



**CHALLENGES  
AND  
OPPORTUNITIES:  
FROM NOW TO 2001**

**Edited by  
Howard F. Didsbury, Jr.**

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## NOTE

This volume was prepared in conjunction with the World Future Society's conference, "FutureFocus: The Next Fifteen Years," held in New York City, July 13-17, 1986. The general chairman of the conference was Kenneth W. Hunter. Robert Lee Chartrand served as deputy general chairman. The staff director of the conference was Scott Foote.

The papers presented here were selected from a very large number submitted to the Editorial Review Committee. A number of distinguished papers whose subject matter did not lie within the limits of the volume could not be included.

Footnotes and other academic paraphernalia have been minimized to avoid disrupting the flow of the authors' ideas and insights.

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# WAGING PEACE WITH GLOBALLY INTER-CONNECTED COMPUTERS

by

Parker Rossman and Takeshi Utsumi

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## Powerful New Tools for Collective Intelligence

Society needs much more sophisticated tools to deal with complex global problems which so overwhelm the world's leaders that they are tempted to simplistic solutions. Benedict Nightingale (1985) writes, for example, about playwright Michael Frayn's concern for "the awesome complexity of the world, and . . . desperate attempts to reduce it to nice, neat shape." In the same issue, James Gleick (1985) reported how the mathematician, Benoit Mandelbrot, has expanded the work of scholars who "missed a whole range of things" because they "simply didn't have the tools" they needed to deal with "complexity (which) has been developing slowly in many disciplines for nearly a generation." Mandelbrot's work, he said, is a part of the revolution in understanding chaos, the study of turbulence and disorder in a whole range of phenomena.

Now, however, powerful new computer-communication and simulation tools can make it possible, as never before in history, for any intelligent citizen to have a hand in developing new alternatives to war and other complex international problems.

Even the political geniuses, and perhaps there are a few, have not been able to keep in mind all they need to know and understand to deal with the whole complexity of global interrelations. But computers, combined with other electronic technology, can now make possible mind-tools for a powerful new "collective intelligence."

## Computers Plus What?

Rossman begins each chapter of his book (1985) with descriptions of tools that might be interconnected for powerful explorations through collective intelligence:

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*Parker Rossman is the former dean of the Ecumenical Continuing Education Center, Yale University. Takeshi Utsumi is the president of Global Information Services (GIS), Inc., Flushing, New York.*

- 1) The meshing of phone and computer systems into a single mode, combined with expert systems and data banks via satellites creates a new tool with breathtaking possibilities. Computer expert systems, as intelligent assistants, can fuse the knowledge of many specialists into tools to deal with complex problems.
- 2) The work of one huge computer can be done by a distributed network of many interconnecting microcomputers which make up a reasoning system, stocked with all necessary knowledge. Access to information stored on optical videodisks, with a high-powered laser diode, can be obtained within seconds, e.g., over one dozen volumes of an encyclopedia can be packed into a single shiny 5¼ inch disk—even including color illustrations and moving pictures and very possibly with voice and music annotations in the future.
- 3) A global computer network can be a major new tool for coordinating complex information, planning and goal-setting, and for mobilizing resources. Computer modeling and simulations to explore risks and possibilities then become a powerful tool for calculating the consequences of experimental change by the people of different views and disciplines in various countries who created those cooperative simulation models.
- 4) Fifth generation computer tools, instead of solving problems step-by-step, can break complex projects up into thousands of units, each to be worked on simultaneously by different computers all over the world. This so-called distributed, asynchronous parallel processing resembles numerous neurons in the human brain. The fusing of expertise through networks of minds can result as thousands of interconnected computers help people work simultaneously on different aspects of the same problem or project, particularly on the utmost crisis facing humankind, i.e., preventing nuclear war and holocaust.

### **Peace Games**

The technology now exists, for example, to interconnect hundreds or thousands of personal computers, in different countries, through distributed network and information processing, into modeling and simulation instruments for playing “peace games” on the scale of Pentagon war games.

