## From the Conference Chair

The historical significance of INET□’93 lies in its focus on networking technology and how human beings use this technology to solve problems, work together and improve their lives, in a year when governments and citizens all over the world are suddenly gaining awareness, familiarity and hopes about the promise of communication infrastructures. The geographical significance of INET□’93 is that it takes place in San Francisco, just a few miles north of Silicon Valley, the home of individuals, universities, government and commercial organizations that all had a predominant role in the invention and the continued growth of data networking. For these contextual reasons, as well as for the intrinsic quality of the INET□’93 program, for the breadth of its participation and for the talent of its program committee, I hope you will find this event enriching and stimulating. These proceedings reflect the work of hundreds of individuals around the world and the leadership of Program Co-Chairs Barry Leiner and William Yundt. I am proud to acknowledge their work. INET□’93 itself reflects the dedication of an enthusiastic conference committee and the financial contributions of dozens of organizations, who espouse the ideals of the Internet community.

**Eric A. Benhamou**
INET□’93 General Conference Chair
3Com Corporation

## From Internet Society Vice President for Conferences

INET□’93, the annual conference of the Internet Society, is the first global networking conference to take place since the existence and availability of networks and their services have become known to the general public. When the first forerunner to INET□’93 was held in London eleven years ago, there were only a handful of attendees from Europe and the United States and very little popular understanding of this new communications medium. All of this has now changed; throughout the world there is a new awareness of the potential societal benefits of network-based communication.

The goal of the INET conferences is to bring together network users, developers, planners, researchers, maintainers and sponsors from all corners of the world. This year’s “Training Workshop for Developing Countries,” led by George Sadowsky and held the week before INET□’93 , provided a first opportunity for many to learn about the practical aspects of network technology and services. The 120 INET□’93 attendees, from over 70 countries, who participated in the Workshop, provide a unique opportunity for all INET□’93 participants to engage in interpersonal networking on a global scale.

The richness and diversity of INET□’93 are due, in no small measure, to the vision and drive of its Conference Chair, Eric Benhamou. Working under his direction, the Program Co-Chairs, Barry Leiner and Bill Yundt have produced an exceptional program. Much of the credit is also due Liz Barnhart and Mike Roberts whose financial and organizational expertise provided coherence to the many conference-related activities.

We welcome you to INET□’93 and hope that you will enjoy the program, the people and the look into the future that you will encounter.

**Lawrence H. Landweber**
Vice President for Conferences
Internet Society

## From the President of the Internet Society

It is a great pleasure to add my welcome to INET□’93, the annual conference of the Internet Society. As you have already noticed, the general chairman, Eric Benhamou, has organized and led an outstanding team this year. Program Co-Chairs Barry Leiner and William Yundt presided over the assembly of a timely and highly relevant collection of sessions. The Society is proud to host a special workshop, organized by George Sadowsky, for attendees from technologically emerging countries. We hope this will be a permanent part of all future INET conferences. The Society is most grateful to the generous sponsors of INET□’93 whose names are shown elsewhere in this proceedings. Without them, the conference would not have been able to offer the rich variety of activities available to you.

1993 has been a year filled with drama in the telecommunications sector, in the business world, on the technological side, and in government. In the U.S., certainly, the National Information Infrastructure initiative has captured the attention of the scientific and technical communities, as well as a wide range of government agencies, service, equipment and software providers, to say nothing of the multitude of new users in education, business, government and even in the residential community(!).

The Internet has expanded very rapidly outside the U.S. The most recent statistics suggest that 40% of the system is situated beyond U.S. borders. The applications show remarkable diversity, and an accelerating trend towards business use. Major efforts to organize backbone facilities in Europe have borne fruit, and similar work is underway in Latin America, Africa, and the countries of Eastern Europe and the former Soviet Union. Everywhere there is evidence of interest in provision of commercially useful services - especially in Europe where there appears to be a virtual revolution in Internet service provision taking place.

We are entering a period filled with creative ferment, with extraordinary potential for restructuring of the telecommunications industry and for unprecedented expansion of the Internet and related services into all sectors of the global economy.

In a microcosm of global networking interests, Silicon Valley is involved in a widespread and energetic exploration of the potential of information infrastructure in its Smart Valley project. John Young, former CEO of Hewlett-Packard, is a major force behind this initiative, as is Eric Benhamou. Along with hundreds, if not thousands of others, the Smart Valley participants are determined to create a sample of the 21st century economy well ahead of schedule. I expect we will hear a bit more about this in John Young’s keynote address.

