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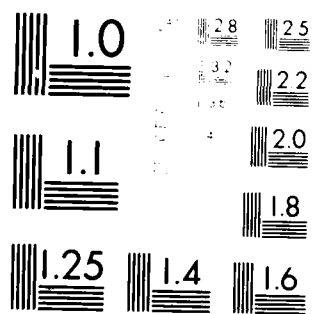
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ECONOMIC TARGETING IN MODERN WARFARE

Benjamin S. Lambeth and Kevin N. Lewis

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ECONOMIC TARGETING IN MODERN WARFARE

Benjamin S. Lambeth and Kevin N. Lewis

The Rand Corporation, Santa Monica, California*

I. INTRODUCTION

Nuclear weapons and strategies for their use play a variety of roles in the defense and foreign policies of the United States and Soviet Union. Accordingly, both nations buy forces and prepare war plans for many purposes.

Although it is perhaps the least likely contingency for which either country prepares, the scenario in which both sides launch more or less all-out attacks against their opponent's economic or "urban-industrial" target system often dominates public consideration of strategic policy issues. These kinds of strikes, generically termed countervalue attacks, are usually assumed to throw many thousands of nuclear weapons against cities and isolated facilities in order to destroy the adversary nation as an organized, functioning, and economically viable entity.

Because both sides maintain enough survivable warheads to inflict what intuitively would seem to be mortal damage upon the other, the mutual ability to unleash such a devastating blow is presumed, at least by many analysts in the United States, to shape all other aspects of strategy. Thus, the relationship of this capability to other possible

* This is a revised version of a paper prepared for presentation at a conference on "Strategic Dimensions of Economic Behavior" organized by the Foreign Policy Research Institute and held in Washington, D.C., February 25-26, 1982. This paper does not necessarily reflect the views of Rand or its sponsors.

roles of nuclear forces is a central planning issue. Some commentators, fearful that even limited use of nuclear weapons would lead inexorably to ultimate catastrophe, extend this notion to imply that planning for nuclear use of any type is madness. Others contend that a strategic concept that postulates only the alternatives of total or no nuclear war is improvident. But in spite of years of debate, we seem to be no closer to answering the basic question of how, if at all, massive attacks relate to other kinds of nuclear employment.

Actually, much of the confusion in the strategic debate derives from widespread misunderstanding about the nature and purpose of economic attack planning. In particular, the popular "hail of doom" image is a poor representation of the economic targeting problem. Such lurid imagery aside, a general attack (in U.S. planning at least) would, like any other use of nuclear force, be designed to satisfy very specific requirements. Official nuclear guidance still carries over from a tradition of economic bombing campaigns prior to the nuclear age, in which planners tried to design very precise theoretical rationales for the application of airpower. Thus, although some people view an economic attack as an indiscriminate brute-force blow, a full-scale nuclear strike does have to serve specific goals, at least in principle.

It is worth thinking about the problem of economic targeting for two reasons. First, we must understand the nature and purpose of such an attack. Second, and far more important, we have to determine how attacks aimed against an enemy's economy relate to other possible applications of military force in the nuclear age.

This paper will review both questions from the perspective of American and Soviet strategy. There are many ways in which the goals of an economic attack can be stated, although in practice technical constraints and other factors may obscure some of the distinctions between attacks based on different theories. Further, there exists in the popular forum a tendency to oversimplify, as though there were just one sort of economic (or any other) attack that had only one purpose at a given point in time. In fact, economic targeting, like other war planning, has seen intensive efforts to rationalize the underlying strategy. Moreover, each superpower's tactical goals have been known to change. Since there have been considerable differences in each side's strategic efforts over time, U.S. and Soviet approaches to economic targeting remain highly dissimilar.

This paper begins with a brief discussion of economic targeting prior to the nuclear age. It then reviews post war American and Soviet approaches to economic targeting.[1] Finally, these approaches are contrasted and some implications for the nature of the long-term Soviet-American strategic competition are outlined.

[1] For the sake of terminological consistency, we mean by "economic attacks" strikes against economic targets (as opposed, say, to "countereconomic" targeting). Note also that throughout this paper, we are concerned only with direct aerial offensives, although other kinds of attacks (e.g. shelling of littoral targets) are possible, as are indirect countereconomic uses of airpower (such as mining).

II. ECONOMIC TARGETING CONCEPTS PRIOR TO THE NUCLEAR AGE

Concepts governing economic targeting for aerial bombardment offensives developed hand in hand with the use of aircraft for military purposes. Initially, the aerial bombardment mission was not a very well defined military function. Rather, prototypical bombing doctrine simply blended ongoing military pursuits with emerging aeronautical technologies. But as technological capabilities evolved, a new, independent concept of "strategic" bombardment emerged.

"Strategic," at least as that term was employed in the classical airpower context, is poor usage, but in the 1920s it came to have a special meaning that continues to apply to this day. Strategic air attack came to describe strikes that reached above and beyond the defended perimeter of a nation in order to destroy the fundamental resources on which an enemy's war potential relied. With the advent, after World War II, of a full-blown U.S.-Soviet competition and a nuclear weapons standoff, the notion of strategic attack was enlarged to take into account long-range attacks against any target in the enemy's homeland, usually with nuclear weapons. But for the time being, we shall consider only the pre-nuclear implications of the term, or in other words, "economic-only" strategic attacks.

To early students of airpower, the effects of strategic bombing were analogous to those of blockades or sieges, which sought to undermine or destroy an adversary's ability to support its armed forces in the field or on the seas. The goal of a strategic air attack accordingly became the strangulation of enemy war potential by hitting his home front. The attack would achieve postulated aims by destroying

plant and stockpiles, disrupting leadership and communications, and precipitating the collapse of popular morale.

In 1914, the air services of Britain, France, and Germany attempted some minor bombing operations. In January 1915, German airships conducted the first sustained air offensive against the UK.[2] These early attacks were ineffective, due mainly to the fact that the hydrogen-filled airships were vulnerable to pursuit aviation. For this reason, Zeppelins were replaced in April 1917 by Gotha and Giant bombers, which carried out daylight raids against London.

Even so, planning for these operations was casual, and nobody was really sure what effect such bombing would have. However, the picture quickly changed, largely on account of chance. In one raid on 13 June 1917, fourteen Gothas dropped 118 bombs on London, killing 160; most casualties resulted from a freak direct hit on the Liverpool Street Underground Station. A hundred British fighters had scrambled, but they did not shoot down a single enemy bomber. This and other attacks sparked panic and outrage among the public and Britain's political leadership. Unfortunately, it seemed as though effective air defense was impossible.

Overall, the results of episodic strategic bombing raids in World War I had no effect on war outcomes. But some observers were willing to extrapolate from the narrow, localized consequences of air attack. Expanding on limited wartime experience, a postwar British analysis of strategic bombing, the "Smuts Report," argued that aerial attack

[2] The following material draws from Kevin N. Lewis and Mark Lorell, Strategic Bombing, 1914-45: A Case Study of the Defense Planning Disconnect, The Rand Corporation, P-6787, forthcoming.

represented a true strategic revolution. Bomber fleets, the report contended, heralded a new type of conflict in which traditional land and sea warfare forces might be eclipsed. Such enthusiasm led to the eventual establishment of several independent European air services and prompted a lot of theorizing about what bombers could do to wreak havoc on an enemy war effort.

As a new weapon, airpower was thought to have several desirable attributes. First, air fleets could bypass superior undefeated land and naval forces, so that some nations that had previously been immune to the threat of land or maritime invasion (particularly Britain) were thought to be endangered. Moreover, airpower seemed relatively inexpensive compared to the costs of standing land and naval forces. Thus, the prospect loomed that hitherto insignificant powers could use airpower to defeat richer and militarily superior nations. Since most theorists advised that investment in air defenses bought nothing, it appeared that this menace could not be eradicated. Hence, strategic airpower was seen to upend traditional military balances of power.

Second, a bomber offensive was thought to encourage surprise attack or preemption. Because a bomber force could reach targets throughout the interior of an enemy country, attacks on enemy resources were not restricted to installations within range of artillery or to those subject to capture by ground forces. War planners could thus exercise considerable discretion over their target lists. Because it was thought that bomber fleets could sortie forth against a large array of targets (including popular morale) in short order, some analysts began to believe that an aerial "campaign" could do the job of a very powerful

blockade, only much more quickly.

Third, the destructive effect of air attacks seemed--incorrectly, in retrospect--to be very profound. (For one thing, the explosive power of high-explosive bombs was grossly overestimated, as was the ability of embryonic air services to mount coordinated raids and deliver their bombs accurately.) Bombers could strike at noncombatants, either coincidentally (because workers were collocated with industry) or deliberately, and economic installations and civilian workers were thought less resistant to attack than prepared troops and fortifications. Although some commentators stressed the sheer morale effects of such attacks, others viewed social disruption as just another form of economic strike, insofar as labor was an input to a national war effort.

Based on such notions, many military thinkers became mesmerized with the possibilities of strategic air attack. But rather than view airpower as an adjunct to other capabilities, these advocates developed a theory that postulated that a massive air offensive against a foe's economic and social structure could win a war independently of successful action on the land or sea.

The popularity of this image of an "independent, war-winning, knock-out" blow was mainly due to three factors. First, no nation (particularly the UK) wanted to replay the agony of World War I, and airpower offered a way out of this. Second, a strategic air force was relatively cheap compared to the alternatives and was thus an appealing proposition to parsimonious intrawar parliaments (especially in Britain, where intrawar planning was based on the so-called "ten-year rule").

Third, airpower proponents naturally advertised their forces' capabilities in the most favorable light possible, in order to hasten the formation of their newly independent services and, hopefully, their attainment of status on a par with the senior military arms.

Although several independent air forces were created in Europe and strategic airpower theories enjoyed tremendous popularity, the doctrine of strategic bombing--aimed at economic targets, political and military leadership, and the civilian will--triumphed only in two countries, the United Kingdom and the United States. In the United States, success only came after a long and hard struggle.[3] In both countries, it is worth noting, nothing resembling an effective force structure or operational planning establishment was in place at the beginning of World War II. In other nations, where close support was regarded as the best use of airpower, it was thought that strategic bombing was not likely to be effective.[4]

So for the time being, we must concern ourselves with the air warfare theories developed in the English-speaking nations. Theorists in both countries concurred that airpower could win a war promptly and single-handedly. But differences of opinion existed about how to go about this task. Two rival economic targeting theories in particular were devised. While both relied on the same basic assumptions--that the "bomber would get through," that the forces would be cheap, and so on--

[3] Interestingly, the Soviet Union built the world's first full strategic bombing force in the early 1920s. However, in the 1930s, it reversed course and redesigned its air forces around tactical missions.

[4] This impression was reinforced by experience acquired in the Spanish civil war and in the Russo-Japanese wars in 1938-39, in which close air support seemed to many to be the best use of airpower.

they differed on the theoretical means by which bombing was supposed to work and, accordingly, on what should be hit and how fast effects would materialize.

Beginning in the 1930s, then, a major strategy debate ensued. For reasons largely divorced from combat ones, some advocates defended the theory popularized by the Italian General Douhet and others. If bombing could dash enemy morale (and, in so doing, draw down economic capability), it was argued, subsequent public reaction or apathy might compel hostile leadership to desist from continued conflict. As that doctrine was embraced by some European air services and a few theorists in the United States, destruction of undifferentiated housing and industrial plant became an all-purpose campaign objective.

Other theorists, including many planners in RAF Bomber Command and the U.S. Army air arm, devised a targeting policy aimed at precise vulnerabilities in an enemy state's economy. They thought that the best war plan would attack specific economic sectors in depth sufficient to destroy vital inputs to other enterprises. As self-reinforcing shortages strangled the enemy's war-sustaining potential, his war effort would grind to a halt. This strategy came to be known as "bottlenecking," because the bomber offensive would be aimed at well-defined bottlenecks or chokepoints in a foe's economy.

To be sure, even among precision-attack advocates in the late 1930s, the terror-bombing sword was rattled for the sake of deterrence. But it took disastrous combat experience in 1939-40 to dislodge British proponents of that school. The British response to high attrition and low effectiveness was to convert, after the summer of 1941, to nighttime

area bombing. The strategy not only made sense in the face of major technological shortcomings of British forces and the stiff defense offered by the Luftwaffe. It also was consistent with the views of wartime RAF leadership, who expected such attacks to have a consuming morale and economic effect. Known as the Congreve strategy (after its theoretical describer), this doctrine suggested that the best air objectives would be large and indistinct but highly-capitalized industrial complexes.[5] The Congreve strategy more or less assumed that the cost of replacing capital should be the criterion for targeting.