When legislation was proposed for a U.S. Peace Academy, like West Point and Annapolis, many asked what peacemaking skills it would teach? Utsumi’s proposal suggests an exciting answer beyond the training of conventional state department personnel, or even of negotiation skills like Terry Waite who sought release of American hostages in Lebanon for the Archbishop of Canterbury. All kinds of possibilities for waging peace could be explored through computer simulations to see what might work, to discover results before risks are actually taken. Developing expertise in modeling and gaming



can be combined in global systems, with a cascading effect, to empower explorations of new international institutions, to remodel existing ones. New precision can come into the diagnosis of problems and the definition of issues and alternatives. It is now possible to combine existing technologies to make possible sophisticated and more holistic explorations of various scenarios in solving global social problems by the people and for the people of the entire world.

### **Tools?**

Is it appropriate to use such words as "tool" or "instrument" for combinations of so many different kinds of technology into a more powerful "system?" As the bulldozer becomes one component in a system for empowering human hands to do physical work—to move mountains—so now existing components can be combined to empower human minds to deal with overwhelmingly complex "mental mountains?" When we speak of "peace games" (the term coined by Utsumi, 1977) some people persist in visualizing some little computer games to play on a screen, where we are talking about research and planning to manage complexity and to test alternative strategies on a global scale. As millions of people must mobilize to wage war, we are talking about the possibility of mobilizing the brains of millions of people to wage peace. The GLOSAS (Global Systems Analysis and Simulation) Project proposes gaming solutions on a very large scale to help decision makers deal with interwoven problems. It seeks to construct a "Globally Distributed Decision Support System" for a plus sum peace game. This system, with cooperative execution of autonomously managed simulation submodels at distributed locations, can provide a "meta-language" for improved communication among users of submodels. Progress in the study of distributed systems has produced a new scheduling algorithm—the Virtual Time concept—which allows for the organization and exchange of information among dispersed locations (Utsumi, 1985).

In less technical terms, we are talking about combining the power of global multimedia communication networks, global teleconferencing and computer conferencing, simulation and gaming methodologies as in war games and economic modeling, electronic data banks and indexing, expert systems, computer bulletin boards and "situation rooms." We are not talking about computers that would do our thinking for us, taking over to guide a missile, or perhaps even deciding when to shoot it. We are talking about mind-empowerment tools to help people do better thinking. Society has vast amounts of data that are not adequately brought to bear in solving many kinds of problems because the information is scattered, uncoordinated, and not available when needed. We need tools to put this data together in what Shubik (1983), in an article on "Computers and Modeling," calls pictures and wholes. He describes four kinds of models: verbal, mathematical, pictorial, and digital. All of these might be used by people who are seeking to build up more comprehen-

sive models of alternatives to war. Pencil and paper will be as important as computers.

### **Importance of Modeling**

Schank (1984) of the Yale Artificial Intelligence Lab points out, however, that from now on it will be essential to use computer modeling for making important decisions—models which incorporate more and more knowledge about people and institutions. Until recently, he says, it has not been possible to make large conceptual computer models of governments, of the work of politicians and other complex systems. Now, however, such models can be increasingly complex, integrated, and can be more and more useful and trustworthy for testing ideas, theories and possible actions. Computers will not make good decisions but can be used to help human beings make better ones. Licklider (1983) says that computer modeling and simulations are already beginning to play an important role in government research and planning as these expand and multiply beyond space and military projects to other national planning efforts. The Soviet Union, he reports, is planning to create a 3000-computer nationwide network with data bases for planning. The Russians were, after all, the first to attempt to apply linear programming optimization to their national economic planning, albeit premature at the time.

Gilpin (1983), in discussing war games, says that the economic and military changes which result from the use of computer and other advanced technologies are bringing human society into an age wherein more is to be gained through cooperation and an international division of labor than through strife and conflict. For, in the electronic global village all people will either lose or win together. To survive in a global society, Shubik (1983) suggests, we must develop tools to control pollution, fight inflation, provide justice and welfare, and to warn of new dangers and threats. This requires the building of more and more sophisticated models of an emerging global system in which computers and communication networks are to the twenty-first century what roads were to the first century's Roman empire.

