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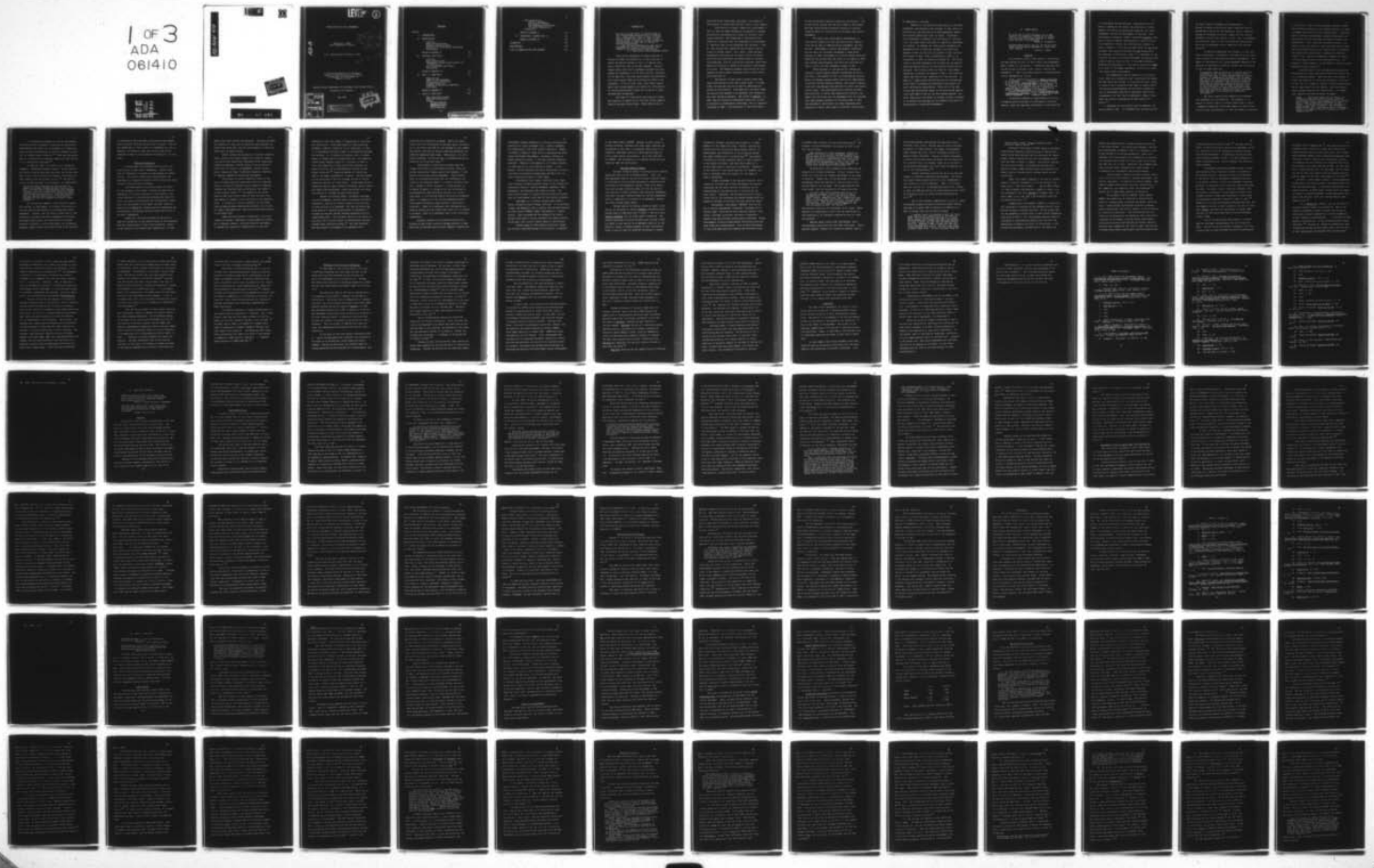

VERIFICATION OF SALT AGREEMENTS

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I. INTRODUCTION

> We live in an age which is characterized by vast and growing potentialities for destruction. Arms control offers a means of lessening the dangers that face us. But if arms control is not to prove an illusory enterprise, the agreements we make must be capable of adequate verification.
> . . . New and more comprehensive arms control agreements are likely to pose greater challenges of our verification capabilities.
> U.S. Arms Control and Disarmament Agency

Arms control agreements are means employed by nations to reduce the probability of war occurring, to reduce the destructiveness of war if it should occur, and to reduce the cost of national defense. National leaders honor arms control agreements because they have judged the agreements to be in their nations' interests. At the same time, they must guard against the possibility that other parties might be violating the terms of the agreements. To be of value, then, arms control agreements must include adequate provisions for verification -- for ascertaining whether states are living up to their international obligations.

The issue of verification has occupied a prominent position in nearly all of the arms control negotiations of the past thirty years. While definitions of

verification may sound clear and simple, the concept of verification is rather more difficult than it first appears.

Verification is closely linked with intelligence -- that is, much the same information is required to satisfy verification requirements as is used for national intelligence purposes. The techniques of verification are essentially identical with the techniques of intelligence. In addition, many of the techniques are intrusive -- that is, they require that inspectors have access to the territory of another nation. As a result, there has been considerable reluctance on the parts of both the Soviet Union and the United States to permit means of information gathering, even for verification purposes, when those means are intrusive or appear to be actually intelligence activities. The ambiguity between verification and intelligence has been a major stumbling block to arms control since World War II.

The history of arms control efforts since 1945 shows verification to have been a major issue. In rough terms, the post-war era can be seen as comprising two periods of verification. From 1945 until the early 1960s, verification was assumed to be dependent upon inspection and other intrusive measures. The launch of Sputnik I in 1957, and the follow-on technological spin-offs, as well as advances in seismological technology, led to a negotiating break in 1963 -- the conclusion of the first treaty

to rely on national technical means for verification. The second period, dating from the early 1960s to the present, has been characterized by greater reliance on national technical means for verification of strategic arms control agreements.

The impact that technological developments in verification capabilities had upon arms control negotiations can be seen at numerous points throughout the post-war era. Development of aerial photographic techniques was the basis for President Eisenhower's "Open Skies" proposal in 1955; development of reliable seismic detectors permitted the Limited Test Ban Treaty to be signed in 1963; and overhead reconnaissance from satellite platforms was used to verify the SALT agreements signed in 1972.

While progress in limiting nuclear weapons has resulted, future progress appears increasingly difficult. The crux of the problem is that, as technological developments in strategic weapons permit qualitative improvements in national nuclear weapons arsenals, arms control negotiations will increasingly seek qualitative rather than quantitative limits. And since qualitative controls are much more difficult to verify than quantitative controls, the result will be either that the agreements will be concluded with less inherent assurance of verifying them, or that the problems in verification will make agreements more difficult to reach, take longer to conclude, and may even

be impossible to conclude.

Because of the world-wide implications of the SALT agreements, and because of the reliance of arms control on verification, the verification of SALT agreements seems a particularly significant topic for study. Following a brief disucssion in Chapter II of the nature of verification, the thesis deals with SALT in a generally chronological fashion. In Chapter III, arms control proposals and agreements prior to SALT are reviewed, with particular emphasis on how verification was handled in each instance. The process of SALT, from its beginning in 1969 to its culmination in 1972, is treated in Chapter IV. The actual terms of the SALT agreements are reviewed and the significance and implications of the verification provisions are analyzed. The follow-on effort at SALT II, which began immediately following the signing of SALT I, has faced new issues and difficulties, especially for verification. In Chapter V, these issues and difficulties are reviewed and recent SALT II proposals are analyzed in some detail for their verification implications. While all of the arms control and verification issues to be faced during negotiations after SALT II may not yet have become apparent, for those issues which are known, an attempt is made in Chapter VI to analyze the problems and the prospects they pose for verification of future SALT agreements.

II. VERIFICATION

> No sound and reliable agreement can be made unless it is completely covered by an inspection and reporting system adequate to support every portion of the agreement.
>
> Dwight D. Eisenhower

> Reconnaissance satellites will be the principal means of policing any agreement to limit strategic weapons.
>
> Phillip J. Klass

Overview

As a technical term of arms control, verification has been defined by the U.S. Arms Control and Disarmament Agency (ACDA) as "the process of assessing compliance with the provisions contained in arms control treaties and agreements."[1] ACDA cites three purposes of verifying arms control agreements as follows:

> First, verification serves to <u>detect violations</u> of an agreement . . . and hence to furnish, as far as is possible, <u>timely warning</u> of any threat to the nation's security arising under a treaty regime.
>
> Second, by increasing the risk of detection and complicating any scheme of evasion, verification helps to <u>deter violations</u> of an agreement . . . .
>
> Third, verification serves to <u>build domestic and international confidence</u> in the viability of an arms control agreement . . . . (Emphasis added.)[2]

Verification depends in large measure on the use of sophisticated techniques of intelligence collection. However, there are important differences in the objectives

of intelligence and verification. Arms-related intelligence is needed for the design and production of future weapons, for tactical planning and targeting, for crisis management, and for the development of doctrine. Such intelligence, therefore, seeks to determine positive information, such as numbers, characteristics, and activities of an opponent's forces, but "verification attempts to prove a negative -- that certain force levels are not being exceeded, that certain activities are not taking place. For purposes of verification, then, it is necessary to pay attention not only to military deployment and testing areas normally used by other parties" -- the same information gathered by intelligence -- "but also to areas which might be so used."[3] For modern agreements, verification cannot take place without intelligence.

Two assumptions form the basis for verification: First, there is a possibility that violations of an agreement may occur and, second, if violations do occur, there is likely to be a concerted effort made to conceal them.[4] "Few military establishments are willing to concede the lack of concealment required by negotiable arms control arrangements, for fear that an adversary's tasks of strategic and tactical planning may be made easier as a result."[5]

Standards for verification must be adequate, but caution must be used. "If standards for verification are

too high, however, agreement may be impossible . . . ."[6] Because no means of monitoring treaty compliance can be guaranteed to detect in time elaborate, costly, ingenious systems of concealed violations, almost any arms control agreement involves some element of risk. Yet, if standards are relatively high, so that violations are sufficiently difficult, an agreement can be compatible with national security.[7]

It should be emphasized that present, or even currently conceivable, techniques of verification do not offer total certainty of verifying arms control agreements. The amount of verifiability of a given agreement depends on the capacity of each party's detection systems and the ability of each to evade detection.

> An agreement might be difficult to monitor with the techniques at our disposal; but if evasion would involve high risks or heavy expenditures with little prospect of commensurate advantage, such an agreement could well be considered adequately verifiable. Conversely, an agreement limiting certain kinds of arms might be relatively easy to monitor given the practices and operating procedures currently used by the other party; yet if these procedures could be easily altered (or substitutes devised) in ways that could facilitate covert violations, the agreement might have to be considered inadequately verifiable.[8]

The actual restrictions imposed by an agreement also determine its verifiability. For example, it is easier to verify a ban of a certain weapon than to verify a numerical limitation of the same weapon (to prove violation of a ban, the discovery of only one weapon is required;

to prove that a limit has been exceeded requires finding and accurately counting all the weapons deployed, in order to compare that count with the allowed number). Similarly, bans on testing or development (somewhat observable) are more easily verified than bans on research (hidden from observation). Also, large and stationary objects (e.g., missile silos) are easier to count and keep track of than small and mobile objects (e.g., mobile missile launchers), and quantitative limitations on discrete or countable objects (e.g., missiles, submarines, bombers) are easier to verify than are qualitative limitations (e.g., the range of a cruise missile, or the number or size of nuclear warheads inside a missile).[9]

Another factor to be considered when discussing verifiability of arms reductions concerns the size of the cut in deployed weapons. When the size of an arsenal is large, the inability to verify the existence or location of one, two, or a number of weapons could be insignificant. But as large reductions are imposed, verification gaps take on proportionately more significance. To compensate, greater verification effort is needed:

> Large . . . reductions might call for greatly increased national means of monitoring variations in adversary forces, since marginal absolute changes make a larger proportional difference in small forces. [If forces were halved, for instance, inspection might have to double.] But one should expect future cuts in the direct costs of strategic forces to be partly offset by increases in intelligence costs.[10]

It is generally assumed that "Soviet policymakers could more easily circumvent a treaty ban on qualitative improvements than could U.S. policymakers in a democratic milieu in which the decisions of military planners are subject to constant public scrutiny."[11] They have the advantage of a closed society competing against an open society. It is a significant advantage.[12]

In addition, what is involved is an information asymmetry. Regarding strategic weapons, "we know what we have and we think we know what they have; the Soviets know what we have, what they have and whether our estimates of their capabilities are accurate or not."[13] One past director of ACDA explained this difference, as regards MIRV:

> The Soviets know from American publications the number of strategic weapons we have or plan to deploy, and they know a good deal about their designs. We have to rely on far from infallible intelligence findings that do not reveal full information about their future deployment plans. They know precisely how many American missiles are to have multiple warheads, we can only estimate the scope of their program.[14]

The information asmmetry is particularly significant because, to some degree, it relieves the Soviets of reliance upon national means for verifying arms control agreements. Instead, they can obtain a great deal of the information they need from open congressional testimony, government publications, and other publicly available technical literature. On the other hand, the information asymmetry tends to place the United States in the position

of insisting on more stringent verification requirements than the Soviet Union may either favor or accept. The U.S. may indeed have to "pay a price" to compensate for its inadequacy, by having to trade away certain arms control measures in order to obtain greater verifiability, or vice versa.

Means and Techniques

Various means and techniques may be used in the verification of arms control agreements. Exactly what type or combination of methods is used depends on several factors: the type of restrictions being imposed, the importance of a possible violation, and the political implications of the verification methods.

Just what kinds of verification means are there? For the purpose of this paper, verification means can be considered to be either technical or non-technical, and either national or international (although some means are able to be used in both national and international roles). Also, for the purpose of this paper, national technical means will be emphasized, because they are unambiguous and non-intrusive, and because they were specified for use in the SALT I agreements.

Simply put, verification means are national if they are carried out by one country using its own resources; they are international if two or more countries, usually in the context of an international organization, in some

manner pool their efforts and resources. Verification means are technical if they rely on scientific and technical apparatus and techniques; they are non-technical if they rely essentially on human efforts.

Before turning the discussion to national technical means, several other means require brief mention. Inspection and on-site monitoring, sometimes called "negotiated inspection measures," provide access to the territory or facilities of a party to an agreement, and may involve mobile inspection teams, fixed-posts manned by observers, or unmanned tamperproof monitoring instruments.

The concept of on-site inspection relies on the use of foreign inspectors operating within the inspected country to ascertain through various schemes of sampling "whether the inspected party is abiding by the terms of an arms control treaty."[15] The inspectors can either operate from fixed control posts or they can roam, with some degree of freedom, in the territory of the inspected party. A variation of on-site inspection is the fixed-location manned remote observation platform, with or without sensor instrumentation, such as have been used recently in the Middle East.

There are many potential limitations to on-site inspection systems: adequately trained inspection personnel in adequate numbers, sufficient mobility and degree of freedom for inspectors, accessibility to sites for

inspection, sufficient number of inspections to allow proper verification. Even under terms of a well-conceived agreement, however, inspection is not infallible; in fact, it is considered relatively simple to overcome most systems. For instance, if, to minimize intrusions, only a limited number of inspections are allowed each year, the inspected country might simulate signs of a violation in order to force the inspectors to waste one of their periodic inspection efforts, while simultaneously carrying on more hidden violations.[16] There are methods of alleviating some of the human vulnerability to deceit. One such method is the monitoring of activity through the use of on-site mechanical devices, or "black boxes." Using these devices, inspectors need not make frequent intrusions, and by installing tamper-alarm mechanisms, inspecting parties can recognize efforts to overcome the monitoring system.

Another verification means, information exchange, involves procedures, neither wholly unilaterial nor wholly cooperative, that do not require access to the territory of other parties of an agreement, but that do require the other parties to furnish certain kinds of information.[17] Information obtained through exchange agreements must be viewed skeptically. Sole reliance should not be placed on such data, but it can be useful in checking data obtained through other verification means.[18] The 1974 Threshold Test Ban Treaty is an example of an agreement with

provisions for information exchange. While the treaty itself calls for verification by national means, the protocol to the treaty provides for the exchange of data regarding precise locations of testing areas and geological information regarding these areas. Additionally, for calibration purposes, the parties were to exchange precise information on two nuclear tests.[19]

Other means of verification include legal and illegal activities of a non-technical nature, which can provide indications (though usually not evidence) of compliance with an arms control agreement. Unfortunately, there is a problem associated with all information collected by non-technical means -- it cannot be used to support a charge of treaty violation. If the material is collected illegally, it normally will not be allowed to be presented for open and public scrutiny; if, on the other hand, it is collected legally and could be presented openly, it normally will not provide unambiguous proof. Intelligence provided by human sources is notoriously unreliable. There is no assurance that information provided by sources will be correct and, even if it is correct on occasion, there is no assurance that it will be correct consistently.

Economic analysis is an indirect method of deducting an arms treaty violation through analysis of data which can be obtained about military budgets, research and

development funding, production of critical raw materials, production of unique equipment (e.g., missile launchers and transporters), and other similar indicators. Trends or breaks in trends of these sorts of indicators may point toward new weapon developments, increase or decline in weapon production levels, or they may indicate something different. Because of the ambiguity of economic analysis, its applicability to verification is slight. It can, however, provide analysts with early indications of activities which are otherwise unobservable and which will require future surveillance by other means.

Information about target countries is also regularly obtained through systematic study of the contents of open-source material, such as documents, speeches, radio broadcasts, and newspaper and journal articles. The quality and accuracy of content analysis cannot be relied upon for intelligence, much less for verification purposes.

Espionage is, of course, another means used to obtain information about foreign countries. It is obviously illegal and dangerous, and it suffers from the same debility as other forms of HUMINT (human intelligence) -- unreliability. Past successes and the prospects for future success would seem to be the rationale for current efforts. In any case, this is not a useful means of verification.

Another means of intelligence collection, though not strictly considered means of verification, is related

to the other forms of HUMINT. Because of their travel in foreign countries, diplomats and other legal travelers can be expected to see, hear, or otherwise obtain bits of information, some small portion of which may have application to arms control verification. As is the case with all HUMINT, this information is of dubious reliability and cannot be used for verification.

National Technical Means

National technical means of verification are treated separately here for the following reasons: first, the SALT agreements specify the use of national technical means of verification for providing assurance of compliance with provisions of the agreements; second, there is no indication that national technical means will not be used for verification of future strategic arms limitation agreements; and third, national technical means can provide unambiguous proof of compliance or violation of an agreement, whereas the other national means cannot.

The key feature of national technical means is the ability of one party to collect reliable information about another party's compliance with a treaty -- and to do this without intruding into the other party's territory. The primary advantage of placing reliance upon national technical means is that parties to an agreement need not be compelled to accept a foreign presence on their territories. There is thus no need for elaborate procedures to ensure

reciprocity, balance, equitable participation, or independence of the inspection teams. Further, national direction over the verification means ensures control, responsiveness, and flexibility in the collection system and ready accessibility to reliable data.[20] The primary limitation of national technical means is their inability to see inside of objects, and thus their inability to collect some kinds of qualitative information. Because it is not possible to see inside missiles, for example, numbers of warheads cannot be counted, nor can range be readily determined.

A basic knowledge of how national technical intelligence is collected and of what information the various techniques can and cannot provide is essential for an understanding of the implications of verification for arms control. Therefore, the discussion here will take a closer look at the techniques and basing systems which are generally included in the term "national technical means."

Photographic Intelligence (PHOTINT) involves the use of optical photographic techniques, including use of visible light, infra-red and multi-spectral sensors, television, low-light television, and laser illumination, usually from high-altitude reconnaissance platforms. Recent developments in photo-reconnaissance satellites allow real-time close-look reconnaissance, with on-board processing of film from high-resolution cameras and electronic relay

of signals back to Earth via data relay satellites.[21] The prospect of such developments led writers in 1972 to project the following:

> The availability of such equipment, planned for 1976-77, will give the West continuous almost-live surveillance of the territory of any potential enemy. This is the kind of reconnaissance that could bring an Open Skies policy fully to life, for it would be impossible for an aggressor to build, test, and deploy an all-powerful strategic weapon without the 'other side' being aware of every detail.[22]

Unfortunately, such a sanguine view overstated the capability of current technology. In fact, whether technology will ever provide "complete knowledge" of the enemy is doubtful. Indeed, part of the usefulness of satellite photography should be credited to clues provided, often unintentionally, by the enemy. One account describes how clues result from the construction of large facilities:

> You don't just build a missile and stick it in the ground overnight. First, you have to dig an enormous hole. You have to clear an area, build roads, install communications, pour concrete and then haul in a missile that fits the hole. All that takes about a year. When we spot a missile we know from its size just about what it can do because at one time or another we built one similar.[23]

Such blatant clues will not be present in all cases. Where deception is taking place, silos might be constructed inside mountains or be otherwise concealed so that no clues are produced.

Besides using visible-light photographs, photoreconnaissance satellites also use other techniques. 'Multispectral sensors' consist of a cluster of cameras, each of

which simultaneously photographs the same area using a different color filter. Because objects reflect sunlight in greater or lesser amounts, the images in photographs taken through red, blue, yellow, and green filters will appear slightly different. Because of these differences, a canvas cover painted green and drawn over the excavation for a missile silo, for example, might not be noticed in an unfiltered photograph, but would likely be apparent in one of the filtered photos.[24]

Another technique involves the use of an infra-red scanner to penetrate camouflage and darkness. The infra-red scanner detects warm objects on a cool background or cool objects on a warm background. "Thus, [if one knew where to look for it,] an underground missile silo, heated to keep its ICBM warm during the harsh Russian winter, would be discernable from the colder ground surrounding the silo."[25]

One of the strongest commendations of the U.S. space photography program was made by President Lyndon Johnson speaking on 15 March 1967 to educators in Nashville in what he thought were off-the-record remarks:

> I wouldn't want to be quoted on this, but we've spent $35-billion to $40-billion on the space program. And if nothing else had come of it except the knowledge we've gained from space photography, it would be worth 10 times what the whole program has cost. Because tonight, we know how many missiles the enemy has. And it turns out, our [previous] guesses were way off. We were doing things we didn't need to do. We were building things we

didn't need to build. We were harboring fears we didn't need to harbor.[26]

Electronic Intelligence (ELINT) seeks to determine locations and technical characteristics of radars which treaty-states have deployed and are operating. By associating a radar's characteristics with the weapons system that the radar is known to support, verification analysts can locate and attempt to differentiate between anti-ballistic missile (ABM) systems (which are controlled by treaty) and air defense missile systems (which are not controlled).

Radar Intelligence (RADINT) is the use of friendly radars to seek out information on the activities of another state. "The first radars . . . had in 1955 a range of 1,600 kilometers and detected a number of tests before the launching of the first Sputnik in November 1947. Now their range is not less than 5,000 kilometers [and they can detect much more]."[27]

Communication Intelligence (COMINT) is essentially the listening to conversations and messages sent by transmitters located in foreign countries. We can assume that, for the purposes of verification of arms control agreements, like those of SALT I, U.S. intelligence analysts might be interested in conversations ranging from top-level communications of Kremlin officials, at one extreme, to the routine and procedural conversations of the people who

operate and support Soviet strategic missile facilities, at the other extreme. For verification purposes, the primary disadvantage of COMINT is that it is basically a fortuitous method of collecting information. There is no assurance that radio signals with information of verification interest can be found or, even if they can be found, that they will be of value. Therefore, while COMINT sometimes provides useful information for arms control, it is generally not considered a verification method.

Various forms of sensors are used to detect indications of activity that relate to testing, development, production, deployment, or operation of nuclear weapons. Some types of sensors used include infra-red, ultra-violet, x-ray, gamma-ray, air sampling, sonar, and seismology.[28] Sensors are a common means used for verification.

The equipment used for PHOTINT, ELINT, RADINT, COMINT, and sensors may be installed in surface-based stations, on-board ships, airplanes and drones, and satellites. Surface-based intelligence collection programs require cooperation from allies, normally in the situating of a station on their soil. "The difficulties this involves are illustrated in the disruption that could result following any withdrawal of United States intelligence collection facilities from Thailand and Turkey; American officials have argued that the loss of radar installations in Turkey would reduce significantly American capabilities

in monitoring Soviet missile tests."[29] The most obvious effect for SALT verification would be an impairment in the U.S. capability to verify constraints on Soviet missile testing and development. An additional difficulty with surface-based equipment is that it is more vulnerable to enemy interference (e.g., Soviet jamming) than satellite-based equipment.

Intelligence gathering equipment placed on ships and airplanes allows collection of data not accessible from ground stations. Because so much of the perimeter of the Soviet Union is bordered by communist countries or by bodies of water, in which the placement of ground-stations or fixed posts is not possible, mobile platforms are used. So-called "ferret" ships and airplanes "have the mission of sailing or flying along the coasts of unfriendly nations to make tape recordings of short-range military-radio broadcasts, especially those in code."[30] Examples of two such intelligence gathering platforms, and the dangers involved in their operation, are the U.S. Navy ship, Pueblo, captured off North Korea in January 1968, and the U.S. Navy plane shot down by the North Koreans in April 1969.