U.S. European Theater strategic air forces, for their part, persisted in daylight operations, despite British pressure to join in night raids. The United States' 8th and 15th Air Forces continued to adhere to the bottlenecking and air superiority objectives, despite a hiatus in deep-penetration operations from October 1943 through the successful Normandy landings and the attainment of nearly total air superiority in the second half of 1944. USAAF targeting was headed up by an "Enemy Objectives Unit," a combined staff consisting of representatives from OSS, the Bureau of Economic Warfare, and the USAAF, who were charged not only with mission planning but also with assessing the consequences of air attack. EOU analysts suggested that destruction of 40-50 percent of capacity in some key industries would accomplish the bottlenecking objective, a contention rejected by the area-bombing theorists. The EOU strategy differed further from the Congreve strategy

[5] For some background on the leading bombing theories, see Haywood Hansell, The Air Plan That Defeated Hitler, privately published, Atlanta, 1972, and Carl Kaysen, Note on Some Historic Principles of Target Selection, The Rand Corporation, RM-189, 15 July 1949.

in its assumptions about the costs and payoffs of bombing, the psychological and administrative effects of air attacks, the delay in onset of bombing effects, and the length of disruption caused by bombing.

Nuclear Weapons and Total National Vulnerability

The outcomes of both bomber offensives were extensively studied, and impressions about their validity came to figure in postwar debate on how U.S. atomic air forces should be targeted and what effects atomic bombing might produce. As neither strategy had performed as anticipated, the cases "in favor" of each rested heavily on the other's faults.

Indeed, some evidence indicated that neither campaign accomplished any very tangible military aims, most notably an earlier end to fighting. Society had hung together and production had not been seriously undercut in Germany until late in 1944; and when the German economy began to deteriorate in early 1945, it was due to many factors.[6] At the same time, the cost of the air offensive was high: Allied losses ran to about 10,000 bombers shot down and more than 150,000 airmen killed.

But in August 1945, atom bombs were dropped on two Japanese cities. Although the damage done was not remarkable compared to that inflicted in the previous year in devastating incendiary raids by the U.S. 20th

[6] Blackett gives the following German war production figures in his criticism of bombing in World War II (index based on output in 1940 before bombing began in scale): 1940=100; 1941=101; 1942=146; 1943=229; 1944=285. See P.M.S. Blackett, Fear, War, and the Bomb: The Military and Political Consequences of Atomic Energy, Whittlesey House, London, 1947, p. 23 and p. 216.

Air Force, great inspiration was given to new debate on whether the atom bomb's destructive power could overturn obstacles to successful prosecution of either of the economic bombing strategies. Some even argued that atomic bombing could knock future foes out of a war single-handedly. To be sure, this approach was not universally accepted. But as we shall see below, the expansion of nuclear arsenals and the development of thermonuclear weapons froze that image probably for good. So whether or not the atomic bombing picture had been properly framed in the late 1940s, in the U.S. government and in the military and scientific communities the issue from the start was never whether nuclear bombing would "work," but rather how targeting should be done, what post-attack effects could be produced, and so forth. Against this backdrop, then, let us turn to the subsequent evolution of economic targeting in U.S. strategy.

III. ECONOMIC TARGETING IN U.S. STRATEGY

The primary purpose of U.S. nuclear forces is to deter attack on the United States and its major allies and interests overseas. The essence of deterrence is to influence an adversary's perception of the costs and consequences of aggression when certain types of retaliation may be provoked. Should deterrence fail, of course, the game is not up: we are obliged to pursue national aims, even in a very destructive conflict.

Unfortunately, our understanding of the nuclear problem has been impeded by an overly narrow view of deterrence. Most people view nuclear deterrence as a sort of set-piece arrangement. Because a given deterrent threat must relate to many kinds of enemy threats, however, the deterrent must be sound in a number of situations.

Historically, we have experimented with many approaches to deterrence. We have seen a painfully slow evolution of planning toward an increasingly refined set of responses that are not all equally useful. Over time, we have generally observed economic attacks decline in relative importance as a part of the overall U.S. deterrent package. In this section, we will trace the specific ways in which economic attacks have figured in U.S. strategy as a whole. In addition, we will review some of the technical underpinnings of those attacks.

Historical Survey of U.S. Economic Targeting Concepts

Since 1945, the declaratory and theoretical bases of U.S. economic targeting policy have undergone considerable change. In practice, however, the technical nature of this attack problem has remained relatively constant. This is due to the simple fact that most Soviet

economic resources are concentrated in a relatively limited number of urban areas. When shooting at components of this target base, even low-yield weapons will cause significant collateral damage. Because there are not very many of these concentrations, it is fairly easy to severely damage the enemy's economy with a relatively limited number of weapons. Since the Soviet Urban/Industrial (U/I) target base changes at a glacial pace, the raw requirements for destruction of a given percentage of Soviet economic capability remain roughly the same, even over several decades. By contrast, Soviet military target systems (nuclear and general-purpose forces alike) have been far more demanding in terms of required numbers and capabilities of warheads. True, we can--and do--sandpaper our fingertips and play out the economic damage game to many decimal places. But despite doctrinal gyrations, technical innovation, threat evolution, and so on, the economic attack problem has not changed much over time. Accordingly, this section tracks two subordinate kinds of change in U.S. economic targeting over the past three decades.

The first aspect of economic targeting to change appreciably over time has been the role of economic attacks within the body of U.S. nuclear policy. A historical review of American economic targeting policy developments reveals two interesting facts. First, there have been two basic epochs of targeting from the perspective of the total U.S. war plan. The role of economic attacks in each has been basically the same, namely, to destroy in a relatively massive and singular blow the USSR's economy. But in the first major epoch, from 1945 to 1960, an economic attack would be committed as part of a single-shot, all-out

U.S. strike. Since then, economic targeting plans have come to be a sort of "reserve force." That is, major economic attacks could at least be withheld while attacks directed principally against military targets were executed. The rationale for this was that the continuing threat of a deadly economic strike could perhaps induce the USSR not to unleash such an attack and could at least open up a chance that fighting could be stopped before all possible damage had been done.

The second general historical change has concerned the analytic means by which we weigh and plan economic attacks. The various approaches used are not particularly important as they relate to the political dimensions of nuclear strategy. What is significant, though, is that these different technical approaches to economic targeting have tended to artificially influence force development and employment planning. Specifically, extraordinarily elaborate analysis of economic target systems--when combined with the traditional requirement to make sure that we could implement this attack with very high confidence at any time in a nuclear war--can lead to exorbitant demands for warheads for this mission. As models are refined, they become even more sensitive to perturbations in their inputs. As a result, doubts are occasionally raised about the "adequacy" of the deterrent. Let us briefly review the evolution of U.S. economic targeting from both of these perspectives.

Economic Attacks as a Component of the Total U.S. Nuclear Plan

Between 1945 and 1950, U.S. planning for nuclear war was casual, to say the least. Neither force structure nor employment planning was done in a systematic way. It has been pointed out that through 1947, "early

target lists and intelligence estimates were tentative and the military role of the atomic bomb was not yet clear." [7] Similarly, only marginal provisions were made to acquire an effective bombing posture.

Employment plans were fairly indiscriminate. Early operational plans vaguely called for all strikes to be carried out "as soon as possible" after the commencement of general war. Due to serious operational deficiencies, however, it probably would have taken days or weeks to have carried out such an attack. As a whole, the atom bomb was only a sideshow in the uncertain U.S. defense posture of the time.

From the vantage point of economic targeting policy, scant attention was paid to the theoretical rationales for atomic bombing attacks aimed against an enemy economy. Nuclear operations were simply cast in the image of the conventional campaigns of World War II. Target selection was for some time tantamount to aiming at city centers. Nominally, planning to destroy enemy industries was based on the wartime doctrine of precision bombing. However, awesome operational and technical deficiencies virtually ensured that the United States could not accomplish the goal of "knocking out the USSR" by a precision attack. [8]

Despite the problems that confounded a precision nuclear campaign, that strategy was retained, at least as a basis for force sizing. Target intelligence shortly revealed that essential Soviet war-related

[7] David Rosenberg, "American Atomic Strategy and the Hydrogen Bomb Decision," The Journal of American History, June 1979, p. 66.

[8] For a more detailed discussion of early U.S. nuclear deficiencies, see Kevin N. Lewis, Strategic Bombing and the Thermonuclear Breakthrough: An Example of Disconnected Defense Planning, The Rand Corporation, P-6609, April 1981.

capabilities--steel, electric power, oil, aluminum, aircraft engines, and tank production--were located in 70 cities.[9] Allocation of weapons to those cities on the basis of war-supporting industrial densities within candidate urban target areas would, it was thought, guarantee the destruction of those key industries, thereby solving economic intelligence and damage criteria problems. Assuming an allocation of two weapons to each of the 70 key cities, U.S. air planners predicted that SAC could wipe out about one-third of Soviet industry. Devastation of Soviet industry on this scale would, so it was thought, be sufficient to knock the USSR out of the war.

As time went on, targeting procedures were adjusted and force requirements were recalibrated to shoehorn the technically inadequate American nuclear posture into the framework of the USAF's precision bombing theory. While no specific requirement existed for killing urban population, the definition of an economic target was expanded to include workers living in the vicinity of installations and plants, making a de facto asset of the insoluble problem of poor bombing accuracy. Indeed, in 1948 an official panel designated as an appropriate atomic target "a vital war plant employing a large number of workers and closely surrounded by workers' houses." [10] In this way, population--as an input to the war economy--effectively became a target in its own right.

[9] See Robert Frank Futrell, Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907-1964, Air University Report AU-19, Maxwell AFB Alabama, p. 122.

[10] Richard Hewlett and Oscar Anderson, The New World, 1939-45: A History of the United States Atomic Energy Commission, Volume I, Pennsylvania State University Press, University Park, 1962, p. 358.

An important milestone in the evolution of economic targeting came in 1949-50. At that time, a struggle between the Air Force and Navy to determine which service would be, in effect, the "first line of national defense" was resolved in favor of the Air Force, or more precisely, in favor of strategic air power. The idea was that the United States and its allies could not possibly hope to contend with the gigantic conventional forces the Soviets were thought to be able to throw into a future land battle. The atomic bomb was put forward as a means for countering this imbalance. It was argued that a precision bombing campaign could thoroughly destroy the Soviets' war-making potential in a hurry, and, more important, that this damage would promptly undermine the Communist war effort.

The timing of the onset of bombing effects would not be terribly relevant if a future U.S.-Soviet war were to be a replay of World War II, featuring an eventual invasion of Europe. But if the goal was to prevent the USSR from overrunning the Continent in the first place, then it would be vital that bombing effects materialize quickly. A costly substitute for quick results, of course, would be the maintenance of large U.S. ground and tactical air forces in Europe to check Soviet armies while bombing effects matured, and a conventional Navy to back it up. Given the U.S. policy of demobilization (and taking into account the Soviets' choice not to reduce their own large land forces), the need for fast nuclear bombing payoffs was clear. Hence the theoretic claim that a precision economic bombing strategy would work quickly was a crucial policy consideration. Again, whether the United States could

knock the USSR out of a war in this way was doubtful.[11] Nonetheless, the decision was made to rely on such an air offensive.

Thus a major effort--given an added impetus by the Communist invasion of South Korea--began to ensure that SAC could accomplish its mission of knocking the USSR out of the war quickly and single-handedly. After the Korean war began, the operational picture began to change rapidly, but the strategic context did not. Basically, the United States became increasingly dedicated to a decisive, single-shot precision attack strategy as its main line of defense. As more and more weapons became available, the requirements of this strategy increased. In October 1947, it had been estimated that to "kill the USSR" would take "approximately 400 atomic bombs of destructive power equivalent to the Nagasaki-type bomb." By 1950, the number was more like 1,000.

As nuclear weapons entered the U.S. inventory in increasing numbers, another thing happened: they were assigned to targets other than economic ones.[12] Taking into account all targets sets, General Vandenberg speculated in 1952 that as many as 6,000 Soviet targets would have to be hit to destroy the USSR.[13] However, economic coverage

[11] A "Weapons System Evaluation Group" was created mainly to arbitrate Air Force-Navy disputes over the possible consequences of atomic air attack. The results of its first report, dated 1950, can be considered relatively optimistic, but WSEG/1 still concluded that 70-85 percent of bombers would reach their targets, that 50-75 percent would return, and that there would be severe basing problems. Moreover, only between 1/2 to 2/3 of industrial installations attacked would be damaged beyond repair. Given the putative goal of a "knockout blow," this performance seemed inadequate.