### **Need for Tools**

The problem is not technology, but what mind-tools we need and how to develop and use them. Their value, to paraphrase Seymour Papert (1980), will be determined by their success in helping us ask the most fundamental questions and solve the most desperate of human global problems. Some of the preliminary thought about waging peace through simulations was begun by Carroll (1983) as he explored the idea for a Catholic Peace Center. We must use these powerful new tools, he said, to understand how the human mind functions in matters of peace and war. Peace is not being achieved

through weapons technology alone, so he proposed a system of "war control" wherein strong and weak nations could cooperate much like the system of ground control which regulates air traffic. As yet, he said, people do not even know how to define peace except as the absence of war, therefore sophisticated systems analysis is needed to experiment with peace systems.

Collective intelligence is needed for theory and practice. Hinds (1983) of the Peace Research Network says that computers and computer communications can make highly significant contributions to two fundamental tasks which are at the heart of peace and world order: trust and community building, and conflict resolution. New tools can now make it possible for more and more people—even millions and tens of millions—to get more involved in these explorations, and thus also in fundamental, the so-called grass root, decision-making.

### **To Do What?**

A great deal of modeling experience is available in political science and economic models, and in strategic decision modeling as in the work of the Club of Rome. Kaplan (1979) says that although great individual minds may have been responsible for spectacular human advances at times, from now on human progress will require a community of minds in which theories are collectively developed, criticized, applied, and tested. Until that happens, he says, human thought in the areas of war, peace, and international relationships will continue to be too simplistic and inadequate.

Individuals can continue to make significant and often exciting contributions, especially as their research and thought is empowered with fifth generation computer tools. They can as individuals and in small groups explore, as Alexrod (1984) describes, strategies such as those necessary to solve the "prisoner's dilemma" game. Already, across international lines, people begin to confer through computer conferencing.

What are some of the games or simulations that might be undertaken? The list is endless; and many groups in different situations may explore different possibilities, separately or through computer connections. Some might begin with the United Nations, exploring alternatives for revising its structure or procedures. It will be possible to try out ideas, through simulations, that nations are unwilling to consider officially. For example:

- What might be done by a global congress—sometimes teleconference and sometimes computer conference in which delegates did not need to leave home—that represented neighborhoods instead of nations, with expanded town-to-town horizontal relationships? Suppose these were regional assemblies?
- What might be accomplished by "conflict anticipation groups" that went in to monitor any potential area of conflict?

- What kind of international police forces might be developed, perhaps to use non-violent methods?
- What kinds of important cases that are not allowed to come to the World Court might be simulated to see what the outcome would be (e.g., a simulation effort on Law of Sea, Sebenius, 1984)? Suppose, for example, a world leader who uses armed force in a situation were required to justify his actions (e.g., as logically presenting the quantitative results of gaming simulation) before a global tribunal. Hearings might especially be held to examine cases of torture.

Licklider (1983) says that it is technically possible now to give international politics much greater depth, wider scope, with much more citizen involvement. Millions of people, in fact, can be active participants, which makes it increasingly difficult for dictators to control or subvert the process. It will be a long time, he feels, before computer networks and conferencing can be used for the official work of legislatures, but simulations—large-scale unofficial experiments—can begin at any time.

### **Who Will Do The Gaming?**

Official governmental and university projects will require special funding, but it is unlikely that “peace games” will be monopolized by government and official groups. War games, the nations feel, must be secret and official, whereas their quest for peace is nearly always an open process, involving anyone who may be interested. Student groups, church groups, peace groups, and informal groupings of interested people can begin to work on peace simulations right now—indeed, some have already started. Ordinary people, with computer facilities, are dreaming and experimenting. Some of them are in the Third World, where computer networking can help them reach out to work with those who may be more technically advanced.

Such groups can begin to examine the models they have in their minds—the usually unexamined political models which have led too often to war. As any given experiment enlarges to the point of complexity, dimensions of it can be divided up with groups in different places keeping in touch with each other via computer bulletin boards. As data banks and systems are developed, more and more groups can involve themselves in a continuing computer conference. This is not so much a new process as it is a way for more and more people to put their heads together. The advantage here is that people can work at different locations and times, as they prefer. Schank (1984) tells how nearly every experiment fails in his artificial intelligence lab because the participants set impossibly different goals for themselves. Yet each failure, when examined, reveals the next steps for experimentation in a continuing process of learning and development. In a similar way, instead of pessimism and discouragement about continuing failures in disarmament and peace processes, many

more people need to use emerging mind tools to learn from political failures. There is a safeguard in that gaming simulations do *not* destroy anything in our real world.

