The Negotiation Training Model

Jonathan Wilkenfeld
University of Maryland

Sarit Kraus
Bar Ilan University
University of Maryland

Kim M. Holley
University of Maryland

Decision makers, particularly in crisis situations, are often overwhelmed by the amount of information they must analyze in relatively short time periods and are often unable to identify optimal outcomes. This article argues that the employment of simulation techniques based on a sophisticated decision support system facilitates the identification of utility-maximizing strategies. The negotiation training model and its negotiation support system GENIE are discussed in this article, and preliminary results based on simulation runs are reported.

KEYWORDS: *communication; complexity; decision support system (DSS); experiments; international crises; negotiation training model; political decisions.*

The Crisis Negotiation Environment Project grapples with these questions as it develops negotiation training tools and conducts simulation experiments designed to enhance our understanding of the conditions conducive to the peaceful resolution of conflict. One such tool, the negotiation training model (NTM), will be discussed in detail below.

Decision makers are frequently overwhelmed by the vast amounts of information they must consider. Often, they are forced to make partially

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AUTHORS' NOTE: The research reported in this paper was supported by the National Science Foundation under Grant IRI-9423967 and the US Institute of Peace under Grant SG-35-95.

EDITOR'S NOTE: This article is reprinted, by permission, with small modifications, from a chapter that appeared in the ISAGA Valencia conference proceedings—Garcia Carbonell, A., & Watts, F. (Eds.). (1996). *Simulación ¡ya! El Aprendizaje a través de la Experiencia: El Reto del Cambio* [Simulation Now! Learning Through Experience: The Challenge of Change]. València: Diputació de València. (Available, price $80 + p&p, from Amparo Garcia Carbonell or Frances Watts, ETSI Telecomunicación, Camino de Vera 14, Universidad Politécnica de València, 46022 València, Spain; telephone: +34-6-3877535; fax: +34-6-3877199; e-mail: agarciac@idm.upv.es or fwatts@idm.upv.es)

SIMULATION & GAMING, Vol. 29 No. 1, March 1998 31-43

informed decisions that ignore critical issues because of the complexity of the situation being analyzed. This tendency becomes even more pronounced in international crises, which are characterized by threat to basic values, finite time for response, and high probability of involvement in military hostilities (Brecher & Wilkenfeld, 1997). These elements all contribute to the possibility that individual decision makers will be overwhelmed with detail and possibly unable to identify optimal outcomes. The vast literature of crisis decision making has shown that situations of intense crisis can create a reduced span of attention, cognitive rigidity, and a distorted perspective of time.[1] These factors combine to make utility maximization difficult in a crisis situation.

Simulations based on the use of computer-based decision support systems (DSSs) can play crucial roles in the crisis decision-making process by allowing the decision maker to examine large amounts of information quickly and to explore interrelationships among factors that may influence the decision. A DSS can also facilitate the simultaneous evaluation of multiple positions in crisis negotiations. This can play a decisive role in real-time negotiations by allowing the supported parties to formulate dynamic strategies rapidly and evaluate their opponents' proposals quickly.[2] The basic argument in this article is that the employment of simulation techniques based on a sophisticated DSS facilitates the identification of utility-maximizing strategies on the part of an individual actor[3] and can, therefore, lead to the formulation of a more effective negotiation strategy.

This article tests the ability of one such DSS—the NTM and its negotiation support system GENIE—to help decision makers maximize their objectives in a crisis situation through the evaluation of alternative outcomes and thus achieve utility maximization. The components of the NTM will be described, with particular emphasis on GENIE.[4] This will be followed by the presentation of preliminary experimental results evaluating the effectiveness of this approach in crisis management and abatement.

Components of the NTM

The NTM is composed of three elements: the GENIE DSS for multilateral crisis negotiation, the language generator, and the interactive communication system.