[12] The target base in 1949 been broken into three distinct classes: DELTA (essentially countervalue); BRAVO (counterforce); and ROMEO (targets to be destroyed to retard the advance of the Red Army into territory along the periphery of the Soviet Bloc).

[13] "Memo for the President," from General H.S. Vandenberg, 17 January 1952, p. 3 (National Archives).

remained the highest SAC priority.

The availability of more and improved weapons--including hydrogen bombs--accelerated the trend toward singular U.S. reliance on a massive-attack deterrent posture. (On 12 January 1954, Secretary of State Dulles outlined this strategy publically in the well-known "massive retaliation" speech.) Thermonuclear weapons, in particular, changed the context of targeting, even though declared U.S. precision bombing objectives were retained. Specifically, the lethal coverage of early high-yield H-bombs would have exceeded the extent of many targets, even given pessimistic assumptions about delivery accuracy and fuzing reliability.

The wide-area coverage of the new weapons obviously undercut the requirement for rigorous target selection. However, relaxed target selection criteria (and a corresponding reduction in force requirements) did not materialize in the period 1954-59. Available weapons were simply consumed by a more broadly defined target system. Operational doctrine emphasizing prompt and total force commitment, targeting practices, technological shortcomings, and high bomb yields combined to assure that any U.S. nuclear attack would include an indiscriminate blow against Soviet cities. Indeed, "the mass killing of noncombatants came to be viewed as a 'bonus' effect....Our knock-out blow would paralyze the Red Army not only by demolishing railroad yards, factories and party headquarters, but also by decimating the urban population and thus (perhaps) crushing Russia's morale." [14]

[14] Fred C. Ikle, Can Nuclear Deterrence Last Out the Century? California Arms Control and Foreign Policy Seminar, Santa Monica, June 1974, p. 12.

Although this strategy was seen by the Eisenhower administration as a relatively inexpensive counterbalance to seemingly invincible "Red Hordes," some analysts beginning in 1954 began to question the wisdom behind committing all U.S. forces against a full range of Soviet targets immediately upon the initiation of hostilities.[15] The Soviets were slowly but surely accumulating nuclear forces capable of striking back after a U.S. attack. Thus the credibility of a policy requiring a total assault against all Soviet targets was slowly eroding.

Accordingly, concerned U.S. analysts weighed alternative strategies. Some cited the numerous benefits of separating military from economic targets in U.S. plans. Others alleged that no form of controlled nuclear warfare made any sense. To resolve arguments about strategy, targeting priorities, and force levels, President Eisenhower commissioned an NSC review (referred to as the "Hickey Study") of strategic alternatives. The Hickey panel attempted to weigh the relative importance of Soviet economic and military targets. The study concluded that attacks on military targets alone could not destroy the USSR because an undamaged Soviet economy could eventually make good those losses. But neither would a purely economic attack do, since the Soviet Union could use its considerable military power to seize the resources necessary to reconstitute its economy.

The Hickey Study concluded that an "Optimum Mix" of both target types was the best. In short, a single-shot, massive war plan continued

[15] This material is discussed in more detail in Chapter Three of Kevin N. Lewis, "Planning Nuclear Defense: Force Structures, Employment Plans, and National Objectives," Ph.D. Dissertation, Massachusetts Institute of Technology, 1980.

in force. Although the "Optimum Mix" gave rise by 1960 to the first "SIOP," the new centralized plan was essentially a reiteration of the "Mix." Had those plans been executed, as one commentator has alleged, the results would have included 325 million immediate fatalities in the USSR, PRC, and satellite countries.[16]

The picture changed dramatically, however, with the 1961 change in administrations. The Kennedy administration's strategic policy reforms marked a critical watershed in the history of U.S. economic targeting policy. This second strategic epoch witnessed two departures from previous custom that continue to shape planning to this day.

The first change was a redesign of war plans to incorporate flexible employment options. Provision for options--along with changes in the posture to support such attacks--was driven by the maturation of the Soviet strategic threat, by the recognition that nuclear weapons (and, more to the point, massive-attack threats) were not credible deterrents in many contingencies, and on changing alliance requirements. Because the fundamental purpose of the options was defensive--namely, to provide an opportunity to stop a war before catastrophe resulted, economic attacks were accorded a new status, that of a withheld "reserve" force that would not be executed unless this were deemed necessary in extremis.

The second change was occasioned by the availability of new technologies that not only made a withholding strategy feasible but also made possible relatively more discriminate and controlled nuclear

[16] "Ellsberg's A-Weapons Plant Vigil Recalls 1 '58 Option: Holocaust," Indianapolis Star, 9 July 1978.

attacks. With new early warning, reconnaissance, intelligence, and command and control systems, one could begin to think about "campaigns" against military target systems that could be located and attacked with unprecedented confidence. With more accurate and sophisticated weapons, it became possible to use lower yields for many jobs. This transformed the flexible nuclear strategy, for years a desirable goal to many, into a feasible concept.

The nature of economic targeting in the overall strategic context has not changed appreciably over the past 20 years. It has been, and remains, a "final sanction" designed to deter total Soviet escalation if a nuclear war starts (and perhaps to coerce Soviet compliance with U.S. general war aims in limited nuclear and large-scale conventional fighting). In sum, key U.S. strategy developments of the past two decades have concerned military options. The economic targeting problem has not been so lively or interesting, despite the occasional turmoil surrounding the Soviet civil defense program.[17]

Evolution of the Methodologies Used to Plan U.S. Economic Attacks

The second major trend over the past three decades has concerned the methodologies by which U.S. economic attacks have been planned and assessed. Little has been said about such techniques in the 1950s. But since the early 1960s, two leading frameworks for evaluating U.S. economic attack effectiveness have been widely discussed. First, through the late 1960s, the U.S. aim in an all-out economic retaliatory attack would be, as Secretary McNamara said, to "destroy the attacker as

[17] For elaboration on this point, see Kevin N. Lewis, "The Prompt and Delayed Effects of Nuclear War," Scientific American, July 1979.

a viable 20th century nation." This capability to inflict "assured destruction" on the USSR was to be guaranteed, said McNamara, even were U.S. forces to absorb the most effective enemy attack possible.

It is worthwhile to define the concept of viability. In technical terms, a nation's economy is said to be viable if, without external aid, the output of the economy is: (1) sufficient and appropriately mixed to ensure productivity and support continued participation in post-attack reorganization; (2) sufficient to meet claims on production for certain purposes other than recovery and reconstitution; and (3) sufficient to support the stock of real capital that will be needed to meet the first two requirements.[18] If a nation (or region) can restore sufficient production before stockpiles are exhausted, the economy is considered viable and the basic prerequisite for recovery is met. But if viability has been devastated, so theory says, the nation cannot get started on the road to recovery and will collapse.

This raises the question of how to compute the requirements for such an attack. Appropriate figures of merit for U/I strikes are not obvious. The first question to be answered is how to measure damage. Economic capacity has been measured by certain aggregate characteristics.[19] One of the first expressions of economic damage was the destruction of Soviet Industrial Floor Space (IFS), which was proposed as a measure of capacity (and its destruction as an index of

[18] Howard Berger, A Critical Review of Studies of Survival and Recovery After a Large-Scale Nuclear Attack, RDA-TR-107006-009, R&D Associates, Marina Del Rey, California, December 1978.

[19] For a more detailed account of commonly used measures, see Jeffrey Richelson, The Effects of Nuclear War: Economic Damage, AAC-TR-10801/79, Analytic Assessments Corporation, Marina Del Rey, California, January 1979.

damage) by Secretary McNamara. The chief value of IFS was that because it was easily measured, it enabled U.S. planners to circumvent economic intelligence deficiencies, specifically the problem of relating plant size to capacity, value of plant and equipment, and so on. However, IFS does not take into account discrepancies in plant layout, the relative efficiencies of different enterprises, their degree of technical sophistication, and so on. Nor does IFS address the value of service sectors.

Because detailed knowledge about economic interactions was a prerequisite to precision strategic targeting, a Manufacturing Value Added (MVA) target base was later prepared. The MVA data base provided a more refined means for assessing the contribution of extra weapons toward the creation of bottlenecks in the recovery economy.[20]

A second, much more difficult question is as follows. Within the context of any measuring system, how much damage must be done to inflict "assured destruction" or any other damage goal? Although we are obliged to devise rationales to define "sufficient" damage, those determinations ultimately revert to fiat. The well-known rationalization for "assured destruction" given by Secretary McNamara was said to be based on rapidly diminishing marginal returns in both fatalities inflicted and economic destruction caused after 400 "Equivalent Megatons" (EMT) had been placed on Soviet cities. Systems analysts produced a chart which showed that 400 EMT delivered would in fact destroy about half of the USSR's population and about two-thirds of its MVA, damage which McNamara

[20] Even so, intelligence on economic targets was so poor that precise estimation of damage done to the USSR as a function of weapons surviving would be beyond accurate calculation.

contended was sufficient to destroy the USSR's viability.

However, it was not McNamara's purpose to specify the size of the force required for the assured destruction of the USSR as a viable nation. Rather, his statement of assured destruction criteria was intended to suppress what seemed to McNamara at the time to be excessive requests by some of the services for new strategic delivery systems.[21] Although this concept of "assured destruction" was the stated aim of U.S. retaliation, operational planning and force requirements probably were derived from other sources. More specifically, it has been said that the destruction of 70 percent of Soviet manufacturing has been the U.S. economic damage objective since 1961.[22]

There is no public reference to indicate that such criteria have not been amended over time. But in public statements, the declared aims of retaliatory attacks have been diluted for reasons having nothing to do with actual economic targeting requirements. In particular, by pointing to increasing threats, Soviet civil defenses, a more diverse target base, and so on, some critics contested the adequacy of the alleged 400 EMT force size. Rather than give in on the point and acknowledge a case for new procurement,[23] McNamara modified the apparent requirements of assured destruction. This step, duplicated in successive years, was undertaken solely as an extension of assured

[21] The 400 EMT figure in effect represents a back of the envelope calculation. To destroy the largest 200 Soviet cities (that is, those with populations greater than 100,000), given a blast objective of about 5-6 psi above ambient atmospheric pressure, 400 EMT are required.

[22] Cited in Hearings of the House Appropriations Committee on DoD Appropriations for 1978, U.S. Government Printing Office, Washington D.C., 1977, Part II, p. 212.

[23] Secretary McNamara brought the U.S. missile buildup to a halt in January 1964, over primarily Air Force objections.

destruction's intended constraint on procurement.

NOMINAL DILUTION OF ASSURED DESTRUCTION REQUIREMENTS

Defense Report for Fiscal Year	Fatalities	Industrial Destruction
1965	25%-33%	67%
1966	20%-25%	50%-67%
1968	20%-25%	50%

At the same time, McNamara qualified the manner in which the attack was to be evaluated. First, the requirement was simply for assured destruction; then for AD given a greater than expected threat; finally, the assured destruction mission was apportioned among the legs of the TRIAD, further weakening U.S. "requirements."

Eventually, official commentators abandoned all quantitative references to the requirements of AD that could be used to support new force buys. For example, Clark Clifford said that the effectiveness of the strategic forces was gauged by "their ability...to inflict unacceptable damage on the attacker." [24] Melvin Laird suggested that U.S. forces should threaten potential aggressors with "unacceptable risks." [25] And James Schlesinger said that deterrence demanded the ability to inflict "irreparable damage" on the USSR. [26]

But despite these declaratory peregrinations, no changes in basic economic targeting policy seem to have been implemented in the 1960s and early 1970s. One author cites an official who said in 1971 that "the SIOP has remained essentially unchanged since [1962]. The targeting philosophy, the options, and the order of choice remain unchanged from

[24] Clark Clifford, Annual Defense Report for FY1969.

[25] Melvin Laird, Annual Defense Report for FY1971.

[26] James Schlesinger, Annual Defense Report for FY1975.

the McNamara speech." [27] That particular account goes on to report that a "two-star Air Force planner was quite emphatic (in 1973) that the SIOP was never reworked under [President] Johnson. It is still basically the same as 1962."

