days. Communists cannot rape the Mother Russia once again! (Vadim)

Reply to my first anxious email message:
Don't worry, we're ok, though frightened and angry. Moscow is full of tanks and military machines—I hate them. They try to close all mass media, they stopped CNN an hour ago, and Soviet TV transmits opera and old movies....Now we transmit information enough to put us in prison for the rest of our life. (Polina)

A request for information for translation and distribution:
...may be you'd write me what do they say on your TV about the situation, as we can't watch CNN now. (Polina)

Moral support may have been more valuable than information:
You can't even imagine how grateful we are for your help and support in this terrible time! The best thing is to know that we aren't alone. (Polina)

Message to Doug Jones at the University of Iowa regarding backup:
Yes, we already prepared to shift to underground; you know—reserve nodes, backup channel, hidden locations. They'll have a hard time catching us! Anyway, our main communication line is still

open and it makes us more optimistic. (Vadim)

The people and machines dispersed after the early days:
Don't worry; the only danger for us is if they catch and arrest us, as we are sitting at home (Valera is at Demos) and distributing all the information we have. (Polina)

Why Demos was not closed by the KGB:
Thanks Heaven, these cretins don't consider us mass media! (Polina)

Posted when the USSR-Finland link became overloaded:
Please stop flooding the only narrow channel with bogus messages with silly questions. Note that it's neither a toy nor a means to reach your relatives or friends. We need the bandwidth to help organize the resistance. Please, do not (even unintentionally) help these fascists! (Vadim) *(In spite of this message, traffic rose to a high of 13,159 messages on August 21st, more than twice the usual volume).*

Polina Antonova

The first hopeful email I received:
Really good news. Right now we're listening to Radio Russia (without any jamming!); they told that the eight left Moscow, no one knows where...Hard to believe...Maybe, they've really run away? (Polina)
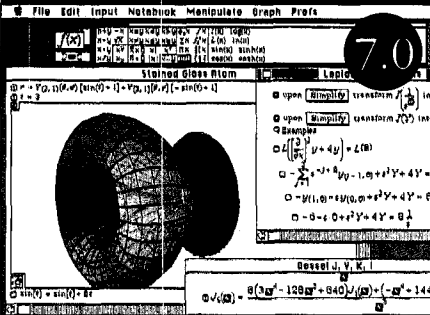
It's all over:
Now Vadim and I have to do our usual work (that's so nice!) and Valera and Mike Korotaev went to sleep. They were on duty the whole night. Now there is celebration in Moscow. We just watched president Gorbachev on TV. (Polina)

George Tereshko's posting of gratitude:
When the dark night fell upon Moscow, Relcom was one source of light for us. Thanks to these brave people we could get information and hope.

Complete archives of TPS and the Relcom traffic during the coup are available via FTP on the Internet.

and well-educated, motivated young professionals. It will be interesting to see if it can attract capital and develop management skills for the transition from a start-up to a large organization. Networks such as Relcom, possibly using satellite technology, may lead to a *truly* global network, changing the face of the earth in peacetime as well as helping to keep the peace.

Larry Press welcomes questions and comments from readers. His address, phone number and email are:

10726 Esther Avenue
Los Angeles, CA 90064
(213) 475-6515
lpress@venera.isi.edu

References
1. Dyson, E. E-Mail in the East: *Rel-East*, 1–91, EDventure Holdings, N.Y., 4–20.

2. Galuszka, P. and Kranz, P. Welcome to the Moscow shopping mall. *Bus. Week,* (Aug. 19, 1991), 44.

3. Snyder, J.M., Jarmoszko, A.T., and Goodman, S.E. International electronic mail gains significance in the Soviet Union and Eastern Europe. *IEEE Comput.* (Mar. 1991), 81–84.

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Pointers:
• Anyone interested in inviting a Soviet computer scientist or student to their lab or university, should contact Larry Press at the address listed at the end of the column.

• Archives of TPS and Relcom postings during the coup are available via anonymous FTP. Readers without FTP capability can have the archives and related material sent by email. For instructions, send messages containing the lines, "get Russia filelist" and "get TPS-L filelist" to listserv@indycms. iupui.edu.

• References [1] and [3] are excellent surveys of the history and current state of Soviet and Eastern European networks. They point out that electronic mail is becoming important, and it is developing differently than it did in North America.

• For a survey of the general economic background of the Soviet Union and the Soviet computer industry, see Seymour Goodman's column in the June 1991 issue of *Communications.*

• Volunteers in Technical Assistance (VITA), runs projects and distributes information regarding technology in developing nations. They have also launched VITASAT, an experimental satellite for packet-radio communication. They expect to begin operational satellite service in 1993. Readers with network access might wish to subscribe to VITAs on-line discussion list, DEVEL-L and receive their monthly electronic newsletter, *DevelopNet News.* VITA, 1815 North Lynn Street, Suite 200, Arlington, VA 22209; (703) 276–1800; vita@ gmuvax.gmu.edu. VITA publications and other discussions are posted to the Usenet news group comp.society.development.

• Motorola has plans for a satellite-based communication network called Iridium. Iridium's 77 low-orbit satellites will cover the globe, permitting communication from remote and undeveloped regions. For further information see, Leopold, Raymond, "Low-Earth Orbit Global Cellular Communications Network," Mobile Satellite Communication Conference, Adelaide, Australia, August 23, 1990. ◧

Larry Press is a professor of computer information systems at California State University at Dominguez Hills.