The theoretical core of the NTM is a strategic model of negotiation, consisting of a model of alternative offers (Rubinstein, 1982), which focuses on the passage of time during the negotiation and the preferences of the players for different agreements as well as for opting out of the negotiations. This model assumes three players: the initiator of the crisis, the participant

(against its will), and a third party. There exists a set of possible agreements between all possible pairs of actors, and each actor has a set of preferences for outcomes. That is, each participant has preferences over agreements reached at various points in time and for opting out at various points in time. The time preferences and the preferences between agreements and opting out are the driving force of the model (for a detailed description of the strategic model of negotiation, see Kraus & Wilkenfeld, 1991; Kraus, Wilkenfeld, & Zlotkin, 1995).

GENIE DSS

The specific implementation of the GENIE DSS that has been explored in our research to date focuses on a hypothetical airplane hijacking crisis involving India, Pakistan, and Sikh separatists.[5] The multilateral negotiation that ensues involves a number of issues, among them an India-Sikh negotiation over the release of Sikh security prisoners in Indian jails for the hostages aboard the plane, an India-Pakistan negotiation for Pakistani logistical information and potential support in the event of an Indian rescue operation, a Pakistan-Sikh negotiation over press access and safe passage, and so on. Although important negotiation issues exist for all three actors, the primary dispute is between India and the Sikhs. In that respect, Pakistan takes on a third-party role, in which it must devise and execute mediating strategies aimed at facilitating agreements.

Each party to the negotiation, represented by a single negotiator or a team of negotiators, has a set of objectives with associated utility values (e.g., Indian objectives include safe return of passengers, credibility of deterrence against future terrorist attacks, the minimizing of public opinion losses, the minimizing of concessions to terrorists, etc.). Time has a differential effect on the parties; in general, it works in favor of the hijackers (the longer the negotiation is drawn out, the more publicity for their cause) and against India and Pakistan (the longer the affair, the less control over the situation they appear to exert) (Kraus, Wilkenfeld, Harris, & Blake, 1992).

GENIE (see Figure 1) provides the negotiator with a mental picture of the negotiation model through problem structuring and knowledge organization. Its function is to present a complex negotiation model to the user in an easily understandable and organized manner. To achieve this, GENIE uses an interactive outline (see Figure 2) that presents the types of data in the model as outline topics and allows the user to select the topics of interest interactively. The flexibility that this approach provides allows the negotiator to investigate the consequences of various positions almost instantly. This