Two of the most widely publicized U.S. aircraft used for strategic reconnaissance are the U-2 and the SR-71. The U-2 is an old airplane, designed to fly relatively slowly at high altitudes with photo-reconnaissance

equipment and air sampling gear.[31] The plane received considerable public attention in 1960, when Francis Gary Powers was shot down over the Soviet Union, and in 1962, when President Kennedy openly presented photographs taken from U-2s of Soviet missile site construction in Cuba. U-2 missions are also credited with discovery that China was working on an atomic bomb before 1964. By 1970, however, it was reported that, "by and large, the U.S. does not now fly U-2s over nations that have modern missiles and are likely to use them. The planes are too slow."[32]

The SR-71, a more modern aircraft, flies at supersonic speeds and at very high altitudes, carrying multiple sensors and recording gear. It has been reported that on a typical mission, an SR-71 might "streak across the edges of Siberia or approach Murmansk, taking photographs from nearly 100,000 feet, while also testing Russian radar capabilities."[33]

It is satellites, however, that are the heart of national technical means of verification. One of the clearest statements offered to explain the success of satellites as a best alternative to on-site inspection is that "satellite reconnaissance . . . provided the ideal method of verification: it was intrusive without being obtrusive."[34] Various U.S. satellite programs have been in operation during the past twenty years, and the result of the technological developments which yielded those

satellites is claimed to be that "there has been perfect knowledge in Washington since 1962 of the number of silos and missiles in the Soviet Union, and in Moscow, of the number of American silos and missiles."[35] The assessment of whether or not Washington and Moscow had "perfect knowledge" is a judgmental one, and its literal accuracy is not particularly important. What is important is that the information available to the decision makers has approximated perfect knowledge -- it has been good enough for strategic assessments and planning. Even more importantly, the information has been gathered unobtrusively.

Various limitations are inherent in reliance on national technical means of verification. One of the most obvious limitations pertaining to satellite reconnaissance is the inability of cameras to see inside objects and facilities. In the case of weapons research and development, satellite photos cannot reveal what new weapons are in development in the laboratory. The earliest, and possibly only, moment that new weapons can be discovered by satellite photo is when they are taken outdoors for testing -- if tests outdoors are, in fact, required. Fortunately, such testing is required for most strategic weapons (including ICBMs, ABMs, and long-range bombers and tankers, but not cruise missiles), but even then it is possible to predict when reconnaissance satellites will pass within viewing range. Tests can thus be scheduled

at times convenient to avoid detection by those satellites, except when they involve long-range missile firings, where the trajectory covers, perhaps, one-quarter of the earth's circumference. Nevertheless, in the case of Soviet ICBM tests, the reentry vehicle may even land outside Soviet borders, for instance in the Pacific Ocean.[36] Provided that precautions are taken, the earliest a new type of weapon could be detected is during its production, storage, and transport to its operational site -- "if the weapon needs to be transported to its operational site and cannot effectively be camouflaged during transport." Even if the weapon were then to be discovered from satellite photos, it would still be difficult to determine its characteristics and purpose.[37]

Just as they are unable to probe inside factories and laboratories, satellite cameras are equally unable to see inside weapons themselves. One troublesome example of the need to see inside nuclear warheads involves the verification of multiple reentry vehicles (MRVs) and multiple independently-targetable reentry vehicles (MIRVs). "Once a missile is deployed inside its silo or submarine, it is impossible for a reconnaissance satellite photo to show . . . how many individual warheads are aboard the missile." The best information that can be compiled consists, in this case, of estimates of roughly how many of the smaller warheads can be carried, calculated from

the known size of the missile, engine thrust, and current state of the art of warhead miniaturization.[38]

One writer in 1970 hypothesized that it was conceivable that "very-high-resolution" satellite photos of missiles in transport might permit determination of the number of warheads carried. He further speculated that such a possibility was in part the reason for U.S. investment in developing an "ultra-high-resolution" camera for fourth generation reconnaissance satellites.[39] However, although ultra-high-resolution photographs may provide clues for analytic judgments as to the payload of missiles, the inability to see inside objects has and will continue to preclude photography from achieving a breakthrough in MIRV verification.

Yet another constraint on space reconnaissance is that photos must be interpreted -- correctly. Photo interpreters "must make an intelligent estimate of what the weapon is they are looking at and how it will be used."[40] The small mobile ICBM is an example of a weapon which might be disguised to resemble transport vehicles like those used to move gasoline. "Following any SALT treaty, photo-interpreters will need to be alert to any upsurge in numbers of large vehicles, especially in geographic areas suitable for ICBM launching."[41]

Evolution of Verification Technology

At each stage of arms control efforts, the level of existing technology has conditioned the type of measures which have been proposed and has affected the ability of agreements to be concluded at all. Through what levels has verification technology passed since 1945? And what has technological development meant for verification?

The years from 1945 to 1977 can be considered for the purposes of this paper to comprise two periods for verification. The actual point of demarcation is somewhat arbitrary, but can be seen as occurring in the early 1960s. Sometime between the Soviet launch of Sputnik I in 1957 and the American decision in 1967 to pursue a U.S.-Soviet SALT agreement (which would place verification reliance on national technical means), a transition took place from reliance on aircraft to reliance on satellites for reconnaissance. The U-2 incident in 1960 may have been the event that demonstrated conclusively the need for such a transition.

At the start of the first period, during World War II, aerial reconnaissance was conducted from airplanes at altitudes up to 35,000 feet, using single and stereo cameras. During the Korean War, jet aircraft began replacing propellor-driven airplanes for reconnaissance, and

infra-red film began to be used to overcome concealment by camouflage and by darkness. By the time, in 1955, that President Eisenhower put forth his Open Skies proposal, reconnaissance aircraft were flying to altitudes of 40,000 feet, and achieving a photographic resolution of a few feet.[42] In 1955, the Air Force formally tasked the CIA to develop a strategic satellite surveillance system, but did not wait for satellites before starting a strategic reconnaissance program.[43] The U-2 aircraft began operational flights in 1956 from altitudes of up to 70,000 feet with resolution estimated to be about five feet.[44] President Johnson revealed U.S. development of an aircraft in 1964 which could fly at supersonic speeds up to 2000+ mph and at altitudes of up to 100,000 feet. The SR-71, which began operation in 1965, was reported to have a resolution of two feet.[45]

Aerial reconnaissance during this period was plagued by two serious limitations. First, the area that could be photographed on a mission was restricted by the limited range of the airplane, the endurance of the crews, and the provocative nature of the mission. Second, the airplane was vulnerable -- to weapons on the ground and to fighter aircraft.[46]

During the first 15-year period, arms control proposals were hampered by the existing level of verification technology. Neither the Soviets nor the Americans seemed

willing to permit on-site inspections on their respective territories, nor were they able to agree on use of aerial reconnaissance for verification. Objections to aerial reconnaissance included its obtrusive nature and the inability to distinguish between collection of verification information and the collection of intelligence.

The invulnerability and unobtrusiveness of satellites gave them a considerable competitive edge over aircraft and, thus, during the second period, satellites took over the strategic reconnaissance mission. The immediate post-Sputnik years saw concerted development of several systems.

In April 1960, the Television and Infra-Red Ovservation Satellite (TIROS) used television pictures detailed enough for identification of large facilities, such as aircraft runways and missile sites. In May 1960, the Missile Defense Alarm System (MIDAS) used infra-red sensors to pinpoint ballistic missile launches. The real workhorse of the early reconnaissance satellites, however, was the Satellite and Missile Observation System (SAMOS), which began operation in January 1961. SAMOS was unique and important for two reasons: first, photographs were captured on film, ensuring fine-detail resolution; second, the film was ejected by the satellite for snatch-recovery by aircraft, thus permitting ground-based processing and providing the analysts with much higher quality photographs

than could otherwise be obtained. SAMOS resolution was reported to be about 2.5 feet.[47]

The quality of reconnaissance available during the 1960s permitted the discussions of strategic arms control proposals to proceed with the implicit understanding that national technical means could be used to verify many possible arms limitations. President Johnson's appreciation of the capabilities of satellite photography would seem to have been a factor in even the exploratory talks in the mid-1960s concerning SALT. More serious SALT negotiations, beginning in 1969, produced formal agreement on the use of national technical means for verification of SALT.

Systems introduced in the early 1960s were continually improved, and by the early 1970s several new generations of reconnaissance satellites were introduced. The most significant new system, introduced in June 1971 and known as Big Bird, combined the best features of earlier systems. Big Bird carried out a continuous search-and-find mission, processed film on-board, transmitted electronic photo-images to earth, could be commanded to focus its high-resolution camera on objects of interest, and sent film capsules back to earth. Resolution from Big Bird was reported to be one foot from an altitude of more than 100 miles.[48]

Big Bird certainly had the capabilities for producing

verification evidence for the 1972 SALT agreements. Quantitative limits could be observed and discrepancies discovered. However, because of the continuing inability of even national technical means to probe inside missiles, the qualitative issue of MIRV was not resolved in SALT I, but was postponed for later consideration.

Additional projects, reported in 1972 to become operational in 1976-77, were to provide the Air Force and the Navy with even greater capabilities: "real-time, close-look reconnaissance, with on-board [processing of] film [from] high-resolution cameras, [and] new-generation scanning systems [for relay] to Earth via Data Relay Satellites."[49] Yet, despite even the most advanced surveillance equipment, the problem still remains -- quantitative restrictions (which are observable) are significantly easier to verify than qualitative restriction (which are not observable). This problem seems to transcend technology and continues to plague current arms control discussions.

The development of highly sophisticated means of verification would never have been possible without the contribution made by computers. The abilities to put a satellite into precise earth orbit, to position a geosynchronous satellite in a stable location, to direct operation of satellite cameras for coverage of desired targets, to store and relay photo-images, all require computer control. The information collected by national

technical means would not be usable in a timely manner were it not for the development of high-speed computers. "Computers permit the collection of masses of data taken from the technical press; from the general and partial statistics relating to production, to traffic, to consumption of electric power; and from reports of travelers. The computers also classify this information immediately and give a good picture of military activities, if they exist."[50] Computers, as an essential element of sophisticated national technical means, may indeed be the most critical of all capabilities developed since 1945.

Conclusion

For arms control agreements, the value of verification rests on its ability to determine whether states are or are not living up to their international obligations. The ability of an agreement to be verified depends in part on the nature of the weapons to be controlled, in part on the terms of the agreement, and in part on the technical capabilities of the parties to perform verification operations. Hence, to some extent, the existing level of technology conditions the shape of arms control agreements.

In this regard, arms control progress since 1945 should be seen as having been constrained until the early 1960s by the limitations of available technology. Until

verification could be accomplished unobtrusively and unambiguously, states were reluctant to accede to the intrusion into their territory required by the use of other means. They were also reluctant to accept less-than-reliable information with which to monitor the actions of other states. Thus, the shortcomings in verification technology during the early years of the atomic age may be seen as a factor, inter alia, contributing to the failure of arms control efforts.

Technological developments led in the 1960s to the introduction and use of verification means -- national technical means -- which were both reliable and unobtrusive. Developments in seismology and in satellite reconnaissance, as well as an improving political climate, made possible the conclusion in the 1960s and early 1970s of several arms control agreements, including SALT I.

While the nature of weapons constrained at SALT I was such that quantitative constraints were sufficient for arms control progress to be made, further progress will depend on the imposition of qualitative constraints. At the current level of verification technology, qualitative controls impose greater strain on verifiability -- possibly to the extent that, when future agreements are concluded, they may not be adequately verifiable, or that future agreements may not even be concluded because of their unverifiability.

Understanding of the current situation regarding verification of SALT agreements requires some knowledge of the efforts that preceded it. The following discussion begins with the arms control efforts in 1945, and reviews proposals and agreements made during the following 25 years, with emphasis on their provisions for verification.

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III. PRE-SALT (1945-1971)

> Dread of nuclear destruction is surely the force that has made arms control and disarmament a major concern of thoughtful leaders and citizens since 1945.
>
> Trevor N. Dupuy and Gay M. Hammerman

> Over the past twenty years, verification has probably been the greatest single roadblock to the successful negotiation of arms control agreements.
>
> Herbert Scoville, Jr.

Overview

Arms control efforts might be dated back to the time when man first lifted arms against his fellow man. One history of arms control notes the first recorded disarmament conference to have occurred as early as 546 B.C.[1] Since then, advances in technology have allowed men to attack each other from great distances, impose massive destruction, and all the while become increasingly more removed from the battlefield and from the horrors of war. The evolution of the atomic bomb began an age in which an attack on an enemy could destroy his entire society and at the same time redound to the destruction of the attacker's society as well.

Because of the horrendous destruction possible with the use of nuclear weapons, discussion of the history of arms control in this chapter begins at the time of the

introduction of atomic weapons in war. As this discussion reviews some of the more significant arms control proposals and agreements from 1945 to 1971, emphasis will be placed on what provisions in the agreements dealt with verification, what verification mechanisms were proposed or established, and how the advent of satellites in the evolution of technology changed the issue of verification.

Early Negotiations

In general terms, "in the first decade after World War II it was assumed that the only form of verification that could be seriously considered would involve teams of inspectors with the capacity to probe where necessary, within specific limits, to monitor compliance."[2] On-site inspection was thus a major element of debate over the character of nuclear arms control from 1945 until into the 1960s, but overhead reconnaissance was to change the course of arms control negotiations as early as the late 1950s.

The period from 1946 to 1950 was characterized by two underlying conditions: American monopoly of atomic weapons and Soviet preponderance in conventional forces. During this initial period, Soviet leaders repeatedly called for bans on production and use of nuclear weapons, but refused to accede to U.S. demands for an acceptable control system.

The review of modern arms control efforts begins three months after the United States had dropped atomic

bombs on Hiroshima and Nagasaki. The heads of government of the United States, Britain, and Canada joined together on 15 November 1945 in proposing international control of atomic energy, in their issuance of the Truman-Attlee-King Declaration, which called for the creation of a United Nations Atomic Energy Commission to manage the effort. To assure that the agreements to be concluded for such control would be complied with, the declaration called for the Commission to "make specific proposals . . . for effective safeguards by way of inspection and other means to protect complying states against the hazards of violations and evasions."[3] The United Nations General Assembly voted unanimously on 24 January 1946 to establish the Commission. Thus, in the age of atomic weapons, the Truman-Attlee-King Declaration marks the start of not only the process of eliminating or reducing the arsenals of nuclear weapons, but also the process of verifying that when the agreements are made, they will be kept.

The first American proposal for control of nuclear weapons was made at the U.N. Atomic Energy Commission's first meeting in June 1946 by the U.S. Representative to the Commission, Bernard Baruch. The Baruch Plan, based on the March 1946 Acheson-Lilienthal Report, proposed establishment of a system for international control of atomic energy. Under this plan, all the atomic resources of the world were to be placed under the ownership or control of

an independent international authority. The United States, the only nuclear power at the time, was to give up its nuclear arsenal. The authority would carry out inspection of all nations. Violations of control rules were to be punished by action of the Security Council, in which the normal veto could not, for this activity, be exercised. The plan was to be carried out in stages: first, the control system was to be established and placed into effective operation; then, the United States would give up its nuclear weapons.

In Baruch's outline of the fundamental features of his plan, paragraph nine dealt with "inspection:"

> By assigning intrinsically dangerous activities exclusively to the [International Atomic Control] Authority, the difficulties of inspection are reduced. If the Authority is the only agency which may lawfully conduct dangerous activities then visible operation by other than the Authority will constitute an unambiguous danger signal. Inspection will also occur in connection with the licensing function of the Authority.[4]

The Baruch Plan was endorsed by a large majority of United Nations members, but the Soviet Union objected to the provisions concerning ownership, staging, and enforcement. From the United States' point of view, the Baruch Plan was an extremely generous gesture, in that the United States would voluntarily relinquish its nuclear strength and thus a powerful military advantage over the Soviet Union. The Soviets, however, objected that U.S. retention of atomic weapons during the first phase of the

plan was aimed at U.S. maintenance of nuclear monopoly. The Soviet Union further objected that since it was in a minority and would be without the veto power, it would be helpless in the face of a hostile Western majority.[5]

In June 1946, the Soviet representative to the United Nations, Andrei Gromyko, responded to the Baruch Plan by presenting a counterplan. The Gromyko Plan reversed the sequence of actions proposed by Baruch, and called for the destruction of nuclear weapons first, and then the establishment of a control system. Enforcement of the plan was to be postponed for resolution at a later date. Article 3 of the Gromyko Plan, which dealt with this matter, stated:

> The high contracting parties shall, within a period of six months from the day of the entry into the force of the present convention, pass legislations providing severe penalties for violators of the statutes of the present convention.[6]

However, verification, per se, was not mentioned.

Later Soviet proposals left nuclear activities under the control of national governments, and gave the international authority power only to conduct periodic inspections of declared nuclear facilities.[7] The total inadequacy of the Soviet plan's verification provisions, as perceived by the United States and many other nations, caused the negotiations to become deadlocked.

The Baruch and Gromyko plans of June 1946 established a rift on nuclear disarmament between the two

superpowers that was to last nearly a decade. Recognizing the impossibility of overcoming this deadlock, the Control Committee of the U.N. Atomic Energy Commission in March 1948 adjourned indefinitely. Following within four months, the Commission itself suspended its work.[8]

While the United States was proposing internationalization of atomic energy, on which it then had a monopoly, the Soviet Union both pursued membership in the exclusive "Atomic Club" and, simultaneously countered American nuclear superiority with its own conventional forces advantage. Unfortunately, substantive progress was not achieved.

> As cold war tensions mounted and political conflicts in Eastern and Central Europe developed, debate over control (which the West sought) and inspection (which the Soviets opposed) failed to become realistic, the unlikelihood of compromise became clearer, and eventually negotiation deteriorated into minimal activity.[9]

The development of technology brought new dangers. In September 1949, the Soviet Union detonated a nuclear device, and in February 1952, the United States exploded the first hydrogen device. (Whereas the first atomic bomb had an explosive equivalent of 15,000 tons of TNT, i.e., 15 kilotons, the first hydrogen bomb had an explosive equivalent in the millions of tons of TNT, i.e., megatons.) In 1953, the Soviets, too, exploded a hydrogen bomb.

To control the threat of atomic catastrophe, President Eisenhower proposed in his "Atoms for Peace" address

to the United Nations General Assembly on 8 December 1953 that international storage and control of fissionable materials be given over to the International Atomic Energy Agency (IAEA) under the aegis of the U.N., and that the materials "be allocated to serve the peaceful pursuits of mankind."[10] Although the Soviet Union was unwilling to join in this proposal, both it and the United States did establish their own peaceful atomic programs.

Once the Soviet Union had joined the nuclear club, and the American and Soviet nuclear and conventional force disparities began to diminish, each side tended to "demand international reductions in the type [of weapons] in which it was inferior." The West sought to prevent the Soviets from equalizing nuclear stockpiles; at the same time, the Soviet Union sought to "retain its intelligence advantage over the West through preservation of its closed society."[11] On 10 May 1955, the Soviets announced a series of extensive proposals for ending international tensions, including reduction of conventional forces of the Big Four and China, and removal, destruction, halting of production and of testing of nuclear weapons. For all the apparent concessions to true arms control contained in the proposals, there were also very large loopholes. Among the American objections was the contention that the disarmament proposals were unverifiable. The Soviets suggestions, that control teams placed at "railway junctions, on the main motor

highways and at aerodromes" could monitor the disarmament process, obviously omitted necessary provisions for inspection of missile launch facilities (which the Soviets were then constructing) and of facilities for research and production of fissionable materials. The problems over verification, combined with more severe political implications, prevented the U.S. from serious consideration of the proposals.[12]

"To soften the negative impact of this [U.S.] refusal [of Moscow's proposals], the American psychological experts came up with Eisenhower's famous 'Open Skies' proposal."[13] On 21 July 1955, President Eisenhower, in his address at the Geneva Conference of the Big Four, made the familiar U.S. point that "no sound and reliable agreement can be made unless it is completely covered by an inspection and reporting system adequate to support every portion of the agreement."[14] Then, addressing himself principally to the Soviet delegates, Eisenhower proposed:

> To give each other a complete blueprint of our military establishments, from beginning to end, from one end of our countries to the other; lay out the establishments and provide blueprints to each other.
>
> Next, to provide within our countries facilities for aerial photography to the other country -- we to provide you the facilities within our country, ample facilities for aerial reconnaissance, where you can make all the pictures you choose and take them to your own country to study, you to provide exactly the same facilities for us and we to make these examinations, and by this step to convince the world that we are providing as between ourselves against the possibility of great surprise attack,

> thus lessening danger and relaxing tension. Likewise we will make much more easily attainable a comprehensive and effective system of inspection and disarmament . . . ."[15]

Because of the similarity between methods of verification and methods of collecting intelligence, the Soviets responded to Eisenhower's proposal with suspicion over the use to which data collected by aerial reconnaissance according to the "Open Skies" plan would be put.[16] From the Soviet point of view, "Open Skies" offered a poor bargain: "since the American system does not allow much secrecy, . . . any exchange of information concerning military capabilities, bases, etc., would reveal more to the United States than vice versa."[17] The plan was eventually rejected by the Soviets as a mere trick to gain intelligence.

As talks between the two sides continued, both within and outside the United Nations, there came to be a general acceptance that step-by-step proposals offered greater chance of success than overall disarmament plans. Beyond that, there was little progress. During 1957, however, there were intensified efforts to reach an arms control agreement. Proposals and counterproposals covered subjects discussed and argued before, but despite their willingness to talk, neither the United States nor the Soviet Union would back down on basic principles. "Among the major East-West differences was the continued Soviet insistance on a complete prohibition on the uses of nuclear

weapons, despite the Western view that this was unenforceable."[18] Among other issues of disagreement was the nature and extent of inspection and control.

During the late 1950s, a shift in arms control efforts took place, with emphasis directed less at comprehensive packages, but rather at individual measures. The shift in attention can be attributed in part to the alteration of security perceptions brought about by the launch of Sputnik and the advance of the missile age and in part to the failure of the U.S., until ACDA was created in 1961, to deal through a single organization responsible for all aspects of arms control. Moreover, the focus of negotiations changed, too, and collateral issues began to be discussed.

Several forums for discussions were opened and various gatherings of experts took place. A 1957 Conference of Experts to study verification questions was considered successful. It was followed in 1958 by the "Geneva Conference on the Discontinuance of Nuclear Weapon Tests," a tripartite U.S.-U.S.S.R.-U.K. meeting which ultimately led to the 1963 Limited Test Ban Treaty. Another conference meeting in Geneva in 1958 to study methods that might be helpful in preventing surprise attack was adjourned after six weeks without having reached agreement on even an agenda. Despite the only partial success of these forums, they did, simply be assemblying a large number of experts, have the

long-term effect of raising the level of interest in arms control.[19]

The years of nearly fruitless negotiations from 1945 until the early 1960s saw much wasted time and effort and many lost opportunities, but the conditions of the times and the developments that occurred made later agreements possible. Dominance of U.S.-Soviet relations by cold war attitudes in these early years made comprehensive agreements almost unthinkable. Also, the strategies and strategic forces of the two sides were so different that objective and equitable agreements would hardly have been possible under any conditions. However, by the early 1960s, the need for arms control was more recognized, an agenda of measures to achieve arms control was available, and the machinery for negotiation had been established by previous efforts in Geneva.[20]

Agreements of Minor Significance for Verification

The arms control agreements of most significance for verification are the Limited Test Ban Treaty and SALT I, but other agreements also have some significance for verification and deserve brief mention.

During the Cuban missile crisis in the fall of 1962, as the two superpowers struggled to avert nuclear war, and as their leaders in Washington and Moscow experienced serious difficulties in communicating rapidly and privately with each other, the need for a direct communications link between

the two capitals became apparent. Discussions after the crisis on measures of reducing the risk of accidental war produced agreement on the establishment of a "Hot Line" -- providing a direct teletype link between Washington and Moscow -- but "fell short of establishing other means desired by the United States to prevent accidental war: an exchange of military observation teams, a system of giving advance notice of maneuvers, and [of] provisions for inspection of transportation centers, airbases, and maneuver areas."[21] In effect, what the U.S. was proposing was another form of on-site inspection, which the Soviets refused to consider outside the framework of a broad disarmament agreement.

In 1971, the "Hot Line" agreement was modernized, providing for technical improvements -- including additional circuits and the use of a satellite communications system instead of wire -- to increase the reliability of the teletype link. At the same time, a Nuclear Accidents Agreement, to reduce the chances of accidental war occurring, was signed. In the Nuclear Accidents Agreements, each party agreed to notify the other immediately if an accident occurs that might cause the detonation of a nuclear weapon; if something suspicious is detected by its early warning system; and in advance of any planned missile launches in the direction of the other. The Nuclear Accidents Agreement is particularly significant as it was the first publicly visible fruit of the Strategic Arms Limitation Talks.