Only recently, in fact, have some elements of U.S. economic targeting policy changed. The early and mid-1970s saw two major shifts in economic targeting policy. These shifts were made possible by new technologies (chiefly MIRV), and they were made attractive by the steady trend toward U.S.-Soviet strategic parity. The first shift featured more employment options. Their purpose was to tailor U.S. nuclear use to specific wartime requirements and to provide more of an opportunity for stopping a war at a relatively low level of fighting.

The second shift, beginning in 1973-74, was from "assured destruction" to "assured retaliation." The new policy differed from the former in not requiring that the USSR's viability be destroyed, but rather that the time it would take to recover after an attack be as long as possible. Secretary Rumsfeld said the new strategy sought to "retard significantly the ability of the USSR to recover from a nuclear exchange and regain the status of a 20th century military and industrial power more rapidly than the U.S." [28]

The new anti-recovery targeting objective supposedly marked a significant departure from previous theory. [29] Yet despite much debate,

[27] Desmond Ball, Deja Vu: The Return to Counterforce in the Nixon Administration, California Seminar on Arms Control and Foreign Policy, Santa Monica, December 1974, p. 16-17.

[28] Donald Rumsfeld, Annual Defense Report for FY1977.

[29] See, for instance, Richard Burt, "Pentagon Reviewing War Plans," New York Times, 16 December 1977.

the actual reasons for the change were less significant than most explanations suggested. Among other things, the new aims owed their creation to the steady equalization of the strategic balance,[30] to a desire by President Nixon to depart (at least in appearance) from the strategy of Presidents Kennedy and Johnson, and to U.S. concern with Soviet efforts in the fields of civil and active strategic defenses. The specific statement of the goal of delaying recovery was thus made in part to warn the Soviets that they should not expect to emerge from all-out war on the better side of some post-attack "chaos gap." According to one study of targeting literature,[31] the new strategy was also adopted because none of the then-available technical evidence strongly supported the proposition that either the United States or the Soviet Union would be able to destroy the other's viability. Be that as it may, the test of the new strategy according to Donald Rumsfeld was as follows: "If the Soviet Union could emerge from [general war] with superior military power, and could recuperate from the effects more rapidly than the United States, the U.S. capability for assured retaliation would be considered inadequate." [32]

Excluding political twists, the two strategies actually do not differ to any appreciable degree from a theoretical perspective. Both obey the vertical bombing concept of the 1940s: the deprivation of some Soviet economic sectors of necessary inputs in order to bottleneck the economy and prevent surviving resources from being used where needed in

[30] Given the slow trend to strategic parity, it might be argued that the U.S. government was interested in reminding the Kremlin that nuclear superiority conferred no advantages.

[31] H. Berger, *op. cit.*

[32] Donald Rumsfeld, *op. cit.*

the postwar liquidation of the consequences. An attack to destroy viability, in effect, simply tries to ensure that the enemy nation be unable to reconstitute far enough to worry about recovery.[33]

Methodological Problems

Using several methodologies, one planning task is to design an adequate offensive posture, given that we can agree on definitions of damage. However, three outstanding problems trouble the determination of "how much is enough." First, data problems are seemingly intractable for a careful assessment of what will do the job of either killing the enemy nation or delaying its recovery. Second, analytic methods often yield only dubious results. Third, it is hard to translate even perfect outcomes of these analyses into an interpretation of recovery times.

Generally speaking, 20 percent of nondifferentiated MVA is located outside major urban conglomerations.[34] In the Soviet case, we may not even have identified all capacity of interest. In fact, the abrupt flattening out of the MVA vs. EMT curve used to describe economic damage after, say, 1000 EMT reflects more a deficiency of the data base than the total disappearance of additional targets.

[33] It is worth noting that recent controversy over the Carter administration's PD-59 strategy revision apparently did not change the economic targeting components of U.S. war plans. See "Slocombe Clarifies PD-59 Policy: Industrial Targets Still Important," Defense Week, 17 November 1980; and Secretary of Defense's Annual Report for FY1983, submitted by C. Weinberger, February 1982.

[34] In the United States, about half of the approximately 300 refineries are outside major urban areas (defined as the 71 largest SMSAs), although those installations represent only about 21.5 percent of capacity. Similarly up to 80 percent of non-ferrous metallurgical refining and smelting establishments; 23 percent of steel mills; 33 percent of electronics; 30 percent of engine and turbine production, and so on. See Richelson, op. cit.

The methodologies used to assess the consequences of economic attacks pose even more problems. Because of the historic emphasis on "bottlenecking," Input/Output analysis has been a popular approach. According to theory, the destruction of an input into an I/O tableau (analogous to the annihilation of a particular sector of the economy) will undercut associated sectors, and the economy will be "brought down" in the traditional vertical bombing sense. However, the difficulties in assessing the effects of attacks (even given target intelligence much superior to that available in earlier years) are apparent. And given the corollary assumption that the United States will be unable to destroy the viability of the Soviet economy, we are left with the problem of computing recovery paths and times, a task for which I/O analysis--in the absence of assumptions about enemy recovery policy, among other things--is not particularly applicable.

Analysis of the postwar utilization of surviving resources relies on assumptions about the surviving government's ability to coordinate residual capacity, the ability of the transportation system to move supplies between imbalanced regions, the dedication of workers and others to post-attack reconstitution, and so on. Treatment of specific capabilities becomes vitally important, because unless these can be introduced directly into the damage model, we cannot assess the consequences of destroying substitutable resources. In an I/O model, inputs are infinitely substitutable within sectors, but there may be no substitution between sectors. Failure to take into account substitution and the changed nature of demand can lead to absurd results.[35]

[35] A classic case in point is the apparent significance of the Soviet paint industry in an I/O tableau. Virtually every finished pro-

The usual solution proposed to deal with such problems is to increase the number of sectors modelled in the economy. But model data requirements can quickly get out of hand as more sectors are added. Barring the practical difficulties inherent in this tactic, R.U. Ayers has pointed out several additional faults with I/O research. First, I/O models are at best "snapshot" representations of an economy and do not reveal evolutionary and dynamic trends. Second, certain features of production such as lead times are ignored. Third, inter-industry coefficients are fixed and therefore are unrealistic. Fourth, lack of geographic specificity does not provide for the important adverse impact of destruction on transportation systems. Fifth, demand is typically portrayed solely as a function of supply. Therefore, there is no compensation for the potentially major impact of policy decisions, such as continuing investment in police and military forces.[36]

Finally, it is hard to translate destroyed capability into "the impedence of recovery." Recently, some studies of Soviet civil defense have referred to its ability to greatly reduce recovery times,[37] but those findings enjoy less than universal acceptance. Although some

duct in the Soviet economy consumes paint, and it is said that there are few paint plants in the Soviet Union. Paint plants are hard to harden and they take a long time to rebuild. Hence, a small attack on the Soviet paint industry should bring the entire Soviet economy grinding to a halt. Obviously that result is nonsense, because destruction of paint plants simply would mean that Soviet finished goods would not be painted.

[36] R. U. Ayers, Models of the Post-Attack Economy, Hudson Institute, HI-648-RR, August 1966.

[37] For some leading examples, see T. K. Jones and W. Scott Thompson, "Central War and Civil Defense," Orbis, Fall 1978; and J. Pettee, et al., PONAST briefing charts (no date). For a critique of these models, see Michael Kennedy and Kevin Lewis, "On Keeping Them Down, or Why Do Recovery Models Recover So Fast?" in Desmond Ball, ed., Strategic Nuclear Targeting, Australian National University, Canberra, 1982.

recovery pathway analysis has been undertaken, most work has continued to seek to locate bottlenecks and breakpoints in an economy at large.[38] Recovery analysis then is focused on estimating the time it would take to unbottleneck critical sectors. But as Sobin and Bull observe, "it is not easy to conclude (from a survey of the literature) that any particular kinds of capacities are the critical ones in the sense of providing absolute limits to objective achievement." In other words, some economic activities are more essential than others, but it is hard to find those that are clearly "critical." [39] Similarly, the research community awaits a major breakthrough in the characterization of the political, social, and organizational determinants of recovery.

New Possibilities For Economic Targeting

Related to political and other rationalizations for "assured retaliation" was the U.S. MIRV program begun in 1970. In particular, the Navy's sea-based deterrent force grew from a total of about 650 warheads in 1969 to on the order of 5000 weapons by 1975. With MIRV, although many new military targets could have been added to U.S. war plans, many opportunities (or, it might be said, a "requirement") for increasingly articulated U.S. economic targeting emerged.[40] In

[38] See, for example, Jane Leavitt, Analysis and Identification of Nationally Essential Industries, Volume I, Institute for Defense Analyses, P-972, March 1974.

[39] Sobin and Bull, Measurement of Critical Production Capacities for Models for the Post-Attack Economy, Research Analysis Corporation, RAC-TP-387, February 1970, and Bernard Sobin, Post-Attack Recovery, Research Analysis Corporation, RAC-P-51, June 1970. Laurino and Dresch have investigated what levels of surviving capacity were and were not able to meet minimal national requirements. See National Entity Survival: Measures and Countermeasures, (Final Report), Stanford Research Institute, June 1971.

[40] Secretary Rumsfeld said that 8500 weapons were needed to retaliate in his FY1978 Defense Report.

addition, more sophisticated targeting systems, acceptable accuracy, the lower yields of POSEIDON, and better target intelligence opened up possibilities for discriminating attacks within the total set of economic targets. For the first time, we could, at least in theory, think about options aimed at portions of the economic target base.

These attacks might be designed to coerce the Soviet leadership by threatening further attacks along the lines suggested by an initial strike. Or they might seek to exploit specific vulnerabilities in the Soviet economy in order to gain some advantage in an ongoing theater war.[41] It might, in some circumstances, be more advisable to attack only industries producing final military goods, as opposed to plants manufacturing tools or those that process raw materials. It is not impossible that attacks could be tailored to influence theater fighting, without precipitating all-out Soviet reprisal.

Another trend in employment policy in the past few years has been to recognize that blunt targeting doctrine may not adequately take into account outside aid, whether coerced, purchased, or volunteered. In an extended war, the reconstitution of damaged forces may be very important. Historical experience suggests the importance of resources available outside of war zones. Such aid may, given an apparent Soviet ground-force superiority, be readily obtainable from nations the USSR

[41] A number of obvious Soviet economic vulnerabilities come to mind. Recent Soviet industrial layout has stressed economies of scale, and so some Soviet industries are heavily concentrated in a few very high value clusters. It would be possible, under the circumstances, to knock out big slices of some kinds of production with relatively few weapons. An example of such a limited economic attack is the counter-refinery one presented in the Office of Technology Assessment Report on The Effects of Nuclear War, U.S. Government Printing Office, Washington D.C., May 1979.

might capture.

Finally, there has been much recent attention paid to the advantages of confining U.S. economic objectives to the specific elements of Soviet power that pose the most immediate threat to U.S. interests. It has been pointed out that the United States has no complaint with a Soviet civilian population that, for the most part, cares little for its own leadership. Hence, there may be a strong political and military, not to mention moral, case for formulating economic attacks with this in mind. Accordingly, some commentators have begun to speak in terms of such objectives as enemy leadership, "ethnic fracture points," and energy production. Naturally, a very precise and detailed data base and sophisticated damage models are necessary to see this kind of targeting through. However, as we will note below, we may be spending too much time massaging inherently uncertain information and methods.

Patterns in U.S. Economic Targeting Evolution: An Overview

Although the context of overall U.S. strategic targeting and the U.S.-Soviet balance have shifted dramatically between 1955 and 1980, the economic targeting problem today does not fundamentally differ from the one we faced in the 1950s, although some refinements have been effected and others are en train. This is true despite the occasional gyrations that mark apparently "new" strategic rationales that we have witnessed over the past three decades. Changes relating to the role of economic attacks within the totality of U.S. nuclear planning however, have been very important. Nonetheless, it will be interesting to see how new weapons technologies--more accurate sea-based systems, cruise missiles,

and improved command, control, and reconnaissance capabilities--will influence the subsequent evolution of economic targeting policy. It is difficult to say for sure, but it is likely that major changes in U.S. nuclear policy over the near term, if there are any, will mainly relate to military options.

