STOPPING THE UNTHINKABLE:
C³I Dimensions of Terminating a "Limited" Nuclear War

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EXECUTIVE SUMMARY

In the 1980s world of relative nuclear parity and limited nuclear options it seems prudent to devote more attention not only to how to fight a nuclear war, but how to end the war at the lowest level of damage.

Command, control, communications and intelligence (C^3I) planning is fundamental to both warfighting and war-terminating.

C^3I projects are subject to the usual problems of budgetary limitations and bureaucratic resistance, but C^3I warfighting projects are more likely to be funded than those designed exclusively for war-termination.

C^3I projects also encounter a special consideration: the civilian/military complexity of existing C^3I systems. Military C^3I planning is complicated by the requirement to include civilian governmental and private sector representation in the decision process. In addition, the increasingly competitive environment in the U.S. telecommunications industry is not necessarily consistent with military requirements for security and survival of C^3I systems.

Requirements for warfighting and war-terminating C^3I overlap, particularly at the systemic level; this suggests that planners examine funded C^3I warfighting projects, such as the Reagan Administration's "strategic modernization package," from a war-terminating perspective as well.

A checklist of special considerations in war-termination that are unique to the C^3I arena would include the following:

1. Planning for war-termination must be accomplished prior to hostilities; after the war starts neither the time nor the infrastructure is available.

2. Upgrading the U.S.-Soviet "Hot Line" to provide a war-terminating capability would constitute a first step toward pre-hostilities planning; the inherently ambiguous capability that makes war-terminating C^3I suitable for warfighting missions may inhibit more ambitious arms control planning for war-termination.

3. A key consideration is the concept of C^3I "functional survival"; it appears easier to ensure survival of the C^3I function than to ensure survival of particular people or facilities.

4. "Command" for war-termination requires rapid, constitutional succession of national leadership; the successor must be recognized, connected to necessary C^3I assets, and in sufficient time to exercise control of warfighting and then war-termination.

5. "Control" for war-termination requires that the successor national leadership have the C^3I assets to quickly execute or halt U.S. and allied force options, particularly those involving strategic nuclear forces.

6. "Communications" for war-termination requires that the successor national leadership be linked to U.S. and allied forces, and to successor or reconstituted Soviet leadership.

7. "Intelligence" for war-termination requires a sustained monitoring capability to police war-termination negotiations in an international environment fraught with uncertainty.

Solutions to the complex C^3I problems of war-termination are not obvious; further study and staffing among national planners may suggest solutions to some of the problems, especially those that are primarily technological. For example, the problems of C^3I survivability, C^3I system design, and procedures for operational control and testing of C^3I assets are all attractive candidates for additional research on war-termination.

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I. A Checklist for C^3I Considerations in Terminating a Limited Nuclear War and Suggested Areas for Additional Study

A major trend characterizing U.S. discussions of strategic issues during the past decade was an increased willingness among strategic thinkers to consider "limited" nuclear war scenarios, doctrine and contingencies. The concept of "limited" nuclear war implies that it is possible to fight a war using nuclear weapons, limit destruction in some meaningful sense, and terminate the war without automatic escalation to "unlimited" nuclear exchange. How difficult it would be to terminate a "limited" nuclear war, and how termination might be accomplished, are questions that deserve more attention; attempts to provide answers must address the command, control, communications and intelligence (C^3I) considerations. The following paragraphs identify major C^3I considerations that would have to be addressed in order to develop the national capability to terminate a limited nuclear war. Together they constitute a checklist for further study and research on C^3I aspects of war-termination.

A. The Usual Considerations: Budgetary Limitations and Bureaucratic Resistance

Among the obstacles to achieving a war-terminating capability are the usual problems of fiscal constraints and bureaucratic inertia. All national security projects must, of course, compete for their share of the economic pie. In addition, there is inherent resistance to fund C^3I projects because it is often hard to quantify benefits and because of the relatively low visibility of C^3I systems compared to that of weapons. Generating and maintaining interest in a C^3I project on war-termination would also be difficult because of bureaucratic resistance to C^3I projects. Institutional structures for resolving unavoidable extra-governmental problems are limited, making unlikely the extensive civilian and private sector participation necessary for successful resolution of those problems.

B. A Special Consideration: Civilian/Military Complexity of C^3I

Another set of considerations, while not unique, is somewhat atypical of other national security areas. The dependence of military C^3I capabilities on civilian communications injects great complexity into any discussion of a C^3I war-terminating capability. In the U.S. both civilian government agencies and the private sector must be deeply involved in planning and implementation

of such a capability. Outside the U.S. such consultation has traditionally included civilian agencies; recently the importance of the private sector has increased.

The civilian/military complexity in the C^3I decision process further complicates the problems of funding and bureaucratic resistance mentioned earlier. Aside from the obvious increase in complexity from a funding and bureaucratic standpoint, there is an additional implication: corporate competition for profits and the development of a C^3I war-terminating capability may prove incompatible. The monopolistic structure of the U.S. telecommunications industry has been replaced by an increasingly competitive environment in which the questions of who coordinates and of who pays and how much, are not easily resolved.

C. Technical Considerations Unique to the C^3I Arena

There are a number of special considerations in war-termination that are unique to the C^3I arena. Some are primarily technological considerations, such as the existence of the U.S.-Soviet "Hot Line," an operational C^3I system, potentially adaptable to war-terminating missions. Another consideration is the concept of functional survivability; from a technological standpoint it appears easier to achieve C^3I functional survival, than to ensure survival of particular people or facilities.

Other considerations, such as the requirements for the individual C^3I elements of command, control, communications and intelligence, involve technological issues intertwined with problems of international politics. Key problems of command, for example, include how to ensure survival of the President or constitutional successors, and how to do so rapidly enough to permit termination of the war prior to unlimited nuclear exchange. The control dimension of C^3I adds the complex requirements of survivable control facilities capable of halting or executing U.S. and allied military options, particularly those involving strategic nuclear assets. Communications planners face similar problems of ensuring survival of a communications system capable of linking the U.S. national leadership with U.S. forces, allied forces, and post-hostilities Soviet leadership. Intelligence problems for war-termination include considerations of survivability and sustained monitoring of operations in an environment characterized by uncertainty about the existing situation and about intentions of allied and Soviet leaders.

In attempting to develop a war-terminating C^3I capability it may be useful to concentrate first on addressing the technical considerations. Addressing the technical issues first suggests an incremental approach that builds on existing C^3I systems, such as the U.S.-Soviet "Hot Line," possibly avoiding some of the bureaucratic and political obstacles. In addition, more attention to the technical problems may produce technical answers that facilitate solution of the bureaucratic and political problems.

1. Warfighting v. War-terminating C^3I Considerations

A major consideration in attempting to achieve a C^3I war-terminating capability is the existence of C^3I warfighting systems, in place and potentially useful for war-termination. A comparison of C^3I requirements for warfighting and war-termination reveals that there is considerable overlap at the systemic level, but important differences as the individual C^3I components are analyzed. Successful execution of the command and control functions in a war-terminating scenario, for example, appears to require a less comprehensive structure than that required for warfighting. The communications element of a C^3I war-terminating capability, however, must provide not only the communications with U.S. and allied forces necessary for warfighting, but also meet new requirements for communications and negotiations with a surviving or reconstituted post-hostilities Soviet government. For war-terminating the emphasis for the intelligence component of C^3I is on verification that belligerents have actually terminated conflict and are continuing to honor that decision; for warfighting the urgency is for targeting information. Despite these differences, it is not obvious that a C^3I system for war-terminating would be configured differently from one designed for warfighting; it is more a question of accommodating both missions in the overall system.

Both the similarities and differences of warfighting C^3I and war-terminating C^3I have implications for planning. The similarity of warfighting and war-terminating systems provides an opportunity to examine funded warfighting C^3I projects from a war-terminating perspective as well. Another implication is that the overlapping nature of warfighting and war-terminating requirements gives any C^3I system an inherently ambiguous capability that makes arms control and other pre-hostilities planning for war-termination more difficult. The challenge for planners is to resolve or decrease that ambiguity through system design, procedures for tasking and operational control, or other

methods. The differences in warfighting and war-terminationg missions for individual C^3I components emphasize the importance of pre-hostilities planning for war-termination. The most complex C^3I problems unique to war-termination, such as how to communicate and negotiate with the Soviets and how to monitor war-termination activities, must be made prior to hostilities; after the war began it would probably be too late.

(a) The Reagan Administration's Strategic Modernization Package:
     An Opportunity to Improve Both Warfighting and War-terminating C^3I

An important implication of overlapping C^3I requirements in warfighting and war-termination is that C^3I projects should be evaluated from both perspectives to improve system implementation. For example, the 18 billion dollar budget proposal by the Reagan Administration for C^3I improvements provides an excellent opportunity to simultaneously upgrade warfighting and war-terminating capabilities. War-termination, after all, is really the final stage of warfighting.

(b) The Difficulty in Using the Arms Control Process to Achieve A C^3I
     War-terminating Capability

Another implication of the overlapping nature of warfighting and war-terminating C^3I is that it makes arms control planning for war-termination more difficult. The arms control process theoretically offers one potential avenue for developing a C^3I war-terminating capability. Analysis suggests, however, that the inherently ambiguous capabilities of C^3I systems seem to deprive the C^3I arena of the stability and verification requirements essential for arms control planning. Neither the Soviet Union nor the U.S. is likely to countenance a C^3I system in the other country, ostensibly designed for war-termination, but readily adaptable to warfighting missions.

(c) Resolving the Ambiguity Between Warfighting and War-terminating C^3I

Further analysis may suggest ways to establish an unambiguous war-terminating C^3I capability. Location of war-terminating assets in probable neutral areas may help to avoid the appearance of having increased potential warfighting assets. Even locating war-terminating C^3I assets in predesigned areas within the national boundaries would simplify verification requirements. Additional research might address technical methods for filtering electronic

emanations to permit specially coded war-terminating signals to pass unimpeded between belligerents. Another potential area for further study is that of procedures to limit operational conrol and tasking of certain C^3I assets to war-terminating missions.