Several agreements were designed to prevent militarization or nuclearization of an area on the premise that to exclude armaments is easier than to eliminate them once they have been introduced. Both sides benefit from such agreements -- military costs are kept low in denuclearized or demilitarized areas, and reciprocal security benefits also accrue. Agreements banning military activity or the introduction of nuclear weapons include treaties on Antarctica, outer space, Latin America, and the seabed.

The first post-World War II arms control agreement, the Antarctic Treaty, internationalized and demilitarized the Antarctic continent. The treaty, signed in 1959, sought to preserve the legal status quo of Antarctica, to ensure continued scientific cooperation there, and to establish use of the continent for peaceful purposes only.[22]

The treaty's verification measures are significant because they are based to an unprecedented extent on on-site inspection. It was possible to achieve agreement on an inspection system, giving each party the right to inspect and overfly the others' facilities because of the uninhabited nature of the area and because of the absence of military installations there.

The right of inspections provided by the treaty has been exercised by five nations; Argentina, Australia, New Zealand, the United States, and the United Kingdom. Inspections by the United States were conducted in 1964, 1967,

1971, and 1975, and Soviet facilities were included in all of the inspections. All U.S. inspection teams reported that "no military activities, armaments, or prohibited nuclear activities were observed and all scientific programs were in accord with previously published plans."[23]

The prohibition of weapons in outer space was proposed as early as 1957, when the United States proposed international verification of the testing of space objects. In August 1957, a Western proposal for partial disarmament included a provision for the development of an inspection system for outer space. At that time, however, the Soviet Union was about to orbit its first earth satellite and, hence, rejected the Western proposals. But, after their space program was well underway, and after signing the Limited Test Ban Treaty in August 1963, the Soviet Union's position changed. In September 1963, Foreign Minister Gromyko told the U.N. General Assembly that the Soviet Union wished to conclude an agreement banning weapons of mass destruction from outer space. In October 1963, the assembly unanimously adopted a resolution calling on all nations to refrain from introducing such weapons into outer space. The United States supported the U.N. resolution, despite its lack of provisions for verification, because it estimated U.S. spacetracking systems capabilities were adequate for detecting launchings and devices in orbit.[24] In January 1967, the Outer Space Treaty was concluded. It provided

for freedom of space exploration for all nations, prohibited military activities and installations in outer space, specifically prohibited the orbiting of weapons of mass destruction, and provided that all stations, installations, equipment, and space vehicles on the moon or other celestial bodies are to be open to representatives of other parties on the basis of reciprocity.

The Outer Space Treaty was hailed by some as a major achievement especially at a time of international tension. Critics, however, point out that while the treaty "was aimed at preserving for peaceful purposes part of man's environment that had not yet been militarized, . . . the Treaty has . . . not seriously hindered the two leading space powers from carrying out missions related to national military security that they deemed necessary."[25] Among criticisms leveled at the Outer Space Treaty has been the concern that even as the treaty was being signed, the Soviet Union was developing a Fractional Orbital Bombardment System (FOBS), which could place nuclear weapons in a partial orbit before the weapon was directed to its target. Although such a system is designed to confuse and overcome American defenses and apparently contradicts any "spirit" of the Outer Space Treaty, it appears not to be a violation. Thus, the treaty has no effect on current or planned development of a weapon to be deployed through outer space. The allegation, that the two sides entered into an arms control

agreement because the agreement would really have no effect on what they intended to do anyway, is a charge often repeated in the history of arms control in general, and of SALT in particular.

The countries of Latin America agreed in 1967 to prohibit nuclear weapons in the region. They called on nations outside the treaty zone which have territories within the treaty zone to place those territories under the same restrictions as the treaty states (of the four powers with such territories, the United Kingdom and the Netherlands have agreed; France and the United States have not). They also called on nuclear weapon states to respect the denuclearized status of the zone, to not contribute to acts involving violations of obligations of the parties, and to not use or threaten to use nuclear weapons against the treaty parties (France, the United Kingdom, the United States, and the People's Republic of China have agreed; the Soviet Union has not).[26]

The control system included in the Treaty on Latin America provided for verification of compliance not only by the parties themselves, but also by the regional organizations they have established and given the right to make special inspections. Safeguards for control are to be applied by the International Atomic Energy Agency (IAEA).

The issue of preserving the seabed for peaceful purposes was first raised in the United Nations in 1967,

with action eventually ending up in the Eighteen-Nation Disarmament Conference session in 1969. There, the Soviets submitted a draft treaty that would have banned all military uses of the seabed beyond a 12-mile coastal maritime zone. The U.S. found the Soviet Draft unacceptable, because of the impracticability of complete demilitarization. Citing the difficulty in defining the meaning of "military uses" and the need for employment of undersea warning devices, the U.S. rejected the Soviet draft, and submitted one of its own, in which weapons would be prohibited beyond a three-mile zone. Private negotiations produced agreement on the U.S. proposal, with Soviet concessions attributed to Soviet eagerness to achieve a follow-on arms control agreement to contribute to the viability of the Nuclear Nonproliferation Treaty.

The U.S.-Soviet draft, however, received a cold reception from other nations, which felt that the draft treaty ignored their interests, particularly in its verification procedures. The draft provision on verification was extremely simple because the Soviet and the U.S. had felt there was no verification problem. Violation of the treaty, they reasoned, would entail emplacement of many weapons (if they were to have any military significance) and would take place on the high seas (traditionally an area where any nation could have ships and, thus, observation capability). Because no verification problem was perceived, no complicated

verification procedures were deemed necessary.

The verification procedures of the Soviet-American draft were felt by smaller and less technologically advanced nations to be impractical for their application. They argued that if they were to be parties to the treaty, they would need assistance in verification. As a result of these and other criticisms, the draft was revised to an acceptable version, and the treaty was signed in 1971. The verification article established rather complex procedures which give each party the right to verify the agreement through observation by itself, with other parties, or through the U.N. Unresolved suspicions may ultimately be referred to the Security Council.

The Seabed Arms Control Treaty prohibits the stationing of weapons of mass destruction on the ocean floor, thus preventing the introduction of nuclear weapons into an area free of them. The treaty has received numerous criticisms. Since it deals only with weapons of mass destruction, the treaty, although denuclearizing the ocean floor, failed to fully demilitarize it. Further, it failed to deal with numerous other issues concerning international use of the oceans and their resources. The treaty is also claimed to be merely a "cosmetic agreement" designed to simulate actual progress by the superpowers toward disarmament when there really was no such progress. And the People's Republic of China has claimed that the treaty is a joint effort by the

superpowers to preserve their dominance of the oceans.[27]

Another treaty also dealt with verification of states either individually or collectively. The Nuclear Nonproliferation Treaty, described by President Johnson as "the most important international agreement since the beginning of the nuclear age"[28] up to that time, prohibits non-nuclear weapon states from developing nuclear weapons. The treaty, signed in 1968, represented more than four years of negotiations during which world nations debated such questions as the following: whether a formal treaty was really necessary, whether non-nuclear states should renounce their rights to acquire a nuclear military capability, whether a treaty would really represent an effort by the armed to disarm the unarmed, whether a treaty would jeopardize peaceful use of atomic energy, whether international inspection would entail dangers of industrial espionage and, finally, whether a treaty would be likely to have an adverse effect upon European integration and the cohesiveness of the Atlantic Alliance. Despite the successful conclusion of the treaty, not all of the questions were satisfactorily answered.[29]

In drafting the treaty, there was disagreement between the NATO and the East European countries on the matter of safeguards. The NATO countries insisted that inspection of their facilities be done by the European Atomic Energy Community (EURATOM); the East Europeans insisted that all

inspection be performed by the IAEA. To meet this concern, provision was made in Article III of the treaty to allow non-nuclear parties to negotiate safeguard agreements with IAEA either individually or together with other states, thus allowing members of the European Community to concert their negotiations and thus preserve the interests and prerogatives of EURATOM.

The Limited Test Ban Treaty

Because of its effect of slowing the arms race without upsetting the strategic balance, the Limited Test Ban Treaty (LTBT) was considered the most important arms control achievement since World War II. The treaty, concluded in 1963, prohibited any nuclear explosion in the atmosphere, in outer space, or underwater, if the explosion would result in fallout outside the country conducting the explosion.[30]

The LTBT was particularly significant from a verification standpoint because it was the first arms control agreement to rely on national technical means -- in this case, seismology -- for verification. To monitor the agreement, seismic detectors were used and, at least in the case of the United States, satellites (of the Vela series) capable of detecting nuclear explosions were employed.

The issue of verifying compliance with a treaty on cessation of tests had long plagued efforts to reach an

agreement between the United States and the Soviet Union. The U.S., and other Western powers as well, were determined to assure that an agreement would not be liable to secret violation. The Soviets held that since the explosion of any nuclear bomb could be recorded in other countries, an agreement to stop tests could be made without provision for international control.[31]

Nevertheless, the Western position remained firm: there was not convincing evidence that existing technology could detect all nuclear explosions and thus be able to adequately monitor compliance with a test-ban agreement.

> Throughout the various conferences and exchanges on a test ban [from 1955 to 1963], the complexity of the central problem brought successive deadlocks, break-offs, and renewals of discussion, shifts in position, searches for compromise, and for new techniques of verifications, and successive suspensions and resumptions of tests.[32]

Among the major points of contention on a control system was the item of on-site inspections. There were disagreements between the United States and the Soviet Union on the number of inspections permitted per year (the Soviet Union demanded none to three as maximum; the U.S. sought a minimum of seven), "the size of the area to be inspected, the nationality and composition of inspection teams, and the criteria for identifying events that required inspection."[33] Submissions of draft treaties by the United States and the United Kingdom in November 1961 and August 1962 included versions providing for on-site inspection, but

Soviet insistence that the West accept the quota of three inspections per year brought talks to an impasse. During 1963, a treaty was finally concluded -- it contained no provisions for inspection.

How had agreement come about? Much credit must be given to technological developments in seismology which would permit resolution of several technical stumbling blocks. The establishment of a calculated "threshold" in the magnitude of underground explosions above which the explosions could confidently be distinguished from earthquakes was made possible by the monitoring and analysis of past explosions, and, of course, by the development of the seismic detectors themselves.

Politically, the treaty was concluded during a period of thaw in the cold war. Talks and negotiations of a comprehensive Test Ban had been underway for several years. When fallout from U.S. atomic tests at the Bikini Atoll in 1954 fell on a Japanese fishing boat, the calls to cease nuclear testing began. Subsequent studies were conducted, and the report of a conference of experts in 1958 led President Eisenhower to announce U.S. willingness to negotiate a test ban, contingent upon the effectiveness of the control system. The Soviets attacked the linkage requirements, but agreed to tripartite U.S.-U.S.S.R.-U.K. negotiations. Testing of nuclear weapons continued until the tripartite talks began, but during the talks (from 1958 to 1961) a moratorium

on testing was respected.

While some progress was made in the talks, the downing of the U.S. U-2 reconnaissance airplane over Soviet territory in 1960 effectively delayed negotiations until the end of Eisenhower's term in office. When President Kennedy resumed discussions, the Soviets hardened their positions, trying to test the strength of the new President. Pressures building within both nations led to the resumption of testing in 1961.

The October 1962 Cuban missile crisis gave renewed emphasis to efforts at negotiating a comprehensive test ban. Proposals for use of seismic stations within the territory of the other nation approached the point of agreement but eventually failed. Both leaders continued their efforts, however, and Kennedy, in a commencement address at American University on 10 June 1963, called for a reexamination of attitudes toward the cold war and arms competition. He announced the resumption of discussions in Moscow and the halting of further U.S. atmospheric testing unless the Soviet Union resumed testing. The speech was well received in the Kremlin and a change in Soviet position took place -- Krushchev indicated Soviet willingness to accept a limited agreement. The partial ban, signed in August 1963, was based implicitly on verification by national means, though no explicit verification provisions were incorporated in the treaty itself.

Conclusion

Of all the points discussed and debated in East-West arms control negotiations since 1945, verification has certainly been the subject of some of the most basic disagreements. Within that context, the United States and the Soviet Union have assumed and clung to polar views. The United States has maintained its early commitment to "no disarmament without controls," which demanded that systems for inspection and control be agreed upon and in operation before actual disarmament would occur. The Soviet Union, on the other hand, countered with its early insistence on "no controls without disarmament," which demanded that disarmament be implementd as a first step, preceding the establishment of verification and enforcement measures.

Proposals for control systems put forth by both sides have ranged from various forms of international agencies (including use of the United Nations organization), to exchange of technical military information and reciprocal aerial inspection procedures, open inspection, and most recently, verification using national means. Actual agreements have been possible because, although they relied on on-site inspection, they did not require inspection on the territory of either the United States or the Soviet Union. The Antarctic Treaty, the Outer Space Treaty, the Treaty on Latin America, and the Seabed Arms Control Treaty are examples.

Control of strategic arms on American and on Soviet territory, however, really only began with the Limited Test Ban Treaty -- and application of national means of verification. Yet, while technological developments made an important contribution during the period since 1945, the changes in the world political climate are also significant. That little progress in arms control was made during the 1950s is understandable, considering the strength of cold war ideological attacks and actual disparities in the balance of forces. Détente of the 1960s and early 1970s provided the accommodating environment in which technological progress could make arms control possible.

If arms control can be seen as in any way epitomizing the character of détente, then the SALT I agreements culminated the efforts made in both areas from 1969 to 1972. The following discussion reviews the SALT I negotiations and agreements, particularly the verification provisions and their implications.

NOTES TO CHAPTER III

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2. Strategic Survey, 1975, p. 112.

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23. Ibid., p. 20.

24. Ibid., pp. 47, 49.

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26. ACDA Pub 77, pp. 58-9.

27. Dougherty, How to Think About Arms Control, p. 153.

28. New York Times, 14 March 1969.

29. Dougherty, How To Think About Arms Control, pp. 148-49.

30. DHACD, p. 524.

31. Letter from Premier Bulganin to President Eisenhower, 17 October 1956, as quoted in ACDA Pub 77, p. 35.

32. ACDA Pub 77, pp. 36-7.

33. Ibid., p. 37.

IV. SALT I (1969-1972)

> The SALT Agreement has made reconnaissance satellites 'respectable.'
> John W.T. Taylor and David Mondey

> The Eisenhower 'open skies' proposal is now a matter of international agreement between the United States and the Soviet Union.
> Herbert Scoville, Jr.

In 1969, twenty-four years of United States' superiority in strategic weapons came to an end. In that year, the Soviets achieved strategic parity, in terms of ICBM launches -- a condition which permitted arms control progress to be made. Both sides realized that failure to establish strategic arms limitations would generate an escalation in the arms race, which would result in heightened international tensions and tremendous national defense costs. Political stability demanded strategic weapons restraints.

Negotiations

The Strategic Arms Limitation Talks (SALT) were the continuation of more than twenty years of discussions, proposals, rejections, counterproposals, and agreements, by which the United States and the Soviet Union sought to reduce the level of nuclear danger in the world. The initiative for the talks came from the U.S. invitation to the

Soviets in January 1967 to enter into discussions aimed at halting the arms race, particularly in defensive systems. Soviet agreement came only in late June 1968. The reasons for the long delay in Soviet response are obscure. According to an expert on Soviet foreign policy:

> We can only surmise that [the delay was] due to the combination of sharp differences within the politburo; the calculation that a delayed response would encourage political cleavages in the United States and occasion a postponement in a "thin" ABM system; the desire to have offensive weapons included as well; and the determination to overcome the United States' lead in strategic weapons before agreeing to talks.[1]

Shortly after the Soviets had agreed to start discussion, they invaded Czechoslovakia, prompting the U.S. to cancel the start of SALT.

A statement by the Soviet Foreign Ministry on 20 January 1969, the first day of Nixon's presidency, expressed willingness to again discuss strategic arms limitations. The president promptly responded to the Soviet offer, initiated an extensive and detailed review of the strategic, political, and verification aspects of the problem, and named a U.S. delegation to the talks.[2]

The first session of talks opened on 17 November 1969 in Helsinki between delegations of the United States and the Soviet Union. Six more sessions, alternating between Vienna and Helsinki, were required to hammer out the complicated details of a final agreement. These negotiations and the resulting agreements are generally referred

to as "SALT" negotiations and the resulting agreements are generally referred to as "SALT I." The term "SALT II" describes follow-on negotiations beginning in November 1972 for a subsequent agreement. The negotiating sessions of SALT were held in secret and details have never been made public.[3]

The first session in Helsinki was for the most part exploratory and has been described as "amounting almost to a seminar in strategic theory."[4] Differences emerged on the definition of "strategic systems," with each side seeking unilaterial advantages. The Soviets maintained that any weapon capable of hitting the other side's homeland from where it was deployed should be considered strategic. According to this definition, U.S. "Forward Based Systems" (FBS) in Europe would be included, since they were capable of hitting the Soviet Union. The United States considered the FBS to be theater rather than strategic weapons and, in any case, insisted that the negotiations should try to limit only "central strategic systems" -- that is, the weapons which were perceived as the greatest threats. The central issues were ABMs and MIRVs, but only limited exploration of either subject was achieved at this first session.

Differences also appeared over the issue of verification. The U.S. delegation, apparently more concerned about verification, raised the issue many times. The standard Soviet reply was that any and all parts of a SALT

agreement must be verified by national means, as opposed to on-site inspection. At one point in the negotiations, the Russians were reported to have relaxed somewhat and were willing to entertain discussion of alternative means of verification, but soon thereafter, presumably acting on fresh instructions from Moscow, resumed repetition of their "national-means-only" position. At some point thereafter, the United States is said to have " swung round to" the Soviet position, and national means became the basis for SALT verification.[5]

Exactly when the U.S. accepted the concept of "national means only" is not certain, although it was reported that just as the second round of negotiations was to begin, the Americans had not yet resolved the question of "whether an agreement verified by national means only was a better and safer alternative than no agreement at all." Verification of a ban on MIRVed missiles was seen to be difficult using only national means, but even if on-site inspection were used, reliability was not seen to be significantly greater. The U.S. negotiating stance on various issues, particularly MIRV, indicated that the Nixon administration had, at least privately, decided to rely on national means for verification. Since accounts of the negotiations make no further mention of the verification issue being discussed, the impression is that, once the U.S. had shown acceptance of the Soviet position, the subject

of verification was effectively settled and further discussion was unnecessary.[6]

At subsequent negotiating sessions, the U.S. and Soviet delegations wrestled over the substantive arms limitation issues. For this study, those negotiations are not as important as the fact that the resulting agreements relied for verification on national technical means.

Sufficient progress had been made by the end of the fifth session of negotiations for President Nixon to announce in September 1971 his intention to visit the U.S.S.R. the following May. During his visit to Moscow, President Nixon, along with Soviet General Secretary Brezhnev, signed the historic SALT I Agreements. Specifically, they signed the ABM Treaty, the Interim Agreement, and a Protocol to the Interim Agreement. In addition, the heads of the SALT negotiating delegations initialed Agreed Interpretations of certain provisions of the ABM Treaty and of the Interim Agreement, and they made Unilateral Statements regarding their sides' interpretations of other provisions. (The texts of the SALT I agreements are attached at Appendix 1.)

Terms of the Agreements

The ABM Treaty and the Interim Offensive Arms Agreement entered into force on 3 October 1972, the former being of unlimited duration, the latter to expire in five years unless superseded.

The most significant achievement of SALT I was the ABM Treaty, which prohibited each side from building an ABM system that could provide a nationwide ABM defense or could become the basis for developing one. To that end, each party was limited to deployment of two ABM systems, each having no more than one hundred ABM launchers and missiles. One such system was restricted to protection of one ICBM launch complex of each side, the other to protection of the national capital. Further provisions prohibited more than fifteen ABM launchers at test ranges; they prohibited development, testing or deployment of other basing systems, as well as multiple-launch, rapid-reload, and multiple-warhead capabilities; and restrictions on types of radars were imposed to prevent possible use of surface-to-air-missile (SAM) systems in an ABM role. Also, while future radars for early warning of strategic ballistic missile attack were permitted, they would have to be located at the periphery of each sides' national territory and oriented outward. Modernization and replacement of ABM systems was permitted under the treaty, but replaced systems would have to be destroyed. Transfer of ABM systems outside the two sides' national territories was also prohibited.

The Interim Offensive Arms Agreement and its protocol are less refined than the ABM Treaty. While national technical means of verification are adequate to count missile launchers, they are unable to count the missiles

themselves. Therefore, the agreement limited launchers rather than missiles. Since missiles cannot be fired without use of launchers, the agreement represented a de facto limitation of missiles.

The Interim Agreement essentially froze at existing levels both fixed land-based ICBMs and SLBMs operational and in construction on each side. There were four essential provisions: additional fixed land-based ICBM launchers were not to be constructed; launchers for light ICBMs were not to be converted for launch of heavy ICBMs; SLBMs and the modern submarines which carry them were limited to those operational and under construction, except that new SLBMs could replace older types of ICBMs and SLBMs; and modernization of strategic offensive ballistic missiles and launchers was permitted. The Protocol to the Interim Agreement presented a mutual understanding of the two parties regarding the article concerning limits and replacement of SLBMs.[7]

The heads of delegations initialed certain Agreed Interpretations concerning both the ABM Treaty and the Interim Agreement. These included certain technical limitations applied to emitted power of the ABM radars. They also established that the two permitted ABM sites of each side must be separated by at least 1,300 kilometers, to prevent creation of a regional defense zone or the development of a nationwide system. Multiple-warhead ABM interceptor

missiles were prohibited. Agreed interpretations of the Interim Agreement concerned understanding of what was meant by a land-based ICBM; construction, replacement, and modernization of ICBM launchers; and training launchers.

Common Understandings were statements presented by one side, and agreed to or in some way acknowledged by the other side. The U.S. delegation presented five such statements, the Soviet side, one. One understanding was that ABM launchers and radars which were not permanent fixed-types were not permitted by the ABM Treaty. Another understanding, which later proved to have no value and became the cause of controversy, concerned the Agreed Interpretation that "in the process of modernization and replacement the dimensions of land-based ICBM silo launchers will not be significantly increased." The understanding was that "significantly increased" means that an increase "will not be greater than 10-15 percent of the present dimensions of land-based ICBM silo launchers."

Unilateral Statements were made by each delegation during the course of the negotiations -- seven by the U.S.; one by the Soviet Union. These statements, because they were made by only one side, had no legal standing and have been criticized frequently since SALT I was concluded. The U.S. stated that it considered deployment of land-mobile ICBM launchers as inconsistent with the agreement. The U.S. emphasized that it viewed the provision prohibiting

concealment of activities to apply particularly to the fitting out or berthing of submarines. The U.S. explained how it interpreted the prohibition against testing components in "an ABM mode." The U.S. defined the term "heavy ICBM." The Soviet Union stated that if U.S. allies in NATO increased the number of their modern submarines, then the Soviet Union saw itself as having the right to increase the number of its submarines. The U.S. did not accept the validity of the Soviet statement, and when the Soviets repeated their statements, the U.S. again rejected it.

As a result of the SALT I agreements, the upward trend in the growth of strategic weapon arsenals of the United States and the Soviet Union was limited. Defensive systems were limited to two for each side; offensive limits were as follows:

	U.S.	U.S.S.R.
ICBMs	1,054	1,608
SLBMs	656	740
Heavy Bombers	*	*
	1,710	2,348

*Note: Heavy Bombers were not limited by SALT I.

The limitations of U.S. weapons were set at the level of systems deployed in 1972, a level which had been

held constant since 1967. Limits for the Soviet Union were set higher than the level of deployment in 1972, allowing 81 more ICBMs and 180 more SLBMs to be deployed.

Verification Provisions

Both the ABM Treaty and the Interim Offensive Arms Agreement provide for use of national means of verification, non-interference with the other party's verification means, and non-concealment from the other party's verification efforts. Article XII of the ABM Treaty and Article V of the Interim Agreement are virtually identical in their wording:

> 1. For the purpose of providing assurance of compliance with the provisions of the (Treaty/Interim Agreement), each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.
> 2. Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.
> 3. Each Party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with the provisions of this (Treaty/Interim Agreement). This obligation shall not require changes in current construction, assembly, conversion, or overhaul practices.[8]

The verification articles are considered particularly significant for a number of reasons. First, "the provisions institutionalize the two super powers' practice of tolerating each other's intelligence-gathering activities . . . ."[9] It is the first time that international treaty law has

recognized the right of nations to obtain information about other nations' military forces through the use of 'national technical means,'[10] and the provisions may be useful as a precedent for establishing the right of nations to have information about the military forces of other countries.[11] Second, and probably more important than recognition of the right to obtain information by national technical means, are the provisions which "make it illegal to interfere with these means."[12] The United States and the Soivet Union had long known that the other was observing its military deployments by satellite, and there had been fears that, at some point, attempts would be made to destroy these reconnaissance platforms. "This provision radically changes the situation from 1960 when the U-2 flight over the Soviet Union was branded as a gross violation of international law and the Soviet Union considered that it was well within its rights to shoot the aircraft down."[13] Third, the provisions which prohibit deliberate concealment measures, such as camouflaging an ICBM launcher, tend to neutralize Moscow's superior command of information. That information asymmetry results, at least in part, from the difference in the characters of open and closed societies. "And commitments made by the Soviets not to . . . conceal weapons systems from national means of verification increase the reliability of the information obtained by those means."[14] The result, therefore, is a more equitable access

to information by both parties.

