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ABSTRACT

This paper addresses issues surrounding the use of conflict alert systems to support conflict prevention activities. The paper first gives the reader an understanding of the role and capabilities of conflict alert systems. The paper then describes the use of such systems within institutions. With that background the paper then discusses issues which must be resolved regarding both the technical and organizational aspects of conflict alert systems to enable them to support conflict prevention by national, regional, and global security organizations.

CONFLICT ALERT SYSTEMS AND CONFLICT PREVENTION

INTRODUCTION

The idea of conflict early warning systems has re-emerged in recent years with more attention and support from academics and practitioners dealing with conflicts than earlier efforts.[1] The realization that early intervention may have prevented disasters such as Rwanda or Somalia has encouraged governments, international organizations, and nongovernmental organizations to get an early warning that a violent conflict, with its attendant humanitarian relief demands, is about to erupt. Organizations with responsibilities for humanitarian relief hope to plan more effective operations to provide food and other necessities to persons displaced by the violence. Other organizations that focus on diplomatic initiatives to end conflicts hope to pre-empt the violence by implementing conflict prevention measures such as preventive diplomacy or preventive peacekeeping.[2]

Two developments have spurred this renewed interest in conflict early warning and computer systems to provide this warning. The first is the that the number of violent conflicts and--especially--the cost of trying to police the situations or provide relief has mushroomed in recent years. Organizations such as the United Nations increasingly confront donor fatigue and realize that something different must be done. Of the three alternatives: Do an inadequate job because of insufficient funds, acquire the funds through a revenue source such as a tax on international airline flights,[3] or try to prevent conflicts from becoming violent (and costly) by

initiating negotiations and addressing the causes of the discontent, the third looks increasingly attractive because the first appears grim and inhumane and the second is certain to meet strong resistance.

The second development is the permeation of computers into so many aspects of organizational operations. The idea of using computers for conflict early warning is no longer far-fetched. Twenty years ago very few of us had direct interaction with computers. To the extent we knew anything about computers, we associated them with "number crunching." Now, primarily because of word processors, we recognize that computers can work with texts as well, and news that would be used for early warning is in large part textual information. Moreover, the emergence of widespread computer networking and on-line information sources, which we most often encounter through email and network "browsers," makes us recognize that information from around the world can quite easily be gathered into computers for analysis. Since computers have found so many uses and do things we never dreamed of, the idea that they could contribute to conflict early warning, while exotic, is no longer something solely in the realm of science fiction.

Some believe that using an early warning system makes little sense "because we already know where the conflicts are likely to happen." That is in part true. In many cases a country expert (or perhaps better, a nongovernmental organization worker in the country) can with reasonable accuracy assess the probability of a violent conflict emerging in the next 3 to 12 months. However, there are four reasons why an early warning system is needed.

First, an alert from an individual regarding an upcoming conflict has little "weight" unless the individual has a track record for such forecasts. Someone would ask, in effect, "Has the individual correctly discerned future conflicts in the country before, or, for that matter, in other countries?" In most cases the answer would be 'no,' and as a result, few organizations would be willing to initiate action upon such a warning.

Second, individuals in conflict management or humanitarian relief organizations tend to focus on existing conflicts or relief efforts. They seldom have time to closely follow developments in other places. Third, individuals in those organizations whose job it is to follow developments usually have several countries to monitor. It is difficult if not impossible for those individuals to sufficiently closely monitor each country so that they could issue an alert a number of months in advance of a conflict.

Finally, the real value of an early warning system appears when it alerts us to impending conflicts that are not obvious. It is possible that an institutionalized early warning system could find harbingers of conflicts that do not attract the attention of experts or people living in the country.

A conflict early warning system exists at two different levels. The first consists of a conflict alert system (CAS), computer equipment, databases, and programs than scan news feeds and other texts to find patterns in events or trends that indicate a violent conflict will erupt at some location in the world in the next 3-12 months.[4] The second level consists of organizational

structures and procedures that enable the CAS to operate properly and that ensure an alert and supporting information reach those who need it, usually decision makers within the organization. The second level can exist without the first, but for the reasons given above, it is probably necessary to have both for conflict early warning to become a reality. The difference between these two levels is often ignored or confused. That is unfortunate because the work involved in making each level function properly differs significantly, and focusing on one or the other will probably result in a suboptimal if not ineffective conflict early warning system.