2. A Key Technical Consideration: The U.S.-Soviet "Hot Line"

A special consideration in attempting to develop a C^3I war-terminating capability is the existence of the U.S. Soviet "Hot Line." The "Hot Line" is a particularly good example of a system that is currently operational and is potentially adaptable to war-termination missions. At very low levels of nuclear conflict even the existing "Hot Line" may offer a fortuitous war-terminating capability. At higher levels of intensity, however, the "Hot Line" as presently configured would almost certainly not be sufficient for war-termination purposes.

Efforts to upgrade the "Hot Line" to encompass a planned war-terminating capability may constitute an attractive area for additional study. In-depth analysis of the current "Hot Line" from a war-terminating perspective may indicate that it is not adequate for war-termination at even the lowest levels of hostilities. Additional research may also indicate feasible steps for upgrading the "Hot Line" in ways attractive to both the Soviets and the U.S. The successful history of the "Hot Line" and the fact that it is currently operational suggest that this may be a useful and productive first effort toward achieving a war-terminating capability. As an incremental approach, efforts to upgrade the "Hot Line" may avoid some of the most difficult technical, bureaucratic and political obstacles inherent to a more ambitious approach.

The potential contribution to war-termination of the existing "Hot Line" or an upgraded version depends in part on the intensity of the conflict to be terminated. This emphasizes another consideration in attempting to achieve a C^3I war-terminating capability: the C^3I requirements for war-termination are highly sensitive to the type of nuclear war envisioned. If the nuclear war is not "limited" in any meaningful sense, consideration of war-termination may be largely pointless. Even the concept of a "limited" nuclear war presents the possibility of a large number of alternative scenarios. Identifying the type of post-hostilities environment and the C^3I requirements posed by that environment are clearly important considerations in war-termination.

3. The Concept of "Functional Survivability" of C^3I

Examination of the separate C^3I components reveals important differences in C^3I requirements for warfighting and war-termination. Analysis of the individual components indicates the considerable difficulty in achieving post-hostilities C^3I system survival while continuing to meet the specialized requirements of command, control, communications and intelligence necessary for war-termination.

A key consideration in planning for post-hostilities survival of a C^3I war-termination system is that of "functional survivability." It appears easier to achieve functional survivability or "endurance" of the C^3I function, than to ensure the survival of particular commanders, or of specific control, communications, or intelligence facilities. It may, for example, be possible to ensure that the President survives even a limited nuclear attack; it should not be as difficult to ensure that a constitutionally designated successor survives. Using proliferation, redundancy, and reconstitution of command and control facilities, communications systems, and intelligence systems appears more feasible than attempting to focus exclusively on "hardening," i.e. on protection of a specific facility.

4. Considerations for the Command Element of C^3I

The most important consideration in fulfilling the requirements for war-termination by the "command" element of C^3I is rapid, constitutionally authorized succession of national leadership. Although obviously desirable, it is not essential that any particular person, including the President, survive the initial outbreak of hostilities. It is essential, however, that an appropriate constitutionally authorized national leadership exercise command of the nuclear war, and early enough to keep alive the option of terminating the war.

The importance to the control function of rapid constitutional succession of national leadership suggests several areas for additional analysis. Further study might examine the current path of constitutional succession to determine whether it would satisfy the demanding requirements posed by nuclear conflict. Analysis might address first, whether there is a sufficient number of persons designated as potential successors, and second, whether some of those designated as successors would be reasonably expected to be located in a relatively "safe" area at any given time. Additional study might also

examine the problem of how to efficiently communicate a post-hostilities change in the national leadership to military commanders, civilian authorities, and allied and hostile leaders. Another consideration to be addressed is swift, secure transportation of national leaders to surviving command and control facilities. In resolving these issues, planners face the unpleasant prospect that a post-hostilities national leadership interested in terminating the war would have to race against the escalation clock.

5. <u>Considerations for the Control Element of C^3I</u>

The major consideration in achieving the "control" essential for a C^3I war-terminating capability is responsiveness, the ability to execute or halt nuclear options very quickly. The responsiveness necessary for war-termination has implications for both the survivability of command and control centers and the design of weapon systems, and also raises difficult questions about post-hostilities control of allied nuclear options.

As with the command function, it is probably not essential that any particular control facility survive the outbreak of hostilities. The importance of ensuring functional survivability of the control element of C^3I, however, suggests that additional study address that issue. Neither proliferation nor hardening of command and control centers is likely to completely solve the problem; the Soviets would merely increase the number or the accuracy of the warheads targeted on those facilities. The most promising approach appears to be using mobile control facilities such as the specially equipped planes that constitute the National Emergency Airborne Command Post. Although such facilities seem most survivable, they encounter other problems of how to conduct sustained operations without replenishing fuel supplies, and how to effectively link on-board U.S. leaders with U.S. and allied forces and with the post-hostilities Soviet leadership.

Further analysis might also examine methods for making strategic weapon systems more responsive to post-hostilities and even post-launch control. For both war-terminating and warfighting, increased control of nuclear weapons offers the President or successor leadership greater flexibility, particularly in a post-hostilities environment characterized by time-sensitive requirements and considerable uncertainty. Research may suggest ways to modify the design or operations of both the control systems and the weapons themselves to increase responsiveness.

Allied participation in nuclear hostilities would greatly increase the complexity of war-termination efforts. Additional study might analyze allied interest and capability to develop war-terminating C^3I systems, with particular attention to post-hostilities control by a central allied leadership.

6.   Considerations for the Communications Element of C^3I

Efforts to achieve a war-terminating capability must address key considerations involving the "communications" element of C^3I; some are primarily technological, while others depend on the post-hostilities international political environment. The technological considerations involve functional survival of the ability to communicate with U.S. strategic forces, and pose problems of survivability similar to those for the command and control functions. In the case of communications proliferation, hardening, redundancy, and reconstitution seem to offer somewhat better prospects for functional endurance, and are attractive candidates for further analysis.

Attempts to communicate with post-hostilities allied governments to control allied nuclear forces may encounter technological obstacles in linking U.S. C^3I systems to foreign systems with different technical characteristics. Study by U.S. and allied planners prior to hostilities may identify and solve many of these technical problems. Allied cooperation could also be invaluable in resolving potential problems of civilian-military ownership and operation of communications circuits.

A major consideration for communications planners is the probable international political environment in a nuclear conflict. Potential problems with U.S. allies are probably best addressed through pre-hostilities planning and coordination. Of the many problems in war-terminating communications, however, easily the most challenging is how to recognize and negotiate with a post-hostilities Soviet national authority.

The uncertainty surrounding Soviet post-hostilities national leadership and the hostile relationship between the U.S. and the Soviet Union severely constrain pre-hostilities war-termination planning between the two countries. It might be useful, however, for U.S. planners to analyze Soviet interest and capability to develop a war-terminating capability. As suggested earlier, the U.S.-Soviet "Hot Line" could be used as the centerpiece for exploratory discussions with the Soviets.

7. Considerations for the Intelligence Element in C^3I

In any war-terminating scenario, the "intelligence" component of the U.S. C^3I capability has the vital mission of verifying that Soviet actions (and, to the extent possible, Soviet intentions) confirm that the Soviets are in fact terminating hostile activity. A key consideration in intelligence planning is that intelligence systems, similar to C^3I systems in general, have inherently ambiguous capabilities. The best intelligence from a war-terminating perspective would also be excellent for warfighting purposes. As with the overall C^3I system, further study might explore ways of reducing ambiguity through design, location, and control of the intelligence assets.

The functional survivability of the intelligence element in C^3I encounters many of the same considerations as the command, control, and communications elements. Proliferation, hardening, redundancy, and reconstitution of intelligence systems are all attractive areas for additional analysis. The concepts of proliferation and redundancy assume special importance in the intelligence field because of the opportunity to use totally different methods or sources to gain the same intelligence. Further study may suggest ways to supplement highly sophisticated technical sensors that may not survive hostilities, with less sophisticated but potentially more survivable intelligence collectors. As always, confirmation of intelligence reports by several sources is desirable, particularly in a post-hostilities environment almost certainly characterized by fluidity and uncertainty.

8. The Necessity of Pre-hostilities Planning for War-termination

Perhaps the most important consideration in attempting to achieve a war-terminating C^3I capability is that efforts to resolve C^3I problems must be made prior to hostilities. After the war has started neither the time, the infrastructure, the people, nor the experience will be available to confront the very complex problems. Analysis and planning prior to the outbreak of hostilities may offer solutions to many of the problems, and a reasonable chance to terminate the war at a relatively low level of damage.

Allied and Soviet cooperation in pre-hostilities war-termination planning would be invaluable. The Soviets may prove unwilling to consider the concept of war-termination, however, and other problems in bilateral or multilateral planning for war-termination may inhibit cooperation. Even unilateral planning by the U.S. may provide valuable insight into how the U.S. might, for example,

use C^3I systems to effectively negotiate surrender by the Soviets in a "limited" nuclear war.

D.   Summary of Supporting Analysis

The purpose of this analysis is not to resolve the problems posed by trying to terminate a nuclear war. Rather, the analysis suggests what some of those problems are, especially in the C^3I arena, the complexity of those problems, and the difficulty in finding solutions. Throughout the discussion C^3I is analyzed both from a systemic level and from the perspective of the individual components of command, control, communications, and intelligence.

This first section summarized major considerations for national planners attempting to achieve a C^3I war-terminating capability; the remainder of the analysis discusses those considerations in greater detail. Section II confines the analysis to a "limited" nuclear war scenario, and examines similarities and differences in C^3I requirements for warfighting and war-termination. Section III addresses C^3I planning for war-termination, and focuses on two separate planning requirements: achieving survivable C^3I, and terminating a "limited" nuclear war. Section IV discusses potential problems in actually terminating the war. Section V briefly explores the possibility of using the arms control process to ensure the survival of a U.S.-Soviet war-termination capability.

In the 1980s world of relative nuclear parity and limited nuclear options, it seems prudent to devote more attention not only to where the war will start, and how it will be conducted, but also to how it can be terminated at the lowest level of damage. The obstacles to achieving a war-terminating C^3I capability are clearly formidable; they are not, however, necessarily insurmountable. However difficult the problems, the importance of being able to terminate a nuclear war at the lowest levels of damage possible argues forcefully for making an attempt to achieve that capability.