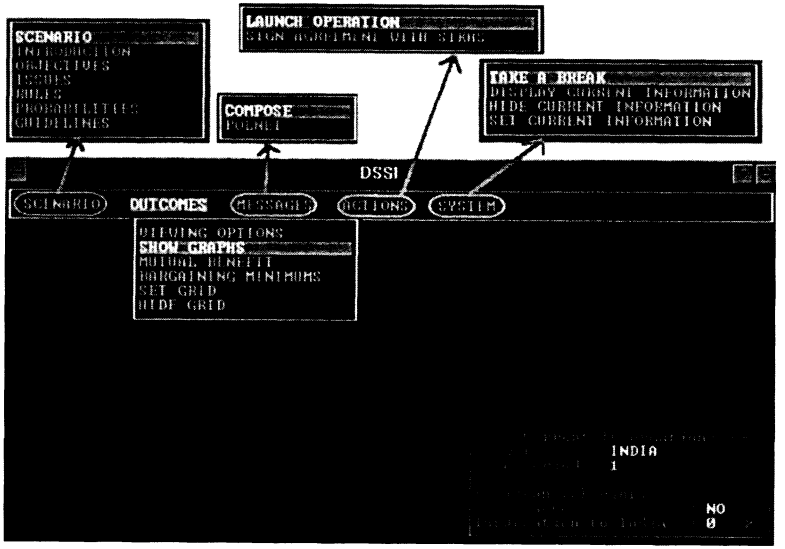

FIGURE 1: GENIE

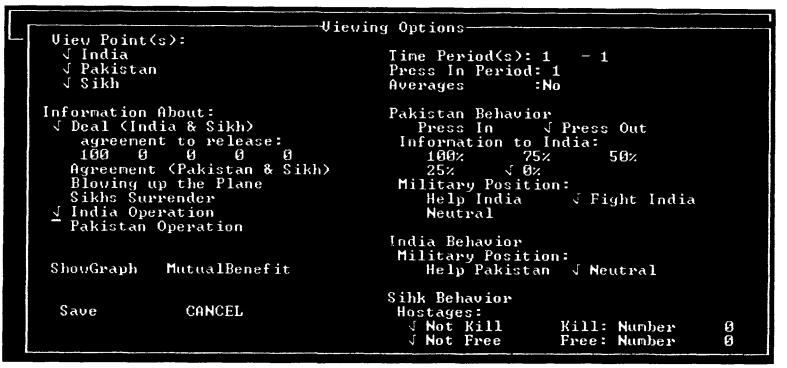

FIGURE 2: Interactive Outline

allows forward, backward, or random evaluation of positions during the formulation of a negotiation strategy. It also allows a negotiator to evaluate opponents' proposals quickly during actual negotiations. Simultaneous viewing

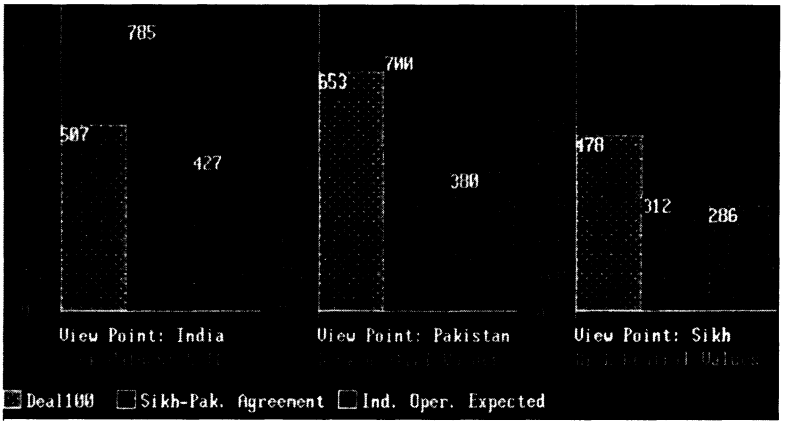

FIGURE 3: Bar Graphs

of a number of negotiating positions facilitates comparative analysis and the optimization of choices.

GENIE was developed with a modular design to allow for its eventual generalization; that is, the content (or knowledge base) of the DSS can be changed to suit the specific substantive interests of the trainer/researcher. The knowledge-base module consists of data on the utility functions of each of the parties to the negotiation and a series of structural equations that define the relationships among critical variables, thus allowing for the calculation of the utility point totals associated with various outcomes across various time periods. The interface module features a menu-driven interactive outline that combines data management and modeling capability in a screen that enables a negotiator to set parameters quickly for the viewing of information, allowing the user to form a rapid mental picture of the entire simulation. The interface allows the user to brainstorm and experiment with different options to form a personalized strategy for utility maximization. Finally, the display module provides the negotiator with graphic output options, consisting of either a time static bar chart representation of the comparative utilities of various outcomes (different agreements, military operations, etc.; see Figure 3) or time-series graphs that allow the negotiator to observe changes in utility values associated with various outcomes over time (see Figure 4). Because this is a full-information model, the individual negotiator can, in all cases, compare his or her projected utilities for a specific outcome with those of the