Neither level of a conflict early warning system exists in full at this time. The rest of this paper describes what needs to be done to develop a conflict alert system and what needs to be considered in order to make effective use of a CAS in an organization so that conflict early warning becomes an accepted and even expected activity. It is hoped that this paper will stimulate thinking and discussion of what should be done when the technical capability to receive conflict alerts, namely, a functioning conflict alert system becomes available.

THE FUNCTIONS OF A CONFLICT ALERT SYSTEM

A conflict alert system has three functions directly relevant to an organization's interest in conflict early warning. The first, obviously, is to generate conflict alerts sufficiently far in advance of the conflict outbreak to help the organization initiate actions to prevent the conflict or deal with its consequences. While a necessary function for a CAS to be useful, it is not sufficient.

The second function is to give the analyst and thus the organization a probability or confidence assessment of the alert. If a CAS can when generating an alert "say" something to the effect that "When we have seen this situation in the past, 88% of the time a conflict has erupted within 12 months," the likelihood that decision makers will act on the alert is much higher than if the probability is 20% or if there is no probability assessment. This function is crucial. It provides an impetus for action by creating a "fact" that a decision maker ignores at her or his peril. If no action is taken in the face of a high probability assessment, the decision maker is open to charges of dereliction of duty.

The third function, while not strictly necessary but probably desirable, is to provide information about the situation and the alert such as what type of conflict is likely to erupt and what are the current and past circumstances in the area. This function is especially relevant when one considers the second, organizational level of a conflict early warning system. As an alert is funneled to appropriate, probably high-level, decision makers such as the UN Secretary-General or the OSCE Committee of Senior Officials or the director of an organization such as CARE, an early warning system that failed to provide the information that can help them make their decisions will not be deemed useful and will almost certainly be ignored.

Precisely what a conflict alert system is may not be familiar to the reader. To fully understand the nature of a CAS and what it can do, let us start at the level of generating an alert.

USING A CONFLICT ALERT SYSTEM IN SUPPORT OF CONFLICT PREVENTION

A conflict early warning alert will begin at the level of an analyst, within some organization, whose job it is to provide conflict alerts. The following example illustrates how such an analyst may use an CAS as part of his or her job.

The analyst arrives at his or her office in the morning, turns on the computer, and activates the CAS program. The first screen that appears is a map. (It may be a world map, but if there are multiple conflict alert specialists, the first map may instead be the region of that individual's specialization.) Highlighted on the map are two adjacent countries flashing red. Moreover, the two countries are flashing synchronously, which means that the problem concerns both of them. The analyst investigates this alert by moving the computer's "mouse" so that a pointer on the screen correspondingly moves to the pair of countries. The pair of countries is selected for investigation when the analyst presses a button on the mouse when the pointer is on either of the countries.

When that is done, a map of the two countries replaces the world (or regional) map. On the new map both country capitals and the border zone are flashing red. The analyst "clicks" the mouse on one of the capitals. A "window" (an area on the screen) opens with news reports and government statements about the situation at the border. This window contains information about or from the capital that contributed to the system generating an alert. After examining the news from both capitals, the analyst then clicks on the border zone. A more detailed map

of that region replaces the two-country map. Certain pieces of information such as key topographical features and territory held by different organizations are depicted on the map. Another window appears that contains recent reports from the border region.

Also on the screen are a number of icons, which are symbols that represent different types of information. For example, an icon in the shape of an army tank could be used to represent military weaponry information. Other examples could be a human body to represent demographic statistics, a book to represent historical information, and a graph to represent economic data. The information represented by these icons is background information. As before, by moving the screen pointer (with the mouse) to the desired icon and pressing the mouse button, a window appears on the screen which enables the user to view the chosen type of information in that window in tabular, graphical, or textual form, whichever is appropriate. In this way the analyst can quickly acquire background information that will help the analyst evaluate the early warning alert. If desired, the user can print information by "dragging" it with the mouse to an icon for a printer.

Numerous embellishments to this basic scheme would undoubtedly appear in practice. These include things color coding to indicate the urgency of the early warning and a symbol adjacent to the flashing unit to indicate the nature of the early warning (conflict, food shortage, refugee flow, etc.).

After examining the background information on the two countries, and especially, the current

event information that caused the computer system to generate an alert, the analyst decides whether the situation merits further investigation or whether it is a false alarm. If a false alarm, the analyst may either ignore the alert or, preferably, indicate to the computer system that it, in the analyst's judgment, made an incorrect evaluation and that it was putting too much weight on a particular factor or event.