### **Achievements and Current Status of the GLOSAS Project**

During the past dozen years, thanks to the assistance of various U.S. Governmental agencies and to the support letters provided from various experts in the United States, a number of goals have been accomplished to advance computer telecommunications and information exchange between the U.S.A. and Japan:

- The extension of U.S. VANs to various overseas countries,
- Japanese deregulation to allow the interconnection of multiple host computers in the U.S. to a U.S./Japan leased data communication line; and to allow the use of electronic mail and computer conferencing via the U.S./Japan packet-switching line,
- Liberalization of the procurement policy of the Nippon Telegraph and Telephone Corporation, de-monopolization of telecommunication industries in Japan, and the proliferation of private and public VANs there.

These steps towards the establishment of infrastructure, the first stage of the GLOSAS Project, made possible the next step: focusing attention on the substance and content of global telecommunication networks. For example:

- Experimentation with the extension of American education to Japan and other countries, with the use of electronic mail and computer conferencing. This has included a TELEclass from the University of Hawaii to a dozen schools in Korea, Japan and other Asian countries.
- There also has been an extension of "connected education" from the New School for Social Research in New York to students and faculty in Singapore, Scandinavia, Europe, Canada, and Japan with the use of Electronic Information Exchange System (EIES) at New Jersey Institute of Technology.

Japan/United States connections are the places GLOSAS seeks to begin because of the high tech status of Japan in electronics and computers. Then after experimentation has proven the possibilities and value of what can be done with global VANs, an effort will be made to reach out to people in various countries.

Such experiments provide a foundation for the second and grand developing stage of the GLOSAS project, PEACE GAMING by the users of global communication media. Large-scale experimentation could begin by using and expanding Onishi's FUGI model (1983, 1984) which has a data basis in many countries and has already been used by the United Nations and various governments for economic and other simulations. It has been suggested, for example, that negotiators could work with greater success if they could use the same information and make continuing input into enlarging data

banks, as they use computer simulations to try out alternative solutions to a crisis. The bringing of many minds together, using interconnected computers as research tools to explore new alternatives for solving global problems and for the management of complexity can bring a new "collective intelligence" to bear upon issues of war and peace.

As demonstrated in the past decade, even preliminary experimentation can improve international relationships far beyond the enlargement of telecommunications and information technologies, as an effort is made to reach out to people in many countries for the promotion of mutual understanding and cooperation in search for new strategies for peace.

## Summary

A long-range, gradually developing process is being initiated. People in Europe and America have become increasingly frustrated at the failure of their leaders to look far ahead, to plan alternatives to solve crucial problems before it is too late. It is difficult to get political leaders to look beyond the end of their terms of office, to do more than improvise patchwork solutions for each crisis that arises. More powerful collective intelligence tools can now enable simulations and research to look further ahead into the future, and deeper into the morass. These tools are the "sleeping giant" which can make it possible for problems to be examined and solved on a larger and larger scale.

"Games" and "simulations" can be undertaken to explore new alternatives for the United Nations, for regional associations of nations, for world law and courts, for global economic development, for trust-building, negotiation, conflict-resolution, police-peace forces, citizen action and preparation, for negotiations in dealing with terrorism and to discover the consequences of proposed unilateral actions.

In contrast to massively-funded global projects which can be encouraged by foundations and governments, the process of computer simulations of new alternatives for waging peace can begin locally in many small ways, then information and experience can be shared—as networks and data banks are gradually developed and enlarged. In time there can be global data banks and global game plans which groups large and small, global and local, can plug into and use. War games must be kept secret, but peace strategies can involve the participation of any qualified person, and can be used to educate, train, and democratically involve large numbers of people in many countries

The proposed global peace gaming system, when fully developed, can become an educational tool for students of international affairs and political science. Moreover, such a system can be at the heart of a global university, or a consortium of institutes in many countries. This can promote mutual understanding among the world's people,

and hence advance peace-keeping. Education of young people and adults on a global scale can be one of the best future investments for world peace and progress.

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