The verification provisions of SALT I have been termed "de facto acknowledgement that technical means of surveillance such as intelligence satellites are now an all-essential element in assuring the stability of the strategic balance."[15] The verification provisions further indicate that both U.S. and Soviet reconnaissance satellites get photo resolutions that are more-than-adequate to check compliance with the limits established for ABMs, ICBMs, and SLBMs. "The fact that neither country found it necessary to ask the other to change its current strategic weapon procedures testifies to the present effectiveness of satellite photography."[16]

Because of adamant Soviet objection to on-site inspection, the SALT agreements put limits only on those categories of strategic weapons that can be adequately verified by national technical means.[17] Essentially, then, "the controls imposed by SALT I were quantitative, and thus verifiable by national means . . . ."[18] Beyond the agreements on numerical of strategic weapons, the situation becomes more complex. The problem then becomes one of achieving qualitative strategic limitations. "It is generally acknowledged that once high accuracy or multiple warhead missile systems have been fully tested it is very difficult to determine whether the warhead of a deployed missile has high or low accuracy or whether it is single

or multiple."[19] The subject of qualitative limitations will be discussed further in following chapters.

Verification was the subject of considerable debate within the United States before and during the SALT negotiations. Stances tended to reflect the biases of the actors involved, each of which attempted to exert its influence in shaping the SALT agreements. From a verification viewpoint, the most powerful actors were the White House, the Central Intelligence Agency (CIA), the Defense Intelligence Agency (DIA), the Arms Control and Disarmament Agency (ACDA), the Department of State, and others, not necessarily in that order. Concern by each of the actors for its own interests appear to be the basis for Newhouse's comment that "no part of the bureaucracy is above suspicion of bias. That includes the intelligence community."[20]

Bias by intelligence agencies has long been felt and expressed by intelligence "consumers" and other observers. The DIA, because of its association as a subordinate organization of the Joint Chiefs of Staff, has always been suspected of sharing the biases of the military services. The CIA, which is not an arm of a policy organization, does not suffer the same guilt by association. It has, however, been accused of bias: "The CIA has by its analytical work shown a strong bias in favor of the venturesome appraoch to SALT." The Nixon White House termed the bias "Ivy League," and clashed with the Agency over

verification, "a problem of which the CIA takes a cheerier view than any competitor." The CIA contended that "most parts of any currently imaginable SALT package should be verified with reasonable confidence," or, in other words, that "cheating would be detected on any scale large enough to make cheating worthwhile." The White House was much less optimistic and "suspected the CIA of abetting those who favor a broad SALT agreement in order to promote funds for the additional systems needed to monitor the various constraints and prohibitions." It was felt that, depending on what was included in its final provisions, a broad SALT agreement "might require certain detection systems not presently 'on the shelf.'"[21] From the CIA's point of view, in that regard, the broader the agreement, the better.

Verification became the focus of discussion within the National Security Council in 1969 when the Chairman of the Joint Chiefs of Staff, in an "unusually harsh statement," expressed serious doubt about the treatment given in a study on SALT to the verification problems. In swift response, the President's Adviser for National Security Affairs, Henry Kissinger, urged and won creation of a Verification Panel, which he himself would chair, and a Working Group, which a White House staff member on SALT would chair. "The two groups were to establish central White House control of SALT that had [theretofore] been lacking."[22] Both groups were subordinate bodies of the National Security

Council (NSC).

The Verification Panel was composed of a small group of senior officials, who were assisted by the Working Group, "composed of highly competent and, for the most part, senior bureaucrats, [which ran] the operational side of SALT." The Working Group, in generating "inputs" for the Panel, "focused the analytical talents of hundreds -- sometimes as many as a thousand -- specialists from the Departments of State and Defense, ACDA, the Joint Chiefs of Staff (JCS), the intelligence community, and outside nongovernmental institutions."[23]

Before the first SALT negotiating session was to begin, the White House assembled task forces to deal with various issues -- one dealt with verification -- and nine options were reported to the President. The options were considered as "building blocks," elements of which could be shuffled into various combinations and packages to give the U.S. great flexibility, and to assure White House control.[24] At almost the last moment, however, the strategy was switched, and instead of emphasizing options, the Administration was to focus on major issues, like ABM and MIRV.

In the first session of SALT negotiations, "both sides were ready to talk about quantity -- about numbers of weapons; they were much less willing to do so about quality -- about MIRVs, improved support systems, and

potential innovations." The Americans planned to explore some issues concerning quality, but found that the Russians "had clearly been instructed to avoid talking about them at all." The Soviet attitude seems best "explained by technological lag; the United States was ahead in all or most qualitative aspects of offensive and defensive weapons, and the Soviet interest lay, not in discussing America's advantages, but in canceling them by some other means."[25] On the issue of verification, the United States and the Soviet Union differed on the desirability or acceptability of on-site inspection. Resolution came only on American accession to Soviet demands for sole reliance on national means of verification.

One issue, raised by the Soviets but not resolved at SALT I, which remained an issue still to be resolved at SALT II or SALT III or later, was the perceived threat posed to the Soviet Union by American Forward-Based Systems (FBS). These systems, mostly aircraft, deployed by the U.S. in continental Europe and on Mediterranean and Pacific carriers, should according to the Soviet contention, be treated the same as other central systems (long-range missiles and bombers), because they are technically capable of striking targets in the U.S.S.R. U.S. arguments, that although the systems were capable of one-way missions, they could not strike and return to base; that they were not a first-strike threat and barely a second-strike threat; that

they were not a first-strike threat and barely a second-strike threat; that their chief purpose was to counter Soviet medium-range and intermediate-range missiles (MRBMs and IRBMs) targeted against America's European allies, were all unacceptable to the Soviets.[26] The issue was finally dropped at SALT I, but is an example of the continuing problem of "grey-area" weapons -- those not wholly strategic nor wholly tactical -- which plague current SALT discussions. This issue is also treated in the next chapter.

After the first session of SALT, the U.S. reassessed its options and consolidated them to four: (A) high ABM and high MIRV limits; (B) low ABM and high MIRV limits; (C) a ban on MIRV but not on ABM; (D) a ban on both. These options received the time and energy of the Verification Panel and of the Working Group in preparation for round two of negotiations. The result of their efforts was a pair of notable White House decisions, one of which is significant for this discussion. Option C, according to the Verification Panel's version, was to verify the ban on testing and deployment of MIRVs by use of national means, "the only approach acceptable to the Russians." The NSC, however, broadened the language to include verification by on-site inspection. Many of those in the bureaucracy who had done the analytical work behind the original language were angered, and some "feared that the White House had scuttled a first and last chance to turn back the clock on MIRV." They felt that

"the prospect of Moscow accepting a ban on MIRV tests was bleak enough [especially at a time when the U.S. was concluding its MIRV testing for Minuteman and Poseidon] without attaching the one condition, on-site inspection, that would all but guarantee a categoric Russian nyet."[27]

Even on the very eve of the second session of talks, a senior member of the Nixon Administration recalled, "we had still not resolved some basic questions." One was whether an agreement verified by national means alone was preferable to no agreement at all. The U.S. SALT position reflected this uncertainty.

> The bureaucracy was looking at the MIRV issue analytically, while the White House saw it in subtler and more political terms. For the bureaucracy, the issue was whether a testing ban could be reliably verified by national means. Nobody doubted that the Soviets could get away with some cheating. Could they, however, cheat undetected on a scale large enough to make it worthwhile? The intelligence community, especially the CIA, thought not, favored the uninspected testing ban, and drew support from the State Department, and ACDA . . . . Skirmishing against the idea was led by DDR&E, backed by various other parts of the Pentagon.[28]

Another unresolved question was "whether on-site inspection would contribute much to a ban on MIRV deployment." On this issue, too, the bureaucracy split in its assessments. Nixon's decision to include on-site inspection in Option C was seen as having been made with clear knowledge of "the pitfalls in on-site inspection and the Soviet loathing of the idea." It was speculated that the decision was made because of, rather that despite, the

negative implications. The requirement for inspection would ensure that the Soviets would reject it, that MIRVs would not be banned, and that the U.S. could thus broaden its technological lead in this area.[29] The White House decision on Option C troubled the Joint Chiefs and others in the Pentagon, the State Department, and ACDA, all of whom preferred the uninspected ban. None, however, chose to make strenuous objection to a decision which they doubted the President and Kissinger would retreat from.[30]

In retrospect, the Option C debate was a futile internal exercise, because the Soviets were not then interested in banning MIRV testing -- "Moscow was determined to master the technology."[31] When the negotiations resumed, the Soviets quickly rejected Option C, feeling that the U.S. "sought to freeze them into a technologically inferior position in the bargain."[32]

In descriptions of the remaining negotiating sessions, mention was seldom made of the verification issue. This could imply that verification was subordinated to limitation or, more likely, that the essential verification arguments, aired during the early sessions, were relied upon for the remainder of the SALT negotiations. As is now well known, debate within the U.S. over verification was effectively settled by Soviet insistence that the SALT agreements rely on national means alone for verification.

Alleged Violations

Once the SALT agreements were signed in May 1972, it became the task of verification to assure that the sides were complying with the provisions of the agreements. That task was not easy. First, there were the assumptions, noted in Chapter I,[33] upon which verification was based: violations of an agreement are possible; and, if violations do occur, there will be a concerted effort to conceal them.

Second, there was the problem of defining the term "violation." Secretary of State Kissinger, discussing at a news conference what is meant by violation, listed several meanings that can be attached to the notion of violation:

> [First,] a violation can be a deliberate violation of a SALT limitation, aimed at increasing the Soviet strategic capability in ways which the agreement was intended to preclude.
>
> Second, a violation can be an action inconsistent with the spirit of the agreement and tending to undermine its viability even though it is not prohibited by the agreement. There can be borderline situations where the activity strains the interpretation of particular provisions.
>
> Third, there can be unintended violations occurring, for example through negligence of higher officials responsible for insuring compliance by their subordinate organizations.
>
> Fourth, there can be actions not banned by an agreement but which can complicate verification of the agreement.
>
> Fifth, there can be ambiguous activities resulting from differing interpretations of the provisions of the agreement.
>
> Sixth, there can be activities that are assessed as ambiguous due to inadequate information or misinterpretation of information which suggests a violation where in fact none exists.[34]

Such a listing, of course, reflects only the American interpretation of what a violation is.

Since the conclusion of SALT I in May 1972, numerous alleged Soviet violations have been charged or reported. One of the most outspoken defense hard-liners made the following accusation:

> The Russians have done a variety of things to defeat our national means of verification, including the covering over with netting and other camouflage of activity at test sites, missile deployment locations, and missile-launching submarines. Other, more sophisticated techniques which they have used go beyond the classification level I can deal with in this talk. All of these Soviet activities violate the SALT I agreement.[35]

Presented here are numerous other charges of SALT violations by the Soviets. Generally speaking, each of the alleged violations involves differing interpretations of what is and what is not permitted by the SALT agreements.

(1) The Soviets were accused of having constructed in their ICBM fields between 150 and 200 new silos capable of housing and launching ICBMs. The alleged silos are reported to be cylindrical, and to have ICBM launcher-type suspension equipment and 'blowaway' doors. The Soviets explain that the purpose of the facilities is not to house operational ICBMs but that some are <u>silos</u> for test and training purposes (as permitted by SALT I), and the rest -- the greater portion -- are not <u>silos</u> but ICBM launch control <u>facilities</u>. Unless these cylindrical facilities could be shown to be operational silos the allegation that

they violate SALT I cannot be proven. Even if they are in fact silos, capable of holding ICBMs, there is reported to be little chance that the Soviets could actually load missiles into the silos without being detected. The potential danger the silos pose is therefore not that they will upset the peacetime strategic balance, but that if the Soviets chose to attack the U.S., they would have up to 200 additional launchers available for their use.[36]

(2) Placing canvas covers over what are believed to be SS-X-16 mobile ICBM launchers is a source of U.S. concern because the practice could be held to be Soviet use of deliberate concealment measures to impede U.S. verification of SALT I (a violation of Article V of the Interim Agreement) and because the U.S. is particularly sensitive to any indications of possible mobile missile deployment (as expressed in the U.S. Unilateral Statement of 20 May 1972). The Soviets contend, with questionable legal justification, that since they neither signed nor initialed any provisions of SALT I that deal with mobile systems, "what they do in the field of land-mobile development and testing is of no legal concern to the U.S." It can further be noted that, while the U.S. statement referred only to deployment (not to development and testing) at the time the charges were made, the Soviet SS-X-16 was still in its testing phase, and even today its development has not been confirmed.[37]

(3) The charge that the Soviets have illegally placed canvas covers over large areas of their facilities for construction and refitting of ballistic missile submarines at Severmorsk on the Kola inlet underscores an ambiguity in the treaty language.[38] Where Article V(3) of the Interim Agreement prohibits deliberate concealment, it also allows that "This obligation shall not require changes in current construction, conversion or overhaul practices." The Soviets claim that the practice of covering some areas of their SSBN yards predated the SALT agreements, and is therefore legal. Here the Soviet argument seems persuasive -- given weather conditions above the Arctic Circle, facilities might require protection -- although recent literature tends to neither confirm nor deny that the practice was employed before 1972. By disregarding the U.S. Unilateral Statement[39] and by interpreting Article V(3) in a way contrary to the American aspirations, the Soviet Union was able, without breaking the terms of SALT I, to render the verification provision virtually worthless.[40]

(4) The Soviets are reported to have tested two "decoy" SSBNs: one made of solid plastic (which is said to have broken up), and one inflatable type (which seemed to suffer a puncture). These are significant not so much as possible SALT violations, "but rather as illustrations of a Soviet attitude toward verification concealment, and toward treaty avoidance, which bodes ill for those among

us who believe that SALT is, in part, really about the building of mutual confidence."[41]

(5) The Soviet Union has been charged with testing air defense missiles and radars "in an ABM mode." These charges stem from the same activity: the Soviets, for eighteen months in 1973 and 1974, were testing SA-5 (and apparently also SA-2) missiles and radars in what could, by the definition provided in the U.S. unilateral statement of 7 April 1972, be termed "an ABM mode."[42] The Soviets are able to fend off this charge by reminding that, unlike the Americans who issued a unilateral statement, they never committed themselves on the precise meaning of "tested in an ABM mode." Since they did not accept the American definition, the Soviets could not be held to have violated the ABM Treaty. In fact, "the Soviets have denied that their high altitude SA-2 and SA-5 tests were 'in an ABM mode,' and they have reminded American officials that [according to 'Common Understanding (C): ABM Test Ranges'][43] non-ABM radars may be used for 'range safety or instrumentation,' off and on agreed ABM test ranges."[44]

Former Secretary of Defense Laird, in explaining the need for effective intelligence to protect the American public, spoke about the alleged Soviet testing of radars in an ABM mode:

> The Russians were testing radars in an antiballistic-missile mode for two years. We should have called

> it to their attention right away that this violated our agreements. When we finally made the violation public, they stopped . . . . It is only because of our intelligence activity that we can expose these violations and make the Soviet Union accountable. That is the only way we can enforce any agreements with the Soviet Union.[45]

(6) The Soviets have been charged with developing, testing, and netting mobile ABM radars. The actual element of alleged violation concerns the definition of mobile: the U.S. views the systems in question to be mobile; the Soviets see them as transportable.[46]

The semantic problem would not seem obvious from the Treaty language. Article V (1) of the ABM Treaty includes the following statement: "each party undertakes not to develop, test, or deploy ABM systems or components which are . . . mobile land based."[47] Further, in an attempt to preclude future problems over this very matter, the U.S. made the following statement on 28 January 1972: "On May 5, 1971, the U.S. side indicated that, in its view, a prohibition on development of mobile ABM systems and components would rule out the deployment of ABM luanchers and radars which were not permanent fixed types."[48] The Soviet Union, on 13 April 1972, said that there is general common understanding on this matter. As a result, it has been hypothesized that, "if as alleged, the Soviets have been testing ABM radars that are not 'permanent fixed types,' they could argue that they never agreed to such a definition of 'mobile.'"[49]

(7) The charge is that mobile ABM radars have been tested at a power aperture in excess of three million, in violation of Agreed Interpretation (D).[50] But that Interpretation refers only to deployment; it is silent on the subject of testing. Moreover, Article IV[51] of the ABM Treaty would appear to permit radar testing, on the agreed test ranges, at any power aperature product allowed by technology."[52]

(8) The Soviets are alleged to have jammed U.S. monitoring of ABM and up-graded-SAM missile and radar tests. If the charge is correct, then it would seem that the Soviets have violated Article XII (2)[53] of the ABM Treaty, which prohibits interference with the technical means of the other party in verifying the Treaty. The Soviets have two likely possible responses: that SAM activity is not covered by the ABM Treaty and that spying on innocent Soviet activity is not included as a right under "generally recognized principles of international law."[59] However, it seems only reasonable that the U.S. would need to verify that SAM technology was not being upgraded,[55] and, the Treaty itself (as well as the U.S. declared policy on the nature of verification) would seem to imply such a need. In any case, "the jamming of American surveillance radars -- if it has happened -- is very difficult to square plausibly with Article XII of the ABM Treaty."[56]

(9) The Americans charge that in violation of

Article II of the Interim Agreement, the Agreed Interpretation (J), and Common Understanding (A), the Soviet Union has replaced light ICBMs with heavy ICBMs.

Article II states that "the Parties undertake not to convert land-based launchers for light ICBMs or for ICBMs of older types deployed prior to 1964, into land-based launchers for heavy ICBMs of types deployed after that time.[57] Agreed Interpretation (J) provides that "the Parties understand that in the process of modernization and replacement the dimensions of land-based ICBM silo launchers will not be significantly increased."[58] Common Understanding (A) explains that "the term 'significantly increased' means that an increase will not be greater than 10-15 percent of the present dimensions of land-based ICBM silo launchers."[59]

Several terms of the above provisions are central to discussion of this alleged treaty violation by the Soviets. The term "heavy" as describing ICBMs, was never defined in the Treaty. In fact, the American unilateral statement of 26 May 1972 attempts to circumvent the impasse:

> The U.S. Delegation regrets that the Soviet Delegation has not been willing to agree to a common definition of a heavy missile. Under these circumstances, the U.S. Delegation believes it necessary to state the following: The United States would consider any ICBM having a volume significantly greater than that of the largest ICBM operational on either side to be a heavy ICBM. The U.S. proceeds on the premise that the Soviet side will give due account to this consideration.[60]

There exists, then, no mutually acceptable definition of a "heavy" missile.

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Taken together, the statements of Article XII, Interpretation (J), and Understanding (A) are ambiguous. For example, "a ten to fifteen percent increase may sound modest in silo dimensions, but translated into the volume of a cylinder (silo) the permitted expansion is close to thirty percent for one dimension (length of diameter), or fifty-two percent if a fifteen percent increase is registered in length and diameter."[61]

What the Soviets actually did was to replace SS-11 missiles (volume: 69 cubic meters) with SS-19 missiles (volume: 100 cubic meters), and in the process of modifying the launch silos to accept the new missiles, silo dimensions were not increased in excess of the ten to fifteen percent specified in the Common Understanding.

(10) It was reported in May 1976 that the Soviet Union had deployed SLBMs above the limit set by the SALT I Interim Agreement. The charges resulted from Soviet sea trials of four new submarines, each carrying 16 SLBMs, before a comparable number of older ICBM sites had been dismantled.[62]

The alleged SALT violation was said to have been detected by Big Bird close-look photo-reconnaissance satellite before it ceased functioning on 1 April 1976 after 118 days in orbit. It is ironic that at the time of discovery of the violations, which is the first ever publicly admitted by a U.S. Administration,[63] a reconnaissance gap

occurred: "there is normally a two-to-three month delay between decay and launch of another Big Bird satellite."[64] Commenting on the situation, a U.S. official said: "We are now in a position of having to accept the Soviets' word after a clear cut SALT violation that they have rendered some of the 51 launchers inoperable and are moving to complete the required dismantling because we have no Big Bird satellite up at the moment . . . ."[65]

Standing Consultative Commission

A mechanism was devised at SALT for the presentation of problem issues which would inevitably arise after the SALT agreements were concluded. "During the negotiations, it was decided that there should be a continuing process for consultation to promote the objectives and implementation of these agreements."[66] Article XIII of the ABM Treaty specifies that a Standing Consultative Commission (SCC) should be established as that forum. Article VI of the Interim Agreement also refers to use of the SCC for resolution of problems arising from that agreement. On 21 December 1972, the SCC was established by a Memorandum of Understanding.[67]

The Commission meets twice a year in Geneva to consider "questions concerning compliance with obligations" under the SALT agreements, to reconcile "any misunderstandings or uncertainties that might arise in connection with those obligations," and to consider, "as appropriate,

proposals for increasing the viability of agreements already in force and for further strategic arms limitation measures."[68] Between sessions, the Commissioners (chief representatives of the United States and of the Soviet Union to the SCC) "may communicate with one another through diplomatic channels on any matter within the competence of the Commission."[69]

Among the fruits of the SCC's labors have been two protocols signed in 1974 "governing the replacement, dismantling or destruction and notification procedures for those armaments in excess of the agreed limits in the ABM Treaty and the Interim Agreement," and in 1976, the SCC worked out ABM replacement provisions of the ABM Treaty and Protocol of 1972.[70]

Of all its tasks one of the most important is that of providing a "face-to-face forum for discussing, clarifying, and resolving questions of compliance and ambiguous situations," particularly as relates to verification of adherence to the agreements. Both the United States and the Soviet Union are reported to have brought such questions to the SCC.[71] The United States used it, for instance, to obtain Soviet assurances over construction of the 150-200 "command and control silos" mentioned earlier.[72] Questions of this sort are "discussed in a pragmatic, thorough manner, and in many instances the questions have been resolved." Agreement between the United States and the Soviet Union that SCC proceedings would be private has "facilitated the

frank exchanges necessary for effectively discharging SCC tasks and responsibilities."[73]

While the SCC seems to have been reasonably successful in its activities to date, it should be emphasized that the Commission acts as a forum for Soviet and American officials to sort out problems, not as an independent arbiter of disputes. The SCC should continue to be reasonably effective so long as the United States and the Soviet Union maintain their commitments to arms control, but it must be remembered that the SCC can be manipulated into becoming a worthless mechanism. "The Commission is . . . a hostage to detente, since a breakdown in political relations would encourage the forwarding of allegations without also encouraging a serious effort to refute them."[74]

Conclusion

The ABM Treaty and the Interim Offensive Arms Agreement of May 1972 were extremely significant arms control agreements because they placed limits and constraints on some of the most important armaments of the United States and the Soviet Union. At the SALT I negotiations, verification implicitly linked the other issues and provided a context for the talks.[75] The verification provisions of the agreement formally and explicitly recognized the legitimacy of national technical means of verification. They prohibited either interference with those means or deliberate concealment measures to impede those means. The SALT I

verification provisions have been described as significant for their effect on institutionalizing U.S. and Soviet tolerance of each others' use of satellites for intelligence collection and for establishing confidence in a means of verification which could make possible further arms control agreements.[76] Yet, for all the inherent significance and potential of SALT I, critics have identified numerous debilities in the agreements, terming SALT I, at the extreme, worse than no agreement at all. And despite all of the technological advances made in satellite reconnaissance and other national technical means of verification, those means are limited in their capabilities.

The character of the terms of this agreement have also affected its verifiability. Where treaty language was vague or imprecise, even reliable means have not been able to provide adequate verification. Where unilateral statements were issued, verification has not been able to hold the other side bound.[77] The changing nature of weapons technology in the future portends greater challenges for verification. The following discussion deals with the issues at SALT II which have posed the most direct challenges for arms control and for verification.

NOTES TO CHAPTER IV

1. Alvin Z. Rubinstein, ed., The Foreign Policy of the Soviet Union 3d ed. (New York: Random House, 1972, p. 355.

2. ACDA Pub 77, p. 126.

3. Perhaps the best account of the SALT I negotiations which has been published to date is Cold Dawn: The Story of SALT, written by John Newhouse. Access to the U.S. negotiators for SALT allowed Newhouse to provide an insight otherwise unavailable. His account must, therefore, form the basis of any discussion about the actual negotiations or the pre-negotiation strategy sessions.