If the analyst believes that the alert should be taken seriously, a different sequence of events begins. If the analyst needs more information, she or he will obtain it and re-evaluate the alert. If the alert still appears real, the analyst will bring the alert to the attention of a higher-level official. If such an individual, perhaps the head of a conflict early warning office, deems the alert meritorious, the individual notifies even higher-level decision makers, perhaps even the head of the organization. That decision maker could, after consultations, initiate an action such as assign a peacemaking envoy, who hopefully can mediate a settlement.

The sequence of steps described above, is, to be sure, much simplified from what would actually happen, but it delineates the essence of how an alert from a computerized system might set in motion actions to prevent a conflict.

One problem with conflict early warning as it is now done is that alerts are sent up the chain of command, but no action is taken. This is not--or should not be--surprizing. The attention of most high-level governmental decision makers swings from one crisis to the next. Taking action to resolve a conflict entails costs be they financial, scarce personnel time, or even lives.

Expending resources to deal with "someone else's problem" or affairs, as a large portion of most countries' populations perceive it, is seldom popular unless a case can be made that the conflict directly and unambiguously affects domestic interests. Given those constraints, a decision maker is naturally going to be skeptical that it is worthwhile to take preventive action in a situation that may or may not become a violent conflict. The decision maker cannot help but ask, "What is the likelihood that a conflict will indeed occur? What if I make the decision to initiate conflict prevention activities, and it becomes a violent conflict anyway? What if I make the decision to intervene but do not get credit if the intervention succeeds?" No decision maker looks at the last two questions as career-enhancing outcomes.

A CAS can help deal with this problem of decision maker inaction even when preventive intervention may help. The analyst has a better chance of convincing a higher-level official that the alert merits action if the analyst can show the official the information that generated the alert so that the official can evaluate it him or herself. As stated earlier, one piece of information that would be particularly useful would be a probability assessment of the likelihood of a future conflict given a comparison with similar situations in the past. For this reason a conflict alert system should be designed and empirically grounded to provide that information. A later section expands upon this point.

It is worth noting that the background information used as part of a CAS can also be used to support other conflict prevention or humanitarian relief activities initiated by an organization's leadership. For instance, information, if available, about troop strengths is certainly of interest

to a mediator that may be sent into a pre-conflict situation. The availability of this information can in a small way enhance the effectiveness of an intervention, such as a mediator, and thus improve the odds that the intervention will succeed. A CAS will not resolve the high-level political issues surrounding the decision by countries and conflict management organizations to intervene, but it can help in the decision-making process.

KEY ELEMENTS OF A CONFLICT ALERT SYSTEM

Let us now examine the core components of a conflict alert system. The interaction described above emphasizes an interface that is timely and user-friendly so that information can be relayed quickly and easily. However, there is much more that lies behind the computer interface, and it is with these components that several questions must be answered and problems solved.

To do the functions described above, the CAS must include a mechanism by which large amounts of raw data, current news and other publications, are gleaned for indications of potential conflicts. This involves two main steps. First, information sources must be tapped. A CAS must access a variety of sources in terms of both type and origin. These include television and radio broadcasts, wire services news feeds, newspapers, journals, books, and statistical compilations. The information should not be restricted to materials generated by North American or European organizations or news media.

To monitor information from a variety of sources, including local ones, essentially worldwide means that an enormous volume of information must be handled. Fortunately, advances in using computers to monitor and process information that is transmitted in electronic form[5] as well as scanners and optical character recognition software to read printed materials into computers makes handling that volume of information feasible for a small staff.

The second step is to glean warning signs from the incoming data. Alternative approaches to finding these signs are being explored.[6] For many, this step reduces to the question of what are the appropriate early warning indicators. They believe that if someone can tell them which indicators, what types of information they should collect, the conflict early warning problem is solved. Moreover, some hope for a set of universal conflict indicators, a relatively small number of indicators that can point to a future conflict in most if not all countries and to the types of conficts that may occur in those countries. Such a set is unlikely to exist, and gleaning warning signs is a much more complicated problem than simply monitoring certain pieces of information.