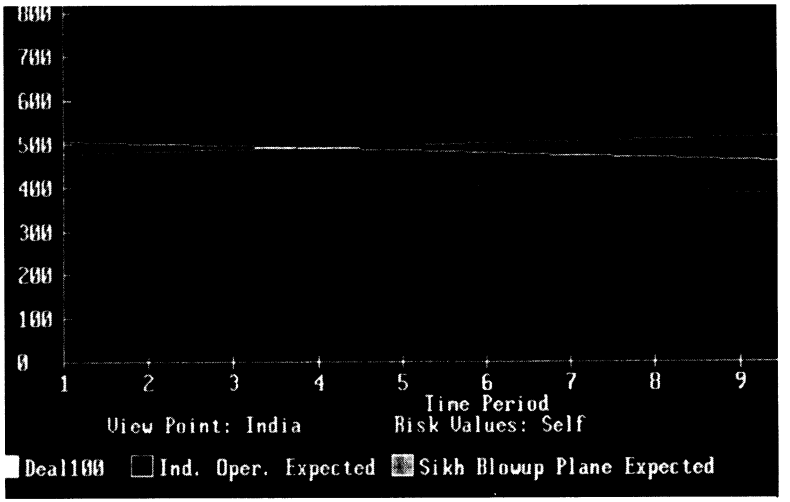

FIGURE 4: Line Graphs

	1	2	3	4	5	6	7	8	9	10
	SPA,785	SPA,780	SPA,774	SPA,769	SPA,764	SPA,759	SPA,753	SPA,748	SPA,743	SPA,738
	POE,645	POE,641	POE,641	POE,637	POE,629	POE,626	POE,625	POE,622	POE,614	POE,611
	D100,507	D100,501	D100,496	SBPE,494	SBPE,497	SBPE,502	SBPE,507	SBPE,513	SBPE,516	SBPE,521

	1	2	3	4	5	6	7	8	9	10
	SPA,700	SPA,696	SPA,693	SPA,689	SPA,686	SPA,682	SPA,679	SPA,675	SPA,672	SPA,668
	D100,653	D100,650	D100,646	D100,643	D100,639	D100,636	D100,632	D100,629	D100,625	D100,622
	IOE,380	IOE,377	IOE,367	IOE,363	IOE,369	IOE,366	IOE,356	SBPE,362	SBPE,376	SBPE,378

	1	2	3	4	5	6	7	8	9	10
	D100,479	D100,486	D100,493	D100,501	D100,509	D100,517	D100,524	D100,533	D100,540	D100,548
	SPA,312	SPA,320	SPA,327	SPA,335	SPA,343	SPA,351	SPA,358	SPA,366	SPA,374	SPA,382
	IOE,286	IOE,294	IOE,293	IOE,301	IOE,320	IOE,328	IOE,327	IOE,334	IOE,353	IOE,360

KEY:
Mutually Beneficial India-Pakistan-Sikh Resolution.
D100: Deal100 SPA: Sikh Pak. Agreement
IOE: Ind. Oper. Expected POE: Pak. Oper. Expected
SBPE: Sikh Blowup Plane Expected

FIGURE 5: Mutually Beneficial Resolutions

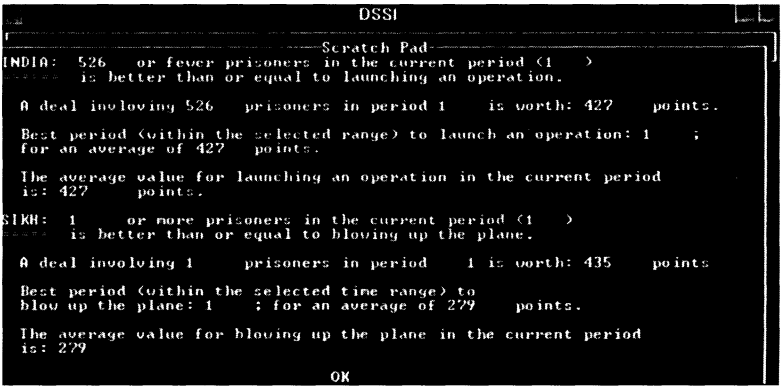

FIGURE 6: Reservation Prices

other two parties. Finally, GENIE facilitates the identification of mutually beneficial resolutions (Figure 5) as well as the calculation of reservation prices (Figure 6).