In light of the preceding review, we can discern a few consistent threads in the evolution of U.S. economic targeting policy. First, U.S. economic target planning has been strongly influenced by the American independent strategic bombing tradition. Initially, this literally meant that a massive, immediate blow against the Soviet economy was supposed to burn up a Soviet invasion. As the ability of Soviet strategic forces to return this favor came to be widely recognized, however, the economic attack was transformed into a withholdable option pending attempts to settle the issue before mutual disaster ensued. Although U.S. strategy has been tending toward increased flexibility, the basic dogma of an "assured-destruction" blow continues to influence U.S. strategic deliberations in other areas and continues to shape force and employment planning generally.

Second, in many respects we seem to have become prisoners of our economic targeting methodologies. It is clearly essential to be very specific about the technical aims of an economic attack, if for no other reason than because just like any other option, explicit statements about the goals of such attacks must be carefully detailed for the use of our target staff. However, excessive fine-tuning of attack criteria and expansion and complication of damage models and data bases seems to have made our planning more sensitive to the perturbations and

uncertainty that pervade all calculations about nuclear war--yet which may not be very important. Since nuclear planners are very conservative, apparent shifts in U.S. capabilities tend to breed large compensatory responses. This may lead to the artificial inflation of U.S. economic targeting requirements, possibly to the detriment of other needs.

Third, the economic targeting problem has been strongly influenced by technological and other force structure developments. Ideally, we should expect our national nuclear policy to lay out operational requirements to be served by available and evolving technology. However, in many cases--the development of the hydrogen bomb and the fractionation of U.S. missile payloads come to mind--targeting adjustments have instead conformed to fit the new force capabilities. In turn, it is even possible that our national wartime strategy has been shaped, or at least powerfully affected, by new technologies.

Fourth, the economic options in the U.S. war plan have increasingly been relegated to a "reserve" status. This has important force structure and employment ramifications, of course, and may very well require refinements in technical capabilities and operational procedures over time. Although it is conceivable that we may develop some relatively "limited" economic options, the heavy collocation of leadership, population, and industrial and transportation targets will probably militate against too much emphasis on these kinds of attacks. An interesting development may result from an apparently inevitable conflict between the deepening reserve status of economic options and the traditional U.S. concept of escalation linkage. Even when we have

developed small options, we have generally tried to tie our big attacks to limited ones to deter Soviet attempts to conduct limited nuclear operations. Moreover, we have in particular disavowed reliable control over escalation once a nuclear war begins. The increased role of reserve capabilities, therefore, forces a new look at these old issues.

Fifth, no matter what else is decided in the economic targeting policy debate, we can expect more and more sophistication, or at least complication, in the design of these attacks. Based on the current popular discussion, it could be that more attention will be paid to specialized components of the Soviet urban-industrial target base, primarily political leadership and administration, internal security capabilities, energy production, and communications. However, it seems likely that, despite rhetoric about "policy shifts," the major options will not differ much in their aggregate effect from massive economic options based on more simple guidance. Indeed, even if some salient new guidance were to be devised, such attacks, like any other ones, could be subject to counteraction by the Soviets.

IV. SOVIET PERSPECTIVES ON TARGETING

Comparing the American approach to nuclear weapons employment with that of the Soviet Union is hard to do with confidence because of the vast information asymmetry that characterizes the strategic policies of the two countries. Even though the operational details of U.S. war plans remain highly classified, there is enough material in the public domain to permit a fairly accurate description at least of the broad philosophy and priorities that underlie American nuclear contingency planning. The same can hardly be said for the Soviet Union because of the pervasive secrecy that shrouds even the most elementary features of the Soviet strategic planning process. Here, about all we have to go on is Soviet commentary on the essential elements of Soviet military doctrine, supplemented by what we can observe in the evolving technical complexion of the Soviet force posture. At best, these sources of insight permit little more than guarded inferences about the nature and associated planning criteria of Soviet targeting options and attack schedules.

Even the public record of Soviet doctrine has become less and less helpful in recent years as a consequence of growing Soviet appreciation of the extent to which the "war fighting" focus of Soviet strategic writing has galvanized American concerns over the goals and purposes that have motivated Soviet force development ever since the ongoing Soviet buildup first began in earnest in the mid-1960s. Increasingly throughout the period since the euphoria of detente began to be displaced by a hardening of American suspicions about the nature of long-range Soviet strategic ambitions, the once voluble body of Soviet

military literature on the character and requirements of future war has become progressively more bland and nondescript. At the same time, we have seen a mounting barrage of high-level (and highly coordinated) "official" Soviet leadership pronouncements and supporting documentation denying Western allegations that the Soviet Union nurtures such unseemly thoughts as the desirability of preemption and victory in nuclear war.[42] Although these self-serving propaganda attempts to discredit the validity of Soviet doctrinal preachments in Western eyes scarcely vitiate the continued relevance of Soviet strategic thought as a factor bearing on Soviet weapons acquisition and contingency planning, they do attest to a substantial "drying up" of Soviet professional military sources as useful indicators of behind-the-scenes Soviet military policy deliberations. Thus, as difficult as it has always been for Western analysts to deduce in much detail the operational elements of Soviet war planning from the meager base of overt evidence, this development portends an even further worsening of that analytical challenge in the years ahead.

[42] Representative examples include Brezhnev's pointed denials that the Soviet Union is pursuing strategic "superiority" (see, among others, New Times, No. 19, May 1978, p. 7 and Time, January 22, 1979, p. 22); a related disavowal by a Soviet General Staff officer of any endorsement of preemption in Soviet military doctrine (General N. Chervov, "A Soviet View on Nuclear War," letter to the editor, Los Angeles Times, February 12, 1982); and two widely cited public relations pamphlets, both of which deny any offensive or war-waging content in Soviet military doctrine: The Threat to Europe (Progress Publishers, Moscow, 1981) and Whence the Threat to Peace (Military Publishing House, USSR Ministry of Defense, Moscow, 1982). Although the latter of these pamphlets was produced expressly in reply to a recent U.S. Defense Department document (Soviet Military Power, 1981) that contains its own share of special pleading, it would have been far more credible were its contents not contradicted by a substantial body of authoritative commentary appearing elsewhere in the Soviet military literature.

Nevertheless, there is more than enough instructive content in Soviet writing on nuclear matters to assemble at least a first-order mosaic of Soviet thought on the role of economic targeting in the broader Soviet conception of what a nuclear war might involve. Although the Soviet force posture has only acquired in the past decade or so the essential wherewithal of a full-fledged nuclear war fighting capability, Soviet doctrine on the likely character and operation ¹ desiderata of a nuclear war has been consistent and uniformly adamant since at least the early 1960s. This doctrine reveals a perspective on economic targeting and its operational relevance in Soviet war planning that stands in marked contrast to that which has largely informed U.S. strategic policy, particularly in its more recent formulations. In the discussion that follows, we will review the major historical underpinnings of modern Soviet targeting doctrine, examine the current Soviet image of nuclear war, and explore the role assigned to economic/infrastructure attacks in Soviet targeting priorities.

Postwar Background and Evolution

Two explanations account for the marked dissimilarity between American and Soviet approaches to economic targeting in modern warfare. One lies in the Soviet Union's lack of a strategic bombing tradition comparable to that developed by the United States and Britain during World War II. The other is the apparent preference of the Soviet leadership to base its nuclear strategy and force design on other than "assured destruction" premises, which have so heavily influenced U.S. strategic planning since the McNamara years.

To some degree, of course, Soviet disdain for the urban-industrial bombing policies of the Western allies against Nazi Germany in World War II has been a classic case of making a virtue of necessity, since the Soviet Air Force during that period almost completely lacked the technical capability and strategic reach needed to carry the air war to the German heartland. Soviet military writings openly concede this point and freely admit that of all the bombing sorties of Soviet Long-Range Aviation during the war, only some four percent were targeted against the Nazi economic and military-industrial base.[43] At the same time, Soviet commentators generally maintain that the sustained countereconomic bombing raids of the USAAF's 8th Air Force and RAF Bomber Command during World War II contributed, at best, only marginally to the ultimate defeat of Germany and thus entailed an expenditure of manpower and materiel far disproportionate to their actual combat significance. Although Soviet wartime planners clearly appreciated the close linkage between the German defense-industrial base and Hitler's war-waging potential, they were driven both by military-technical and operational necessity to concentrate their own combat efforts almost exclusively against the German military formations that were directly

[43] As Marshal Sokolovskii notes: "Independent air operations were ... conducted to neutralize and destroy enemy economic and political centers. However, because the Soviet Air Force lacked the necessary means to do this during the past war, such operations were rare and conducted with limited forces; they were not able to exert any major influence on the course of the armed conflict. Consequently, during the war we really were not able to solve the problem of destroying the enemy's deep strategic rear areas or to undermine his economic potential and national morale. The long-range Air Force flew a total of only 215,000 sorties; of these only 3.9 percent were aimed at enemy economic centers." Soviet Military Strategy, translated by The Rand Corporation, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1963, p. 260.

threatening the survival of Moscow and the Soviet heartland.

If the Soviets had any abiding thoughts at all during those dire years regarding the relevance of economic assets to modern warfare, they were directed far more toward the imperative of preserving the Soviet economic and industrial base than toward studied concern over ways to neutralize that of their principal adversary. This concern was most vividly reflected by the ultimately successful Soviet effort to relocate their key war-support industries from the Moscow area to dispersed regions east of the Urals, well beyond the reach of German ground forces and airpower. In the purely military realm, however, Soviet counteroffensive operations remained almost totally directed toward destroying the major forces of the Wehrmacht directly on the battlefield. As Marshal Sokolovskii observed years later, the principal goal of Soviet military operations was "to destroy the main enemy forces in one or two most important sectors," with particular concentration on "the largest enemy formations threatening Moscow." [44]

This approach to force employment clearly reflected the heavy counter military emphasis that has come to dominate Soviet defense planning ever since. In Sokolovskii's words, the principal criteria that governed the Stavka's deliberations prior to mounting an offensive were "the composition of Soviet forces, the configuration of the front lines, the composition of enemy forces, weak and strong points in the enemy's defenses, and the character of the theater of military operations." [45] Conspicuously lacking in this formulation was any

[44] Ibid., pp. 235, 241.

[45] Ibid., p. 239.

notion that the defeat of the enemy could be brought about by attacking his rear-area infrastructure, particularly in the absence of accompanying success on the forward battlefield. With due allowance for the lack of a significant Soviet strategic air arm and the consequent Soviet propaganda need to discredit the contributions of the Allied powers with their long-range bombers, this conception of target priorities and the proper focus of the main war effort stood at marked odds with the theoretical teachings of Douhet, which had largely given inspiration to the American and British concentration on urban-industrial bombing during the years of the war prior to the Normandy invasion.

Given the limitations in destructive power of munitions available at the time for rear-area bombing, the Soviet tendency was to argue that selective attacks on presumed enemy economic/industrial infrastructure nodes could not, short of near-total devastation, guarantee a crippling of the enemy's war-making potential. This was particularly so, in Soviet thinking, because of the difficulties that attended a correct determination of the enemy's key industrial war-support vulnerabilities. As an example, one Soviet writer singled out the case of the German chemical industry: "During the past war, the U.S. staff section for the study of strategic bombing calculated that the Allied Air Command made a serious error by not selecting as a first-priority target the sole and very vulnerable plant for the production of diboromethane. This plant produced the ethyl compound required for high-grade gasoline, and which is so necessary that not one modern airplane can fly without it. Specialists maintain that the bombing of this single target could have

caused greater damage to the German air forces than was caused by all the saturation bombings against aircraft plants throughout the war." [46]

In the absence of high-confidence intelligence regarding where those critical vulnerabilities lay, to say nothing of the gross Soviet incapacity to get at them directly with strategic airpower, the preferred Soviet approach was to concentrate all the resources of the Soviet armed forces directly on the more tangible instruments of German military power. What few Long-Range Aviation attacks and naval interdiction efforts the Soviets were able to mount against the Nazi rear echelon were largely devoted toward undermining key sources of German strength (such as critical raw materials resupply) rather than toward disrupting the German war economy as a whole and causing large-scale societal demoralization. Indeed, in the forward combat area, the Soviets occasionally seemed less interested in destroying the nonmilitary assets of the adversary than in "liberating economically and politically important areas" that might, in turn, be exploited to support the Soviet war effort and subsequent postwar reconstruction. [47] All in all, the Soviets maintain--with considerable justification--that they prevailed on the Eastern Front primarily by engaging the German forces in a head-on confrontation of countervailing firepower, in which the Wehrmacht was ultimately ground down by the superior weight of Soviet numbers, operational persistence, and materiel sustainability in

[46] Colonel M. Shirokov, "The Question of Influences on the Military and Economic Potential of Warring States," *Voennaia mysl'*, No. 4, April 1968, translated in Selected Readings from Soviet "Military Thought," SPC Report 584, System Planning Corporation, Arlington, Virginia, April 1980, p. 321.