The first problem to overcome in order to glean early warning signs from news feeds and other information sources is to properly identify the violent conflicts towards which indicators would "point." Stated differently, we cannot determine the independent variables that "cause" a change in the dependent variable unless we know what the dependent variable is, and "the outbreak of war" or even "the outbreak of a violent conflict" does not suffice as a dependent variable. Both of them are too general. One position to take on this issue is to focus on one

type of conflict and attempt to find appropriate indicators. However, there is a problem with this position. If we put ourselves in the role of an analyst concerned about conflict early warning, that individual would not want the conflict alert system to give an alert only for a certain type of conflict such as an ethnic conflict between two groups; the arena of concern for such an analyst is virtually any kind of violent conflict.

King, Keohane, and Verba argue that finding the sources of phenomena such as armed conflict benefits enormously from choosing cases that allow one to cover the full range of values of the dependent variable.[7] This dovetails with the analyst's concern to support an alternative position. The variety in characteristics of the different types of violent conflicts within and between countries almost certainly requires that we think in terms of finding different combinations of indicators for different kinds of violent conflicts (although whether a limited set of universal conflict indicators is possible is ultimately an empirical question.)

To properly establish the different kinds of conflicts, we need to create a taxonomy of violent conflicts that classifies them according to theoretically important distinguishing characteristics and groups them at higher levels of generality. Existing typologies are not sufficient for this purpose because they are not comprehensive.[8] Another facet of this research project is developing a taxonomy to get us past this problem.[9]

The second problem to overcome is the choice of early warning indicators. At one level this is easy. Anyone interested in the conflict early warning problem can in short order develop a list

of those indicators the individual deems important. The hard part is convincing anyone that the list consists of good predictors or at least better predictors than other individuals' lists. There are two components to overcoming this hurdle, one theoretical and one empirical. The theoretical component is that the indicators should be supported by theoretical schools pertaining to the causes of violent conflict. We do not lack theoretical explanations. The difficulty lies in that none hold up consistently either empirically or logically.[10] With respect to conflict early warning there is another aspect to the problem that makes progress difficult. When one is in the role of an academic wrestling with theoretical arguments, one tends to focus on one or a few indicators in order to tease out its/their role.[11] On the other hand, when one is in the role of a researcher attempting to develop a CAS, one does not want to be restricted to indicators favored by a particular theoretical school because no theoretical framework has demonstrated its superiority. The resulting lists of indicators tend to be extensive as the researcher attempts to be inclusive and incorporate a large portion if not all causes of conflict.[12] (As one can see, this is related to the specification of different types of conflicts problem.) Given the current state of our knowledge, a reasonable middle ground may be to develop lists of indicators that span different theoretical schools but at the same time consist of indicators that possess theoretical support rather than just seem plausible.[13]

The empirical component to determining the best list of indicators raises other problems. One will almost certainly need a large number of cases (conflicts) in order to find good early warning indicators. Getting this requires that one use conflicts from an extended time period. The post-World War II period is probably a minimum time frame within which to get enough

examples of any particular type of conflict to find its harbingers. Datasets including only those conflicts from the past few years will likely be insufficient.

Even if or when one has one's type or types of conflict carefully specified, has a theoretically-informed list of indicators, and has a dataset containing a significant number of cases relevant to the type or types of conflict, one still faces nontrivial obstacles in determining whether one has indeed identified good, useable indicators. For example, it may be that only particular configurations of conditions (and thus only particular combinations of indicator values) serve as the harbingers of future violent conflicts.[14] If so, then identifying early warning indicators becomes a pattern recognition problem that is not easily addressed with conventional statistical regression techniques. What is more, it is possible, perhaps even probable, that these configurations are complicated, making it such that one cannot simply monitor a few indicators and so to speak "eyeball" them. If this is the case, statistical pattern recognition techniques will need to be brought to bear on the collected data.

The panoply of problems discussed above refers only to the question of finding early warning indicators or combinations of them. There remain additional hurdles to overcome to accomplish the second task of a CAS, gleaning warning signs from the incoming data. They pertain to the problem of how to translate knowledge about early warning signs into a real-time (or nearly so) computer system monitoring the incoming information as described above. The first of these hurdles concerns the database that will lie at the core of an operating conflict alert system. In fact, a CAS is more than anything else a well-designed database with sophisticated

procedures for scanning the data and extracting patterns that are believed or have been demonstrated to be indicators of future problems.

CAS database development is not a trivial problem. First, the design is complicated. This results from the facts that:

1. Data must be organized for a large number of entities (roughly 200 countries, perhaps 30 regional groupings, and hundreds of ethnic groups),
2. Many of these entities overlap with each other (for example, there are many ethnic groups whose territory crosses national boundaries),
3. Many of these entities interact with each other, and
4. Information must be stored about these entities and their interaction over time.