Language Generator

A language generator has been specifically developed for the crisis negotiation context, so that the three parties (India, Pakistan, Sikhs) can formulate messages to be exchanged during the negotiation (see Figures 7, 8, and 9 for some of the choices available to the three parties). Use of the language generator is appropriate in both experimental simulation settings and in training session debriefings to support the immediate content analysis of messages exchanged during the negotiation. The data on negotiation strategy contained in the messages exchanged and the offers accepted and rejected provide the basis for the examination of propositions relating to the negotiation process, as well as the basis for the comparison of negotiation strategies exhibited by the trainees.

Interactive Communication System

The final component of the NTM is an interactive communication system, allowing the three parties to exchange the messages they have constructed using the language generator. Because we have, to this point, restricted our

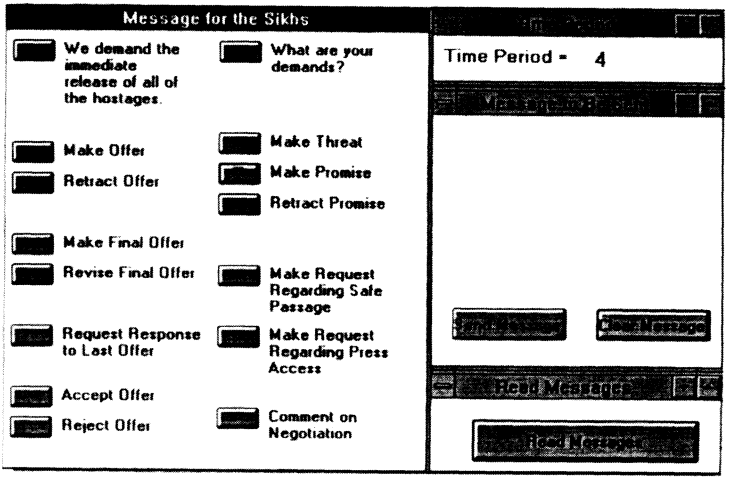

FIGURE 7: Language Generator (India): Messages for the Sikhs

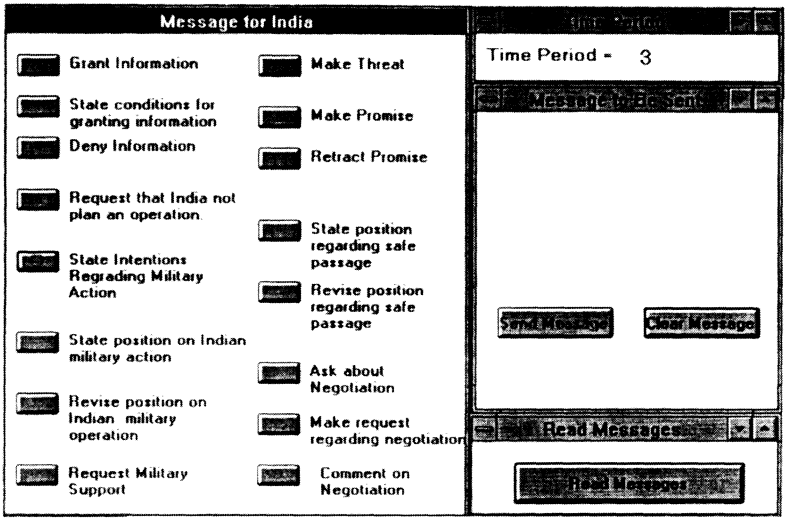

FIGURE 8: Language Generator (Pakistan): Messages for India

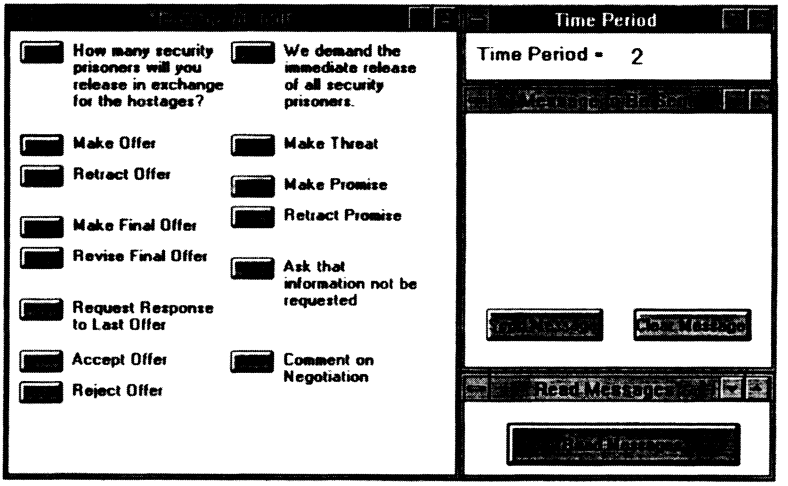

FIGURE 9: Language Generator (Sikh): Messages for India

use of the experimental environment to the University of Maryland, we have used the POLNET II communication software developed for the ICONS simulations.[6] A generalized network version of the interactive communication system that can be easily ported to any network environment, including the Internet, is currently under development with support from the U.S. Institute of Peace.

Research Findings to Date

During the past 6 years, we have conducted a series of pilot experiments designed to explore several aspects of both the behavioral and instrumental characteristics of negotiation, using components of the evolving NTM. We will provide a summary of these experimental simulation results and point the interested reader to articles containing more complete discussions of the findings.

Behavioral Findings

An early set of experiments focused on the types of communication patterns most conducive to the achievement of negotiated agreements versus those associated with the resort to violent means for resolving crises. Among