II. The Close Relationship Between C^3I Requirements for
    War-termination and the Post-hostilities Environment

A. Similarities and Differences Between Warfighting C^3I and War-terminating C^3I
    Requirements

Although the concept of a survivable war-terminating C^3I capability has
been considered by some writers,[1] most discussions of survivable C^3I envision
a warfighting capability. The following chart summarizes broad similarities
and differences between the two concepts.

CHART I

COMPARISON OF C^3I REQUIREMENTS FOR
WARFIGHTING AND WAR-TERMINATING

U.S. Warfighting C^3I	U.S. War-terminating C^3I
Command by surviving or reconstituted national authority or leadership	**Command** by surviving or reconstituted national authority or leadership
Control of means of destruction (strategic forces and TNF)	**Control** of means of destruction (strategic forces and TNF) and of diplomatic apparatus
Communication with U.S. and Allied military forces	**Communication** with U.S. and Allied military forces with surviving or reconstituted Soviet National authority or leadership
Intelligence targeting information (intelligence activity would also provide damage assessment of hostile and friendly areas)	**Intelligence** monitoring activity; confirmation that Soviets can/are terminating conflict (monitoring activity would also provide damage assessment of hostile and friendly areas, and retargeting information as necessary)

Chart I visually suggests that there is considerable overlap between C^3I requirements or missions for warfighting and war-terminating. The impression of overlapping functions is correct; particularly at the systemic level it is difficult to distinguish between warfighting and war-terminating C^3I. It is not obvious, for example, that a C^3I system for war-terminating would be configured differently from one designed for warfighting. As the C^3I system is disaggregated, however, and the individual components of command, control, communications and intelligence are examined, it is possible to identify differences. Both the similarities and the differences beteen warfighting and war-terminating C^3I have important implications for this analysis.

1. Command and Control Requirements

Chart I indicates that for both warfighting and war-terminating, successful execution of the functions of command and control requires a surviving national authority or leadership, or a subsequently reconstituted leadership. In addition, the leadership must have the capability and the will to control the means of destruction.

In this analysis "means of destruction" is limited in the case of war-termination to strategic nuclear forces and theater nuclear forces (TNF); tactical nuclear forces are specifically excluded. After more than three decades without nuclear war, the use of any nuclear weapons, including tactical weapons, would constitute the crossing of a major threshold. It is therefore conceivable that the initial use of tactical nuclear weapons might trigger strategic nuclear exchange. In a war-terminating scenario, however, the threshold has already been crossed. Defining the "means of destruction" to exclude tactical nuclear weapons is based on the assumption that war-termination will not initially or primarily require control of conventional forces or of tactical nuclear forces. Provided strategic and TNF forces are controlled by the national authority, conventional and tactical nuclear strikes on relatively localized battlefields may assume less importance. In a "limited" nuclear war involving strategic nuclear forces, or TNF, the relative importance of a tactical nuclear strike is diminished. The chief task in nuclear war-termination is to stop strategic and TNF exchange; other hostilities, while destructive, can await satisfactory completion of the first task. Stated differently, the assumption is that the minimum C^3I capability necessary for nuclear war-termination is that sufficient to halt strategic and theater nuclear exchange;

with luck the rest will somehow follow. An important exception is attack, including conventional attack, against "unused" strategic nuclear weapons. Implicit in the decision by either side to halt strategic nuclear strikes is confidence in the security of that country's surviving strategic nuclear assets.

For warfighting purposes, "means of destruction" requires a broader definition. Although the probable decentralization of conventional and tactical nuclear warfare would make command and control difficult, there is advantage in warfighting in control of the entire spectrum of military forces. Thus command and control for warfighting seems to require a more comprehensive structure than for war-termination. Command and control of strategic nuclear forces and TNF is, however, a most important part of the C^3I warfighting mission.

Control in a war-terminating scenario may involve more than the "means of destruction." To successfully terminate hostilities, the surviving national authority may want to use diplomatic personnel to communicate and negotiate with the national authority in the Soviet Union. Depending on the level of destruction and the confusion surrounding events, national leaders may want to preempt diplomatic channels and communicate directly with their Soviet counterparts. Control of diplomatic assets and possible means of employing those assets are certainly considerations worth examining in pre-hostilies planning for war-termination.

The national diplomatic apparatus may offer at least two advantages in war-terminating efforts. First, diplomatic channels permit negotiations to proceed on different levels with varying degrees of formality and secrecy. Second, diplomatic personnel located in allied or Soviet territory may provide useful background information in the period immediately prior to hostilities. If these personnel survive the outbreak of hostilities and are still able to communicate with U.S. leaders, a distinct possibility in a limited nuclear war scenario, they may provide post-hostilities information essential for war-termination, including assessments of successor Soviet (or allied)leaders.

2. Communications Requirements

Analysis of the communications element of C^3I reveals key differences between warfighting and war-terminating requirements. As the chart suggests, there is a major added communications requirement for war-termination: communication (probably negotiations) with the Soviet Union. That requirement

is particularly problematic because it implies communication with a surviving or reconstituted Soviet leadership with the means and the will to terminate conflict. The configuration of the U.S. government in a post-nuclear environment is uncertain; that of the Soviets is largely unknown.

Both war-fighting and war-terminating require communication with U.S. and allied military forces. Warfighting, however, demands a more comprehensive communications structure, capable of linking diverse military elements and directing the prosecution of war. In a warfighting scenario the prospects are for continued and possibly protracted hostilities, an extended area of operations and a continuum of force options. Endurance of equipment and operators, intensity of traffic levels, and security of communications are important considerations in addition to survivability. In contrast, for war-termination, prospects are for an imminent end to hostilities. Provided the war is successfully terminated, neither endurance of equipment nor of operators is essential; in addition, volume of communications is likely to be less than for warfighting. Finally, it is worth noting that a war-terminating communications capability could be held in reserve until an appropriate time; both operators and equipment would be fresh (but presumably tested) in such a scenario.

3. Intelligence Requirements

Analysis of the intelligence element of C^3I indicates a difference in emphasis in the intelligence requirements for warfighting and war-termination. As the chart suggests, warfighting intelligence would consist primarily of targeting information. In a war-termination scenario, the emphasis on intelligence would be on verification; confirmation that both sides have actually terminated conflict and are continuing to honor that decision.

As with communications, the warfighting intelligence capability must be enduring and comprehensive, as well as survivable; for war-termination the emphasis is on functional survivability. As with communications, there is the theoretical possibility of holding certain intelligence assets in reserve, and activating them at an appropriate time.

B. Increased Consideration of "Limited" Nuclear War by U.S. Planners

The concept of nuclear war termination used in this discussion envisions a "limited" nuclear war. Assuming for the moment that it is possible for a nuclear war to be "limited," the purpose of a war-terminating C^3I capability

would be to stop the war before it escalated to a massive strategic nuclear exchange.

The concept of limited nuclear war is not new; strategic planners have consistently sought ways to increase the President's options in a crisis situation:

> "No American President has wanted to find himself, should deterrence fail, confronted with the choice between unleashing a nuclear holocaust on the Soviet Union or doing nothing. All have sought flexibility. As the Soviet Union came to match, or even exceed, the United States in some categories of nuclear weapons, the interest in a wide range of retaliatory options became more insistent. Technology provided more warheads for more options, plus more accuracy for selective strikes and the possibility of rapid re-targeting. In 1974, Secretary of Defense James Schlesinger announced a doctrine of limited nuclear options embodied in National Security Decision Memorandum (NSDM) 242.[2]

More recently, several Presidential Directives (PD) issued by the Carter Administration reopened public debate on the concept of limited nuclear options, and explicitly recognized the importance of C^3I to "limited" nuclear war scenarios. PD 53 addressed the issues of communications survivability and interconnection of civilian, governmental, and military communications facilities, PD 58 focused on the survivability of political leadership and continuity of government, and PD 59 directly addressed the concept of "limited" nuclear conflict.[3] Debate continues in and out of government on the desirability of limited nuclear options, and the feasibility of keeping a nuclear war limited.

In the process of explaining PD 59, then Secretary of Defense Harold Brown stated that defense planners had, "not ignored the problem of ending the war."[4] Such planning considerations appear to be quite sensitive to the type of "limited" nuclear war envisioned. One question to address in examining alternative scenarios is whether the existing "Hot Line" between the U.S. and the Soviet Union would be sufficient for war-termination purposes.

C.   The Dependence of War-termination on Nuclear War Scenarios

This analysis includes neither a detailed description of alternative nuclear war scenarios nor an assessment of which, if any, is most likely. It is essential, however, to describe the kind of nuclear war for which a theoretical war-terminating capability might be envisioned.

Nuclear war scenarios can be described in terms of a continuum representing increasingly intense nuclear conflict. For the purposes of this analysis, scenarios in the middle portion of the spectrum are relevant. At the lowest end of the continuum might be an isolated, unauthorized nuclear strike, by the Soviet Union or the U.S., against the other's territory, using a single delivery vehicle. Even if it is assumed that such an "accidental" nuclear strike would trigger a state of hostilities between the superpowers, the existing "Hot Line" might be sufficient to prevent escalation and to terminate the war.