4. Barton and Weiler, International Arms Control, p. 180.

5. Newhouse, Cold Dawn, p. 174. Also, note that the Soviet military is reported to have had as one of its second-order objectives at SALT "to avoid any on-site inspection in the U.S.S.R. and to obtain agreement instead to rely on national means of verification." Raymond L. Garthoff, "SALT and the Soviet Military," Problems of Communism 24 (January-February 1975) 27.

6. Ibid., p. 180.

7. The understanding is that the U.S. is limited to 710 SLBMs carried on up to 44 submarines, and the Soviet Union is limited to 950 SLBMs on 62 submarines. However, for the U.S. to exceed 656 SLBM and for the Soviet Union to exceed 750 SLBM, the additional missiles must replace equal numbers of older types of ICBMs and SLBMs.

8. ACDA Pub 77, pp. 135, 140.

9. Hedley Bull, The Moscow Agreements and Strategic Arms Limitation (Canberra: Australian National University Press, 1973), p. 6.

10. Scoville, "Strategic Forum: The SALT Agreements," pp. 210-12.

11. Ibid., p. 212.

12. Ibid.

13. Ibid.

14. Gerard C. Smith, "Negotiating with the Soviets," New York Times Magazine, 27 February 1977, p. 19.

15. W.K.H. Panofsky, "From SALT I to SALT II," Survey 19 (Spring 1973): 165.

16. Klass, "Keeping the Nuclear Peace," p. 35.

17. Bull, The Moscow Agreements, p. 6.

18. Ibid.

19. Panofsky, "From SALT I to SALT II," pp. 169-70.

20. Newhouse, Cold Dawn, p. 44.

21. Ibid., pp. 44-5.

22. Ibid., p. 162.

23. Ibid., pp. 9-10.

24. Ibid., pp. 170-71.

25. Ibid., pp. 173-74.

26. Ibid., p. 175.

27. Ibid., p. 179.

28. Ibid., p. 180.

29. Ibid., pp. 180-81.

30. Ibid., p. 181.

31. Ibid.

32. Ibid., pp. 183-84.

33. See Chapter II, p. 6.

34. "Secretary Kissinger's News Conference of December 9, [1975]," Department of State Bulletin 74 (5 January 1976); 1-2.

35. Elmo Zumwalt, "Zumwalt Disputes Policy Over SALT; Excerpt from Testimony Before the House Select Committee on Intelligence," Aviation Week and Space Technology, 19 January 1976, p. 49.

36. Strategic Survey, 1975, p. 116; and "Agreed Interpretation (L)," ACDA Pub 77, p. 144; and Colin S. Gray, "SALT I Aftermath: Have the Soviets Been Cheating?," Air Force Magazine 58 (November 1975): 31.

37. "Unilateral Statement (B): Land-Mobile ICBM Launchers," ACDA Pub 77, p. 147; and Gray, "SALT I Aftermath," p. 31.

38. Gray, "SALT I Aftermath," p. 31.

39. "Unilateral Statement (C): Covered Facilities," ACDA Pub 77, p. 147.

40. Gray, "SALT I Aftermath," p. 32.

41. Ibid.

42. "Unilateral Statement (E): Tested in an ABM Mode," ACDA Pub 77, pp. 147-48.

43. American statement of 26 April 1972, and Soviet response of agreement of 5 May 1972, ACDA Pub 77, p. 145.

44. Gray, "SALT I Aftermath," p. 30.

45. Melvin R. Laird, et al., Who's First in Defense -- The U.S. or the U.S.S.R.?, AEI Roundtable (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1976), p. 15.

46. Gray, "SALT I Aftermath," p. 30.

47. ACDA Pub 77, p. 134.

48. Ibid., p. 145.

49. Gray, "SALT I Aftermath," p. 30.

50. ACDA Pub 77, p. 143.

51. Ibid., p. 134.

52. Gray, "SALT I Aftermath," p. 32.

53. ACDA Pub 77, p. 135.

54. Gray, "SALT I Aftermath," pp. 30-1.

55. Strategic Survey, 1975, p. 115.

56. Gray, "SALT I Aftermath," p. 31.

57. ACDA Pub 77, p. 139.

58. Ibid., p. 144.

59. Ibid.

60. Ibid., p. 147.

61. Gray, "SALT I Aftermath," pp. 32-3.

62. "Newest Delta Sub Pivotal in Latest SALT Violation," Aviation Week and Space Technology, 24 May 1976, p. 20.

63. Clarence A. Robinson, Jr., "Another SALT Violation Spotted," Aviation Week and Space Technology, 31 May 1976, p. 13.

65. Newest Delta Sub Pivotal in latest SALT Violation," p. 20.

66. U.S. Arms Control and Disarmament Agency, Arms Control Report, USACDA Publication 89, Released July 1976 (Washington, D.C.: Government Printing Office, 1976), p. 12.

67. "Memorandum of Understanding Between the United States and the Soviet Union Regarding the Establishment of a Standing Consultative Commission, December 21, 1972," Documents on Disarmament, 1972, pp. 868-69.

68. Documents on Disarmament, 1974, p. 845.

69. ACDA Pub 89, p. 12.

70. Ibid.

71. Ibid.

72. Strategic Survey, 1974, p. 116.

73. ACDA Pub 89, p. 12.

74. Strategic Survey, 1974, p. 116.

75. Newhouse, Cold Dawn, p. 14.

76. Desmond J. Ball, "The Pinch of SALT: Strategic Arms Limitation from Moscow to Vladivostok," Australian Outlook 29 (August 1974): 232; and Herbert York, "Postscript: The Common Understandings Implicit in SALT Phase I," in Arms Control: Readings from Scientific American, ed. Herbert York (San Francisco: W.H. Freeman, 1973), p. 278.

77. Gray, "SALT I Aftermath," p. 33.

V. SALT II (1972-1977)

> . . . the technological and political complexity of arms control meant that watertight agreements were simply a thing of the past -- if they ever had existed.
>
> Strategic Survey, 1975

> We have learned the lesson . . . . We have no illusion that our adversaries will give us something from sheer gratitude . . . . We negotiate rigorously for a *quid pro quo*.
>
> Fred C. Ikle

To date, a SALT II agreement has eluded the best efforts of the United States and the Soviet Union to continue the momentum generated in 1972 by SALT I. This failure may be attributed to the effects of national and international events on arms control. Yet, because arms control is afforded central prominence in the national interests of both superpowers, it enjoys a certain stability -- it tends not to be strongly affected by most national and international activity. At SALT II, therefore, the stumbling block seems to be the complexity of the central issues of modern arms control.

The Vladivostok Accord

Following the signing of the SALT I agreements in May 1972, the second phase of Strategic Arms Limitation Talks (SALT II) resumed in Geneva on 12 March 1973. Three

months later, during the 17-25 June 1973 visit of General Secretary Brezhnev to Washington for talks with President Nixon, two important arms control agreements were signed. One concerned the avoidance of nuclear war, in which they agreed that if there is a risk of nuclear conflict between the United States and the Soviet Union they will "immediately enter into urgent consultations with each other to make every effort to avert this risk"; the other agreement is a commitment to work out an agreement on offensive arms in 1974. The Basic Principles of Negotiation include two points related to the aspect of verification:

> [1] The limitations placed on strategic offensive weapons can apply both to their quantitative aspects as well as to their qualitative improvement.
> [2] Limitations on strategic offensive arms must be subject to adequate verification by national technical means.[1]

These points are significant, first, because reliance on national technical means for verification is continued and, second, because the use of national technical means to monitor qualitative improvements in weapons has continued to be a major stumbling block in the negotiations.

Sessions of the SALT talks were resumed in Fall 1973 and again in Spring 1974. In Moscow, 24-27 May 1974, Secretary of State Kissinger met with Soviet leaders for talks aimed at breaking the existing SALT deadlock, but failed to reach agreement. In July, however, an agreement was concluded to limit missile defense systems from two to

one site per side. President Nixon and General Secretary Brezhnev signed a Protocol to the ABM Treaty in Moscow on 3 July 1974. According to the Protocol, each party agreed to limit itself to only one ABM site, and each side has the right one time to deploy its ABM system to an alternate site after giving notice to the other party.

Additional arms control agreements were signed on 3 July 1974. The Threshold Test Ban Treaty and Protocol were concluded, limiting underground nuclear weapon tests to a maximum yield of 150 kilotons -- a level that can be independently verified, and providing for separate negotiation of an agreement governing underground nuclear explosions for peaceful purposes. Also, a Joint Soviet-American statement was issued to advocate an effort to overcome the dangers of environmental modification for military purposes.

During September 1974, exchange visits of Soviet Foreign Minister Gromyko to Washington and U.S. Secretary of State Kissinger to Moscow set plans for the November meeting in Vladivostok between President Ford and General Secretary Brezhnev. On 23-24 November 1974, Ford met Brezhnev in Vladivostok for talks. While the joint American-Soviet communique issued at the completion of the talks revealed that discussions were held on a number of international issues, the foremost subject was arms limitation.[2] The two leaders issued a statement on 24 November 1974 in which they "reaffirm[ed] the intention to conclude

a new agreement on the limitation of strategic offensive arms, to last through 1985."[3] The agreement included equal aggregate numbers of strategic delivery vehicles and an equal aggregate number of MIRVs. (An excerpt of the substantive portion of the statement is attached at Appendix 2.)

While the statement itself does not specify what the actual numbers of aggregate missiles and aggregate MIRVs is to be, Secretary of State Kissinger, in a press conference at the conclusion of the Vladivostok visit, explained that both numbers had already been agreed upon, but that he would not yet divulge the numbers.[4] On 2 December 1974, President Ford gave the limits as being "a ceiling of 2,400 each on the total number of intercontinental ballistic missiles, submarine-launched missiles, and heavy bombers" and, on MIRVs, "of each side's total of 2,400, 1,320 can be so armed."[5]

The success in reaching agreement at Vladivostok has been attributed to the fact that "the agreement did not restrict the freedom of both sides to continue their current strategic programmes. In effect it codifies the next generation of strategic weapons of the two super-powers."[6]

MIRV and Verification

One of the most perplexing verification problems to emerge from the Vladivostok Accord concerns MIRV. How can unobtrusive surveillance, as by national technical means of verification, determine the number of warheads

contained in a missile nose cone? The MIRV verification problem received considerable attention by defense and nuclear weapon experts. For the sake of simplicity, the problem can be viewed in two ways: counting MIRVs directly or counting MIRVs indirectly.

Direct determination of whether a missile contains single or multiple warheads is generally agreed to be possible only by on-site inspectors and, even then, without complete assurance. It has been written that "it is impossible at the present state of surveillance capabilities to determine a warhead's composition without physical inspection."[7] Many technicians are said to believe that even on-site inspectors could be easily deceived by determined efforts to cheat and that "only if allowed to pry open the cover of a missile system and gaze upon its interior parts might an inspector be absolutely sure of how many and what kind of warheads there were."[8]

The other method of verifying MIRVs is indirectly. Essentially, this involves a worst-case analytic judgment, based on indications of probable deployment of MIRVs, i.e., if a missile type is MIRV-capable, then all deployed missiles of that type will be considered to actually be MIRVed. One such effort would involve monitoring missile silos to observe modification of existing missiles to carry multiple warheads.

> It is believed to be virtually impossible to dismantle a warhead and install a new one in a closed

> silo . . . . The silo must either be opened or ideally the desired warheads fitted on new missiles while still on the assembly line. Warhead configuration at launch sites can be monitored adequately by satellite surveillance, but this cannot be done at the production plants.[9]

Another indirect method that can be used to verify compliance with MIRV limitations involves monitoring the test phase of MIRV development. If a MIRV were to be used, for instance, to destroy hardened ICBM sites, it would have to be very accurate. To assure that the required accuracy characteristics have been achieved, it is necessary that MIRVed missiles be tested at full range and at as near operational conditions as possible. Experts seem to agree that, without completely testing a new ballistic missile, no country would use it to replace existing reliable missiles, much less consider using it in nuclear war.[10]

> MIRV testing . . . can be verified by observations of the launch and reentry areas without intrusion into the territory of the nation carrying out the test. Radar and other scientific techniques have long been used for such observations by the United States so that the nature of a launched missile and its reentry characteristics can be quite satisfactorily determined . . . . MIRV development without adequate testing can only lead to decreased reliability.[11]

Another source, commenting on the ability of U.S. intelligence efforts to obtain information on Soviet MIRVs, related this:

> When the Russians shot those 3-in-1 multiple warheads into the Pacific Ocean in August [1970], we had people hanging around with gadgets and cameras. That's how we photographed the re-entry of the warheads in color.[12]

The United States, using precision-ground radar and airborne optical sensors, "can determine the timing and trajectories of a number of warheads which separate over, and impact in, the Pacific Ocean area.[13] This type of monitoring permits the U.S. to evaluate Soviet technology in single reentry vehicles, multiple reentry vehicles (MRVs), and multiple independently targetable reentry vehicles (MIRVs).

It is important to note that observation of MIRV testing is absolutely critical to verification. Once a MIRV system has been tested and is available for deployment, the chances of detecting actual deployment is reduced to virtual impossibility.[14]

As a means of tallying numbers of MIRVs deployed by the enemy, certain rules-of-thumb, or "counting rules" have been proposed by various experts. Simply, they provide that a missile will be counted as though it actually were MIRVed, if, based on the certain types of criteria, the missile is judged capable of carrying multiple warheads. Examples of such criteria are as follows:

(1) if the missile has been successfully tested in a MIRV mode;

(2) if a missile silo or submarine launch tube has characteristics, or has been modified to have characteristics, which would indicate its MIRV capability;

(3) if a missile is deployed in any class of launcher, e.g., submarine, one of which has been retrofitted with MIRVed missiles;

(4) if a missile is located in certain specified missile fields or areas.

The existence of counting rules does not provide a clear-cut solution to verification of MIRVs.

> . . . whatever counting rules are agreed, it would clearly be very difficult, if not impossible to prove that the MIRV launcher ceiling has been violated but the absence of agreed counting procedures would seem to offer great scope for charges and counter-charges of treaty violation. Moreover, a treaty billed as contributing to a measure of confidence-building by providing certainty over force levels would have built into it a central uncertainty about how the weapons it seeks to limit are to be counted.[15]

Secretary of State Kissinger, in a background briefing, discussed the verification of MIRV limits. He said that "it is, because of an accident of Soviet design, luckily not as difficult [to verify] as it might easily be." He went on to explain that the Soviets, in developing missiles to carry multiple warheads, created missiles which do not fit into existing silos. Therefore, we can assume that any silo being substantially modified will be fitted out with a MIRV missile. Specifically, Secretary Kissinger mentioned that the United States would consider any silos modified to accept SS-17, SS-18, and SS-19 missiles as being MIRVed. He also said that:

> On submarines, the problem is going to be somewhat more complicated because we have not yet seen

> any tests of their submarine-based missiles. Therefore, we don't know what the characteristics will be. But on the whole we would have to again assume that any submarine capable of carrying a MIRVed missile, once the missile has been tested, likely will have to be counted as MIRVed, just as all of our submarines will have to be counted as MIRVed.[16]

Thus, the United States adopted "counting rules" as its solution to the MIRV-counting delimma. It is not yet clear whether the Soviets have also adopted the use of counting-rules for MIRV verification. If they should choose not to use counting-rules, MIRV limits will be difficult to verify because the two sides will be using different ways of counting their own and each others' MIRVs. It is quite easy to imagine that, under such circumstances, alleged violations could be charged based on each side's method of counting.

Issues

One of the most basic issues of strategic arms control that should be considered here is defining what constitutes the class of weapons called "strategic." Because weapons which are not considered strategic will not be controlled by SALT II agreements, both the Americans and the Soviets tend to see their own national interests being served by their seeking to define the term "strategic" to include as many of the adversary's weapons systems as possible while excluding as many of its own weapons systems as possible.

Simply, nuclear delivery systems may be categorized,

based on their range and the size of their payloads, as either tactical weapons, having shorter ranges and smaller warheads for use on or near the battlefield, or strategic weapons, having longer ranges and more destructive warheads for use against important centers in the homeland of the adversary.[17] Such a rationale for distinguishing between strategic and tactical weapons is simple and logical. It has worked quite adequately for many years, despite the fact that the boundary between tactical and strategic weapons has never been precisely defined, is at the least highly subjective, and may indeed be impossible to define.

There are other problems, too. First, strategic weapons can be used against tactical targets and tactical weapons against some strategic targets.[18] Second, many new weapons systems are "dual-capable" -- that is, they are able to deliver either nuclear or conventional warheads.[19] Third, the use of "regional strategic weapons by regional states and the use of strategic weapons by the superpowers have nearly identical results. " . . . and despite the fact that an IRBM attack [by the U.S.S.R.] on London or Paris would be difficult to distinguish from an ICBM attack [by the U.S.S.R.] on New York, the general tendency is to lump [regional strategic weapons] together with 'tactical' nuclear weapons."[20]

One of the most difficult problems at SALT has concerned the systems called "grey area weapons," that is,

possessing capabilities to perform in a strategic role but, for one reason or another, not having been brought under SALT controls. The greatest difficulties in SALT II negotiations revolve around the Soviet Backfire bomber and the cruise missile. Other such weapons which pose potential difficulties in SALT include "the nuclear-capable aircraft deployed in and around Europe, medium-range bombers and missiles in the Soviet Union, and the British and French nuclear forces."[21]

These European weapons systems are inextricably linked to the weapons systems which SALT is intended to control. U.S. strategic missiles are poised to deter Soviet attack on our allies in Western Europe, just as they deter attack on the United States itself. While control of the superpowers' strategic weapons are being negotiated at SALT, control of NATO and Warsaw Pact conventional forces and nuclear weapons is being negotiated separately at the Mutual Force Reduction (MFR) talks.[22] The Soviets, even during the early days of SALT, took issue with the existence of American forces in Europe. "At the first round of SALT the Soviet Union insisted that, because American tactical aircraft in Europe could strike the Soviet homeland with nuclear weapons, these 'forward-based systems' (FBS) should be included under ceilings on offensive weapons."[23]

Grey-area weapons offer both advantages and

disadvantages for emplacement in the European theater. On the positive side, some advanced conventional weapons might be substituted for some of the 7,000 U.S. tactical nuclear warheads now deployed in Europe. "Such a shift in posture would seem to have the advantage both of raising the nuclear threshold in time of war and of facilitating an agreement on mutual force reductions by incorporating reductions in nuclear weapons in a NATO-Warsaw Pact accord." On the other hand, because of the blurred distinctions between strategic and theater nuclear forces, and because of the increased possibility of conventional weapons being used in past traditional missions of tactical nuclear systems or of strategic forces being used in theater roles, "it could become difficult to differentiate levels of conflict escalation or to structure arms control agreements in terms of the nature of the weapons employed."[24]

The strong European connection of the [grey area] problem makes it seem unlikely that, first, the superpowers will be able to avoid the issue as they move forward at SALT and, second, they will be able to continue to isolate the American-Soviet strategic relationship from the wider East-West nuclear balance. One writer felt that "the ability of the two superpowers (and their allies) to come to terms with these problems will determine the future of SALT and East-West arms control."[35]

Cruise Missiles

Probably the most controversial weapon being discussed

at SALT II is the cruise missile, defined by one expert as "a dispensable, pilotless, self-guided, continuously-powered, air-breathing, warhead-delivery vehicle that flies just like an airplane, supported by aerodynamic surfaces."[26] While cruise missiles have been around for over 25 years, the modern version is different -- it is considerably improved -- over older models. Typically, a U.S. long-range cruise missile could be launched from 2,500 nautical miles away against targets in the Soviet Union; the launch signature would resemble that of a jet airplane; the flight would be slow (300-500 mph); the missile would hug the ground (at 20-100 meters altitude); and a very accurate navigation system (terrain contour-matching guidance) would place the warhead within ten meters of its target.

From the U.S. perspective, cruise missiles offer a major means of counteracting the slow but gradual erosion of American strategic capabilities relative to those of the Soviet Union. Secretary of Defense Harold Brown, in arguing for U.S. deployment of cruise missiles said: "the cruise missile provides the potential for significantly improving our position with regard to the static measures of the strategic balance. I am certain that the cruise missile will improve the world's perceptions of the potency of our forces . . . by maintaining the credibility of strategic force parity with the Soviet Union . . . ."[27] The small size, apparent pentrability, precise accuracy, and

relatively inexpensive cost tend to weigh in favor of U.S. adoption of the cruise missile into the strategic triad.

From the Soviet perspective, cruise missiles pose a significant threat. Because it flies so close to the ground and because it possesses a small radar profile, the cruise missile makes detection by the extensive Soviet surface-to-air missile (SAM) defenses difficult. These capabilities are counterbalanced by the high vulnerability of the slow-flying cruise missiles, once they are detected by radar, to SAM interception. So U.S. deployment of cruise missiles would impose on the Soviet Union the burden of developing additional, more adequate, air defenses.[28]

According to those who portray cruise missiles as a stabilizing influence, the missile's slow speed would give sufficient time for warning of attack that the country being attacked would be able to launch its own strategic missiles before the cruise missiles struck. Therefore, the cruise missile could not be used in a first-strike role for surprise attack; it is of value only as a second-strike weapon. The Soviets counter that logic by saying that, because the cruise missile is small and thus hard to find by radar, and because it flies close to the ground where "ground clutter" makes it hard to see on a radar scope, they cannot be sure that their defenses would detect an incoming cruise missile.[29] These contradictory positions seem to have been at least partially resolved by one account

which explained that although cruise missiles may lack sufficient speed and payload to pose a "major first-strike threat" against hard-targets, they are nevertheless useful against airfields and other defense or industrial sites.[30] So, perhaps the conclusion should be that cruise missiles do not pose a first-strike threat. However, the deployment of cruise missiles would likely be perceived as an escalation of the arms race.

What do cruise missiles mean to SALT and to verification? For SALT, cruise missiles pose a real dilemma. If strategic (or long-range) cruise missiles are not constrained, both sides could deploy as many cruise missiles as they choose, placing in jeopardy the value of having an agreement based on the Vladivostok guidelines. If, on the other hand, cruise missiles were to be limited, the limitations would be difficult, if not impossible, to verify using national technical means.

The Vladivostok aide-memoire does not specifically designate cruise missiles for inclusion in the launcher ceiling. American officials argued that the provision that air-launched missiles with ranges exceeding 600 kilometers were to be included in the overall limit of 2,400 "applied to balistic stand-off missiles, like the short-range attack missile (SRAM), and not to cruise types." They also noted that, in any case, "there were no constraints on the deployment of sea-launched or land-based

cruise missiles."[31] Nevertheless, Soviet negotiators, who did not share this interpretation, insisted in early 1975 that "the new American cruise missile either be included within the overall ceiling or be banned altogether."[32] The Soviets claim that "if cruise missiles are not included in the SALT ceiling, the United States will obtain a free ride for its potential ALCM [air-launched cruise missile] and SLCM [submarine-launched cruise missile] deployments -- which would negate the whole purpose of SALT."[33]

Because cruise missiles have been developed by the United States and the Soviet Union for different political and technological reasons- the two countries see control of the missiles from different perspectives. Soviet SALT negotiators are reported as insisting "on outlawing sea-based cruise missiles with a range over 600 km, primarily because their missiles don't need more range [for their designated missions]." They do not currently use cruise missiles in a long-range stand-off role, as is envisioned for future American cruise missiles. Further, their existing guidance technology is "adequate to deliver cruise missiles against cities and large industrial complexes over such a relatively short distance [600 kilometers]." The Soviets, however, are considered to be years behind the U.S. in self-contained terminal guidance -- as much as ten years by some estimates -- and, therefore, probably would have difficulty attacking military targets from

significantly farther than 600 kilometers.[34] Additionally, and very importantly, the United States is said to have opposed the inclusion of cruise missiles in the numerical quotas for strategic delivery vehicles because a provision to limit deployment of strategic cruise missiles would have the effect of limiting or precluding the deployment of tactical cruise missiles as well, since the two types are visually indistinguishable. The U.S.S.R. is said to have argued for limiting all cruise missiles by applying the same reasoning -- they would be unable to determine whether any given cruise missile deployed by the United States was of tactical or strategic range.[35]

In dealing with the possible limitation of cruise missiles, there has been a tendency, especially by the U.S., to not preclude options for the cruise missile until its implications for the strategic balance and for strategic stability were better understood.[36] In the Annual Report submitted by outgoing Secretary of Defense Rumsfeld, he cautioned that "cruise missiles may be tempting candidates for arms control, but because of their versatility and the verification issues they raise, considerable caution needs to be exercised in how they are treated within the framework of SALT."[37]

What are the verification implications of cruise missiles? Put very simply, "there is really no reliable way of distinguishing a strategic cruise missile from a

tactical one -- which makes verification of limits on the former virtually impossible . . . . Once they are deployed, it will be impossible to tell which are strategic (and hence subject to limitation) and which are tactical (and thus unrestricted)."[38] Cruise missiles thus pose a dilemma: if SALT II were to include cruise missiles in the aggregate ceiling on strategic delivery systems, that provision could not be adequately verified; if, on the other hand, SALT II did not place limits on cruise missiles and each side could therefore deploy as many cruise missiles in any mode it chose, then the SALT II limits on other launchers would be of little value.[39]

One arms control scholar proposed a method for correcting the problem. His concept relied on the negotiation of criteria for differentiating between tactical and strategic versions of cruise missiles -- criteria which, he said, "must be based on observable physical variables such as a missile's range or the type warhead it carries." Such physical characteristics can, he claimed, be detected from reconnaissance satellites. Yet, although national means could prove that something was taking place in the other side's territory, it could <u>not</u> ensure that something was <u>not</u> taking place. Therefore, while national means can be used to monitor Soviet development of cruise missiles, the monitoring systems do not offer ambiguous verification, which the Senate would need in otder to ratify a SALT

agreement banning the deployment of strategic cruise missiles. However, such monitoring systems would allow the U.S. to unilaterally restrain its development and deployment of long-range cruise missiles and would allow the Soviet Union to restrain itself similarly. The monitoring systems do offer the United States the certainty of detecting the development of long-range cruise missiles early enough to allow the U.S. to halt its unilateral restraint in plenty of time, if it so chooses.[40]

While such a proposal offers some prospect for resolution of the cruise missile dilemma, it is itself subject to numerous difficulties. First, it relies on unilateral restraint. While it is only likely that the United States will choose to unilaterally impose restraints, it is much less likely that the Soviet Union will do so. Second, negotiation of observable distinguishing criteria between tactical and strategic cruise missiles also has doubtful prospect. Negotiations could drag on over a considerable period of time, during which development and deployment could continue unrestricted. At the same time, continuing technological developments will tend to produce cruise missiles that are even smaller, more versatile, and probably even less distinguishable in long-range and short-range versions. Third, President Carter's recent decision to substitute development and future deployment of cruise missiles, which will be deployed on B-52 bobmbers and

possibly other carriers, instead of development and future deployment of B-1 bombers, will tend to accelerate the production cycle of cruise missiles. That decision may also cause American reliance on the cruise missile to such an extent that it will preclude other U.S. weapons options from future consideration for development or deployment.