[47] Sokolovskii, op.cit., p.235.

what might be regarded, in modern parlance, as a prototypical "slow-motion counterforce war of attrition."

A great deal of this Soviet emphasis on countermilitary operations faute de mieux promptly evaporated once the Soviet Union acquired the truly mass-destruction capabilities afforded by nuclear weapons and intercontinental air and missile delivery systems. Much of the Soviet depreciation of countereconomic targeting during and immediately after World War II, it must be remembered, was a reflection of Soviet accommodation to prevailing military-technological realities rather than of conscious Soviet strategic choice. Notwithstanding their emphasis on countermilitary operations and their self-serving tendency to discredit the deep-penetration bombing strategy of their Western allies, the Soviets always harbored a well-honed appreciation of the critical relationship between a thriving war-support infrastructure and deployable combat power. Had they been blessed with large numbers of long-range bombers and escort fighters comparable to those of the United States, there is little doubt that the Soviet Air Force would have made every possible effort to bring the German war economy under sustained fire in conjunction with its close-support and battlefield interdiction activities in the forward land theater.

Transition to the Nuclear Age

With the introduction of nuclear weapons into the Soviet arsenal, the formerly denied option of comprehensive rear-area targeting became quickly elevated to a level of major importance in the hierarchy of Soviet offensive functions. During the prenuclear era, the standard Soviet formula held that ultimate strategic victory could only come at

the end of a lengthy process of cumulative military successes at the operational and tactical levels. In light of the vast destructiveness of nuclear weaponry, however, this traditional Soviet image of warfare was quickly supplanted by a new conception which held that, under the right circumstances, effective employment of intercontinental strikes with the benefit of mass, shock, and surprise could achieve fundamental strategic objectives at the very outset of a future war, in effect ending the painstaking and methodical sequence of steady force application with only incremental success from campaign to campaign that had been the characteristic feature of wars in the prenuclear age. As Marshal Sokolovskii described the change, the "revolution in military affairs" brought about by the emergence of nuclear weapons had rendered the goals of war achievable "not only by the defeat of the enemy's armed forces, but also by the complete disruption of the enemy economy and demoralization of his population." [48]

This new catechism of Soviet military thought was echoed in subsequent years by the former Chief of the General Staff, Marshal Zakharov, who reaffirmed that "whereas in past wars the armed forces as a whole were ... a target, now one should add the economy of the warring countries." [49] A similar formulation was put forward by a prominent Soviet military theoretician, Major General M.I. Cherednichenko: "In light of the revolutionary changes that have taken place in the weapons used, the economy has now become a target for ... nuclear missiles." [50]

[48] Ibid., p. 235.

[49] Marshal M.V. Zakharov, "Leninism and Soviet Military Science," Krasnaia zvezda, April 5, 1970.

[50] Major General M.I. Cherednichenko, "Modern War and the Economy," Kommunist vooruzhenykh sil, No. 9, September 1971, p. 20.

The point of all this was to indicate that the former difficulties that had attended effective economic/infrastructure targeting by precision conventional bombing had been fundamentally eliminated by the comprehensive destructive power of nuclear warheads, which now rendered possible the reduction of entire economic target systems with a single, well-placed blow. With this new-found Soviet capability to bring major sectors of a potential adversary's rear-area mobilization and war-support base under attack, a Soviet writer was able to proclaim by 1961 that the "necessity to weaken the economic potential of an aggressor" had now become "one of the most important rules governing modern warfare." Recognizing the Soviet Union's newly-acquired technical capability to lend teeth to this emergent doctrinal injunction, he added that it had now become necessary for Soviet contingency planners to devote careful study toward the enemy's economic and military-industrial nexus so as "to discover strong and weak points" that might help inform purposeful target planning.[51]

Even with these dramatic changes in emphasis, however, Soviet military doctrine remained sharply divergent from the premises concerning the military value of economic targeting that had come to dominate U.S. strategic thinking and planning during the same period. In point of fact, until the late 1960s, the embryonic Soviet intercontinental attack posture afforded Soviet war planners few practical options other than large-scale destruction of selected U.S. urban-industrial targets. The few truly intercontinental-range bombers

[51] Colonel A. Lagovskii, Strategiia i ekonomika (Strategy and Economics), Voenizdat, Moscow, 1961, p. 32.

of the Soviet Air Force during the late 1950s would have had to face a substantial U.S. early warning and air defense capability, sharply limiting their target coverage potential. Even at the time of Khrushchev's ouster in 1964, the Strategic Rocket Forces had only some 200 SS-7 and SS-8 ICBMs, and these were far too inaccurate to be used successfully for hard-target killing. It was not until the deployment of the Soviet third-generation ICBM force (consisting largely of SS-9 and SS-11 missiles) during the latter half of the 1960s that the SRF could seriously begin contemplating anything other than fairly indiscriminate countervalue attacks against U.S. cities.

Today, of course, the Soviet Union's possession of large and accurate MIRVed ICBM and SLBM forces gives it a credible range of attack options against the whole spectrum of potentially interesting U.S. strategic target types. Yet even when the Soviet armed forces possessed only the rudiments of an intercontinental attack posture capable of little more than destroying unhardened American urban-industrial assets, Soviet military doctrine firmly retained its dominant countermilitary emphasis that was first forged and case-hardened during the trials of combat in World War II. Even in the earliest years of the nuclear era, there began to crystallize a major distinction between Soviet and American approaches to deterrence and war fighting that has largely persisted to this day, despite the increasing technical and operational comparability of Soviet and U.S. strategic forces themselves. This distinction, in the now-familiar idiom of Western strategic theory, was between a growing American intellectual preference for "deterrence by punishment" and a persistent Soviet commitment to the more classical

notion of "deterrence by denial."

Contrasts in U.S. and Soviet Targeting Approaches

The American approach to nuclear force design and employment planning during the initial decade and a half following Hiroshima was heavily shaped both by the assumed "lessons" of the allied industrial bombing policies of World War II (along with the operational preferences of the new U.S. Strategic Air Command that had largely emerged in their wake) and by the rise to prominence of a powerful community of civilian strategists who brought some distinctly non-military views to the formulation and refinement of U.S. nuclear contingency planning.[52] Although these two influences frequently worked at cross-purposes (especially regarding the question whether a nuclear war was "winnable" in any practical political sense), they combined to produce a distinctive American approach to the nuclear security predicament by threatening a massive nuclear reprisal that would guarantee infliction of "unacceptable damage" on the Soviet Union as an organized society in response to any Soviet attack on the United States or its allies.

Throughout its progressive refinements over the years, this U.S. approach to deterrence remained informed at least as much by a determination to exact retaliatory revenge as by any commitment to "defeat" the Soviet Union militarily in the event of a deterrence

[52] The most influential of these civilian views, which largely set the tone for more than three decades of subsequent American strategic policymaking, was reflected in the following statement by the late Bernard Brodie: "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose." The Absolute Weapon, Harcourt Brace, New York, 1946, p. 76.

failure. This priority was reflected both in the overwhelming urban-industrial emphasis of U.S. nuclear war plans during the 1950s and, more important, in the stress on "assured destruction" that came to characterize not only U.S. declaratory strategy but also the operational concerns of the SLOP beginning with the McNamara reforms of the early 1960s. In its most reductionist (and now widely criticized) incarnation, this "assured destruction" emphasis was neatly captured in Secretary McNamara's confident claims during the early 1960s that a credible U.S. capability to destroy some 50 percent of the Soviet population and 70 percent of Soviet industry in retaliation would be sufficient to enforce deterrence of any rational Soviet contemplation of nuclear war. In the years since that formative period, the targeting doctrine and contingency plans of the United States have undergone substantial refinements in their approach to counter-infrastructure targeting and have also assumed a substantially increased counterforce complexion. Nevertheless, they remain even today heavily influenced by the legacy of "assured destruction" thinking and accordingly reveal a very pronounced, if not dominant, fixation on economic targeting as a priority function of strategic nuclear forces.

For better or worse, the Soviet Union has experienced no comparable intellectual and conceptual proclivities in its own approach to the nuclear predicament. It has developed a strategic doctrine (and an increasingly congruent force posture to support it) that continues to insist that even in the nuclear era, the most reliable defense is one that would permit a credible effort to seize the initiative and fight to meaningful victory in the event that circumstances allowed no other

choice. In consonance with this traditional approach to military planning, the Soviets have not only remained unaffected by "assured destruction" fixations, but have consistently radiated the most pointed disdain and contempt for the dominance of such premises in U.S. strategic planning. Obviously, in view of the unprecedented destructive capabilities of modern weaponry, rear-area economic and industrial assets have now become lucrative targets in a way that was never possible before, and none of the potential of infrastructure attacks for disorganizing an enemy's war-waging power has been lost on Soviet planners. Since any future war between the superpowers will, in the Soviet view, be a "decisive" confrontation of the opposing social systems with no holds barred, it goes without saying that economic targeting has now become a major ingredient of the Soviet strategic combat repertoire.

At the same time, Soviet planners remain persuaded that the only reliable key to victory in such a war lies in defeating the enemy militarily in the shortest possible time. This necessarily means, in turn, that economic warfare remains subordinate in Soviet priorities to the paramount task of destroying the enemy's means of strategic attack and other direct war-waging potential. In order to comprehend Soviet attitudes toward economic targeting, it is first necessary to understand Soviet strategy in broader perspective and to appreciate how Soviet planners view the basic challenge posed by nuclear weapons, the probable character of a future war, and the operational goals to be sought by Soviet force employment.

The Current Soviet Image of Nuclear War

Aside from periodic refinements in mission support and a major shift in Soviet thinking that occurred during the mid-1960s regarding whether or not a major conventional war in Europe would "inevitably" escalate to the nuclear level, Soviet strategic doctrine has remained remarkably consistent for at least the past two decades, particularly concerning its characterization of a future global war between the superpowers. The way in which economic targeting figures in the Soviet conceptualization of such a war will be deferred for treatment below, but it should be underscored here that other objectives more immediately related to the enemy's war-fighting potential command substantial precedence in Soviet operational priorities.

As indicated above, Soviet commentators routinely insist that any major superpower confrontation would constitute a "decisive clash between the two opposing world socioeconomic systems," in which Soviet combat and combat-support operations would be uncompromisingly directed toward achieving total Soviet victory in the shortest possible time.[53] In this conception of warfare, there is no place for the sort of incremental, selective, and measured application of nuclear firepower aimed at intrawar bargaining and "crisis management" that have long figured so prominently in American strategic theory. Instead, as Sokolovskii has asserted, the imperatives of such a war will call for a "strategy of missile and nuclear strikes in depth, along with the simultaneous use of all branches of the armed forces, in order to

[53] Colonel General N. Lomov, ed., Scientific-Technical Progress and the Revolution in Military Affairs, Voenizdat, Moscow, 1973 (translated by the USAF, Soviet Military Thought Series No. 3), p. 137.

achieve complete defeat of the enemy and the destruction of his economic potential and armed forces throughout his entire territory ..."[54]

Despite the surface bravado of Soviet doctrine, Soviet planners hardly approach the specter of nuclear war with equanimity or indicate a lack of appreciation of the profound uncertainties that would attend the Soviet Union's prospect of emerging from such a war with any sort of "victory" worthy of the name. Indeed, a senior Soviet officer has gone to extraordinary lengths in underscoring the argument for supreme caution and circumspection at the threshold of a potentially decisive intercontinental nuclear showdown: "There is too great a risk of the destruction of one's own government, and the responsibility to humanity for the fatal consequences of nuclear war is too heavy, for an aggressor to make an easy decision on the immediate employment of nuclear weapons from the very beginning of a war without having used all other means for the attainment of its objectives."[55] The pervasive tendency toward risk aversion that has long characterized Soviet strategic conduct and crisis comportment would be likely to disincline Soviet planners strongly from any course of escalatory action that did not promise very confident prospects of ultimate Soviet success.[56]

At the same time, Soviet leaders are animated by powerful countervailing urges to nip undesirable trains of events in the bud at the earliest possible moment, before they have a chance to burgeon and

[54] Sokolovskii, op.cit., p. 93.