the results isolated thus far are findings pertaining to the pivotal role of third-party mediation in crisis. By maintaining open and balanced communications channels with each of the engaged parties, a greater number of agreements are produced than when the third party acted in a more biased manner. These experiments also revealed important differences in the communications patterns of the main conflict rivals, particularly with regard to the circumstances under which negotiations conclude with a successful agreement. For additional details on these experimental results, see Kraus et al. (1992).

Instrumental Findings

To examine the general proposition that the NTM based on a DSS helps negotiators to act as utility maximizers and thus improve their performance in simulated crisis situations, a set of carefully designed experiments was conducted. The proposition would be well supported if experimental results showed that the users of the DSS, as compared to nonusers, placed more emphasis on utility maximization in their negotiating goals and were more capable of realizing this goal in the negotiation situation. In a series of preliminary experiments, the following hypotheses were confirmed:

- DSS-supported users are more likely to identify utility maximization as their primary objective in a crisis situation, whereas non-DSS-supported users are more likely to identify deeply held principles as the primary motivating factor.
- DSS-supported users will achieve higher utility scores than will non-DSS-supported users.
- Simulations with a DSS-supported user present among the parties will produce higher overall scores than simulations without DSS-supported users.
- Simulations with DSS-supported users are more likely to end in negotiated agreements.

Administration of presimulation and postsimulation questionnaires revealed that a lower level of strategic thinking was evident among the participants without access to the DSS. The DSS users were more motivated by maximizing their score in the simulation and were therefore more interested in analyzing the differing effects of various negotiating strategies. Participants motivated by principle alone made negotiating choices based on these principles and did not evaluate as wide a variety of negotiation strategies. For instance, an Indian player guided by the goal of upholding the principle of not giving in to terrorists did not evaluate his or her reservation price, the values of various integrative strategies, or the existence of mutually beneficial resolutions because he or she would not have any interest in

making a deal with the Sikhs. A player motivated by utility maximization would have to consider all of these factors to increase the possibility of succeeding in maximizing his or her utility. For additional details on these experimental results, see Holley and Wilkenfeld (1994), and Wilkenfeld, Kraus, Holley, and Harris (1995).