The existing "Hot Line" capability is important for several reasons. First, the "Hot Line" represents an early, successful attempt to recognize and improve "communications" with the Soviets in order to prevent the outbreak of war. Second, in a very low-level nuclear conflict the "Hot Line" may be sufficient to terminate hostilities. A more extensive C^3I capability is not likely to improve the prospects for terminating a low-level nuclear war if efforts using the "Hot Line" have failed. Third, the U.S.-Soviet agreements establishing and upgrading the "Hot Line" provide a model for a pre-hostilities agreement to establish a post-hostilities C^3I war-terminating capability. The development of the "Hot Line" emphasizes that preparations for successful war-termination must be made before hostilities.[5]

This analysis is confined to "limited" nuclear war scenarios in the middle portion of the nuclear conflict spectrum. Although any attempt to "type" nuclear wars is somewhat artificial, this analysis makes several assumptions about mid-level nuclear conflicts. The first assumption is that the major command and control centers of Washington and Moscow would have been hit by nuclear strikes, or that imminent strikes had forced the relocation of the national leadership. Second, it is assumed that the nuclear strikes would have been preceded or accompanied by attacks degrading or neutralizing major C^3I systems, particularly space-based C^3I systems. "Attacks" might include such actions as electronic counter-measures, physical destruction of platforms, and sabotage of ground stations. A third assumption is that the "Hot Line" capability would be insufficient to terminate hostilities. In the situation described here, the communications links for the "Hot Line" would probably have been degraded or destroyed. In addition, damage to major supporting intelligence systems might render them unable to provide a credible monitoring capability. Even if the "Hot Line" survived intact, it would

probably be insufficient to terminate a mid-intensity nuclear conflict. As
Thomas Schelling noted:

> The hotline is not a great idea, just a good one...In an
> engineering sense, starting a major war is about the most
> demanding enterprise that a planner can face. In broader
> strategic terms, terminating a major war could be incom-
> parably more challenging...getting it stopped in a manner
> consistent with all that is at stake would be of an
> importance and a difficulty that eclipsed any other
> problem that any modern country has ever faced... Some
> kind of communication would be at the center of the
> process. Even deciding with whom one is willing to
> negotiate might be of critical importance. The hotline
> does not take care of this problem; it only dramatizes
> it.[6]

The mid-level nuclear conflicts suggested here would include very limited
punitive countervalue strikes, at a level of intensity roughly comparable to
the Hackett scenario.[7] The most intense nuclear conflict envisioned in this
discussion is one that might be described as a selective strategic counterforce
strike against major military targets. Despite the substantial amount of
damage that such a strike would cause, it might nonetheless be worthwhile to
try to stop the conflict prior to a full countervalue strike.

Scenarios involving more intense nuclear conflict are excluded from this
analysis. The proposed C^3I war-terminating capability would not, for example,
be particularly relevant in the case of a surprise attack involving a massive
strategic first-strike, and the strategic second-strike to such an attack.
Whether surprise attack or not, a massive countervalue strike that incinerated
the major population centers also falls outside the scenario relevant to this
discussion. An unrestricted "counterforce" strike, directed at all conceivable
military targets (e.g., a nuclear strike on Logan Airport in Boston or other
metropolitan airports, to destroy relocated U.S. bombers) would be difficult
to distinguish from a countervalue strike, and is therefore also excluded.
When the war is not "limited" in any meaningful sense, efforts to "terminate"
the war would be replaced in the most optimistic calculations by efforts to
restore civilization.

The war-terminating C^3I capability envisioned in this discussion, then,
would have to survive and function in nuclear conflicts ranging from acci-
dental strikes up to and including limited counterforce strikes. Undoubtedly
one could construct worst-case scenarios, even within these bounds, that made
war-termination highly unlikely. There are, for example, thorny problems

associated with a European war scenario, and the European TNF in particular. From a logical standpoint, however, it is useful to first examine the feasibility of a war-terminating C^3I capability in best-case scenarios. Depending on the results of that analysis, more sophisticated analysis might or might not be undertaken.

Analysis to this point suggests two preliminary conclusions. First, there are several important differences between warfighting and war-terminating C^3I. Second, from a technological standpoint, a war-terminating C^3I capability appears to be somewhat less complex, subject to less demanding requirements, and therefore theoretically easier to achieve than a warfighting C^3I capability.

The next section considers how to plan for a C^3I war-termination capability. An important limitation on that analysis is that classified sources have not been consulted. That restriction is particularly relevant given the highly classified context in which many C^3I discussions are held. While noteworthy, that limitation may not be as significant as it first appears. Doctrinal, bureaucratic, and political factors may constitute greater obstacles to achieving a war-terminating C^3I capability than the relatively ephemeral constraints of highly classified operational details.

Another restriction on the analysis is that planning for a Soviet war-terminating C^3I capability is not addressed. Where possible, observations that suggest differences in the Soviet perspective have been included. In any case, there is little value in exploring the subject in the Soviet context unless a war-terminating C^3I capability seems feasible within the U.S. framework.

III. C^3I Problems in Planning for War-Termination

A. The Complexity in the C^3I Decision Process Caused by Civilian/Military/ Governmental Interaction

The concept of war-termination appears on the surface to be unambiguously a military-governmental function. As a military-governmental function, planning would be conducted entirely by agencies of the government, including the military services. Most military communications in the Continental United States (CONUS) and in Europe, however, use civilian communication systems. Consequently C^3I policies, requirements, and planning intimately involve the civilian sector. According to former Director of the Defense Communications Agency, Lee Paschall:

> "Ninety percent of the Defense Communications System in the United States is leased; we have very few government owned communications systems."[8]

William Odom adds the following:

> "An enormous amount of military communications is transmitted over public telephone lines. Completely integrated, self-contained military communications only involve low-level units on ships, fighter squadrons, bomber squadrons, etc. Once any distance is involved, and once you get further up the command structure -- for example, if the President gets the word that there is an incoming Soviet missile attack -- it travels many legs of the trip from the satellite centers on AT&T. If you want not just strategic command and control but lots of other command and control, the common carriers are intimately involved in telecommunications policy."[9]

The inherent dependence of governmental military C^3I capabilities on civilian communications has significant implications for planning. The most obvious implication is the necessity for participation in planning by the civilian sector. Although essential, such participation increases the complexity of the decision process, severely straining the limited U.S. governmental capacity for resolving extra-governmental problems.

Planning for C^3I capabilities is essentially a process of determining requirements, a process that vividly illustrates the difficulty in managing even the intra-governmental decision process. A three-star general, a member of the Joint Staff in the Pentagon, is responsible for integrating C^3I requirements.[10] According to Odom however:

> "...although the JCS has that requirement, nobody seems to have had any responsibility for generating national-level requirements, or interdepartmental requirements, non-military, diplomatic. Requirements are developed it seems on a departmental basis... If somebody decides that we need a new communications system for intelligence or for diplomatic channels, its a real task to discover who decided we needed, or validated that requirement."[11]

It is thus difficult and frequently impossible to coordinate and resolve intra-governmental differences. Structuring the decision process to include extra-governmental input is even harder. In the U.S. both the private sector and civilian government agencies are involved in the decision process. Outside the U.S. the primary problem is consultation with civilian government agencies, but the private sector is assuming increasing importance.[12] The

important and expanding role of the civilian and private sector in C^3I complicates the decision process because the institutions and procedures are not well defined and experience is not extensive. The problem may not be insurmountable; it is clear, however, that developing a war-terminating C^3I planning capacity demands that the problem be addressed.

B. Resistance to C^3I Funding and the Reagan Administration's Strategic Modernization Package

Assuming that they have developed an adequate set of requirements for a war-terminating C^3I capability, the planners must next address the difficult problem of who pays? Within the governmental structure the chief obstacle to successful funding of C^3I projects is that C^3I is usually lower in priority than other projects.

> "If the Air Force has a choice between buying more airplanes or providing a command and control airplane for the President... they prefer the airplanes, not the control. The Army prefers tanks to paying for the President's White House communications system. The Navy has its preferences along the same lines. So there is in the way the Defense Department budgets are developed, an inherent bias against funding-JCS level, Defense Department-level and, certainly NCA-level communications."[13]

One problem in convincing the military services or other government agencies to fund C^3I projects is that the benefits are frequently not obvious. As Paschall explains:

> "It's very hard to quantify the benefit you get by spending a million dollars on a command, control, and communications system."[14]

And, as Paschall notes, funding the C^3I project requires a sponsor for budgetary purposes.

> "The sponsor is the guy who puts it in the budget, who helps defend it before the Congress and who asserts its need over ...other competing investment priorities."[15]

Even warfighting C^3I projects encounter the "inherent bias against funding"; war-terminating C^3I funding would surely face much stiffer opposition. From a technological standpoint improvements in warfighting C^3I would also improve the war-terminating C^3I capability. This suggests that advocates of war-terminating C^3I may have greater success if they "package" their projects as warfighting C^3I proposals.

The resistance that would almost certainly be encountered in attempting to fund a C^3I war-terminating project suggests an alternative approach: examine funded warfighting C^3I projects from a war-terminating perpective as well. In October 1981 the Reagan Administration presented a "strategic modernization package" that included a proposed 18 billion dollar budget over six years for modernization of strategic command, control, and communications systems. According to Richard D. DeLauer, Under Secretary of Defense for Research and Engineering,

> "The approximately $18 billion the Administration expects
> to devote over the next six years to developing endurable,
> survivable command, control and communications systems is
> the most important part of the strategic modernization
> package."[16]

The implication from published reports is that the 18 billion dollars will be spent on modernization of C^3I warfighting systems. The project represents an excellent opportunity, however, to examine the same systems from a war-terminating perspective. Section I of this analysis summarizes major C^3I considerations involved in war-terminating. Because of the considerable overlap in warfighting and war-terminating C^3I, analysis of C^3I systems from both perspectives may suggest ways to accommodate both missions in the modernization process. In addition, such analysis may highlight those key areas in which the special requirements for war-termination have not been adequately addressed.

C. The Potential Conflict Between Corporate Competition and Survivability of C^3I Systems

There are other obstacles to funding when extra-governmental participants are involved. Private sector participation introduces an element in the decision process that does not operate in the public sector: corporate competition for profits. The goals of profitability and development of survivable C^3I are not necessarily consistent; they may actually conflict. A potential problem arises because of the history of the telecommunications industry in the U.S. Odom poses the problem in the following terms:

> "If AT&T does things to enhance the system, or to improve
> the system's ability to resist foreign attack, should it
> charge the Defense Department? In the past it has not
> done so. It did not try to segregate out those additional
> costs and say they belong to the Defense Department, it
> merely passed along the cost to the subscribers in their

rates. So that many of the national security attributes
of the AT&T Long Lines and the common carrier systems
were being paid for by private users, rather than by the
department that had the responsibility to provide that
service -- the Defense Department."[17]

Previously, legislation was introduced in Congress to deregulate the telecommuni-
cations industry,[18] but as of early 1982 had not been successful. One possible
effect of such legislation is to permit new competitors to sacrifice survivability
of C^3I to achieve lower, and hence more competitive costs:

"the new competitors...want to charge the least amount
possible because they have to compete with something that
already exists and is very large, indeed, the Bell System.
So they're not going to build the additional features of
redundancy, restoration, and hardness."[19]

In addition to the potential conflict between corporate profits and
survivable C^3I, unfettered competition increases the problems of coordination.
The bills proposing deregulation of the telecommunications industry and the
AT&T Consent Decree modification proposed in January 1982 envisage some
forums for coordination among competing corporations, but these are untested
as of the time of writing.[20]

The budgetary and bureaucratic obstacles to achieving a war-terminating
C^3I capability do not appear to be insurmountable. Planning efforts that
fail to consider these problems are, however, unlikely to be successful.