Second, the database structure must be capable of evolving so that it corresponds to changing circumstances such as the breakup or integration of states. Few databases can do this with ease.

Whereas the database is a condensation of information about the world deemed important to identifying potential conflict, the heart of the CAS--and the second hurdle--consists of a mechanism that searches through the database, identifies "significant" situations, and then brings them to the attention of the analyst. This mechanism must compare the current situations of countries and regions around the world and compare them to generalizations of those situations in the past that subsequently became violent conflicts. If it finds an

approximate match, the system must generate an alert with a probability assessment that such a situation will become a violent conflict given past occurrences. Doing this requires the CAS to put the incoming and database information into a form that allows comparison with past cases and then make the comparison.[15]

This mechanism must operate in both automatic and manual modes. That is, given a "list" of what to look for, the program should periodically (daily if the database is updated that frequently) and on its own search for items on the list. In the manual mode a user should be able to expand or focus the search criteria to follow a particular lead or hunch, or the user should be able to improve the automatic mechanism by redefining its search list, in a sense "teaching" the mechanism how to do a better job of finding the crucial situations which merit attention.

It must be kept in mind that a CAS is not a crystal ball. It will not spot all potential conflicts, and it will give false alarms. Yet, it can help by drawing attention to situations that given past experience appear to be conflict-prone. On the other hand, the CAS will be able to "learn" from its alerts (both successes and failures) and thus become more accurate as time progresses and the variety of its "experiences" accumulates.

EARLY WARNING SYSTEMS IN AN ORGANIZATIONAL FRAMEWORK

Conflict alert systems will be situated within an organizational setting. An institution that opts

to do conflict early warning as described above will probably create an early warning group or early warning office. This group, which should consist of six to ten individuals for world-wide coverage, can reside in a number of locations. At one extreme an early warning group could be an independent entity within the organization (such as the United Nations or the US State Department) and could provide information to all components of the organizaton. At the other extreme it could be a component of an existing office or department. For example, a bureau that focuses on a particular region might employ an early warning group while another bureau that concentrates on a different region might choose to not create such a group.

The location could be functionally focused. For instance, an office that deals with humanitarian relief activities might choose to house an early warning group while an office that concentrates on peacemaking activities might not. Naturally, there are trade-offs between the alternatives. An independent group can easily provide information to all other components of the larger organization. Unfortunately, it might be ignored by most, if not all, because it is not affiliated with them. Conversely, a group residing within a larger bureau might be taken seriously by those in that bureau, but it may be stymied in providing information to others outside of it because of bureaucratic "turf wars."

Another possibility is to locate a conflict alert system within a new office whose function is to try prevent the outbreak of violent conflict.[16] These organizations have been referred to as War Risk Reduction Centers and Conflict Prevention Centers.[17] They all share two missions:

1. Acquire, assemble, and report information about potential conflicts or other threats to peace to their parent organizations (such as the Organization for Security and Cooperation in Europe or the United Nations).
2. Support efforts by the parent organizations to avert the threats to peace.

Both regional and global versions of these centers have been proposed, and one regional example now exists. The Conflict Prevention Center in Vienna began operating in 1991 with some of the features proposed for this type of center.[18] An early warning capability is necessary for conflict prevention centers to play their envisioned anticipatory, preventative role. Unfortunately, the Conflict Prevention Center does not possess a unit capable of performing early warning at this time. The Office for Research and the Collection of Information (ORCI) at the United Nations, which was founded in 1987, was intended to provide early warning and information support at the UN[19] and may have evolved into a global conflict prevention center. ORCI was eliminated during a reorganization in 1993, but its functions have continued in other locations within the UN such as the Department of Humanitarian Affairs (DHA) and the Department of Political Affairs. The Humanitarian [Relief] Early Warning System (HEWS) at the Department of Humanitarian Affairs is a prototype CAS that will hopefully receive additional development support. At this point in time, one cannot say that conflict early warning and conflict prevention are thriving activities.