If, then, it becomes impossible to distinguish between tactical and strategic cruise missiles, one alternative arms control option might be to ban all cruise missiles. However, a total ban on cruise missiles would be unacceptable to the United States. A limited ban on cruise missiles was, in fact, included in the so-called "comprehensive proposal" which the U.S. offered in March 1977 and which the Russians immediately rejected. The proposal was reported to have called for a ban on development, testing and deployment of all cruise missiles whether nuclear armed or conventionally armed, with ranges [2500 kilometers], that were not intercontinental ranges, over which they would be banned. All elements of the provision (bans on development, testing and deployment, and the limit on range) appear to be unverifiable. The ban on deployment would be unverifiable because cruise missiles could be correctly deployed on-board submarines and bombers, thus evading monitoring efforts. Additionally, the partial ban still leaves unresolved the problem of distinguishing between tactical and strategic cruise missiles. Development, as has been

mentioned previously, invariably occurs in laboratories or other closed facilities, which precludes observation by national means: testing of cruise missiles differs from testing of other strategic weapons because, unlike a ballistic missile, for example, the cruise missile need not undergo a sustained flight test to determine its range capability. It can be tested for range and propulsion indoors, in a wind tunnel. Therefore, the proposed ban on flight testing would not necessarily prevent development of strategic cruise missiles.[41] Finally, the proposed range constraint is essentially unverifiable, unless appreciable changes in external design of cruise missiles occurs. The inability of distinguishing between long-range and short-range cruise missiles tends to render virtually worthless a less-than-total ban on all cruise missiles,

Backfire Bombers

Another weapon which has been the subject of considerable discussion and disagreement at SALT is the bomber developed and deployed by the Soviets in the mid-1970s which NATO has code-named Backfire. The primary concern over Backfire is that if it has the range to strike the United States, then the U.S. wants it to be considered a strategic delivery vehicle and thus to be constrained under SALT.

The Backfire bomber's influence on SALT II dates back to the Vladivostok meeting between President Ford and Soviet leader Brezhnev. There, they seemed to agree that

Backfire would not be included in the ceiling on strategic bombers. The U.S. position was shaped, in part, by Pentagon intelligence estimates that Backfire was intended primarily for tactical use around the periphery of the U.S.S.R.[42] Since the Vladivostok meeting, the intelligence estimates have been revised, and the Backfire is considered to have greater range than was previously thought.[43]

The Soviets claim that Backfire "is not an intercontinental bomber since it cannot strike at North America and return, unrefueled." They term it a "medium" rather than a "heavy" bomber. Various American estimates argue, however, that "when aerially refuelled, Backfire can strike at North American and land on Cuban airfields."[44] While it is not clear which range estimates are officially recognized, it appears evident that the United States does consider Backfire a potential threat that needs to be constrained.

Backfire promises to complicate SALT II negotiations. Soviet concern about U.S. cruise missiles and American concern about Soviet Backfire bombers become intermeshed during SALT II negotiations. Restraints on cruise missiles were to be balanced by restraints on Backfire. The exact formula remains to be worked out, but recently Secretary of State Vance explained the rationale behind one U.S. proposal:

> One of the elements of the proposal which we made to the Soviets in Moscow was that any missile, air-

> launched cruise missile, with a range over 600 -- in other words, between 600 kilometers and 2,500 kilometers -- could only be carried on heavy bombers.
>
> The reasons for that was to meet the problems created by the "Backfire" bomber, which the Soviets maintain is an intermediate bomber. But if one were able to hand long-range missiles on it, it could, as you can obviously see, change the characteristics of that bomber.[45]

What are the verification implications of the Backfire bomber? Essentially the implications are few and relatively insignificant. Backfire poses what might be considered a "definitional" problem -- i.e., is it a "strategic" weapon or not? If it is strategic, and were controlled under SALT, then the process of counting the numbers of deployed Backfire bombers could be accomplished by national technical means without difficulty just as the numbers of strategic bombers are now counted. Where problems do arise, however, is in assuring that Backfire, whether it is labeled "strategic" or "tactical" or "theater," poses no significant threat to the United States. In the March 1977 "comprehensive proposal," the Carter Administration sought to solve that problem by seeking from the Soviet Union a list of verifiable measure with which the United States could assure that the Backfire bomber could not be used as a strategic bomber. Although the specific measures which were sought were not made public, they are assumed to include actions which would make aerial refueling impossible -- if the Backfire bombers were based beyond striking range of the United States, and if they could not be refueled

on a mission enroute to the United States, then, presumably, they could not strike the U.S., and would thus be no threat to the U.S. An example of one possible means of preventing aerial refueling would involve sealing the refueling probe (the opening into which fuel is pumped) on all Backfire bombers, a measure which probably could not be unambiguously verified without some form of intrusive inspection. Other measures, particularly those regarding basing of the Backfire bombers, are likely to be verifiable, but may not provide meaningful constraints on how the Soviets use the bombers.

Mobile Missiles

Land-mobile ICBM launchers were discussed at SALT I negotiations, but they were specifically excluded from the Interim Agreement. In May 1972, the United States' position was expressed as follows: " . . . The U.S. would consider the deployment of operational land-mobile ICBM launchers during the period of the Interim Agreement as inconsistent with the objectives of that Agreement." The Soviet delegation took no action to indicate its concurrence with the American statement.

Mobile land-based missiles are a logical step in the evolution of qualitatively superior strategic weapons. At SALT I, it was agreed to limit the number of fixed silos that the United States and the Soviet Union could use to launch land-based ICBMs. Ever since that agreement was

concluded, research has attempted to provide each side with increasingly more accurate warheads. The effect of high-accuracy warheads in the future will be to increase the vulnerability of small, hardened, point-objects (such as silos) to the extent that only one warhead would need to be targeted against them in order to assure complete destruction. The possession of a so-called one-shot-kill capability would enable the possessor to budget its warheads more liberally -- whereas in the past, perhaps two or three warheads would have been targeted against a single silo to assure its destruction, now only one warhead per target would be required. Thus more targets could be fired upon. From the perspective of the defender, a means of counteracting the increased threat would need to be devised. One method, known as the "multiple launch-point" concept, involves the deployment of ICBMs on mobile launchers which would be moved in come random fashion in order to increase the difficulty of the missiles being detected and attacked. These ICBMs could replace some or all of the ICBMs in silos. As one expert put it, "in essence the multiple launch-point idea is a method of preserving and increasing the effectiveness of land-based systems by making them partially mobile."[46]

The concept is particularly useful to the United States because a "significant portion of a U.S. multiple launch-point system would survive even if the Soviet Union

were to devote to the task of attacking it double the four million pounds of MIRVed throw-weight it would have to allocate to the destruction of our Minuteman silos." [Up to 12 million pounds of MIRVed throw-weight can be expected to be available to the Soviet side under the limits contemplated by the Vladivostok Accord.][47] The Soviet entry in the mobile ICBM field is the SS-18, which has apparently been ready for deployment for some time. The United States still has its mobile missile in development -- it is called M-X.

Numerous land-mobile concepts have been considered for deployment of the new missiles: "road-and-rail-mobile ICBM (capable of firing from cold-launch canisters); an off-road countryside-wandering system; a garage-mobile system (an ICBM would move at random from the hub of an underground 'wheel' along the spokes -- covered trenches -- to one of 13 silos around the rim of the firing comples; and deployment in complexes of ponds, 40 ft. deep, with the missiles rotated at random between the ponds."[48] The Department of Defense had, in mid-1976, four modes under consideration for deployment of the M-X: "existing Minuteman silos; air mobile launch from wide-body jet aircraft; semi-hardened trenches to provide land mobility; or numerous semi-hardened shelters."[49]

The verification significance of these various deployment schemes lies in the fact that most are intended to deceive the enemy. If a missile is mobile and could be

located at any one of 13 positions, or even between positions during its movement, then national technical means of intelligence might be unable to maintain up-to-date locations of the mobile targets. The enemy might then operate under the assumption that the intelligence on the locations of the missiles which he receives is continually being superseded by the subsequent relocation of the missiles. If the enemy's intention is to destroy the mobile missiles with high confidence, then he might be forced into firing up to 13 warheads at each mobile target (one warhead at each of the potential launching positions). The diminishing returns on such an investment might justify not even attempting a first-strike attack on an adversary's mobile ICBM system.[50]

Consider, also, the contention of some that SALT I, at least, would be violated by the deployment system using shelters unless each individual shelter was counted as a launcher,whether or not it was occupied. If that argument has validity, it would then follow that in order to deploy a mobile missile within a complex of 13 possible launch positions, 13 other ICBMs (silos or submarine-based missiles) would have to be deactivated. But if each shelter is counted, then the mobile concept becomes meaningless unless the levels for aggregate strategic delivery vehicles is increased significantly beyond the Vladivostok limits. Viewed from such a perspective, mobile missiles could easily be seen as a destabilizing influence and, even worse, as counter-productive

of true arms control.[51]

Another implication to be considered is the improved accuracy designed into the M-X. The new guidance system for the M-X is said to be able to place a warhead within 300 feet of its target. (By means of comparison, the nominal accuracy of Minuteman II is one mile, and of Minuteman III, one-quarter mile.) Since it is accepted that, mathematically, the doubling of a missile's accuracy is equivalent to an 800 percent increase in throw-weight, the new guidance system will provide an enormous boost to American counter-force capability. The effect will be to further decrease the invulnerability of Soviet missile silos, giving the United States a clear one-shot-kill capability.[52]

What are the verification implications of mobile missiles? While the relative invulnerability of mobile ICBMs would reduce the risk to the United States of the Soviets acquiring a first-strike capability, the mobile missiles are much more difficult to find and to count with national technical means of intelligence.[53] The verification problems likely to result have been seen by one writer to be "so horrendous as to jeopardize the offensive arms agreements."[54] Further, the shelter concept of deploying mobile missiles has been labeled "the ultimate shell game" -- a game which might easily be perceived by some as being exactly the kind of deliberate concealment which the verification provisions of SALT I prohibit. Since SALT II can be

expected to maintain the same reliance on national technical means for verification as SALT I, mobile missiles could become a serious violation issue once they are deployed in "deceptive" schemes.

SS-20 Missiles

In addition to the previously mentioned implications of mobile missiles, the Soviet SS-20 missile poses more problems for verification. The SS-20 mobile IRBM is closely related to the SS-X-16 ICBM[55] -- the SS-20 is comprised of the first two stages of the three-stage SS-X-16.[56] The International Institute for Strategic Studies recently reported that SS-20s have already begun to be deployed. That deployment portends serious arms control and verification problems.

First, the deployment of a new series of IRBMs in the western U.S.S.R. will pose additional threats to the NATO countties of Western Europe. Since the SS-20, an IRBM, would not be considered a strategic weapon as defined at SALT, it would not be vulnerable to SALT limitation.

Second, the potential exists that the Soviets, once having deployed SS-20s, could at some time in the future relatively quickly upgrade the SS-20 by adding a third stage -- essentially converting it into an SS-X-16 ICBM. Such an action would increase the number of Soviet ICBM's and thus increase the strategic threat to the United States, as well as exceed the limits set at SALT.[57]

Third, and closely related to the second point, the Defense Department estimated that the SS-20, carrying three MIRVs, could be given additional range by the off-loading of one or two of the MIRVs.[58] This, too, could upgrade the role of the SS-20 from an IRBM to an ICBM.

Fourth, the SS-20 mobile launcher, which carries the missile inside a container, could conceivably be used to carry the SS-X-16. The verification problem of such an arrangement would be in distinguishing between SS-20 launchers and SS-X-16 launchers. The United States, in not opposing Soviet development of the SS-20, could provide the Soviets with the means to covertly deploy the SS-X-16 missile for use with the SS-20 launcher.

1977 Negotiations

When President Carter took office in January 1977, the stage seemed to have been set for a straight-forward and uncomplicated negotiation of SALT II. However, actions by the president to critically emphasize human rights and his radical new arms control proposals surprised the Soviet leadership and quickly and drastically changed the political climate. The Soviets reacted to Carter's moves with extreme coolness, causing some observers to warn of possible reversion to a pre-detente Cold War atmosphere. A softening of American attitudes subsequently prevented further damage to the superpower relationship. The SALT negotiations, generally impervious to domestic and international activities,

received quite a jolt in 1977.

At his first news conference after taking office, President Carter spoke of a possible SALT II agreement as he then envisioned it:

> I would be willing to go ahead with the Soviet Union to conclude a quick agreement if they think it advisable and omit the Backfire bomber and the cruise missile from the negotiations at this stage. And then in the SALT III talks, if necessary, put those two others back in for further discussion.[59]

This was considered the "easy way out" for both sides, for it obviously failed to deal with the most serious problem: Backfire, cruise, and mobile missiles.

When President Carter addressed the United Nations General Assembly on 17 March 1977, he expressed feeling on arms control which seemed to prepare the way for introduction of his "comprehensive proposal" at SALT: "My preference would be for strict controls or even a freeze on new types and new generations of weaponry, with a deep reduction in the strategic arms of both sides."[60] At the same time, he kept open the possibility of an easier, less complex agreement:

> Alternatively, and perhaps more easily, we could conclude a more limited agreement based on those elements of the Vladivostok Accord on which we can find consensus, and set aside for prompt consideration and subsequent negotiations the more contentious issues and also the deeper reductions that I favor.[61]

Carter's Proposals

Strategic Arms Limitation discussions began at the end of March, when Secretary of State Vance carried to Moscow

two Carter Administration proposals. The so-called "deferral proposal" represented the U.S.' fall-back position. It simply followed the Vladivostok understandings, and deferred consideration of the cruise missile and Backfire bomber issues. This proposal was essentially the same as the one that the previous administration had been discussing with the Soviets during 1975 and 1976.

In what seemed to have been perceived by the Soviets as a surprise move, despite previous expressions of his feelings, President Carter fashioned another proposal -- his "comprehensive proposal" -- which was put forward as the U.S.' initial and fundamental offer. According to this package, the total number of strategic delivery vehicles was to be substantially reduced; the numbers of large, modern ICBMs, of MIRVs, and of MIRVed ICBMs were also to be reduced. Numerous additional restrictions were placed on ICBMs, and cruise missiles and Backfire bombers were also to be constrained.

In all, the comprehensive proposal was quite a departure from the Vladivostok agreements and it apparently surprised the Soviets. Their rejection of the proposal could probably have been predicted by many scholars who watch the Kremlin, but Soviet rejection of the deferral plan, too, seemed to surprise most western observers. Since the deferral plan was essentially a reiteration of proposals tentatively agreed to by the Soviets a year before, there was no

reason to anticipate that the Soviets would not reject the old offer. Whether or not their total rejection stemmed from Soviet shock reaction to the comprehensive proposal is merely conjectural, but other analyses explain the Soviets either as delaying SALT to give themselves time to digest the comprehensive plan's provisions or, alternatively, as typical Soviet testing of a new American Presidnet. Negative Soviet response to Carter's human rights stand has also been mentioned as a possible explanation of the failure of the March meeting.

What about verification of the Carter proposals? Because of the implications of being able or not being able to verify a potential SALT II agreement, the provisions of Carter's two proposals will be analyzed here point-by-point (as those points are known from press briefings and news media accounts).

The Deferral Proposal

There are two basic elements contained in the "deferral proposal:" (1) defer consideration of the cruise missile and Backfire bomber issues, and (2) resolve all other remaining issues under the Vladivostok Accord guidelines and sign a new treaty. This proposal seeks merely a continuation under a treaty regime of the status quo. National means would be used to verify limits on strategic missile launchers and on MIRVs. Cruise missiles and Backfire bombers would require no verification since they would

not be controlled. Although from the standpoint of arms control the deferral option offers no progress, all of its provisions can be adequately verified.

The Comprehensive Proposal

Because the "comprehensive proposal" is very complex, each of its four elements will be analyzed separately. First, numerical restrictions are placed on missile launchers and MIRVs: (1) the overall aggregate number of strategic delivery vehicles (ICBMs, SLBMs, and bombers) will be reduced from 2,400 allowed each side to 1,800-2,000 each, for a reduction of 16 to 25 percent; (2) within that aggregate, the number of modern large ballistic missile launchers will be reduced from 308 to 150 (this only affects Soviet SS-18 missiles, and appears to be a U.S. effort to reduce the Soviet throw-weight advantage from 3:1 to 2:1); (3) the overall aggregate of MIRV launchers (ICBMs, SLBMs, and bombers) will be reduced from 1,320 each to 1,100-1,200 each, for a reduction of 9 to 16 percent; (4) within the MIRV aggregate, the number of land-based ICBMs which could be MIRVed would be limited to 550.

Except for the verification difficulties concerning MIRVs, all of the numerical restriction are verifiable by national means. As larger and larger reductions are contemplated, however, the significance of each individual weapon will increase proportionately, and greater verification efforts may be required in order to compensate. This

aspect of verification may not yet emerge as a problem because even the proposed new levels are still very high, but it should be noted and watched.

Second, ICBMs are restricted by (1) continuing the ban on construction of new ICBM launchers; (2) banning modification of existing ICBMs; (3) limiting the number of test flights for existing ICBMs; (4) banning development, testing, and deployment of mobile ICBM launchers.

National means of verification have been and will continue to be able to monitor bans on construction, modification, testing, and deployment of ICBMs. A potential problem exists with the ban on mobile ICBM deployment. Whether the U.S. will press the Soviets for assurances that the SS-20 will not be converted into a strategic threat or will press for other, more verifiable controls over this weapon at SALT (rather than at MFR talks) is not clear. Lacking such assurances or controls, the U.S. must remain wary of the SS-20 threat.

The bans on development (of new ICBMs and of mobile ICBMs) may well be considered unverifiable by national technical means. In this study, no evidence has even hinted at the possibility of unambigously verifying bans on either research or development. Because these activities can be carried out almost completely inside laboratories or other covered facilities, there is virtually no opportunity for them to be observed until a weapons system is ready for

testing or deployment.

Third, cruise missiles are to be restricted by imposing a ban on development, testing, and deployment of all cruise missiles, whether nuclear-armed or conventionally-armed, with ranges beyond 2,500 kilometers (1,500 miles). As has been stated before, for most weapons, bans on testing and development are not verifiable. For cruise missiles, however, bans on neither testing nor development, nor deployment, appear to be verifiable. Additionally, this particular ban appears to be unenforceable in any of its aspects because of the range discrimination provision. All available evidence indicates that there is currently no way to distinguish between a long-range cruise missile and a short-range cruise missile. Therefore, unless some means to so discriminate is devised, the ban as described seems to be unverifiable. Even if a discrimination convention (perhaps similar to the MIRV counting rules) is devised, it is likely to be arbitrary, reliant on trust, and ambiguous.

The possible implications of the cruise missile provision are quite significant. From an observer's perspective, it is still unclear why the United States couched the provisions in the terms used. Two aspects of the decision to adopt that provision are perplexing: first, is the provision verifiable or not? And second, if the provision is not verifiable, as this study suggests, did the United States propose it deliberately (as a change of long-

standing position, for instance) or was the decision made hastily or in error (without due regard to verification)? Until more information becomes available, no conclusion can be made.

It is generally accepted that no SALT proposal will ever be both entirely acceptable to both sides and 100 percent verifiable. Compromises between arms control measures and verification are usually required in order to make progress. Here, neither were the arms control measures acceptable, nor did they appear to be verifiable. Hence, the implication might be that the American goals had been compromised before the proposals were made. In any case, the Soviets rejected the March 1977 proposals, but did continue informal, as well as formal, discussions with the Carter administration on the subject of SALT II.

Follow-on Discussions

In May 1977, U.S. Secretary of State Vance and Soviet Foreign Minister Gromyko met in Geneva for a second session of discussions at which SALT II was the primary topic. On this occasion, agreement was reached on the establishment of a three-part framework for a SALT II treaty:

(1) The Treaty would last until 1985 and would essentially reconfirm the Vladivostok Accords. Some small reductions in weapons ceilings, perhaps up to ten percent, seem likely.

(2) A protocol to the treaty, which would last for three years, would place restraints on the U.S. cruise missile and the Soviet Backfire bomber.

(3) A statement of general principles would establish the ground rules for SALT III negotiations.[62]

Thus, it seems that SALT II will mark a retreat from President Carter's ambitious "comprehensive proposal" of March 1977, and instead will codify the Vladivostok agreement of November 1974.

Meetings are scheduled to continue throughout 1977, so that SALT II can be concluded as soon as possible. Whenever SALT II is signed, it will undoubtedly reflect the three-part framework decided in May. At that time, the questions should again be asked: can SALT II indeed be verified?

Conclusion

From the perspective of an observer of SALT, one could say that since a SALT II agreement was not concluded in the five years of post-SALT I negotiations, then the SALT process has failed. But that really does not do justice to the efforts that have been made. True, SALT II has been elusive. And true, the SALT I Offensive Arms Interim Agreement expired on 3 October 1977 without having been superseded by a follow-on agreement. Yet, progress has been made in the interim and the prospects for SALT II

in late 1977 or, more likely, during 1978 seem optimistic.

In 1974, despite the difficult discussions regarding control of MIRVs, despite the domestic political upheaval in the United States as a result of Watergate, and despite heightened international tensions (especially between the two superpowers) that developed from conflict in the Middle East and from rising prices of the dwindling supplies of oil, the United States and the Soviet Union were able to agree on an outline for a SALT II agreement.

In late 1975 and early 1976, the prospects for agreement on SALT II appeared good, but dissipated because, inter alia, domestic political pressures prevented the incumbent U.S. president from concluding an election-year agreement that would initiate divisive debate in the U.S. Congress, and even more because the outstanding issues of Backfire bombers and cruise missiles could not be resolved.

By the start of 1977, the newly elected U.S. President and the aging Soviet leader shared common interests in signing a SALT II agreement as early as possible. The opportunity to conclude the agreement was, unfortunately, delayed by an increase in Soviet-American tensions similar to those which had occurred during the initial years in office of several past U.S. presidents. Having cleared that hurdle by mid-1977, the two sides approached SALT II in a more favorable political climate. Agreement in the near future seems possible.

Resolution of the issue of verification of SALT II has not been easy. Several new weapons (MIRV, cruise missiles, and mobile missiles, foremost), all marvels of technological development, are more difficult to control because limits of these weapons are more difficult to verify. What these weapons all represent is a shift in development from more to better -- from quantitative to qualitative. In response, arms control efforts must also shift similarly from imposition of quantitative limits on weapons to qualitative restriction. The retention of sole reliance on national technical means for verification has limited the freedom of choice of both sides in resolving the arms control issues. As a result, the conclusion of SALT II has depended on hard choices being made between the restriction of weapons and the verification of the agreement. The choices have not been easy and the negotiations have dragged on and on.

The requirement to achieve a balance between arms control provisions that impose strong limits and provisions that can be verified by national technical means have required each side to rank order its goals at SALT II. While shopping lists of rationally chosen and rank ordered proposals have not appeared in media reports, the inference can be made that the proposals of both sides incorporated only items which were apparently considered to be acceptable balances between control and verification.