[55] Army General S. Ivanov, "Soviet Military Doctrine and Strategy," Voennaia mysl, No. 5, May 1969, in Selected Readings, op.cit., p. 412.

[56] For elaboration on this point, see Benjamin S. Lambeth, Risk and Uncertainty in Soviet Deliberations About War, The Rand Corporation, R-2687-AF, October 1981.

slip irretrievably out of grasp. This blend of caution and impulsiveness in Soviet strategic style would probably exert a major restraining influence on Soviet nuclear employment in most conceivable conditions of crisis. Nevertheless, it could also engender irresistible pressures on the Soviet leadership to preempt massively in any truly catastrophic superpower collision where it was apparent that war was definitely coming sooner or later and that Soviet inaction would entail greater risks than proceeding with forceful and goal-oriented nuclear initiatives. As one Soviet publication has observed in this regard, "the principle to attack the enemy only when one is sure of success does not exclude but presupposes the need of taking risks, even big risks, when this is required by the situation." [57]

In view of the extraordinary destructive power of nuclear weapons and the potentially unbearable costs that could attend a failure to land the first punch, Soviet doctrine strongly endorses the notion of "striking first in the last resort," in Malcolm Mackintosh's apt formulation. It further maintains that the results of the initial strike will fundamentally influence the subsequent course and outcome of the war: "The decisive act of a nuclear war in all conditions is the infliction of a strike by strategic nuclear means, in the course of which both sides will obviously use the main portion of the most powerful nuclear ammunition. The moment of infliction of this strike will be the culminating point of the strategic effort, which can virtually be combined with the beginning of a war. This was not the

[57] Cited in Jacquelyn K. Davis et al., The Soviet Union and Ballistic Missile Defense, Institute for Foreign Policy Analysis, Cambridge, Mass., 1979, p. 26.

case in any of the past wars." [58]

Because of the predictable foreign opprobrium that would almost surely be triggered by any overt Soviet admission of determination to be the first side to use nuclear weapons in the event of war, Soviet declaratory rhetoric has only rarely given express endorsement to preemption as a preferred Soviet strategy. Its frequent usage of suggestive euphemisms for the idea, however, (such as the following assertion that "a correct estimate of the elements of supremacy over the opponent and the ability to use them before the opponent does are the key to victory ...") [59] gives every reason to believe that Soviet planners are thoroughly serious about the profound operational advantages that could accrue to the Soviet side from the timely exploitation of a surprise attack at the brink of major war. Whether the Soviet early warning capability, strategic alert posture, command and control network, and political decisionmaking system all possess the required responsiveness to support a timely preemptive attack under the actual stresses of a nuclear crisis remains a separate and unanswered question. But there seems little doubt that Soviet commanders attach great theoretical importance to beating the enemy to the punch--at least as an optimum goal to be striven for in peacetime force management and contingency planning.

Once the war is on, Soviet doctrine stipulates that the main focus of intercontinental attack operations should be directed toward

[58] Major General V. Zemskov, "Characteristic Features of Modern Wars and Possible Methods of Conducting Them," *Voennaja mysl'*, No. 7, July 1969, in *Selected Readings*, *op.cit.*, p. 438.

[59] Colonel B. Byely, ed., *Marxism-Leninism on War and the Army*, Progress Publishers, Moscow, 1972, p. 217.

eliminating as comprehensively and promptly as possible the United States' capacity to inflict retaliatory damage on the Soviet Union, coupled with simultaneous efforts to destroy the enemy's war-waging capability more broadly defined. This means, first and foremost, "the inflicting of nuclear strikes against the means of nuclear attack, enemy troop groupings and naval forces, his military objectives, and the centers of governmental and military control simultaneously over the entire territory of the probable enemy." [60] In the characteristic Soviet rank-ordering of strategic offensive missions, the first priority is clearly to destroy the enemy's strategic nuclear forces. In this primary strike package, as a Soviet general officer has noted, "strategic rockets are regarded as the most important strategic objectives." [61] Also included are enemy alert bomber bases, SSBNs both at sea and in their home ports, nuclear weapons storage facilities, and key strategic command and control nodes. Second-priority Soviet targets in general war encompass theater-based nuclear forces (including U.S. carrier aviation) and their associated support and command and control networks. In the third priority are other military targets, such as major ground troop formations and marshalling areas, aerial ports of debarkation in the forward land theater, reserve forces, conventional weapons stocks, and the like. The fourth category embraces the enemy's political leadership structure and administrative centers that would be required to maintain social cohesion and organization during a major

[60] Ivanov, in Selected Readings, op.cit., p. 410.

[61] Major General Kh. Dzheleukov, cited in Joseph D. Douglass, Jr., and Amoretta M. Hoebel, Soviet Strategy for Nuclear War, Hoover Institution Press, Stanford, 1979, p. 75.

war. Only last in this array of target priorities indicated by Soviet military writings is the broad category of economic-industrial facilities (such as power stations, refineries, production plants, and so on). [62]

Economic Targeting in Soviet Strategy

Beyond the absence of "assured destruction" inclinations in mainstream Soviet strategic thought or any related Soviet conception that strategic operations ought to be aimed at exacting vengeful "punishment" for an enemy's transgressions, the distinctly subordinate status assigned to economic and industrial infrastructure targeting in the Soviet hierarchy of military objectives stems from the dominant concern of Soviet planners to attend first to those assets of an adversary that would most directly serve his ability to inflict damage on the Soviet Union and permit him to continue fighting in regional theaters beyond that. It is also very likely affected by the general Soviet tendency to dismiss the practical utility of either side's defense-industrial base as a source of meaningful support to its war effort during the cataclysmic throes of an ongoing thermonuclear exchange. As Marshal Sokolovskii and Major General Cherednichenko once expressed this point, a future nuclear war will most likely be conducted "only with those means existing at its beginning, since it will not be possible to count on the mobilizational development of the economy in these conditions. The possibilities of production continuing to

[62] This hierarchy of target priorities has been extracted from pertinent Soviet military writings and developed by Desmond Ball, Can Nuclear War Be Controlled?, Adelphi Papers No. 169, International Institute for Strategic Studies, London, 1981, pp. 31-32.

function in a period when nuclear strikes are being exchanged and during a lengthy period thereafter are wholly problematic." [63]

The most basic explanation for the subordinate status which economic targeting commands in Soviet strategic theory, however, lies in the fundamentally countermilitary orientation of Soviet doctrine and operational planning across the board. In any war of "decisive" proportions, the overriding (and overwhelmingly prepossessing) Soviet goal will be to destroy the United States' strategic retaliatory forces and associated capacity for collective action needed to continue fighting after the initial attack. This means primarily concentrating Soviet nuclear offensive strikes against the U.S. military posture and command control infrastructure.

Of course, in the process of attempting to eradicate the U.S. leadership's "will to resist" and to disrupt the ability of the U.S. economy to underwrite continued combat operations, Soviet planners will certainly not exclude from their target list the major American urban-industrial centers. These targets, however, will presumably be attacked with considerable economy of force, since there will always be more theoretically interesting aim points on an ideal economic target roster than the Soviet Union will have forces that can be indiscriminately used against them. [64] One repeatedly finds comments throughout the Soviet

[63] Marshal V.D. Sokolovskii and Major General M. Cherednichenko, "Military Strategy and Its Problems," *Voennaia mysl'*, No. 10, 1968, in Selected Readings, op.cit., p. 388.

[64] This is in no way to suggest that the Soviet NCA would feel constrained from attacking any and all enemy U/I targets deemed important by Soviet war planners. It is only to note that the Soviets will probably not be very much inclined to waste RVs needed for critical countermilitary tasks by reflexively throwing them against large numbers of DGZs associated with specific "MVA nodes" or other highly exotic U/I targeting criteria in a pointless effort to destroy the last 10 percent

military literature that nuclear strikes should only be dispatched against the "most important" targets affecting the enemy's war-making potential. As Colonel Sidorenko has remarked in this connection, from a simple cost-effectiveness viewpoint "nuclear strikes are best delivered [only] against the most important objectives and the main enemy grouping. The use of nuclear weapons against insignificant, secondary objectives contradicts the very nature of this weapon." [65] In a related vein, Colonel Shirokov noted in a recent article that "the quantity of objectives, especially military-economic, located on the territory of warring states ... is very great. Therefore, the belligerents will strive to select from the objectives those which have the greatest influence on the course and outcome of the armed struggle." [66] In other words, those economic and industrial targets will be included in the Soviet operational playbook not so much because of whatever postwar significance they might have for the adversary as because of their more tangible relevance to immediate Soviet combat objectives.

In this regard, a Soviet colonel has expressly indicated the necessity to consider "in each specific instance the special features of the economy and the presence of critical and vulnerable points" in the enemy's target base, and then to allocate Soviet weapons with careful reference to "the influence of the target on the progress of armed combat." [67] Note that there is no suggestion here of any Soviet

of U.S. economic capacity.

[65] Colonel A.A. Sidorenko, The Offensive, Voenizdat, Moscow, 1970 (translated by the USAF, Soviet Military Thought Series No. 2), p. 88.

[66] Cited in Leon Goure and Michael J. Deane, "The Soviet Strategic View," Strategic Review, Winter 1980, p. 81.

[67] Shirokov, in Selected Readings, op.cit., p. 318.

interest in this function's impeding the subsequent economic recovery of the adversary. Undoubtedly there is a place in Soviet options planning for the retardation of the enemy's economic recuperation in ways that might enhance his strategic stature in postwar global affairs (the war is, after all, plainly envisaged by Soviet doctrine as being "decisive" and directed toward total rather than merely marginal alteration in the correlation of forces). Yet the most immediate and predominant Soviet operational-tactical concern lies with more purposeful targeting that will bring about a favorable military resolution of the conflict.

In working toward the achievement of victory, the Soviet High Command will certainly not flinch from employing all force deemed necessary to break the enemy's combat capability. As we have noted above, this effort will surely include concerted attacks aimed at destroying the enemy's national leadership and command and control facilities. This will inevitably involve byproduct damage to the enemy's "value" resources (including his economic assets) on a very large scale. Although there is ample evidence of tendencies toward selectivity in Soviet war planning and weapon-to-target allocations, there is nothing in Soviet thinking that even remotely approximates the Western idea of sparing the enemy's cities for "intra-war bargaining" or purposely avoiding attacks on the enemy NCA so as to have some agency to negotiate with in the process of war termination. By the same token, while Soviet writings reveal numerous indications of target-servicing discrimination motivated by an operational desire to maximize economy of force, the Soviet conception of the initial period of war envisages rapid, intense, and simultaneous nuclear strikes against very large

numbers of countermilitary and countervalue aim points in combination.

In consonance with this image of central war as an all-or-nothing proposition, Soviet military spokesmen indicate no concern whatever over purposeful "collateral damage avoidance" in the interests of "signalling" a strategy of intentional restraint to the enemy's decisionmakers. Nevertheless, the operational objective of any economic-industrial damage that might be inflicted upon the adversary in the process is, in Soviet thinking, quite different from that which has hitherto informed American countereconomic options planning. Rather than merely assure the comprehensive wrecking of the enemy's economic infrastructure (irrespective of whatever successes or failures that might be registered on the countermilitary front) so as to prolong his postwar recuperation as long as possible, Soviet countervalue targeting--including countereconomic targeting--is principally intended to serve the more specific and proximate wartime goal of disrupting the enemy's continued capability to fight. Soviet planners appear to harbor little interest in striving to influence the geopolitical contours of a post-nuclear world in any situation where prior Soviet efforts to secure military victory had not been (or could not be) satisfactorily consummated.

Before departing this survey of how economic targeting figures in the predominantly countermilitary orientation of Soviet strategic doctrine, we should offer some indication of what the Soviet image of "victory" may comprise. For obvious reasons, not the least of which is that the Soviet Union has had no prior experience at nuclear warfare, Soviet commentary is vague and ambivalent on this score. We can infer

from Soviet writings that an acceptable victory would at least include unquestioned Soviet political-military dominance in Eurasia, unchallenged Soviet control of major sea lines of communication, and the elimination of the United States as an effective military power in international affairs, but this must be frankly acknowledged as guesswork. We can, however, identify glimpses of insight in Soviet military pronouncements that suggest that Soviet planners are more concerned with destroying the United States' practical ability to continue fighting following the initial attack than with systematically eliminating all targetable U.S. forces as an independent end in itself. Recognizing the enormous shock potential of a massive preemptive strike aimed at reducing the enemy's capacity for organized counter-offensive operations, Sokolovskii observed as early as 1962 that "a country plunged into catastrophe by nuclear blows may have to surrender even before its armed forces have suffered decisive defeat."^[68] To be sure, this formula for victory reflects a substantial element of nervous whistling in the dark and may suggest, in one possible interpretation, that any realistic expectation of Soviet victory will necessarily require as a precondition that the enemy be rendered either unable or unwilling to retaliate with his surviving nuclear forces. If true, this logic may go far toward explaining not only the recurrent Soviet stress on getting in the first blow and maintaining offensive persistence in central war, but also the emphasis placed by Soviet military strategy on comprehensively attacking the enemy's national command links along with his strategic forces.