There are many reasons why conflict prevention and conflict early warning have not moved into a normal and expected role within organizations.[20] The largest roadblock is, of course, the

reluctance of individuals and organizations to get involved in peacemaking. Do we set dangerous precedents by usurping state sovereignty? Do we even know what to do? Can we make a difference? Do we really care what happens? This paper does not have answers to these questions, but it is fair to say that with respect to the second and third questions, research has been done and is being continued to find answers.[21] With respect to the first and fourth questions, they are primarily philosophical, but if one accepts a Rawlsian perspective, there exist good reasons for attempting conflict prevention.[22]

Whether conflict prevention centers will be established or not, and if so, what form they will take will depend primarily on the degree to which the international community wishes and decides to have multilateral conflict management and the range of behaviors (cross-border wars, civil wars, government-sponsored violence against social groups) over which it will allow that management. A second major determinant will be the extent to which conflict prevention is valued as a component of conflict management. If a conflict prevention center is established, it would be a natural home for an early warning group. The existence of functioning conflict alert systems will, conversely, increase the viability of conflict prevention and the establishment of conflict prevention centers.

PRACTICAL CONSIDERATIONS FOR SUCCESSFUL CONFLICT EARLY WARNING SYSTEMS

Absolutely essential for getting an early warning capability to help conflict prevention is the

following: Senior leadership at the organizations attempting preventive diplomacy (such as the UN or OSCE) must *demand* from their staffs that they get a useable early warning of violent conflicts. Nothing short of this will motivate the staffs to do the best job they can to develop an effective CAS and efficient channels for information transfer up through the organization. An attitude of "It would be nice to have early warning" will not lead to sufficient energy, attention, and resources being allocated to early warning. This can be made very concrete by linking promotions and salary increases for individuals in the chain of command from the leadership to the early warning group to their effectiveness in providing conflict alerts with very few false alarms.

Earlier the point was made that the ability to provide a probability assessment of a conflict alert was a necessary feature of a CAS. There, unfortunately, is a problem with this capability. We face an unavoidable problem in that decision makers hate probabilistic assessments that something will happen because it places them in the situation that they may suffer the ignominy or worse of making the wrong choice. For this reason many decision makers may be very reluctant to have an conflict alert system that can put them in such a situation. There is no easy answer for this problem. To overcome it we need to make sure that a system is well-grounded and developed before it is put into operation. To achieve this a system would need to be brought "on-line" at first only in a test mode so that there are not unrealistic expectations.

As stated earlier, an effective early warning system will operate on the basis of a large number of varied information sources. These should range from fast-paced, timely news sources such

as the press services (AFP, AP, MENA, Reuters, Hsinhua, CNN, etc.) to intermittent or sporadic sources such as books, journal articles or eyewitness accounts. One can expect that the press services will tend to provide the "catalysts" to the CAS whereas the other sources will supply much of the background, contextual information that determines whether a particular event or action is a likely harbinger to a conflict or refugee flow (i.e. be a "catalyst").

As much as possible, a CAS should take advantage of local sources such as local newspapers, and, if possible, reports from individuals working or living in potential hotspots. An example of these individuals would be workers for humanitarian relief or aid organizations. These workers who are “on the ground” can, in principle, provide some of the most relevant early warning information such as ‘people going to meetings in which a political entrepreneur is attempting to mobilize them against the government or other groups. However, it is and will be exceedingly difficult to access these individuals’ insights because they will lose the neutrality and trust they need with the different groups in a society, especially if tensions rise. As a result, aid workers and the organizations they work for are and will be loathe to share what they know. This is a difficult problem that raises questions of the proper role and extent of intelligence gathering and protecting civil and political rights.

The office or center operating an early warning system will need to subscribe to the press services and to a wide range of journals and news magazines. In order to minimize delays, newspapers, journals, and magazines should be purchased in the country of publication and then be scanned and faxed or emailed to the early warning office. Ideally, the United Nations

offices in each country would perform this task for a UN early warning center. Unfortunately, host government sensitivity to "spying" will in most instances prevent this from happening.

Obtaining information pales in difficulty compared with the task of gleaning from the deluge of data which can now be accessed those nuggets that help in early warning. A key question is what should be the extent of "hands-on" human intervention in this process. If people are to do essentially all of the work in what is essentially an extension of their current activities, program managers must know that the work is labor-intensive. The employment of six to ten full-time-equivalents (FTE's) is not an unreasonable estimate for global coverage. Moreover, these individuals should possess master's degrees or the equivalent or higher in fields closely related to international affairs.

If computers are to do the bulk of the work, the center will require advanced, sophisticated computer software to scan documents for relevant texts, at least one highly-skilled individual to operate (and perhaps improve the software), and three or four FTE's to assemble the documents. Procuring the scanning software and hardware entails a significant but not overwhelming expense.