The Soviet Union has appeared to be generally less concerned than the United States about whether proposals could be verified. With the shift toward qualitative control measures, the Soviet Union, as a closed society facing an open one, has a significant edge over the United States in the verification of agreements. Hence, it can afford to concern itself less with verification provisions of SALT agreements.

The United States has long maintained the requirement that any and all parts of arms control agreements be verifiable. The quantitative-qualitative transition would appear to have made more difficult that position, and perhaps caused deviation from that stand. Illustrative of the point are the recent Carter proposals, which put forth cruise missile restrictions that apparently cannot be verified.

SALT II indeed seems to have fallen prey to the effects of more difficult verificiation resulting from qualitative improvements in strategic weapons. Future agreements appear equally vulnerable, and may prove to be even more elusive than SALT II.

NOTES TO CHAPTER V

1. "Basic Principles of Negotiations on Further Limitation of Strategic Offensive Weapons, June 21, 1973," Documents on Disarmament, 1973, p. 272.

2. "Joint American-Soviet Communique, November 24, 1974," Documents on Disarmament, 1974, pp. 747-50.

3. "Joint American-Soviet Statement on the Limitation of Strategic Offensive Arms, November 24, 1974," Documents on Disarmament, 1974, pp. 746-47.

4. "News Conference Remarks by Secretary of State Kissinger: Limitation of Strategic Offensive Arms, November 24, 1974," Documents on Disarmament, 1974, pp. 757-58.

5. "News Conference Remarks by President Ford on the strategic Arms Limitation Talks, December 2, 1974," Documents on Disarmament, 1974, p. 773.

6. International Institute for Strategic Studies, Strategic Survey, 1974 (London, IISS, 1975), p. 63.

7. Lawrence L. Whetten, "Soviet Interests and MIRV Control," Survival (March-April 1974): 62.

8. Newhouse, Cold Dawn, p. 180.

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11. Scoville, MIRV Control is Still Possible," p. 55.

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13. Klass, "Keeping the Nuclear Peace," p. 35.

14. Scoville, "MIRV Control," p. 55.

15. Gray, "A Problem Guide to SALT II," p. 230.

16. Henry Kissinger, "The Vladivostok Accord," a background briefing, 3 December 1974, reprinted in Survival 17 (July-August 1975): 191-98.

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18. Fred C. Iklé, "New Threats to the Nuclear Balance," Address, 31 August 1976, Vital Speeches of the Day 42 (1 October 1976): 743.

19. Strategic Survey, 1974, p. 46.

20. Burt, "The SS-20," p. 44.

21. Strategic Survey, 1976, p. 111.

22. The talks concerning the Mutual Reduction of Forces and Armaments and Associated Measures in Central Europe (MUREFAAMCE) is referred to by the more convenient acronym MFR, which stands for Mutual Forces Reduction. See The Military Balance, 1976-1977, p. 104.

23. Strategic Survey, 1976, p. 111.

24. Strategic Survey, 1974, p. 46.

25. Strategic Survey, 1976, p. 111.

26. Kosta Tsipis, "Cruise Missiles," Scientific American 236 (February 1977): 20.

27. Harold Brown, "What's Behind the B-1/Cruise Missile Decision?," Commanders Digest, 15 September 1977, p. 11.

28. Robert L. Pfaltzgraff, Jr., and Jacqueline K. Davis, SALT II: Promise or Precipice? A Monograph in International Affairs. (Miami, Fla: Center for Advanced International Studies, University of Miami, 1976), p. 10.

29. Tsipis, "Cruise Missiles," p. 20.

30. Pfaltzgraff and Davis, SALT II, p. 12.

31. Strategic Survey, 1975, p. 108.

32. Colin S. Gray, "The Limits of Arms Control," Air Force Magazine 58 (August 1974): 72.

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36. Strategic Survey, 1975, p. 109.

37. Ulsamer, The USSR's Military Shadow," p. 42.

38. Gray, "A Problem Guide to SALT II," p. 23.

39. Ibid., p. 232.

40. Tsipis, "Cruise Missiles," p. 29.

41. Pfaltzgraff and Davis, SALT II, p. 16.

42. Milton R. Benjamin, Lloyd H. Norman, and Bruce van Voorst, "Two Stoppers in SALT," Newsweek, 24 November 1975, p. 60.

43. Intelligence estimates of the range of Backfire varied from 1,750 to 6,000 nautical miles, with concensus centering around 2,750 to 3,750 nautical miles.

44. Gray, "The Limits of Arms Control," p. 72.

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46. Paul H. Nitze, "Assuring Strategic Stability in an Era of Detente," Foreign Affairs 54 (January 1976): 230.

47. Ibid., pp. 230-31.

48. Strategic Survey, 1974, p. 50.

49. "Senate Unite Blocks M-X Pending Study," Aviation Week and Space Technology, 13 May 1976, p. 13.

50. C. Robert Zelnick, "M-X and the Next Arms Debate," Washington Post, 27 February 1977.

51. Ibid.

52. Ibid.

53. Ulsamer, "The USSR's Military Shadow," p. 38.

54. Michael Nacht, "The Vladivostok Accord and American Technological Options," Survival 17 (May-June 1975): 112.

55. In Department of Defense and NATO Nomenclature, the "X" stands for "experimental," indicating that the weapon is still in some stage of development prior to deployment. Once the weapon is deployed, the "X" is dropped from the nomenclature.

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57. Ibid., p. 111.

58. Ulsamer, "The USSR's Military Shadow," p. 38.

59. "Transcript of President's News Conference on Foreign and Domestic Matters," New York Times, 9 February 1977.

60. Washington Post, 18 March 1977.

61. Ibid.

62. Susan Fraker, Scott Sullivan, and Elaine Shannon, "Breaking the Ice," Newsweek, 30 May 1977, p. 16.

VI. CONCLUSION: BEYOND SALT II

> We not only need backup satellites, both in surveillance and communications areas, but we will probably also need in the not too distant future what one might call defensive satellites so that our surveillance and communications systems can be protected from potential attack . . . . We cannot forget that we live in a very insecure world that [that] there will be military purposes for that [Space Shuttle] system.
>
> Senator Harrison Schmitt

The ambitious process of strategic arms limitation will continue beyond SALT II, directed toward additional agreements which would further reduce the possibility of war occurring, the destructiveness of war if it does occur, and the cost of national defense. What then are the verification issues that are likely to be faced at SALT II and later agreements?

In general, the problems which must be faced will continue to stem from qualitative improvements in weapons. The blurring of distinctions between strategic and tactical systems and the emergence of gap-bridging "grey area" weapons undoubtedly will exacerbate arms control differences both at SALT and at the Mutual Force Reduction (MFR) talks in Europe. Specific problems are likely to appear in the following areas.

First, because technological developments will

create uncertainties about the shape and effectiveness of future military forces, both sides will tend to resist limitation of new and untested waepon options and they will be "reluctant to enter into long-term agreements whose implications could change over time."[1] Evidence for this proposition seems to flow from the preliminary framework established in May 1977 for SALT II, in which both sides agreed to some form of controls over cruise missiles and Backfire bombers. However, while the SALT II treaty is to last for eight years, the controls over cruise missiles and Backfire bombers will last for only three years. Here, both sides seem unwilling to forego military advantages stemming from these weapons.

Second, as the two sides asymmetrically acquire new weapons systems, the existing differences in the military balance will tend to be exacerbated. Further, evolving technology may just make the use of gross and relatively simple comparisons of static factors such as symmetrical force size and posture increasingly irrelevant.[2]

Third, various characteristics of new weapons systems -- their small size, high mobility, and diversity of platforms available for their launch -- will tend to strain the capabilities for unobtrusively monitoring compliance with arms control agreements.[3] For example, at SALT II, constraints on missiles themselves were not employed because they could not be verified from satellites. Instead,

limits on missile launchers, which could be verified, were used. The subsequent development of mobile missiles (which move from launcher to launcher to launcher, at random) and "cold launch" techniques (which allow a launcher to be reloaded and thus be able to launch several missiles sequentially) will tend to alter the "launcher-missile" equation. No longer can the assumption be made that a limitation of launchers is really a de facto limitation on missiles. And with the cruise missiles (which may requrie no special or distinguishable launcher) especially, the launcher-missile equation becomes quite meaningless.

Fourth, where the issues of numerous alleged Soviet SALT I violations caused difficulties during 1975 and reminded us that some uncertainty is inherent in any arms control agreement, new weapons systmes may stretch verification to the point at which the uncertainty and ambiguity become politically intolerable. The cruise missile may again be used as an example. If the verification by national technical means of limits on numbers or capabilities of cruise missiles is determined to be inadequate, ambiguous, or unreliable, either a more intrusive verification means would have to be used (such as on-site inspection) or else the threat must be seen as sufficient to warrant no agreement being concluded. It should be emphasized, too, that even on-site inspection is not completely reliable -- it can easily be overcome by a determined effort to cheat. So

even the resort to more intrusive measures may not be sufficient to counteract the inherent ambiguity of the new weapons systems.

Fifth, the continuing deployment of grey-area weapons will make it even more difficult to distinguish between strategic and theater weapons, thus confounding efforts to separate superpower arms control concerns (SALT) from regional arms control concerns (MFR). SALT is organized to limit a specific class of armaments: strategic weapons. But, as strategic armaments become no longer easily distinguishable and as they no longer comprise a readily definable class of weaponry, the organization of arms control efforts based on the categorization of weapons by function (strategic, theater) will have less utility. The implication is that controls placed on a superpower's strategic weapons will also limit that state's capabilities relative to other military tasks. For instance, SALT controls over strategic weapons (such as cruise missiles or SS-20 missiles) will also limit their uses in theater roles. There are, therefore, important consequences for theater military balances that result from decisions about the strategic balance. The strategic-theater distinctions are increasingly being seen as artificial and problematic both for SALT and for MFR.[4]

Further, certain grey-area weapons seem likely to escape control by either SALT or MFR, in effect slipping

between their jurisdictional boundaries.[5] This is not to imply that SALT and MFR were designed to be mutually exclusive or to be jointly all-encompassing; rather, to acknowledge that they are neither and that despite efforts to establish jurisdictional boundaries for each, some weapons systems will not be controlled in either forum. The Intermediate Range Ballistic Missile (IRBM) is an example of an entire class of weapons that, according to one report, had not been under discussion at SALT (because IRBM range is not "strategic") nor at MFR (because IRBMs are not deployed in Central Europe).[6] It appears likely that as grey-area weapons proliferate and grow in importance, their presence will inevitably be felt and they will intrude into calculations made at SALT and MFR.[7]

The very structure of the arms control talks tend to complicate rather than facilitate at least this grey-area weapon aspect of arms control. The problem is that both SALT and MFR are based on definitional assumptions about military technology that are becoming obsolete. The logical extension of such an argument would tend to suggest a redefinition of the boundaries of East-West arms control to accommodate changing political interests and new developments in military technology.[8]

If the task of restructuring arms control were ever to be seriously approached, a possible first step might be the expansion of participation, from just the two

superpowers to a multilateral group including the nuclear powers of Europe. Following logically, then, would be the merging of SALT and MFR processes into a single multilateral negotiating format in which the gaps would be breached to include constraints on weapons which otherwise would be excluded from control.[9] Such a sweeping restructuring of arms control may, unfortunately, be unrealistic for current circumstances, but since technological developments do threaten to blur distinctions between weaponry, with all of the implications that follow, efforts should begin soon even as SALT and MFR continue, to create an alternative forum for arms control negotiation as a contingency to be employed when conditions are more favorable.[10]

Sixth, if uncertainty is inherent and increasing in the verification capabilities currently possessed or envisaged, then the development of methods of interfering with national technical means brings to question even the sincerity of the parties in pursuing arms control. Numerous reports indicate that both the Soviet Union and the United States are engaged in efforts to develop weapons which could damage or destroy reconnaissance and surveillance satellites. These weapons have been called anti-satellite satellites (ASAT), interceptor satellites, or hunter-killer satellites.

In this field of military research and development, the Soviet Union appears to be significantly more active than the United States. The Chairman of the Joint Chiefs of

Staff is reported to have stated that the "Soviet Union has continued to pursue extensive research and development and a renewed testing effort in space warfare as an integral element of their military doctrine. In . . . space weapon capability, they are ahead and likely to continue to lead for the next several years."[11]

Recent Soviet anti-satellite test activity, it has been claimed, "indicates that the Soviets have undertaken a broad-based program to develop the capability to interfere with the operation of our satellites at all altitudes." Such weapons threaten not only U.S. satellites used to verify arms control limits but, more importantly, the early warning satellites which give warning when the Soivets actually fire their ICBMs. As military dependence on space grows, "the loss of key space systems could materially influence the outcome of future conflicts."[12]

Soviet interest in developing interceptor satellites has been described, by some American officials, as being directed against U.S. reconnaissance satellites.[13] The use of such weapons would be a clear-cut violation of the verification provisions of SALT I which prohibit interference with national means of verification. In response to the threat of interceptor satellites, the Department of Defense sponsored studies of possible means of protecting our miltiary satellites from attack.[14]

Proof of deliberate Soviet interference with U.S.

satellites would mean that the Soviets had chosen to violate SALT I. The implications of such an eventuality could be disastrous: for future arms control agreements, it would mean that any past "trust" the United States might have felt about Soviet adherence to their treaty and agreement commitments was no longer justified; and although trust alone is not sufficient basis for stable agreement, the absence of trust would cause even greater reliance to be placed on verification.

It has been further hypothesized that "the provocative nature of any attempt to interfere with verification capabilities makes it unlikely that the Soviet Union would engage in a large-scale effort to sabotage American surveillance in peacetime." In a crisis, such hazardous activity could trigger a pre-emptive military response.[15] It is felt that a large-scale attempt to blind a military space power would evidence dangerous military excalation and "present command authorities a totally new strategic situation of the utmost gravity." Because of the dangers involved, the likelihood of a large-scale attack on satellites is small, though it can not be ignored.[16]

It is doubtful that, because of American redundancy in early-warning and reconnaissance systems, even a large-scale attack could "blind" the United States -- "a dedicated Soviet attack against satellites would be more likely to produce a strategic 'blink' by the United States."

Still, potential U.S. countermeasures and current limitations of Soviet interceptor satellites make even that an unlikely possibility. It is most probable, therefore, that the Soviet interceptor program is directed more toward China than the United States.[17]

Awareness of the vulnerability of the U.S. spacedraft has spurred the development of countermeasures:

> The effective range of the American space tracking system is being extended; a Space Attack Warning System is being developed to sound the alarm in the the event of Soviet satellite interference; and various satellite decoy and disguise techniques are being explored, such as the use of 'dark' satellites, undetectable from earth, to be kept dormant in space until they are needed.[18]

Seventh, besides taking merely defensive countermeasures, the United States may be forced to take the offensive in satellite warfare. U.S. Interest involved satellite interception programs similar to the Soviet testing program already described. It also included use of ground-based ABMs in an anti-satellite role, and space-based systems. One U.S. program which is speculated to have a possible anti-satellite mission is the Space Shuttle, but this has been officially denied.[19]

The shuttle, termed "perhaps the most powerful potential weapon in the U.S. arsenal" is a mammoth spaceship "scheduled to make its first trip into orbit in 1979." The size of the ship -- carrying seven astronauts and 65,000 pounds of cargo -- would allow it to transport

"twice the payload weight and three times the volume of the biggest rockets now in use."

For verification, the Space Shuttle affords numerous potential uses. Frequent Shuttle missions, essentially maintaining a small force of people in space, open the possibility of monitoring, or management of monitoring efforts, by astronauts. The reconnaissance platforms already in space could be reloaded with film capsules, maintained, and repaired by astronauts. New reconnaissance systems could be deployed using the Space Shuttle at a much lower cost than by sending them aloft atop rockets.

The Shuttle might also tempt some to consider capturing (interfering with) the satellite reconnaissance systems of other states. Because the potential uses of the shuttle offer both hope and danger to U.S. space programs, one U.S. space planner said: "I think the space shuttle has let a lot of demons out of the cave."[20]

In the thirty years that have elapsed since atomic weapons were first used, the basic attitudes of the two superpowers toward arms control and verification seem to have remained firm. In 1945, the United States took the lead in developing and acquiring strategic armaments and has continued ever since to maintain its technological superiority. At the same time, the Soviet Union, having been placed in an inferior position, began determined efforts to catch up with and to surpass the U.S. As a

result, although efforts to control arms have been sought by both sides and heralded under the banners of peace, international stability, and national security, each side has rejected arms control proposals that would have placed it in what is perceived to be an inferior position. Verification of arms control agreements turned out to be not only a safeguard, ensuring that fair agreements would be kept, but also a facile excuse for avoiding perceived imbalanced agreements.

Where the Baruch and Gromyko plans in 1946 represented opposing views of the inter-relationship between disarmament and control, more recent proposals and agreements of the two superpowers appear to be less polar. Still, even at the SALT I and the SALT II negotiations, the United States appeared to have continued its quest to maintain superiority, and the Soviet Union appeared to have continued its desire to achieve parity en route to superiority over the U.S. Ever since reliance began to be placed on national technical means for verification, the U.S. attitude toward verification has de-emphasized inspection but has maintained the long-standing contention that only verifiable agreements should be concluded. Some observers claim that the U.S. has become venturesome and that it may be placing too much reliance on its technology. The Soviet Union appears to be considerably less dependent than the United States on technical verification means -- because of its

ability to take advantage of the openness of the U.S. government and society -- and thus is more able to push the U.S. into venturesome agreements.

As new agreements become more venturesome, they are likely to be even more difficult than past agreements to verify, likely to require greater national surveillance efforts, and likely to thus "increase funding and operational levels of military activities in space."[21] This chain of events, beginning with technological developments of qualitatively superior weapons, seems to have developed its own momentum. Nevertheless, the argument here is not intended to vilify technology or technological developments, but rather to emphasize the potential they hold for arms control verification. It has been said that "technology is inherently neutral; whether it is good or bad depends on the uses it is put to and whose ox is being gored."[32] The United States and the Soviet Union have the opportunity to harness the potential of technology and to find meaningful arms control regimes, which will reduct the risk of war occurring, reduce the destructiveness if it should occur, reduce the cost of defense -- and which will be verifiable.

NOTES TO CHAPTER VI

1. Richard Burt, "Technology and East-West Arms Control," International Affairs 53 (January 1977): 54, 55.

2. Ibid., p. 58.

3. Ibid., pp. 58-60.

4. Ibid., pp. 61-2.

5. Ibid., p. 64.

6. Strategic Survey, 1976, p. 111.

7. Burt, "Technology," p. 64.

8. Ibid., p. 68.

9. Ibid., p. 69.

10. Ibid., p. 70.

11. General George S. Brown, USAF, quoted from the Military Posture Statement, in Ulsamer, "The USSR's Military Shadow is Lengthening," pp. 45-6.

12. Ibid., p. 46.

13. Strategic Survey, 1976, p. 30.

14. Klass, "Keeping the Nuclear Peace," p. 36.

15. Strategic Survey, 1976, p. 30.

16. Sheldon, "Space Activities in 1976," p. 76.

17. Strategic Survey, 1976, p. 30.

18. Ibid.

19. Ibid., pp. 30-1.

20. Kim Willenson and Evert Clark, "War's Fourth Dimension," Newsweek, 29 November 1976, p. 46.

21. William H. Schauer, The Politics of Space: A Comparison of the Soviet and American Space Program (New York: Holmes and Meier, 1976), p. 193.

22. Paul H. Nitze, "The Vladivostok Accord and SALT II," Review of Politics 37 (April 1975): 150.

APPENDICES

Appendix

SALT I Agreements

ABM Treaty

Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems

Signed at Moscow May 26, 1972

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Proceeding from the premise that nuclear war would have devastating consequences for all mankind,

Considering that effective measures to limit anti-ballistic missile systems would be a substantial factor in curbing the race in strategic offensive arms and would lead to a decrease in the risk of outbreak of war involving nuclear weapons,

Proceeding from the premise that the limitation of anti-ballistic missile systems, as well as certain agreed measures with respect to the limitation of strategic offensive arms, would contribute to the creation of more favorable conditions for further negotiations on limiting strategic arms,

Mindful of their obligations under Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons,

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to take effective measures toward reductions in strategic arms, nuclear disarmament, and general and complete disarmament,

Desiring to contribute to the relaxation of international tension and the strengthening of trust between States,

Have agreed as follows:

Article I

1. Each party undertakes to limit anti-ballistic missile (ABM) systems and to adopt other measures in accordance with the provisions of this Treaty.

2. Each Party undertakes not to deploy ABM systems for a defense of the territory of its country and not to provide a base for such a defense, and not to deploy ABM systems for defense of an individual region except as provided for in Article III of this Treaty.

Article II

1. For the purpose of this Treaty an ABM system is a system to counter strategic ballistic missiles or their elements in flight trajectory, currently consisting of:

(a) ABM interceptor missiles, which are interceptor missiles constructed and deployed for an ABM role, or of a type tested in an ABM mode;

(b) ABM launchers, which are launchers constructed and deployed for launching ABM interceptor missiles; and

(c) ABM radars, which are radars constructed and deployed for an ABM role, or of a type tested in an ABM mode.

2. The ABM system components listed in paragraph 1 of this Article include those which are:

(a) operational;
(b) under construction;
(c) undergoing testing;
(d) undergoing overhaul, repair or conversion; or
(e) mothballed.

Article III

Each Party undertakes not to deploy ABM systems or their components except that:

(a) within one ABM system deployment area having a radius of one hundred and fifty kilometers and centered on the Party's national capital, a Party may deploy: (1) no more than one hundred ABM launchers and no more than one hundred ABM interceptor missiles at launch sites, and (2) ABM radars within no more than six ABM radar complexes, the area of each complex being circular and having a diameter of no more than three kilometers; and

(b) within one ABM system deployment area having a radius of one hundred and fifty kilometers and containing ICBM silo launchers, a Party may deploy: (1) no more than one hundred ABM launchers and no more than one hundred ABM interceptor missiles at launch sites, (2) two large phased-array ABM radars comparable in potential to corresponding ABM radars operational or under construction on the date of signature of the Treaty in an ABM system deployment area containing ICBM silo launchers, and (3) no more than eighteen ABM radars each having a potential less than the potential of the smaller of the above-mentioned two large phased-array ABM radars.

Article IV

The limitations provided for in Article III shall not apply to ABM systems or their components used for development or testing, and located within current or additionally agreed test ranges. Each Party may have no more than a total of fifteen ABM launchers at test ranges.

Article V

1. Each Party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based.

2. Each Party undertakes not to develop, test, or deploy ABM launchers for launching more than one ABM interceptor missile at a time from each launcher, nor to modify deployed launchers to provide them with such a capability, nor to develop, test, or deploy automatic or semi-automatic or other similar systems for rapid reload of ABM launchers.

Article VI

To enhance assurance of the effectiveness of the limitations on ABM systems and their components provided by this Treaty, each Party undertakes:

(a) not to give missiles, launchers, or radars, other than ABM interceptor missiles, ABM launchers, or ABM radars, capabilities to counter strategic ballistic missiles or their elements in flight trajectory, and not to test them in an ABM mode; and

(b) not to deploy in the future radars for early warning of strategic ballistic missile attack except at locations along the periphery of its national territory and oriented outward.

Article VII

Subject to the provisions of this Treaty, modernization and replacement of ABM systems or their components may be carried out.

Article VIII

ABM systems or their components in excess of the numbers or outside the areas specified in this Treaty, as well as ABM systems or their components prohibited by this Treaty, shall be destroyed or dismantled under agreed procedures within the shortest possible agreed period of time.

Article IX

To assure the viability and effectiveness of this Treaty, each Party undertakes not to transfer to other States, and not to deploy outside its national territory, ABM systems or their components limited by this Treaty.

Article X

Each Party undertakes not to assume any international obligations which would conflict with this Treaty.

Article XI

The Parties undertake to continue active negotiations for limitations on strategic offensive arms.

Article XII

1. For the purpose of providing assurance of compliance with the provisions of this Treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.

2. Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.

3. Each Party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with the provisions of this Treaty. This obligation shall not require changes in current construction, assembly, conversion, or overhaul practices.

Article XIII

1. To promote the objectives and implementation of the provisions of this Treaty, the Parties shall establish promptly a Standing Consultative Commission, within the framework of which they will:

(a) consider questions concerning compliance with the obligations assumed and related situations which may be considered ambiguous;

(b) provide on a voluntary basis such information as either Party considers necessary to assure confidence in compliance with the obligations assumed;

(c) consider questions involving unintended interference with national technical means of verification;

(d) consider possible changes in the strategic situation which have a bearing on the provisions of this Treaty;

(e) agree upon procedures and dates for destruction or dismantling of ABM systems or their components in cases provided for by the provisions of this Treaty;

(f) consider, as appropriate, possible proposals for further increasing the viability of this Treaty, including proposals for amendments in accordance with the provisions of this Treaty;

(g) consider, as appropriate, proposals for further measures aimed at limiting strategic arms.