^[68] Sokolovskii, op.cit., p. 105.

The Enduring Countermilitary Emphasis of Soviet Doctrine

Since the beginnings of the current Soviet buildup that was inaugurated by the Brezhnev regime in 1965, almost every major feature of Soviet strategic force development has been directed toward providing a high-confidence attack capability against the strategic warfare infrastructure of the United States. There is a strong presumptive argument, for example, that the Soviet SS-9 inventory was expressly targeted against the U.S. Minuteman ICBM launch-control network.[69] Relatedly, periodic Soviet SSBN patrolling patterns have indicated a possible Soviet interest in attacking with surprise from close-in launch points so as to bring SAC's alert bomber bases and C³ facilities under prompt fire with the benefit of the SLBM's comparatively short time of flight. With the advent of their fourth-generation SS-18s and SS-19s, the Soviets have now acquired both the warhead numbers and accuracy required to engage all major U.S. fixed land-based military forces and other hardened capabilities directly. Through continued RV refinement and MIRV payload fractionation, the Soviets may also be able to credibly engage a fully-deployed U.S. MX force, even in a comprehensive MPS basing mode.

To be sure, with their SLBM force, their now-obsolescing SS-11s, and the residual SS-17s, 18s, and 19s that would be withheld from any initial hard-target counterforce attack, the Soviets would have more than enough remaining offensive assets to cover all interesting U.S.

[69] In this regard, former Defense Secretary Harold Brown expressed the view that "more than 200 SS-9 ICBMs were almost surely targeted against the 100 Minuteman launch control complexes, two missiles to a complex." Text of address to the U.S. Naval Academy, May 31, 1979, pp. 6-7.

economic, administrative, and urban-industrial targets comfortably, whether in simultaneous laydowns or in sequential strikes after the initial countermilitary blows had been inflicted. The point, however, is that neither Soviet doctrinal commentary nor Soviet strategic force development activities have ever reflected any special Soviet concern over meeting the requirements of countervalue targeting. For example, notwithstanding the absence of a significant U.S. continental air defense posture since at least the late 1960s, the Soviets have never shown much interest in acquiring a large bomber force comparable to SAC that might be dedicated to destroying non-time urgent U.S. urban-industrial targets.

While the importance and requirements of countereconomic warfare are duly recognized in Soviet strategic policy, the overwhelming impression radiated by the Soviet military literature is that acquiring and maintaining the hardware wherewithal for that mission constitute among the least demanding tasks of Soviet force development and contingency planning. One Soviet officer almost casually dismissed the economic targeting problem by noting that although enemy economic assets would certainly constitute a "primary objective" of Soviet offensive operations in any nuclear war, these can be attended to "literally in a matter of hours and days" through the appropriate application of nuclear firepower.[70] Far more pressing, in the view of Soviet doctrine, is the timely reduction of the enemy's capacity to wage war, an objective which in no way requires either comprehensive economic targeting for its own

[70] Major General V. Zemskov, "Wars of the Modern Era," *Voennaia mysl'*, No. 5, May 1969, in *Selected Readings*, op.cit., p. 420.

sake or the retardation of enemy economic "recovery potential" to any prespecified level. As Colonel Shirokov expressed this point in 1966, "the objective is not to turn large economic and industrial regions into a heap of rubble (although great destruction apparently will be unavoidable), but to deliver strikes that will destroy strategic combat means, paralyze enemy production, making it incapable of satisfying the priority needs of the front and rear lines, and sharply reduce the enemy capability to conduct strikes." [71] This observation, one might add, was ventured well over a decade before Soviet offensive forces actually acquired the material capacity to underwrite this objective.

To summarize, Soviet targeting policy recognizes the importance of each side's economic base as a factor affecting the correlation of forces in peacetime, but it also stresses the overriding importance of destroying the enemy's immediate war-waging potential once the threshold of nuclear war has been crossed. This means concentrating the finite number of non-reserve Soviet nuclear weapons principally against enemy strategic forces, command and control facilities, direct war-support infrastructure, and other instruments of military organization and cohesion rather than indiscriminately attacking the enemy's urban-industrial network in pursuit of independent "economic targeting" objectives of less than compelling importance to the course and outcome of the war. Of course, Soviet planners admit that much economic damage will naturally result as a side-effect of their counter military campaign. They also appreciate that this may contribute significantly to the disruption of the enemy's capacity for organized military action

[71] Cited in Ball, op.cit., p. 39.

and show no indication of concern to minimize such collateral damage in the interests of signalling an implied message of Soviet "restraint." Yet they appear not to believe that massive urban-industrial damage need be a priority goal of Soviet wartime targeting, in light of their tendency to assume that the war will be won or lost by those forces in being on each side prior to the outbreak of hostilities. Because of the severe dislocations that any unrestricted nuclear war would inevitably impose on all participants, they maintain, there would be no possibility for industrial and other economic assets to alter the military balance substantially after the war began. Consequently, their operational priorities (and elementary economy-of-force considerations) dictate that Soviet targeting efforts concentrate predominantly on destroying the enemy as a military power. In this scheme of warfare, "economic targeting," particularly as it has been developed and refined in U.S. strategic policy over the years, remains decidedly a sideshow to the main effort and one of only marginal relevance to the ultimate outcome of war in Soviet thinking.

V. CONCLUSIONS

As the preceding discussion has indicated in some detail, the United States and the Soviet Union have pursued markedly divergent approaches toward the development and servicing of their respective targeting priorities throughout the nuclear era. There is no doubt that a nuclear war fought according to any strategy would be destructive beyond previous human experience. However, the different views of nuclear strategy held by the United States and the Soviet Union do have important implications for defense planners that are worth recalling here.

The two sides' views about the role of economic attacks in nuclear war are so deeply embedded in their respective planning traditions that they form what are essentially two very different strategic "cultures." Indeed, the origins of this divergence considerably predate the advent of nuclear weapons and can be traced back at least as far as the earliest years of World War II. The United States and Britain, by virtue of their pioneering efforts in the realm of long-range strategic airpower, became attracted during the 1930s and 1940s to the idea that the most vulnerable dimension of enemy power was his comparatively "soft" rear-echelon infrastructure and that the enemy's war effort could be most effectively crippled by destroying the economic and industrial assets required to support it--particularly at critical "choke points." For its part, the Soviet Union, with different defense requirements and traditions, and lacking comparable airpower capabilities, adhered to a wartime strategy of engaging enemy forces and other war-waging potential directly on the battlefield.

With due allowance for the subsequent impact of increasingly sophisticated nuclear weapons and long-range delivery systems on the strategic policies of the superpowers (including the development of refined economic recovery models and associated economic attack options in U.S. planning and the parallel development of a highly articulated countermilitary approach to nuclear planning in the Soviet Union), this divergence in the targeting orientations of the two countries has essentially persisted to the present day. It is thus appropriate to consider the effect of this divergence on current U.S. security interests and its implications for future U.S. strategic nuclear planning.

Whatever merits it may command as a high-confidence means of destroying any adversary as a functioning social entity, economic targeting confronts a number of problems when it becomes the focus of all strategic employment planning. True, the United States has developed a number of selective employment options over the years, yet the principal deterrent effect intended by U.S. planning remains the threat of escalation to overarching general war. In light of this, development of selective options has not removed a number of difficulties with a strategy based on a final economic attack sanction.

Foremost among these is the questionable relevance of such a strategy to the determination of immediate war outcomes. Comprehensive destruction of an enemy's domestic economic infrastructure and industrial base can profoundly shape the complexion of the postwar world and the enemy's place in it, but it cannot by itself resolve the combat issues at stake. For this, the enemy's forces and supporting battle

management and command-and-control instruments must be neutralized. Even for the unlikely case of nuclear war itself, there are good grounds for questioning the value of comprehensive economic damage potential for achieving combat objectives.[72] In light of the very remote probability that any country's economic infrastructure and industrial mobilization potential could weather the stresses of general nuclear war and continue functioning with even a bare modicum of effectiveness, it is hard to see how investment in efforts to draw down that capability, however successful they might be, could contribute significantly to the outcome of a war that would necessarily be fought almost entirely by weapons and forces already produced and deployed.

Such efforts could turn out to be suicidal, furthermore, in the absence of accompanying capabilities for (and priority emphasis on) massive countermilitary and counterpolitical targeting aimed at eliminating the enemy's ability to continue the campaign in the first place. It would do little to support our basic national survival interests to obliterate an enemy (even in flawless conformance with the most recondite economic targeting criteria) if, in the process, he were allowed to retain sufficient elements of counteroffensive nuclear power to inflict comparable damage in punitive reprisal.[73] The Soviets, unfortunately to their credit, appear by every indication to appreciate this far more keenly than we do and structure their forces and targeting

[72] For further discussion, see Nathan Leites, Once More About What We Should Not Do Even in the Worst Case: The Assured Destruction Attack, California Seminar on Arms Control and Foreign Policy, Santa Monica, July 1974.

[73] This argument is developed in considerable further detail in Colin S. Gray, "Targeting Problems for Central War," Naval War College Review, January-February 1980, pp. 3-21.

concepts accordingly.

To be sure, the threat to demolish an enemy's base of economic livelihood (as opposed to its actual consummation) may be highly appropriate and effective as a peacetime deterrent. Yet, however impressive general attack capabilities may be in the abstract, reliance on them after deterrence has failed begs the question of insurance. Even if neither side sees any advantage in nuclear use, the possibilities of accident, miscalculation, and madness exist. The old question thus remains: Would we deliberately execute our final deterrent threat, knowing that retaliation in kind would certainly follow?

For such a threat to credibly disincline enemy strategic initiatives that might otherwise appear attractive, it must be capable of being invoked with relative impunity to enemy countermeasures. This, in turn, requires either comprehensive counterforce capabilities linked to a surprise first-strike strategy or reliable active and passive damage limitation capabilities, neither of which the United States possesses. It is more than a little ironic that despite its vocal disdain for "assured destruction" notions and other economic targeting concepts, the Soviet Union either now has or is vigorously striving to acquire precisely the sort of wherewithal that would be required to lend credible support to such concepts. The United States, by contrast, has at best registered only the most desultory progress toward acquiring significant hard-target counterforce capabilities and other damage-limiting assets during the past decade, precisely during the time it has been so fervently fine-tuning the sort of economic targeting strategies

for whose support such capabilities would be absolutely essential.

In light of these considerations, concepts for the use of nuclear weapons against economic targets as the principal focus of strategic options planning are appropriate subjects for skepticism, particularly in the case of the United States, which remains sorely lacking in the forces and capabilities that would be required both to enforce the deterrent credibility of these strategies in peacetime and to allow them to contribute purposefully toward the successful resolution of the ensuing military campaign in the event of war. Certainly more narrow efforts to destroy an enemy's specific military-industrial and other war-support infrastructure would make operational sense in a general war, especially one that appeared likely to take on protracted dimensions of a sort that could allow those assets to be exploited to the enemy's advantage. But more undifferentiated economic targeting aimed at creating intrawar bottlenecks, imposing "unacceptable damage," shattering the "will to continue fighting," or impeding enemy postwar recovery is unlikely to be a sound basis for U.S. strategic planning in the decade ahead, particularly in light of technologies (both offensive and defensive) now coming on line that promise to provide the United States a real grasp at effective damage-limitation if pursued with the proper wisdom, determination, and discipline. Not only would continued emphasis on economic targeting be of questionable utility on either deterrent or war-fighting grounds in the absence of other, more important strategic measures, it could be downright counterproductive if it were allowed to divert attention away from the systematic development of those forces, concepts, and options that would be needed to fight to

a favorable military outcome should errence fail and events leave no
less drastic alternative.

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