Many feel uneasy about relying solely on computers to identify and pick out the information that is important or relevant for early warning. This is a valid concern that should be addressed by developing and using procedures to ensure that individuals with appropriate expertise make key decisions about what is relevant and what is not. In practice this can be done by having a

small group of individuals establish and refine the parameters by which certain pieces of incoming information are included by the computer system while others are discarded. To do this the individuals must periodically "sample" the information that goes into the database and compare it with the incoming information to make sure that the computer system properly discriminates between pertinent and less essential information. On the other hand, the computer system will over time accumulate data about what information is better suited for conflict early warning, and that "knowledge" needs to be communicated back to the human users to help them refine their own assessments of what incoming information should be used. The best conflict alert systems will employ this kind of back and forth interaction.

If conflict alert systems do become operational and function as designed, one second-order consequence of that deserves mention. If people believe that CAS's work, one should expect that individuals, organizations, and countries would endeavor to more thoroughly disguise their intentions and actions in order to "beat" the CAS. This likelihood makes it imperative that the CAS be endowed with learning mechanisms so that it becomes more adept in recognizing patterns that signal intent and thus potential conflict.

CONCLUSION

Early warning is only one part of conflict prevention. In turn, conflict prevention is just one component of the even higher-level issues of collective security and international peacemaking.

Conflict alert systems are like any technology. They can be either good or bad depending upon on how they are used and one's perspective on that use. Let us make certain that early warning systems are used to help prevent violent conflict, but let us also make sure that they are not used to stifle political change. Much work needs to be done in order for us to have operational early warning systems for conflict prevention. Even more must be done to ensure that we have multilateral security organizations that can effectively yet never improperly use those systems.

NOTES

1. See, for example, the edited volume by Kumar Rupesinghe and Michiko Kuroda, Early Warning and Conflict Resolution, (New York: St. Martin's Press, 1992); S. J. Andriole and R. A. Young, "Toward the Development of an Integrated Crisis Warning System," *International Studies Quarterly*, Vol. 21, No. 1, (1977), pp. 107-150; Boutros Boutros-Ghali, *An Agenda for Peace: Preventive Diplomacy, Peacemaking, and Peace-keeping*, (New York: United Nations, 1992); the *Journal of Ethno-Development*, Volume 4, Number 1, (July 1994) issue; Edward J. Laurance, "Events Data and Policy Analysis: Improving the potential for applying academic research to foreign and defense policy problems," *Policy Sciences*, Vol. 23, (1990), pp. 111-132; and R. C. Snyder, C. F. Hermann, and H. D. Lasswell, "A Global Monitoring System: Appraising the Effects of Government on Human Dignity," *International Studies Quarterly*, Vol. 20, Number 2, (1976), pp. 221-260.

2. Boutros-Ghali, *An Agenda for Peace*.

3. Walter Hoffman and Scott Hoffman, eds., *A New World Order: Can It Bring Security to the World's People? Essays on Restructuring the United Nations*, (Washington, DC: World Federalist Association, 1991).

4. Three months is probably the minimum advance notice that would give efforts at conflict prevention a sufficient chance to avert a conflict or would give adequate time to

thoroughly plan a humanitarian relief operation. At the other end, twelve months is both a likely upper limit to our ability to get high probability early warnings and, more importantly, as far in advance as decision makers are going to be willing to devote much attention.

5. See Doug Bond, Brad Bennett, William Vogele, and others, "Interaction Events Data Development Using Automated Human Coding," (unpublished paper presented at the International Studies Association meeting in Washington, DC in April 1994) as well as Deborah J. Gerner, Philip A. Schrodt, Ronald A. Francisco, and Judith L. Weddle, "Machine Coding of Event Data Using Regional and International Sources," *International Studies Quarterly*, Vol. 38, No. 1, (1994), pp. 91-119.

6. See Barbara Harff, "A Theoretical Model of Genocides and Politicides," *Journal of Ethno-Development*, Vol. 4, No. 1, (1994), pp. 25-30; and Philip A. Schrodt, "Pattern Recognition of International Event Sequences: A Machine Learning Approach," in Valerie M. Hudson, ed., *Artificial Intelligence and International Politics*, (Boulder, CO: Westview Press, 1991), pp. 169-193.

7. King, Gary, Robert O. Keohane, and Sidney Verba, *Designing Social Inquiry: Scientific Inference in Qualitative Research*, (Princeton, NJ: Princeton University Press,1994).