2. The Parties through consultation shall establish, and may amend as appropriate, Regulations for the Standing Consultative Commission governing procedures, composition and other relevant matters.

Article XIV

1. Each Party may propose amendments to this Treaty. Agreed amendments shall enter into force in accordance with the procedures governing the entry into force of this Treaty.

2. Five years after entry into force of this Treaty, and at five-year intervals thereafter, the Parties shall together conduct a review of this Treaty.

Article XV

1. This Treaty shall be of unlimited duration.

2. Each Party shall, in exercising its national sovereignty, have the right to withdraw from this Treaty if it decides that extraordinary events related to the subject matter of this Treaty have jeopardized its supreme interests. It shall give notice of its decision to the other Party six months prior to withdrawal from the Treaty. Such notice shall include a statement of the extraordinary events the notifying Party regards as having jeopardized its supreme interests.

Article XVI

1. This Treaty shall be subject to ratification in accordance with the constitutional procedures of each Party. The Treaty shall enter into force on the day of the exchange of instruments of ratification.

2. This Treaty shall be registered pursuant to Article 102 of the Charter of the United Nations.

DONE at Moscow on May 26, 1972, in two copies, each in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF AMERICA

President of the United States of America

FOR THE UNION OF SOVIET SOCIALIST REPUBLICS

General Secretary of the Central Committee of the CPSU

SALT I Agreements

Interim Agreement

Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures With Respect to the Limitation of Strategic Offensive Arms

Signed at Moscow May 26, 1972

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Convinced that the Treaty on the Limitation of Anti-Ballistic Missile Systems and this Interim Agreement on Certain Measures with Respect to the Limitation of Strategic Offensive Arms will contribute to the creation of more favorable conditions for active negotiations on limiting strategic arms as well as to the relaxation of international tension and the strengthening of trust between States,

Taking into account the relationship between strategic offensive and defensive arms,

Mindful of their obligations under Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons,

Have agreed as follows:

Article I

The Parties undertake not to start construction of additional fixed land-based intercontinental ballistic missile (ICBM) launchers after July 1, 1972.

Article II

The Parties undertake not to convert land-based launchers for light ICBMs, or for ICBMs of older types deployed prior to 1964, into land-based launchers for heavy ICBMs of types deployed after that time.

Article III

The Parties undertake to limit submarine-launched ballistic missile (SLBM) launchers and modern ballistic missile submarines to the numbers operational and under construction on the date of signature of this Interim Agreement, and in addition to launchers and submarines constructed under procedures established by the Parties as replacements for an equal number of ICBM launchers of older types deployed prior to 1964 or for launchers on older submarines.

Article IV

Subject to the provisions of this Interim Agreement, modernization and replacement of strategic offensive ballistic missiles and launchers covered by this Interim Agreement may be undertaken.

Article V

1. For the purpose of providing assurance of compliance with the provisions of this Interim Agreement, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.

2. Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.

3. Each Party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with the provisions of this Interim Agreement. This obligation shall not require changes in current construction, assembly, conversion, or overhaul practices.

Article VI

To promote the objectives and implementation of the provisions of this Interim Agreement, the Parties shall use the Standing Consultative Commission established under Article XIII of the Treaty on the Limitation of Anti-Ballistic Missile Systems in accordance with the provisions of that Article.

Article VII

The Parties undertake to continue active negotiations for limitations on strategic offensive arms. The obligations provided for in this Interim Agreement shall not prejudice the scope or terms of the limitations on strategic offensive arms which may be worked out in the course of further negotiations.

Article VIII

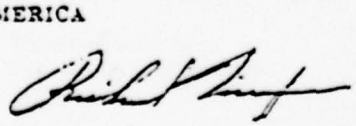
1. This Interim Agreement shall enter into force upon exchange of written notices of acceptance by each Party, which exchange shall take place simultaneously with the exchange of instruments of ratification of the Treaty on the Limitation of Anti-Ballistic Missile Systems.

2. This Interim Agreement shall remain in force for a period of five years unless replaced earlier by an agreement on more complete measures limiting strategic offensive arms. It is the objective of the Parties to conduct active follow-on negotiations with the aim of concluding such an agreement as soon as possible.

3. Each Party shall, in exercising its national sovereignty, have the right to withdraw from this Interim Agreement if it decides that extraordinary events related to the subject matter of this Interim Agreement have jeopardized its supreme interests. It shall give notice of its decision to the other Party six months prior to withdrawal from this Interim Agreement. Such notice shall include a statement of the extraordinary events the notifying Party regards as having jeopardized its supreme interests.

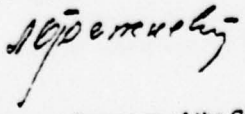
DONE at Moscow on May 26, 1972, in two copies, each in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF AMERICA



The President of the United States

FOR THE UNION OF SOVIET SOCIALIST REPUBLICS



General Secretary of the Central Committee of the CPSU

SALT I Agreements

Protocol to the Interim Agreement

PROTOCOL

To the Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures With Respect to the Limitation of Strategic Offensive Arms

Signed at Moscow May 26, 1972

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Having agreed on certain limitations relating to submarine-launched ballistic missile launchers and modern ballistic missile submarines, and to replacement procedures, in the Interim Agreement,

Have agreed as follows:

The Parties understand that, under Article III of the Interim Agreement, for the period during which that Agreement remains in force:

The U.S. may have no more than 710 ballistic missile launchers on submarines (SLBMs) and no more than 44 modern ballistic missile submarines. The Soviet Union may have no more than 950 ballistic missile launchers on submarines and no more than 62 modern ballistic missile submarines.

Additional ballistic missile launchers on submarines up to the above-mentioned levels, in the U.S. – over 656 ballistic missile launchers on nuclear-powered submarines, and in the U.S.S.R. – over 740 ballistic missile launchers on nuclear-powered submarines, operational and under construction, may become operational as replacements for equal numbers of ballistic missile launchers of older types deployed prior to 1964 or of ballistic missile launchers on older submarines.

The deployment of modern SLBMs on any submarine, regardless of type, will be counted against the total level of SLBMs permitted for the U.S. and the U.S.S.R.

This Protocol shall be considered an integral part of the Interim Agreement.

DONE at Moscow this 26th day of May, 1972.

FOR THE UNITED STATES OF AMERICA

The President of the United States of America

FOR THE UNION OF SOVIET SOCIALIST REPUBLICS

The General Secretary of the Central Committee of the CPSU

SALT: AGREED INTERPRETATIONS AND UNILATERAL STATEMENTS

I. AGREED INTERPRETATIONS

(a) Initialed Statements. – The texts of the statements set out below were agreed upon and initialed by the Heads of the Delegations on May 26, 1972.

ABM TREATY

[A]

The Parties understand that, in addition to the ABM radars which may be deployed in accordance with subparagraph (a) of Article III of the Treaty, those non-phased-array ABM radars operational on the date of signature of the Treaty within the ABM system deployment area for defense of the national capital may be retained.

[B]

The Parties understand that the potential (the product of mean emitted power in watts and antenna area in square meters) of the smaller of the two large phased-array ABM radars referred to in subparagraph (b) of Article III of the Treaty is considered for purposes of the Treaty to be three million.

[C]

The Parties understand that the center of the ABM system deployment area centered on the national capital and the center of the ABM system deployment area containing ICBM silo launchers for each Party shall be separated by no less than thirteen hundred kilometers.

[D]

The Parties agree not to deploy phased-array radars having a potential (the product of mean emitted power in watts and antenna area in square meters) exceeding three million, except as provided for in Articles III, IV and VI of the Treaty, or except for the purposes of tracking objects in outer space or for use as national technical means of verification.

[E]

In order to insure fulfillment of the obligation not to deploy ABM systems and their components except as provided in Article III of the Treaty, the Parties agree that in the event ABM systems based on other physical principles and including components capable of substituting for ABM interceptor missiles, ABM launchers, or ABM radars are created in the future, specific limitations on such systems and their components would be subject to discussion in accordance with Article XIII and agreement in accordance with Article XIV of the Treaty.

[F]

The Parties understand that Article V of the Treaty includes obligations not to develop, test or deploy ABM interceptor missiles for the delivery by each ABM interceptor missile of more than one independently guided warhead.

[G]

The Parties understand that Article IX of the Treaty includes the obligation of the US and the USSR not to provide to other States technical descriptions or blueprints specially worked out for the construction of ABM systems and their components limited by the Treaty.

INTERIM AGREEMENT

[H]

The parties understand that land-based ICBM launchers referred to in the Interim Agreement are understood to be launchers for strategic ballistic missiles capable of ranges in excess of the shortest distance between the northeastern border of the continental U.S. and the northwestern border of the continental USSR.

[I]

The Parties understand that fixed land-based ICBM launchers under active construction as of the date of signature of the Interim Agreement may be completed.

[J]

The Parties understand that in the process of modernization and replacement the dimensions of land-based ICBM silo launchers will not be significantly increased.

[K]

The Parties understand that dismantling or destruction of ICBM launchers of older types deployed prior to 1964 and ballistic missile launchers on older submarines being replaced by new SLBM launchers on modern submarines will be initiated at the time of the beginning of sea trials of a replacement submarine, and will be completed in the shortest possible agreed period of time. Such dismantling or destruction, and timely notification thereof, will be accomplished under procedures to be agreed in the Standing Consultative Commission.

[L]

The Parties understand that during the period of the Interim Agreement there shall be no significant increase in the number of ICBM or SLBM test and training launchers, or in the number of such launchers for modern land-based heavy ICBMs. The Parties further understand that construction or conversion of ICBM launchers at test ranges shall be undertaken only for purposes of testing and training.

(b) Common Understandings. – Common understanding of the Parties on the following matters was reached during the negotiations:

A. INCREASE IN ICBM SILO DIMENSIONS

Ambassador Smith made the following statement on May 26, 1972:

The Parties agree that the term "significantly increased" means that an increase will not be greater than 10-15 percent of the present dimensions of land-based ICBM silo launchers.

Minister Semenov replied that this statement corresponded to the Soviet understanding.

B. LOCATION OF ICBM DEFENSES

The U.S. Delegation made the following statement on May 26, 1972:

Article III of the ABM Treaty provides for each side one ABM system deployment area centered on its national capital and one ABM system deployment area containing ICBM silo launchers. The two sides have registered agreement on the following statement: "The Parties understand that the center of the ABM system deployment area centered on the national capital and the center of the ABM system deployment area containing ICBM silo launchers for each Party shall be separated by no less than thirteen hundred kilometers." In this connection, the U.S. side notes that its ABM system deployment area for defense of ICBM silo launchers, located west of the Mississippi River, will be centered in the Grand Forks ICBM silo launcher deployment area. (See Initialed Statement [C].)

C. ABM TEST RANGES

The U.S. Delegation made the following statement on April 26, 1972:

Article IV of the ABM Treaty provides that "the limitations provided for in Article III shall not apply to ABM systems or their components used for development or testing, and located within current or additionally agreed test ranges." We believe it would be useful to assure that there is no misunderstanding as to current ABM test ranges. It is our understanding that ABM test ranges encompass the area within which ABM components are located for test purposes. The current U.S. ABM test ranges are at White Sands, New Mexico, and at Kwajalein Atoll, and the current Soviet ABM test range is near Sary Shagan in Kazakhstan. We consider that non-phased array radars of types used for range safety or instrumentation purposes may be located outside of ABM test ranges. We interpret the reference in Article IV to "additionally agreed test ranges" to mean that ABM components will not be located at any other test ranges without prior agreement between our Governments that there will be such additional ABM test ranges.

On May 5, 1972, the Soviet Delegation stated that there was a common understanding on what ABM test ranges were, that the use of the types of non-ABM radars for range safety or instrumentation was not limited under the Treaty, that the reference in Article IV to "additionally agreed" test ranges was sufficiently clear, and that national means permitted identifying current test ranges.

D. MOBILE ABM SYSTEMS

On January 28, 1972, the U.S. Delegation made the following statement:

Article VI(1) of the Joint Draft Text of the ABM Treaty includes an undertaking not to develop, test, or deploy mobile land-based ABM systems and their components. On May 5, 1971, the U.S. side indicated that, in its view, a prohibition on deployment of mobile ABM systems and components would rule out the deployment of ABM launchers and radars which were not permanent fixed types. At that time, we asked for the Soviet view of this interpretation. Does the Soviet side agree with the U.S. side's interpretation put forward on May 5, 1971?

On April 13, 1972, the Soviet Delegation said there is a general common understanding on this matter.

E. STANDING CONSULTATIVE COMMISSION

Ambassador Smith made the following statement on May 22, 1972:

> The United States proposes that the sides agree that, with regard to initial implementation of the ABM Treaty's Article XIII on the Standing Consultative Commission (SCC) and of the consultation Articles to the Interim Agreement on offensive arms and the Accidents Agreement,* agreement establishing the SCC will be worked out early in the follow-on SALT negotiations; until that is completed, the following arrangements will prevail: when SALT is in session, any consultation desired by either side under these Articles can be carried out by the two SALT Delegations; when SALT is not in session, *ad hoc* arrangements for any desired consultations under these Articles may be made through diplomatic channels.

Minister Semenov replied that, on an *ad referendum* basis, he could agree that the U.S. statement corresponded to the Soviet understanding.

F. STANDSTILL

On May 6, 1972, Minister Semenov made the following statement:

> In an effort to accommodate the wishes of the U.S. side, the Soviet Delegation is prepared to proceed on the basis that the two sides will in fact observe the obligations of both the Interim Agreement and the ABM Treaty beginning from the date of these two documents.

In reply, the U.S. Delegation made the following statement on May 20, 1972:

> The U.S. agrees in principle with the Soviet statement made on May 6 concerning observance of obligations beginning from date of signature but we would like to make clear our understanding that this means that, pending ratification and acceptance, neither side would take any action prohibited by the agreements after they had entered into force. This understanding would continue to apply in the absence of notification by either signatory of its intention not to proceed with ratification or approval.

The Soviet Delegation indicated agreement with the U.S. statement.

2. UNILATERAL STATEMENTS

(a) The following noteworthy unilateral statements were made during the negotiations by the United States Delegation:

A. WITHDRAWAL FROM THE ABM TREATY

On May 9, 1972, Ambassador Smith made the following statement:

> The U.S. Delegation has stressed the importance the U.S. Government attaches to achieving agreement on more complete limitations on strategic offensive arms, following agreement on an ABM Treaty and on an Interim Agreement on certain measures with respect to the limitation of strategic offensive arms. The U.S. Delegation believes that an objective of the follow-on negotiations should be to constrain

*See Article 7 of Agreement to Reduce the Risk of Outbreak of Nuclear War Between the United States of America and the Union of Soviet Socialist Republics, signed Sept. 30, 1971.

and reduce on a long-term basis threats to the survivability of our respective strategic retaliatory forces. The USSR Delegation has also indicated that the objectives of SALT would remain unfulfilled without the achievement of an agreement providing for more complete limitations on strategic offensive arms. Both sides recognize that the initial agreements would be steps toward the achievement of more complete limitations on strategic arms. If an agreement providing for more complete strategic offensive arms limitations were not achieved within five years, U.S. supreme interests could be jeopardized. Should that occur, it would constitute a basis for withdrawal from the ABM Treaty. The U.S. does not wish to see such a situation occur, nor do we believe that the USSR does. It is because we wish to prevent such a situation that we emphasize the importance the U.S. Government attaches to achievement of more complete limitations on strategic offensive arms. The U.S. Executive will inform the Congress, in connection with Congressional consideration of the ABM Treaty and the Interim Agreement, of this statement of the U.S. position.

B. LAND-MOBILE ICBM LAUNCHERS

The U.S. Delegation made the following statement on May 20, 1972:

In connection with the important subject of land-mobile ICBM launchers, in the interest of concluding the Interim Agreement the U.S. Delegation now withdraws its proposal that Article I or an agreed statement explicitly prohibit the deployment of mobile land-based ICBM launchers. I have been instructed to inform you that, while agreeing to defer the question of limitation of operational land-mobile ICBM launchers to the subsequent negotiations on more complete limitations on strategic offensive arms, the U.S. would consider the deployment of operational land-mobile ICBM launchers during the period of the Interim Agreement as inconsistent with the objectives of that Agreement.

C. COVERED FACILITIES

The U.S. Delegation made the following statement on May 26, 1972:

I wish to emphasize the importance that the United States attaches to the provisions of Article V, including in particular their application to fitting out or berthing submarines.

D. "HEAVY" ICBM'S

The U.S. Delegation made the following statement on May 26, 1972:

The U.S. Delegation regrets that the Soviet Delegation has not been willing to agree on a common definition of a heavy missile. Under these circumstances, the U.S. Delegation believes it necessary to state the following: The United States would consider any ICBM having a volume significantly greater than that of the largest light ICBM now operational on either side to be a heavy ICBM. The U.S. proceeds on the premise that the Soviet side will give due account to this consideration.

E. TESTED IN ABM MODE

On April 7, 1972, the U.S. Delegation made the following statement:

Article II of the Joint Text Draft uses the term "tested in an ABM mode," in defining ABM components, and Article VI includes certain obligations concerning

such testing. We believe that the sides should have a common understanding of this phrase. First, we would note that the testing provisions of the ABM Treaty are intended to apply to testing which occurs after the date of signature of the Treaty, and not to any testing which may have occurred in the past. Next, we would amplify the remarks we have made on this subject during the previous Helsinki phase by setting forth the objectives which govern the U.S. view on the subject, namely, while prohibiting testing of non-ABM components for ABM purposes: not to prevent testing of ABM components, and not to prevent testing of non-ABM components for non-ABM purposes. To clarify our interpretation of "tested in an ABM mode," we note that we would consider a launcher, missile or radar to be "tested in an ABM mode" if, for example, any of the following events occur: (1) a launcher is used to launch an ABM interceptor missile, (2) an interceptor missile is flight tested against a target vehicle which has a flight trajectory with characteristics of a strategic ballistic missile flight trajectory, or is flight tested in conjunction with the test of an ABM interceptor missile or an ABM radar at the same test range, or is flight tested to an altitude inconsistent with interception of targets against which air defenses are deployed, (3) a radar makes measurements on a cooperative target vehicle of the kind referred to in item (2) above during the reentry portion of its trajectory or makes measurements in conjunction with the test of an ABM interceptor missile or an ABM radar at the same test range. Radars used for purposes such as range safety or instrumentation would be exempt from application of these criteria.

F. NO-TRANSFER ARTICLE OF ABM TREATY

On April 18, 1972, the U.S. Delegation made the following statement:

In regard to this Article (IX), I have a brief and I believe self-explanatory statement to make. The U.S. side wishes to make clear that the provisions of this Article do not set a precedent for whatever provision may be considered for a Treaty on Limiting Strategic Offensive Arms. The question of transfer of strategic offensive arms is a far more complex issue, which may require a different solution.

G. NO INCREASE IN DEFENSE OF EARLY WARNING RADARS

On July 28, 1970, the U.S. Delegation made the following statement:

Since Hen House radars [Soviet ballistic missile early warning radars] can detect and track ballistic missile warheads at great distances, they have a significant ABM potential. Accordingly, the U.S. would regard any increase in the defenses of such radars by surface-to-air missiles as inconsistent with an agreement.

* * * * * * *

(b) The following noteworthy unilateral statement was made by the Delegation of the U.S.S.R. and is shown here with the U.S. reply:

On May 17, 1972, Minister Semenov made the following unilateral "Statement of the Soviet Side":

Taking into account that modern ballistic missile submarines are presently in the possession of not only the U.S., but also of its Nato allies, the Soviet Union agrees that for the period of effectiveness of the Interim 'Freeze' Agreement the U.S. and its NATO allies have up to 50 such submarines with a total of up to 800 ballistic missile launchers thereon (including 41 U.S. submarines with 656 ballistic missile launchers). However, if during the period of effectiveness of the Agreement

U.S. allies in NATO should increase the number of their modern submarines to exceed the numbers of submarines they would have operational or under construction on the date of signature of the Agreement, the Soviet Union will have the right to a corresponding increase in the number of its submarines. In the opinion of the Soviet side, the solution of the question of modern ballistic missile submarines provided for in the Interim Agreement only partially compensates for the strategic imbalance in the deployment of the nuclear-powered missile submarines of the USSR and the U.S. Therefore, the Soviet side believes that this whole question, and above all the question of liquidating the American missile submarine bases outside the U.S., will be appropriately resolved in the course of follow-on negotiations.

On May 24, Ambassador Smith made the following reply to Minister Semenov:

The United States side has studied the statement made by the Soviet side of May 17 concerning compensation for submarine basing and SLBM submarines belonging to third countries. The United States does not accept the validity of the considerations in that statement.

On May 26 Minister Semenov repeated the unilateral statement made on May 24. Ambassador Smith also repeated the U.S. rejection on May 26.

Appendix 2

Vladivostok Accord

Excerpt from Joint American-Soviet Statement of 24 November 1974.

Agreement was reached that further negotiations will be based on the following provisions.

1. The new agreement will incorporate the relevant provisions of the Interim Agreement of May 26, 1972, which will remain in force until October 1977.

2. The new agreement will cover the period from October 1977 through December 31, 1985.

3. Based on the principle of equality and equal security, the new agreement will include the following limitations:

a. Both sides will be entitled to have a certain agreed aggregate number of strategic delivery vehicles;

b. Both sides will be entitled to have a certain agreed aggregate number of ICBMs and SLBMs equipped with multiple independently targetable warheads (MIRVs).

4. The new agreement will include a provision for further negotiations beginning no later than 1980-1981 on the question of further limitations and possible reductions of strategic arms in the period after 1985.

5. Negotiations between the delegations of the US and USSR to work out the new agreement incorporating the foregoing points will resume in Geneva in January 1975.

Appendix 3

Carter Administration's SALT II Proposals of March 1977

I. COMPREHENSIVE PROPOSAL

1. substantial reduction in overall aggregates of strategic delivery vehicles: total strategic missiles or bombers allowed each side from 2,400 each to 1,800-2,000 each.
2. reduction in number of modern large ballistic missile launchers: limit USSR from 308 to 150 modern large ballistic missiles (SS-18). (Effect: reduce Soviet throw-weight advantage from 3 to 1 to 2 to 1.)
3. reduction in MIRV launcher aggregate: from 1,320 each to 1,100-1,200 each.
4. limit launchers of MIRV equipped ICBMs: limit land based multiple warhead ICBMs to 550 each.
5. ICBM restrictions:
   1. continue ban on construction of new ICBM launchers.
   2. additional ban on modification of existing ICBMs.
   3. additional limit on number of test flights for existing ICBMs.
   4. additional ban on development, testing, and deployment of new ICBMs.
   5. additional ban on development, testing, and deployment of mobile ICBM launchers. (Effect of test ban is to preserve U.S. lead in MIRV-technology.)
6. CRUISE missiles:
   ban on development, testing and development of all cruise missiles whether nuclear armed or conventionally armed, with ranges, that were not intercontinental ranges, over which they would be banned. [2,500 kilometers]
7. BACKFIRE bombers:
   U.S. wanted U.S.S.R. to provide a list of [verifiable] measures to assure the Backfire bomber could not be used as a strategic bomber.

II. DEFERRAL PROPOSAL

1. defer consideration of the cruise missile and the Backfire bomber issues.
2. resolve all other remaining issues under the Vladivostok accord and sign a new treaty.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABM:	Anti-ballistic missile
ACDA:	U.S. Arms Control and Disarmament Agency
ALCM:	Air-launched cruise missile
ASAT:	Anti-satellite satellite
CIA:	U.S. Central Intelligence Agency
COMINT:	Communications Intelligence
DDR&E:	Director(ate) of Defense Research and Engineering
DIA:	U.S. Defense Intelligence Agency
DoD:	U.S. Department of Defense
ELINT:	Electronic Intelligence
EURATOM:	European Atomic Energy Agency
FBS:	Forward-based Systems
IAEA:	International Atomic Energy Agency
ICBM:	Intercontinental ballistic missile
IMEWS:	Integrated Missile Early Warning Satellite
IRBM:	Intermediate-range ballistic missile
MaRV:	Maneuverable reentry vehicles
MBFR:	Mutual and Balanced Force Reductions
MFR:	Mutual Force Reductions
MIDAS:	Missile Defense Alarm System
MIRV:	Multiple independently-targetable reentry vehicles
MRV:	Multiple reentry vehicles

NATO: North Atlantic Treaty Organization

PHOTINT: Photographic intelligence

RADINT: Radar intelligence

RV: Reentry vehicle

SAL: Strategic Arms Limitation

SALT: Strategic Arms Limitation Talks

SAM: Surface-to-air missiles

SAMOS: Satellite and Missile Observation System

SCC: Standing Consultative Commission

SLBM: Submarine-launched ballistic missile

SLCM: Submarine-launched cruise missile

SRAM: Short-range attack missile

SSBN: Nuclear-powered ballistic missile submarine

TIROS: Television and Infra-Red Observation Satellite