D. Problems in Operational Planning for "Terminating a Nuclear War"

Chart 2 below is the description of "war-terminating C^3I" extracted from Chart 1 and provides the framework in which to discuss the planning requirements for terminating a nuclear war.

CHART 2

U.S. War-Terminating C^3I

Command

by surviving or reconstituted national authority or leadership.

Control

of means of destruction (strategic forces and TNF)

and of diplomatic apparatus

Communication

with U.S. and Allied military forces

with surviving or reconstituted Soviet national authority or leadership

Intelligence

monitoring activity; confirmation that Soviets can/are terminating conflict

(monitoring activity would also provide damage assessment of hostile and friendly areas, and retargeting information as necessary)

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1. Planning for Command in a War-Termination Scenario

The most important and most difficult aspect of planning for command in a war-termination scenario is ensuring that a constitutionally authorized national leadership exercises command of the nuclear war, and that it does so rapidly enough to keep alive the option of early termination of the war. Before the national leadership can hope to command actions to negotiate a termination of the war, the leadership must exercise command over the forces conducting the war. Time is thus spent in organizing or reconstituting the national leadership, and more time is spent in assuming command and direction

of the warfighting. Those efforts must precede any attempt to terminate the war, and therefore represent lost time, during which the war may have escalated to full strategic exchange.

Nuclear war termination requires a national authority or leadership capable of exercising command. If the President does not survive, then national leadership must be reconstituted in accordance with the constitutional requirements for presidential succession. Assuming that military, political, and other leaders attempt to comply with the constitutional requirements, there remain other potential problems of command.

Determining who among the political leadership has survived, in what condition, and where they are presently located, promises to be a difficult problem assuming, as this discussion does, that the national capital has been destroyed or that the national leadership has evacuated the city. Once the legitimate constitutional successor is located, transporting that person in safety to the "right" command center may pose additional difficulties. Even connecting a successor to the command center would be difficult while he or the center or both were mobile. During the process of leadership transition those who are to be commanded, particularly military leaders in charge of nuclear assets, must clearly understand at each stage who is their current commander-in-chief.

2.   Planning for Control in a War-termination Scenario

The control necessary to terminate a nuclear war would have to be exercised through a rather sophisticated command and control center. An important planning consideration is that existing command and control centers, including those designed for operations in a nuclear environment, may not survive even a limited initial nuclear strike. Recalling the assumptions in this discussion, the centers in Washington as a minimum would be destroyed or evacuated. This implies that planners should concentrate on mobile command and control centers such as the specially equipped planes that constitute the National Emergency Airborne Command Post. While these mobile facilities appear the best chance for survival, it is not obvious that a mobile command and control center can provide the level of sophistication desirable in a war-termination scenario.

Even if there is an operational command and control center, control of the means of destruction will not be easy. Technological and procedural

obstacles may intervene to prevent adequate control of U S. strategic nuclear forces. Unless so designed, missiles cannot be recalled once fired. Even piloted aircraft may be beyond recall, once a certain point in operational procedures has been reached.[21] Unless it is possible to recall or destroy the delivery vehicles once launched, control is effectively lost, especially the control necessary to terminate the war.

Control of forces other than those of the U.S. (such as TNF) is even more problematic. It is not clear to what extent the U.S. could influence the use of strategic nuclear weapons by third countries. Prior to the outbreak of hostilities, the U.S. could probably exert considerable influence on its allies; on the People's Republic of China probably very little. Even prior to hostilities, however, France's independent nuclear force is clearly less subject to U.S. influence than that of Britain. After hostilities commence, U.S. ability to influence the use of non-U.S. strategic nuclear weapons would probably decrease. Considerations of third-country national survival, retaliation, and obstacles to C^3I coordination among allies, would all contribute to a loss of U.S. control over allied nuclear forces. Another planning consideration is that the significance of third country nuclear arsenals increases as the arsenals of the U.S. and USSR are depleted.[22]

Effective planning for war termination recognizes that control in a nuclear conflict necessarily implies responsiveness, the ability to execute or halt nuclear options very quickly. Because of the intensity, destructiveness, and short response time in a nuclear conflict, control must be characterized by rapid assimilation of data, decision-making, transmission of instructions, and implementation of orders.

3. **Planning for Communication in a War-termination Scenario**

A prerequisite for the exercise of command and control is the existence of effective communications. War-termination entails planning for three types of communications each of increasing difficulty: with U.S. forces, with allied governments, and with the Soviet government.

Planning for communications with U.S. forces in a nuclear environment appears to be primarily a technological problem. Planners might ask the following question: What steps must be taken to ensure that the national leadership will be able to communicate effectively with U.S. forces in a nuclear environment, with priority to those communications that connect

strategic nuclear forces to the national leadership? Presumably national planners have already addressed that question from a warfighting perspective. The Reagan Administration's "strategic modernization package" is further evidence that this important concern is receiving the attention it deserves. It is worth stressing again, however, the need to pose the question not only for warfighting, but also with war-terminating in mind.

Communications with allied governments to control allied nuclear forces is partly a technological problem, and partly a political problem. The technological problems are similar to those involved in communication with U.S. forces, with additional considerations. First, allied communications circuits in most cases will be owned and operated by the allied country, rather than by the U.S. government or private U.S. corporations. Second, different technical characteristics of the foreign system may obstruct efforts to link the system with the U.S. C^3I systems, especially after hostilities have commenced. The potential political problems range from different perceptions by existing allied governments of what is desirable, to drastic changes in government leadership precipitated by the crisis of nuclear war. Both technological and political planning for communications with allied forces should be aided by the fact of allied cooperation. Especially in the technological dimension, most of the relevant data should be available for planning.

The thorniest problems in planning for a war-terminating capability are those associated with U.S.-Soviet communications. The technological problems are similar to those involving communication with allied countries, with major additional considerations. The closed Soviet society severely limits U.S. information on the technological or procedural requirements necessary for U.S. C^3I centers to link with Soviet centers in any war-termination effort. Second, the hostile relationship between the two countries limits pre-hostilities war-termination planning and exchange of necessary technical data. Much U.S. data is already available to the Soviets in open sources; the Soviets therefore have little incentive to unilaterally reveal even limited technical information on their own systems. Another problem is that the technical information on C^3I systems necessary for war-termination planning (e.g., system compatibility) is likely to include data that could be used for less benign purposes. Planning for hostile exploitation (through intelligence operations) of C^3I systems or for electronic counter-measures to defeat the systems may require the same type of data. Neither side would be eager to divulge technical operating characteristics that would serve those purposes.

Although the technological obstacles are severe, they are dwarfed by the
political problems in planning for U.S.-Soviet war-terminating communications.
War-termination requires communication with a surviving or reconstituted
Soviet leadership, capable of controlling Soviet means of destruction, prepared
to do so, and with a sufficient monitoring capability to make leaders of both
countries willing to trust a negotiated termination. Each of these requirements
entails major problems.

Once hostilities of the intensity envisioned in this discussion had
commenced, establishing the identity of surviving national leadership in the
opposing country might prove very difficult. Assuming a relatively orderly
and constitutional succession in the U.S., the Soviets might have considerable
confidence about their ability to recognize U.S. leadership. From the U.S.
perspective, however, the post-hostilities evolution of national leadership
in the Soviet Union is likely to be highly uncertain. The secrecy surrounding
Soviet plans for succession and the possibly unstable post-hostilities internal
political situation in the Soviet Union, would raise serious questions for
Western planners. U.S. officials might have considerable difficulty, for
example, in validating the authenticity or intentions of new Soviet leaders
that emerged during the conflict and attempted to negotiate a cessation of
hostilities.

Even if the pre-hostilities Soviet leadership survived, there are other
political considerations in planning for war-terminating communications
between the U.S. and the U.S.S.R. Communications between the two countries
would play a vital role in the timing of actions to terminate hostilities.
Uncertainty as to capabilities and intentions of Soviet leaders, however,
might make it very difficult for U.S. leaders to coordinate the timing of
war-terminating actions that potentially increased the vulnerability of the
U.S. Yet timing would be vitally important according to Thomas Schelling:

> "There may be very few points at which such a war could
> be stopped. ...If both sides must stop their weapons at
> approximately the same time, as might be essential and
> surely would be important, a reciprocally synchronized
> halt of all important activities would be feasible, at
> best, only at a few opportune moments, and even then only
> if both sides were alert to the opportunities and had
> identified them in advance."[23]

As Schelling concludes, timing termination actions depends heavily on adequate
verification capabilities:

"Stable stopping points...must not only be physically
possible, in terms of momentum, gravity, and fuel supplies,
and consistent with command arrangements, communications,
the speed of decisions, and the information available;
they must also be reasonably secure against double cross
or resumption of war."[24]

Verification information must be communicated, of course; first, however, it
must be acquired. Planners would therefore have to think carefully about the
intelligence requirements for terminating a nuclear war.