8. See, for example, John Vasquez, "Capability, Types of War, Peace." *Western Political Quarterly*, Vol. 38, (June 1986), pp. 313-327; or Meredith Reid Sarkees, "The Correlates of War Project: Expanded Typology," Handout prepared for the Annual Meeting of the Peace Science Society (International) in Columbus, Ohio on October 13-15, 1995.

9. Reference to work by author deleted for review process.

10. James B. Rule, *Theories of Civil Violence*, (Berkeley, CA: University of California Press, 1988).

11. For summaries and analyses of different theoretical schools, see Rule, *Theories of Civil Violence;* and Alex P. Schmid and Albert J. Jongman, et. al., *Political Terrorism: A new guide to actors, authors, concepts, data bases, theories, and literature*, (Amsterdam: North-Holland Publishing Company, 1988).

12.This has been taken to the extent of a list containing approximately 700 indicators by R. N. Dolnykova, Metodologiia i metodika prognozirovaniia vneshnei politiki nesotsialisticheskikh gosudarstv : opyt sistemnoi organizatsii poniatii (Methodology for Forecasting the Foreign Policy of Nonsocialist States: the systematic classification of terms), Moskva: Izd-vo "Nauka" (Moscow: Nauka), Akademiia nauk USSR (USSR Academy of Sciences, Institute of Oriental Studies), 1986. (Text in Russian, Summary in English.)

13. Reference to work by author deleted for review process.

14. See Ted Robert Gurr and Barbara Harff, "Conceptual Research, and Policy Issues in Early Warning Research: An Overview," *The Journal of Ethno-Development*, Vol. 4, No. 1 (July 1994), pp. 3-14.

15. Reference to work by author deleted for review process.

16. James Sutterlin, "A Multilateral Nuclear Alert Centre: Objectives, Utility and

Structure." Paper prepared for the Seminar on Multilateral Confidence-Building and the Prevention of War, Kiev, September 4-7, 1989.

17. **War Risk Reduction Centers** (WRRCs) have as their mission monitoring events and trends that may point to the outbreak of war between countries. A Multilateral WRRC would support the UN Secretary-General and Security Council. The regional WRRCs would support regional security arrangements such as the Organization for Security and Cooperation in Europe (OSCE).

Conflict Prevention Centers (CPCs) have a broader mandate than WRRCs in that their task is to monitor and thereby help prevent all violent conflicts. The major distinction is that conflicts *within as well as between* countries fall under the purview of CPCs. CPCs have also been discussed in terms of both global and regional variants.

A third kind of center merits mention for it in many ways overlaps with CPCs.

Refugee Alert Centers (RACs) monitor situations where displacement of populations may occur in the hope of being able to alert those who may be able to prevent the flow, or if it occurs, to help the international community be better prepared to cope with the flow. Because many refugee movements occur as a result of conflict, the similarities with CPCs are strong. The major differences are that RACs must watch for non-conflictual sources of population displacement and that they are not directly involved in attempting to prevent refugee movements. They are almost solely early warning organizations. RACs may appear within larger humanitarian relief organizations.

18. See, for example, Haken Wiberg, "The Conflict Prevention Centre in Vienna--Mandate and Functions." Paper prepared for the Symposium on Multilateral Centres to Reduce the Risk of Conflict, Copenhagen Centre for Peace and Conflict Research, 12 October 1991; and Heinz Vetschera, “Cooperative Security in the OSCE Framework--Confidence-Building Measures, Emergency Mechanisms and Conflict Prevention,” Organisation for Security and Cooperation in Europe, Vienna, unpublished manuscript, October 1995.

19. Tapio Kanninen, "New Prospects at the United Nations to Utilize Research and Technology Related to Data on International Relations." Paper prepared for the Conference on New Technologies for the Codification, Storage, Retrieval and Analysis of International Events Data, Center for International Studies, MIT, Cambridge, Massachusetts, 13-15 November 1987.

20. See Stephen John Stedman, "Alchemy for a New World Order: Overselling 'Preventive Diplomacy'," *Foreign Affairs*, Vol. 74, No. 3 (May/June 1995), pp. 14-20.

21. See, for example, Paul Diehl, *International Peacekeeping*, (Baltimore: The Johns Hopkins University Press, 1993); and Mark Zacher, *International Conflicts and Collective Security, 1946-77*, (New York: Praeger Publishers, 1979).

22. John Rawls, *A Theory of Justice*, (Cambridge, Massachusetts: Belknap Press of Harvard University Press,1971).