Your participation in INET□’93 is only one of many ways for you to take an active part in the Internet Society’s programs. As you make use of the Internet on a daily basis, take a moment to consider how you use it, and share this knowledge with others. Send a summary to the Internet Society News editor; help a friend get onto the Internet; go to an IETF meeting if you have technical contributions to make; and volunteer to help with INET□’94 in Prague!

**Vinton G. Cerf**
President
Internet Society

## From the Program Committee Co-Chairs

Continuing the precedent of INET '92, the program committee decided to set up six parallel tracks, allowing expansion of sessions exploring internet technologies while retaining the traditional international character of the INET conferences. The INET '93 program thus has parallel tracks in Network Technology, Network Engineering, Application Technology, User Applications, Policy Issues, and Regional Issues.

Each of these tracks was in essence a mini-conference, ably organized by the track leaders (respectively Christian Huitema & Phill Gross, Elise Gerich & Francois Fluckiger, Eric Hood & John Hine, Laura Breeden & Rolf Nordhagen, Haruhisa Ishida & Steven Goldstein, and Richard Mandelbaum & Tomaz Kalin) with assistance from the program committees, shown in Appendix C. We are most grateful for their efforts in pulling together the program.

We set a goal to increase the number of refereed papers -- and succeeded. In addition to the many fine invited papers, refereed papers were submitted from around the globe to all of the tracks as follows (note: all numbers are for papers, not panelists).

| *Track* | *Submitted* | *Accepted* | *Invited* |
|---|---|---|---|
| *Network Technology* | 6 | 4 | 5 |
| *Network Engineering* | 13 | 9 | 7 |
| *Application Tech.* | 15 | 6 | 11 |
| *User Applications* | 12 | 8 | 5 |
| *Policy Issues* | 7 | 4 | 2 |
| *Regional Issues* | 29 | 19 | 8 |

Another goal we had was that the conference maintain its international character (i.e. that the program not be dominated by USA speakers.) We also were successful at achieving this goal. Contributions were received from 48 countries around the globe, and the program includes papers from 30 countries.

| | *All* | *USA* |
|---|---|---|
| *Submitted* | 82 | 22 |
| *Accepted* | 50 | 11 |
| *Invited* | 38 | 25 |

In addition to the main conference, a Training Workship for Developing Countries was organized by George Sadowsky with Steve Fram, Randy Bush and Art St. George as leaders of the Basic and Advanced Technical Tracks and the Network Services Track, respectively. Major sponsors of the workshop are the Internet Society and Novell, Inc., and it is being hosted by Stanford University on the Stanford campus. The workshop will be held the week before the conference and will feature hands-on network implementation, configuration/managment, and use instruction in four laboratories with equipment and software donated by IBM, Novell, Stanford and 3Com. An intensive curriculum has been planned and will be supported by the workshop track leaders, workshop committee and volunteers (see Appendix D).

To assure the Proceedings would be available for participants at the conference, it was essential that the speakers respond quickly once papers were selected. We used network means almost exclusively for the entire process, from original submittals of intents through paper reviews to the final submittal of camera-ready copy. Despite the anticipated problems and the difficulties with obtaining consistent formatting, we found the network process to be highly effective.

We would like to express our appreciation to all those involved in pulling together this program: the conference organizers, regional coordinators, track leaders, program committee, authors, panelists, keynote speakers, workshop organizers, and the many volunteers. We would particularly like to express our appreciation to Ms. Leslie Todd for her efforts in working with us and the authors in coordinating the program and producing a high-quality proceedings and book of abstracts.

**Barry M. Leiner**
INET□'93 Program Co-Chair
Universities Space Research Association

**William Yundt**
INET□'93 Program Co-Chair
Stanford University

## A Note on these INET□'93 Proceedings

The hard copy INET□'93 proceedings were assembled several months ahead of time to allow them to be distributed at the conference. Furthermore, they were assembled from camera-ready copy provided by the authors directly. This had two implications:

1. The Program and Papers reflect the Advance Program which was subject to change up to the time of the conference. (These online proceedings are up to date).

2. The numbering system was required to support "self-ordering"

To accomplish the latter, we used a somewhat unconventional page numbering system. Each track was assigned a letter. Each session within a track was assigned a letter. Each paper within a session was assigned a letter. Page numbers were then the concatenation of those letters with the page number within the paper. For example, the first paper of the first session in the track on Policy Issues was assigned the code "FAA" and the third page was numbered "FAA-3".

Thus, the papers in the proceedings could be automatically sequenced in order of track, session, and paper. Other than the changes that occurred between the assembling of the proceedings and the conference, these proceedings then reflect the actual Program.