4. Planning for Intelligence in a War-termination Scenario

Assuming that the functions of command, control, and communications are
intact and operating, the final necessary condition for war-termination is
intelligence. The chief function of intelligence in war termination is to
monitor termination activities. For those at all familiar with current U.S.
and Soviet intelligence capabilities that would seem to be a relatively easy
technological task. The problem for the planner in the scenario envisioned
in this discussion is that the massive indications and warning intelligence
network is not likely to survive hostilities. If it does survive, intelligence
assets will surely be committed to warfighting assignments. From a technological
standpoint, intelligence assets can, of course, perform both functions;
providing targeting information for warfighting and monitoring information
for war-termination. The more difficult problem, however, is planning for
operational control of intelligence assets. Personnel responsible for warfight-
ing are likely to resist through bureaucratic means any effort to deprive
them (by operational tasking or by physical control) of intelligence assets.
In addition, the ambiguous capabilities of intelligence operations may make
the Soviets reluctant to countenance intelligence activities that could serve
that dual purpose. Planners must realize, however, that war termination
scenarios are not realistic without provision for verification that neither
side is "cheating" (e.g., masking efforts to resume hostilities behind a
war-termination facade).

Intelligence functions of damage assessment of both friendly and hostile
territory (and retargeting as necessary) could be performed by the same
intelligence assets that monitor compliance. The value of damage assessment
of hostile territory is that it may provide hints as to when war-termination
has the greatest chance of success, and with whom negotiations should be

conducted. Continuous damage assessment of friendly areas after war-termination is an additional check that termination has been achieved. Prior to the war-termination phase, damage assessment may indicate that enemy strikes have made friendly control of particular nuclear assets impossible and/or unnecessary.

E. Problems in Operational Planning for "C^{3}I Functional Survival"

A fundamental consideration in planning for war-termination is that survival of a functional capability to terminate war is different from survival of particular people, equipment or facilities. Some prefer to contrast the "endurance" of a function with the "survival" of a person or facility:

> "...the key... is a function that is endurable, rather than survival of a person or a facility. Worrying about whether or not the President lives or dies, or whether you can dig a hole deep enough in the ground to survive a direct three-megaton blast, is just not the right way to solve the problem. It is the function that has to endure through the long term, while survivability is associated with things."[25]

From a conceptual standpoint, ensuring that the functions of command, control, communications and intelligence survive seems more realistic than trying to ensure the survival of specific commanders or control, communications and intelligence assets. It follows, however, that efforts to improve survivability of specific people and things contribute to survivability or "endurance" of the function.

1. Planning for Survival of the Command Function

The distinction between survival and endurance is relevant to command. The concept of presidential succession recognizes the transience of particular human leaders, a transience that will probably be accelerated in nuclear conflict. From a planning standpoint, however, it is not sufficient to leave the prospects of leadership to fate. Who survives and assumes command may greatly affect the credibility of national leadership with U.S. forces and U.S. society, with allies, and with the Soviet Union. Planning should emphasize functional endurance; it should also seek to ensure the survival of the President. If the President dies, planning should help ensure that the successor is as high as possible in the pre-hostilities chain of succession. One method that has been proposed for this purpose is the presidential duty party concept. Under this plan, 17 duty parties would be organized, one for

the President and each of the 16 constitionally designated successors. One of the parties would be outside of Washington at all times. Proponents of the concept maintain that it would serve three purposes:

(a) Make the President an unattractive target to the enemy.
(b) Increase the probability of survival of Constitutional national command in a nuclear attack.
(c) Provide the opportunity to train the presidential successors.[26]

Whatever method is chosen, planning for survival of the command function should accomplish three things. First, planning should increase the probability of survival for constitutionally designated successors, and especially for the President. Second, planning should ensure that the post-hostilities President can be transported safely to a command and control center. Third, planning should ensure that the entire process takes place rapidly enough to give the President time to control escalation.

2.   Planning for Survival of the Control Function

Survival of the control function requires the survival of at least one command and control facility, and one sophisticated enough to permit national leaders to rapidly halt or execute U.S. and allied force options. The facility might be one of the command and control bunkers, or one of the presidential airborne command post planes. While it is probably true that no specific facility need survive, one of the facilities must survive. Theoretically the problem could be solved by proliferation of command and control centers; in practice the idea is fraught with difficulties. Such centers are far too expensive, complex, and difficult to construct to try to resolve the problem by proliferation. In addition, non-mobile command and control centers could easily be targeted by enough enemy warheads to ensure their destruction, unless their location were kept secret, a prospect implausible in the U.S. Solution of the problem, if it is possible at all, probably depends on the use of mobile, airborne command posts, operated using procedures to minimize vulnerability. Presumably that was the impetus behind the decision to upgrade the presidential command post planes.[27] Such airborne command and control centers also have weaknesses, however, including limits on the amount of time they can remain airborne, and limits on the airfields where they can land. Another consideration is that a mobile surviving U.S. leadership is of limited value unless it is effectively linked to U.S. and allied forces and to other

C^3I assets. Given the scenario in this discussion, the survival of airborne command and control centers is probably feasible.

Survival of the control function requires more than the physical survival of a command and control facility; the facility must be capable of executing or stopping the execution of nuclear options. Functional survival of the control of the means of destruction is therefore inextricably tied to the functional survival of communications, especially those linking the strategic nuclear forces.

3. Planning for Survival of the Communications Function

The concept of functional survival is particularly relevant to communications planning for hostilities. A number of options, including redundancy, proliferation, and reconstruction appear to offer realistic alternatives to hardening.[28]

Redundancy in communications is achieved by ensuring that communicators are linked by more than one type of communication. For example, adding redundant commercial cable links to a system entirely dependent on military satellite links would increase the system's chances for survival in the event of hostilities.

Proliferation increases the probability of surviving communications by increasing the number of facilities that must be successfully targeted to disrupt communications. For example, positioning more commercial communications satellites in orbit than are currently necessary, would increase the number of targets for Soviet anti-satellite attacks during hostilities. Surviving satellites would use reserve capacity to keep communications circuits operating.

Reconstitution of communications circuits offers a third method for increasing the survivability of the communications function. Reconstitution could be achieved by positioning dormant or "dark" satellites in geosynchronous orbit, and activating them after operational assets are destroyed.[29] Another possibility is holding communications satellites in "reserve" for launching after hostilities have begun.

When used in combination, different measures to increase survivability of communications make a successful attack more difficult. Diversity prevents the enemy from launching the same type of attack against the entire communications system, thereby increasing the difficulty in launching a successful

attack. Department of Defense communications planning is apparently based on that concept:

> DOD states that the major purpose of striving for redun-
> dancy and diversity is to enhance the survivability -- or
> security -- of DOD's communications in the event of a
> major facility interruption.
>
> DOD states that its current policy of placing one-third
> of its overseas communications requirements on each of
> commercial cable, commercial satellites and military
> satellites is the mix which DOD believes will best assure
> the diversity and redundancy it deems necessary for
> national security. DOD asserts that media diversity and
> redundancy are essential because each medium has unique
> advantages and disadvantages which require an enemy to
> employ different interception or attack techniques.[30]

4. Planning for Survival of the Intelligence Function

The alternative methods available for ensuring the survival of the intelligence function are virtually the same as those for communications: redundancy, proliferation, and reconstitution. Intelligence necessary for war-termination would probably consist primarily of intelligence from technical sensors capable of monitoring Soviet nuclear assets. Human intelligence assets would also be useful in assessing intentions of allied and particularly hostile leaders in a war-terminating scenario. Emphasis in intelligence reporting would be on real-time or near real-time transmission of data.

For intelligence, as well as for communication, control and command, "hardening" is one option to increase functional survivability. In the case of command and control, physical hardening measures such as shielding, underground locations, and similar measures are most relevant. Planning for communications and intelligence assets should also consider "electronic hardening," including measures to protect such assets from both deliberate and inadvertent interruption or degradation of missions.

IV. C^3I Problems in Actually Terminating the War

A. Problems in Ensuring "C^3I Functional Survival"

The Federation of American Scientists recently stated that:

> "Nothing ought to be of more concern... than the growing
> disproportion between the extraordinary good ability to
> command, control and communicate with strategic forces
> before they are attacked and the very poor ability there-
> after."[31]

There are many reasons for that "disproportion"; this analysis considers those problems that seem most intractable.

1. Survival of the Command Function

John Steinbruner argues that, "the command structure of modern strategic forces is much more vulnerable to attack than are the weapons themselves."[32] To understand why that is so, it is useful to visualize from the President's perspective, the first few minutes of hostilities in a nuclear environment such as the one postulated in this discussion. The following describes plans to ensure the survival of the national leadership:

> "...Before the attack strikes, an effort would be made to
> get the President and his top defense staff airborne...
> From the moment a Soviet attack was launched, the President
> would have at most half an hour to take off... Other key
> government officials in line of succession to the Presidency
> would leave Washington by helicopter according to a
> carefully rehearsed plan."[33]

Thirty minutes is not much time; a missile launched on a depressed trajectory from a Soviet submarine in the Atlantic would arrive even sooner. A report first completed during President Kennedy's tenure, and recently rereleased, noted that on the opening day of Congress in any year, chances are excellent that the President and all legally designated successors are in Washington.[34] In that situation, even one nuclear warhead could be sufficient to destroy the constitutionally-mandated national leadership. Given the scenario in this discussion, the President might have enough time to move to a secure command and control center; it seems unlikely, however, that the survival of the President or of any given successor can be predicted with confidence. Once the list of legally designated successors is exhausted, severe problems would arise. Whoever assumed command might face almost insurmountable problems in attempting to direct the war and eventually order termination. That person would face the triple problems of establishing credibility as the national leader, making life and death warfighting decisions, and racing the "escalation" clock. Assuming however, that the President does survive, are the command and control centers likely to survive?