Since the writing of this article for the International Simulation and Gaming Association meeting in Spain in 1995, additional research has focused on assessing the impact of the cognitive complexity of decision makers on their behavior in crisis negotiation situations and on the outcomes they attain. This is an effort to better understand the dynamics that lead certain persons to have greater success in negotiations and that lead certain groups of adversaries to achieve more mutually beneficial outcomes. The underlying assumption is that the greater the level of cognitive complexity that the individual brings to the crisis negotiation situation, the more likely it is that his or her process of arriving at decisions will result in utility maximization. Individuals at higher levels of cognitive development will be better able to cope with the crisis environment than will those at lower levels. In particular, the perceived shortness of time for response, combined with truncated and restricted communications among the parties, will frustrate negotiators at the lower levels of cognitive complexity and will generate suboptimal outcomes to negotiation (for a report on this line of research, see Wilkenfeld, Kraus, Santmire, Holley, & Santmire, 1996).

A second research direction has focused on the impact of grouping decision makers by level of cognitive complexity on the outcomes they attain in crisis negotiation. These findings point to a positive relationship between the level of homogeneity of cognitive complexity among the crisis negotiators and the achievement of positive outcomes, that is, a greater propensity to terminate in agreement (for a report on this line of research, see Santmire, Wilkenfeld, Kraus, Santmire, & Gleditsch, 1997).

Notes

1. See Holsti (1989) for an excellent review of the crisis decision-making literature.

2. Negotiation support systems, an important subset of decision support systems (DSSs) in general, come in three basic varieties: support for the entire negotiation group, mediation support, and support for individual negotiators. For a review of these approaches, see Wilkenfeld, Kraus, Holley, and Harris (1995).

3. Note that our argument for the enhanced ability of a DSS user to maximize his or her utility does not imply the achievement of mutual benefit on the part of all parties to the negotiation. The latter is a more complex issue, which we address explicitly in some of our theoretical work

on the strategic model of negotiation (Kraus & Wilkenfeld, 1990, 1993; Kraus, Wilkenfeld, & Zlotkin 1995).

4. GENIE was developed jointly by the University of Maryland Institute for Advanced Computer Studies and Project ICONS of the Department of Government and Politics.

5. A Middle East version of this scenario has been developed and is reported on in Kraus, Wilkenfeld, Harris, and Blake (1992).

6. More recent applications of the GENIE DSS have used the Pegasus Mail System. For a description of the ICONS simulation and software, see Wilkenfeld and Kaufman (1993).

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Jonathan Wilkenfeld is a professor and chair of the Department of Government and Politics at the University of Maryland and the director of Project ICONS. He received his PhD in political science from Indiana University in 1969. He is a specialist in foreign policy decision making

and the analysis of international crisis and is the author of six books and numerous articles. In recent years, his work has focused on the development of simulations of international negotiation for both teaching and research purposes. He and Sarit Kraus are currently principal investigators on a National Science Foundation grant for the development of automated negotiators in multiagent environments.

Sarit Kraus is an associate professor in the Department of Mathematics and Computer Science at Bar Ilan University in Israel and an adjunct associate professor at the Institute for Advanced Computer Studies at the University of Maryland. Her research interests include the development of intelligent systems, distributed artificial intelligence, automated negotiation, planning, user interfaces, and decision support tools. She received her PhD from the Hebrew University in Computer Science in 1989 and has done postdoctoral work at the University of Maryland.

Kim M. Holley received her BS in mathematics, computer science, and philosophy from Ashland University, and her MA in international peace studies from the University of Notre Dame. She is currently a doctoral student in political science at the University of Maryland. Her research focuses on conflict resolution and negotiation, with a special interest in the role technology can play in the resolution of international and communal conflict.

ADDRESSES: Jonathan Wilkenfeld, Department of Government and Politics, University of Maryland, College Park, MD 20742, USA; telephone 301-405-4160; fax 301-314-9690; e-mail jwilkenf@bss2.umd.edu. Sarit Kraus, Department of Mathematics and Computer Science, Bar Ilan University, Ramat Gan, Israel 52900; telephone (03) 531-8863; e-mail sarit@umiacs.umd.edu. Kim M. Holley, Department of Government and Politics, University of Maryland, College Park, MD 20742, USA; telephone 301-405-4172; e-mail kholley@bss2.umd.edu