2. Survival of the Control Function

The 1980 report to Congress by General Jones, Chairman of the Joint Chiefs of Staff concluded:

"Though the United States has several alternative head-
quarters, some of them underground... these facilities
would almost certainly be destroyed by a nuclear attack...
The National Emergency Airborne Command Post "[a reference
to four specially equipped planes]"... may be the only
surviving element.[35]

If the airborne command post were the sole surviving command and control
center (or the center from which the President exercised authority), there
are reasons for being less than optimistic about the prospects for effective
control. The following 1977 report offers a graphic description of some of
the limitations of that facility:

"The presidential plane, a converted Boeing 747 jet
airliner, can stay in the air, with refueling for four
days -- until its engines run low on oil... An automatic
communication center on board would sort out incoming
messages, but the plane does not have a computer to help
in the decision-making process. Instead, the staff would
carry some 2,800 pounds of data and computerized battle
plans to leaf through manually... The President might
find himself unable to speak directly with anyone outside
his plane, because radio transmission is affected by
radiation. But a special slow-speed teletype would
continue chattering away..."[36]

There are reasons why the Soviets might not target U.S. command and
control centers. As William H. Kincade notes:

"There are certain possibly severe penalties for the
attacker for destroying or damaging its adversary's
command and control system, including misguided missiles,
uncontrolled salvos, and the difficulties of terminating
hostilities."[37]

Planners, however, worry that by attacking U.S. command and control centers
"the Soviets may believe they can either nullify or greatly reduce the U.S.
ability to respond to a Soviet attack."[38]

Kincade concludes that:

"Concern for command and control vulnerability is driving
both superpowers to harden and disperse some of these
facilities and to increase redundancy, partly by developing
improved airborne command posts, though these also have
their particular vulnerabilities and limitations. Providing
highly dependable command and control facilities has
proved difficult, however, owing to problems inherent in
defending a limited number of fixed sites against a
determined nuclear attack and the limitations of mobile
command posts."[39]

Assuming, however, that the command and control centers do survive, are the communications likely to survive?

3. Survival of the Communications Function

Gerald P. Dinneen, Pentagon C^3I expert in the Carter Administration argued that:

> "Redundancy, which involves not only different paths but includes land lines, radio and satellite communications on a variety of frequencies... insures that at least some will survive..."[40]

By all accounts the existing United State communications system is extensive. Michael Getler reports that:

> "The United States has an elaborate communications network in place which... includes 43 different radio and telephone pathways for a president to send one-way messages to U.S. strike forces... But hawks and doves alike have serious questions about how much of this would survive, especially the crucial first link in the chain: the ability of the president to give the order to fire or to hold fire in the wake of new developments."[41]

The possibility of nuclear or conventional strikes on communications assets is one reason for questioning the survivability of communications. For example, communications satellites might be vulnerable to anti-satellite attacks. There is, however, an easier method for destroying the vitally important satellite communications:

> "In space warfare it is not only satellites that need to be protected. The Pentagon is also worried about ground stations. 'They are extremely vulnerable' notes a Pentagon planner, and taking them out could be just as effective as destroying the satellites they control."[42]

In addition to the physical destructiveness of nuclear weapons, exotic electronic effects caused by radiation could significantly disrupt or degrade communications. Wilson Clark, the energy consultant who headed a Federal Emergency Management Agency study on energy vulnerability, maintains that:

> "One or two well-placed nuclear warheads detonated in the upper atmosphere could cause failure in the entire national power grid."[43]

The previously cited report by General Jones concludes that "a few well-placed atomic explosions high in the air over the United States could cause a wide-spread loss of connectivity in communications."[44]

4. Survival of the Intelligence Function

The practical obstacles to survivability of intelligence assets are similar to those threatening survival of communications. Former campaign advisor to President Reagan, William Van Cleave, concluded that the entire intelligence warning system and its associated command and control is "extraordinarily fragile."[45]

5. C^3I System Survival

As with the other functions, intelligence is merely one part of the overall C^3I system. From a practical standpoint, survival of one part of the system is virtually meaningless in isolation. If, for example, intelligence assets survive, but communications are destroyed, the intelligence will not reach the decision-makers. Accordingly, the threats to the survival of the separate functions of command, control, communications and intelligence, combine to pose a serious threat to the systemic survival of a C^3I functional capability sufficient to terminate war.

B. Problems in "Terminating a Nuclear War"

Ensuring the survival of C^3I assets is necessary for successful termination of nuclear war; it is not, however, a sufficient condition. Assuming C^3I survival, there remain serious technological and political obstacles to successfully terminating a nuclear war at minimum damage levels.

1. Command Problems in War-termination

Previous analysis has indicated that there are severe technological constraints that may limit the President's or a successor's ability to exercise command in a nuclear war. Equally as important, and perhaps more important, are the human constraints limiting a President trying to terminate a nuclear war. Schelling offers a sobering description of the situation confronting the President:

> "We are dealing with a process that is inherently frantic,
> noisy, and disruptive, in an environment of acute uncer-
> tainty, conducted by human beings who have never experienced
> such a crisis before and an extraordinarily demanding
> time schedule. We have to suppose that the negotiation
> would be truncated, incomplete, improvised, and disorderly,
> with threats, offers, and demands issued disjointedly and

inconsistently, subject to misunderstanding about facts
as well as intent, and with uncertainty about who has the
authority to negotiate and to command."[46]

One temptation is to use technology to make the problems more tractable;
that, however, raises other problems of control.

2. Control Problems in War-termination

The technology that is introduced to make it easier to exercise the
functions of command and control, may, in a crisis effectively limit control:

> "There is a widespread sense that our weapons systems
> have become so complex, that we can no longer effectively
> control them... As fear mounts regarding the vulnerability
> (of strategic forces), the temptation is to try to increase
> the rate of response of the command and control system,
> and this leads to greater automation. While automation
> may decrease the likelihood of small errors, or cumulations
> of human errors, we know little about how automated
> command and control systems might degrade... The uncer-
> tainties surrounding... real conflicts are tremendous and
> increasing."[47]

The incentive, from a warfighting standpoint, for the attacker to destroy
enemy C^3I centers has been previously discussed. The United States has taken
steps to reduce that incentive as the following report explains:

> "To reduce the temptation for the Russians to attempt a
> surprise attack aimed at the President and the command
> system, some presidential control over nuclear weapons
> has been delegated. Just how much of that power has been
> passed along to subordinates is a deeply held secret."[48]

From a war-terminating standpoint such decentralization causes other problems;
it virtually guarantees that any war that starts will be harder to stop.

Even if the President retained complete control, there is a momentum
toward escalation that is, according to former Defense Secretary Harold
Brown, difficult to stop:

> "There is a kind of power train even if both sides do not
> want it to happen... The compression of time for decision,
> the lack of information that would be available on both
> sides, the expected great advantage that a military
> commander might think would come from being the first one
> to get in his blow, all push for rapid escalation."[49]

Brown's conclusion is that:

> "The odds are high, whether the weapons were used against
> tactical or strategic targets, that control would be lost
> on both sides and the exchange would become unconstrained."[50]

3. Communication Problems in War-termination

There are technical obstacles to implementing effective war-terminating communications with national and allied forces and with the Soviet Union in a nuclear environment. The technical problems in ensuring C^3I system survival make war-terminating communications more difficult. The destruction or degrading of communications capabilities would impact adversely on the speed, volume, and reliability of war-terminating communications. The problems of system compatibility between U.S and allied communications and especially U.S.-Soviet communications would be vastly increased in a post-hostilities environment. Coordination between countries on procedures, or technical steps to permit system compatibility, would be far more difficult after hostilities; the available time would be far less.

Analysis suggests, however, that the technical problems of implementation are overshadowed by the political difficulties involved in U.S.-Soviet war-terminating communications. U.S. officials might confront one of several unpleasant possibilities in negotiating a cessation of hostilities with the post-hostilities Soviet leadership. One possibility is that Soviet leaders, particulary new leaders that have emerged from the conflict, may sincerely want to terminate hostilities, but be unable to control Soviet military forces or key political factions. A second possibility is that the Soviet leaders might be able to control Soviet forces, but be unwilling to do so, unless their personal safety and future are protected. Another possibility is that an ostensible commitment to termination of hostilities may mask other, treacherous intentions. The practical problem for U.S. officials is that it might be very difficult to ascertain which, if any, of these situations has occurred.

The uncertainty and mutual distrust confronting U.S. and Soviet officials would probably be aggravated by the existence of third-country nuclear arsenals. The unpredictability of third countries, and the relative lack of control over allies by the U.S. (or USSR) in a mid-level nuclear conflict might generate pressure against war-terminating activities. Termination of hostilities implies actions that potentially increase a nation's vulnerability, especially that of third countries not directly involved in negotiations.

Another problem that U.S. officials might encounter is what to conclude and what action to take if communications with the Soviets are suddenly interrupted or stop for unknown reasons. Is the break in communications a

technical disruption or a signal that negotiations have ended? Is there a power struggle between rival political factions in the Soviet Union? Has the Soviet military deliberately interrupted communications? There are a great many possible explanations; U.S. officials would be under enormous pressure to assume the worst. Intelligence might provide some answers, but major questions would probably remain.

4. Intelligence Problems in War-termination

As previously indicated, technical intelligence would be required to monitor and prevent the enemy from "cheating" (using truce or negotiations periods to prepare for or conduct new offensive operations). During such periods the extent and quality of intelligence would be most important. There are "two very different dangers" according to Schelling:

> "One is that the enemy may cheat and get away with it;
> the other is that he may not cheat but appear to, so that
> the arrangement falls apart for lack of adequate inspection."[51]

Given the mid-intensity scenario envisioned in this discussion, it seems likely that surviving or reconstituted U.S. intelligence assets could provide much of the technical data necessary to monitor compliance. Would Soviet systems survive or be replaced? If not, would Soviet officials accept intelligence provided by U.S. assets? These questions suggest additional problems in terminating a nuclear war. The most vital intelligence is likely to be information about who is in control in the Soviet Union and what their intentions are. That intelligence would be far more difficult and perhaps impossible to obtain, particularly by technical sensors. This may indicate the need for more human intelligence operations with long-term planning horizons. It is unlikely, however, that any intelligence operations will provide all the intelligence necessary or desirable to support war-terminating activities.

V. Possibilities for Using the Arms Control Process to
Achieve a C^3I War-terminating Capability

In 1966 Thomas Schelling concluded that:

> The most important measures of arms control are undoubtedly
> those that limit, contain, and terminate military engage-
> ments. Limiting war is at least as important as restraining
> the arms race, and limiting or terminating a major war is
> probably more important in determining the extent of

> destruction than limiting the weapon inventories with
> which it is waged. There is probably no single measure
> more critical to the process of arms control than assuring
> that if war should break out the adversaries are not
> precluded from communication with each other."[52]

The preceding analysis suggests that prospects are limited for C^3I survival through national protective measures such as redundancy, proliferation, and reconstitution. Even if individual systems survive, the prospects for a surviving C^3I systemic capability sufficient to terminate war are not good. Yet a prerequisite for termination of a "limited" nuclear war is a sufficient C^3I capability for belligerents to negotiate a cessation of hostilities. The importance of C^3I in terminating hostilities and the questionable surviv-ability of current C^3I systems suggests the following possibility: arms control measures to ensure the survival of a Soviet/U.S. functional C^3I capability to terminate a nuclear war at the lowest level of damage.

"Arms control measures" satisfy any of three classical objectives: "(a) to reduce the risk of war; (b) to reduce the cost of preparing for war; [or] (c) to reduce the cost of war should it occur."[53] Using that definition, the "Hot Line" between Moscow and Washington, for example, would qualify as arms control. A war-terminating C^3I capability would constitute arms control by satisfying the third objective. Just as the "Hot Line" is designed to "reduce the risk of war," a war-terminating C^3I capability would minimize damage, or "cost of war," by early termination of the conflict.

A U.S. arms control initiative to facilitate war-termination might be attractive for several reasons. Negotiations concerning such measures may be one type of low-key arms control discussion well suited for the environment of the early 1980s. Even if the concept of a war-terminating C^3I capability were eventually discarded, the process of considering the proposal might help keep the option of arms control alive.

A war-terminating C^3I capability is also consistent with overall national security planning. Throughout the nuclear age, U.S. strategic planners have been concerned with the survivability of the C^3I function. Since PD 53, survivable C^3I has been an explicit concern of U.S. strategic planners. The planners have usually focused on a warfighting C^3I capability, rather than a war-terminating C^3I capability. Nonetheless, efforts to develop a survivable capability to perform either function much in common, despite the semantical conflict between warfighting and war-terminating.

There are at least two arms control approaches to developing a war-terminating C^3I capability. One approach is pre-hostilities planning between the Soviets and the U.S. as to how a war once started could be terminated. This assumes that sufficient C^3I assets survive on each side to give the national leadership the opportunity to negotiate a termination. Implicit in that approach is national planning to ensure functional survival of national C^3I by the protective methods previously discussed. There is a second approach: to conclude some sort of international agreement that explicitly guarantees survival of certain C^3I assets, to be used for the purpose of war-termination.

The second approach can be likened conceptually to the agreement not to attack medical facilities during hostilities. The international agreement would somehow protect specified C^3I assets in the same way that the "red cross" is designed to protect the medical centers. In one sense, the second approach is merely an extension of the first; in both cases surviving C^3I assets would be used to negotiate an end to hostilities.

The potential problems for arms control measures of funding, intergovernmental bargaining, and extra-governmental interaction are formidable. For example, the inherent resistance to funding C^3I assets is certain to be increased by linking the project to arms control. As suggested previously in the section on planning, however, enhancement of warfighting C^3I capabilities would also increase war-terminating C^3I capabilities. Packaging C^3I improvements as improvements in the U.S. warfighting capability may avoid some of the political and funding problems caused by labeling the same efforts as arms control measures. It is thus conceivable that some domestic obstacles to C^3I arms control could be overcome.

Arms control negotiations with the Soviets to establish and protect a bilateral C^3I war-terminating capability would be more problematic. Returning to the "red cross" analogy, it is difficult to conceive of how a C^3I war-terminating system could be similarly protected. Medical facilities are unambiguous physical structures, C^3I systems involve transmission of data, and other technical operations that would have to be recognized and protected as part of the war-terminating capability or activity.

There are major technical problems in recognizing and protecting war-terminating C^3I capabilities or operations. In the conduct of electronic warfare, for example, belligerents would need to employ very selective targeting for electronic countermeasures, to ensure that C^3I war-terminating

systems were spared while C^3I warfighting systems were attacked. Conventional and nuclear attacks on C^3I physical targets would have to avoid destroying or degrading C^3I war-terminating systems through direct or collateral damage.

Technical problems increase the political obstacles to reaching a C^3I war-terminating arms control agreement with the Soviets. A prerequisite for such an agreement is mutual trust (impossible because of the hostile relationship), or an effective verification capability. Verification encounters another serious problem because of the inherent ambiguity of C^3I systems.

Whatever the expressed or actual intentions for a given C^3I network, it represents a clearly ambiguous capability. A C^3I system designed for war-termination must of necessity contain the same elements necessary for warfighting. Thomas Schelling describes the constant and unavoidable tradeoff confronting the attacker:

> "A critical choice in the process of bringing a war to a
> successful close -- or to the least disastrous close -- is
> whether to destroy or to preserve the opposing government
> and its principal channels of command and communication.
> If we manage to destroy the opposing government's control
> over its own armed forces, we may reduce their military
> effectiveness. At the same time, if we destroy the the
> enemy government's authority over its armed forces, we
> may preclude anyone's ability to stop the war, to surrender,
> to negotiate an armistice, or to dismantle the enemy's
> weapons. This is a genuine dilemma."[54]

The dilemma diminishes prospects for an arms control solution. An arms control agreement that protected a full scale war-terminating C^3I capability would also protect the "brains" of the warfighting effort. To solve the problem by restricting the arms control protection to one country-to-country communication link, for example, does not solve the problem. While a single communication link might not pose a threat because it would be insufficient to control the warfighting efforts, neither would it be sufficient for war-termination purposes in the scenario envisioned in this discussion. Arms controllers thus face an analogous dilemma: an effective war-terminating C^3I capability is inherently a warfighting C^3I capability; a C^3I system restricted to assets insufficient for warfighting is inherently insufficient for war termination.

This discussion indicates that severe problems would confront arms control planning for war-termination. There are, however, opportunities to take an incremental approach toward pre-hostilities planning for war-termination;

upgrading the U.S.-Soviet Hot Line would constitute a limited beginning in that direction. Any surviving C^3I warfighting capability could also serve as a C^3I war-terminating system; the task for planners is to study systems from both perspectives.

NOTES

1. Richard Burt and Roger F. Pajak, "Problems and Prospects for Arms Control in the 1980s," in Defense Planning and Arms Control: Proceedings of a Special National Security Affairs Institute Conference June 1980 (The National Security Affairs Institute, Washington, D.C., Sept. 1980) p. 64.

2. "American Nuclear Doctrine," Survival, November/December 1980, p. 267.

3. Michael Getler, "U.S. Ability to Retaliate After Nuclear Attack Concerns Officials," The Washington Post, 26 January 1981, p. A2.

4. Harold Brown, Address of 20 August, 1980, reprinted in Survival, November/December, 1980, p. 268.

5. Thomas C. Schelling, Arms and Influence (Yale University, 1966), p. 205.

6. Ibid., pp. 262-263.

7. General Sir John Hackett, et al, The Third World War: August 1985 (Macmillan, New York, 1980).

8. Lee Paschall, "C^{3}I and the National Military Command System," in Seminar on Command, Control, Communications and Intelligence (Program on Information Resources Policy, Harvard University, 1980), p. 83.

9. William Odom, "C^{3}I and Telecommunications at the Policy Level," in Seminar on Command, Control, Communications and Intelligence (Program on Information Resources Policy, Harvard University, 1980), p. 12.

10. Ibid., p. 11.

11. Ibid.

12. I am indebted to Professor Anthony G. Oettinger, Program on Information Resources Policy, Harvard University, for this observation.

13. Odom, p. 12.

14. Paschall, p. 82.

15. Ibid., p. 73.

16. Clarence A. Robinson, Jr., "Pentagon Backs Strategic Modernization," Aviation Week and Space Technology, 26 October 1981, p. 49.

17. Odom, p. 13.

18. Ibid., p. 12.

19. Paschall, p. 83.

20. I am indebted to Professor Anthony G. Oettinger, Program on Information Resources Policy, Harvard University, for this observation.

21. Schelling, p. 206.

22. Ibid., p. 215.

23. Ibid., pp. 206-207.

24. Ibid., p. 208.

25. Robert Rosenberg, "The Influence of Policy-Making on C^3I," in Seminar on Command, Control, Communications and Intelligence (Program on Information Resources Policy, Harvard University, 1980), p. 59.

26. SRI International, A Retrospective Look at Some of the Basic Issues Connected with National Command, Control, and Communications (Based on a declassified 1962 SRI/BTL Study of "National Strategic Command-Control-Communications Requirements to 1975"), n.p., n.d., pp. 75-76.

27. "Air Force Awards Boeing Plane Contract," The Associated Press, 26 June, 1980.

28. Rosenberg, p. 65.

29. "The New Military Race in Space," Business Week, 4 June 1979, p. 149.

30. Hearings before the Federal Communications Commission, 71 F.C.C. 2d 1090, Released 26 April 1979, p. 1100.

31. Getler, p. A2.

32. Ibid.

33. "If U.S. Comes Under Nuclear Assault," U.S. News and World Report, 5 September 1977, p. 19.

34. SRI International, p. 74.

35. Getler, p. A2.

36. U.S. News and World Report, p. 19.

37. William H. Kincade, "Over the Technological Horizon," Daedalus, Winter 1980/81, p. 110.

38. Getler, p. A2.

39. Kincade, p. 110.

40. Getler, p. A2.

41. Ibid.

42. <u>Business Week</u>, p. 149.

43. Constance Holden, "Energy, Security, and War," <u>Science</u>, 13 February 1981, p. 683.

44. Getler, p. A2.

45. Ibid.

46. Schelling, p. 220.

47. Harvey Brooks, "Notes on Some Issues on Technology and National Defense," <u>Daedalus</u>, Winter 1981, p. 135.

48. <u>U.S. News and World Report</u>, p. 19.

49. George C. Wilson, "Defense Orders New Study on Limited Nuclear War," <u>The Washington Post</u>, 11 November 1978, p. A2.

50. Fred S. Hoffman, <u>The Associated Press</u>, 30 November 1978.

51. Schelling, p. 211.

52. Ibid., pp. 263-264.

53. Originally formulated in Schelling and Halperin, <u>Strategy and Arms Control</u>. Paraphrased by Barry Blechman, "Do Negotiated Arms Limitations Have a Future?" <u>Foreign Affairs</u>, Fall 1980, p. 113.

54. Schelling, p. 212.