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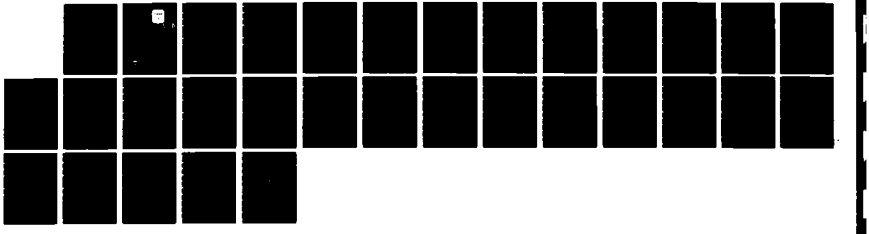

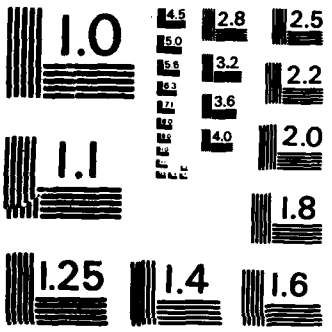

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STUDENT ESSAY

TRANSFER OF HIGH-TECHNOLOGY TO THE SOVIET UNION A PREDICAMENT FOR THE UNITED STATES

BY

LIEUTENANT COLONEL JOHN E. HOLLAND, JR., MI

21 MARCH 1986

US ARMY WAR COLLEGE, CARLISLE BARRACKS, PENNSYLVANIA

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Through reading Western open-source literature and by international purchases of U.S. computers and electronics, the Soviets have been able to modernize their military forces. This raises the question, "Should U.S. technology be in the public domain and available for exploitation by the Soviet Union?" The scope of Soviet information gathering operations raises concerns about the true Russian motivation for detente. Complicating the technology-transfer issue has been the prevailing attitude that parity promotes stability among world (Con't)

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powers. As a result of this philosophy, the United States has found itself restrained from acquiring a significant technology advantage over the Soviet Union. The U.S. finds itself in the predicament of both needing a technology edge yet being unable to have a significant one. Thus, ensuring that the Soviets are not able to apply U.S. technology too quickly becomes an important aspect of the technology-transfer solution. But technology controls are expensive and require the commitment of the American public. Therefore, resolve is required. Should the Soviets gain technological parity, then the U.S. would be compelled to match Soveit conventional forces to ensure that Russian expansionism is equally restrained.

USAWC MILITARY STUDIES PROGRAM PAPER

TRANSFER OF HIGH-TECHNOLOGY TO THE SOVIET UNION A PREDICAMENT FOR THE UNITED STATES

INDIVIDUAL ESSAY

by

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March 21, 1986

ABSTRACT

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Through reading Western open-source literature and by international purchases of US computers and electronics, the Soviets have been able to modernize their military forces. This raises the question, "Should US technology be in the public domain and available for exploitation by the Soviet Union?" The scope of Soviet information gathering operations raises concerns about the true Russian motivation for detente. Complicating the technology-transfer issue has been the prevailing attitude that parity promotes stability among world powers. As a result of this philosophy, the United States has found itself restrained from acquiring a significant technology advantage over the Soviet Union. The US finds itself in the predicament of both needing a technology edge yet being unable to have a significant one. Thus, ensuring that the Soviets are not able to apply US technology too quickly becomes an important aspect of the technology-transfer solution. But technology controls are expensive and require the commitment of the American public, Therefore, resolve is required. Should the Soviets gain technological parity, then the US would be compelled to match Soviet conventional forces to ensure that Russian expansionism is equally restrained.

TRANSFER OF HIGH-TECHNOLOGY TO THE SOVIET UNION

A PREDICAMENT FOR THE UNITED STATES

In 1982, Hughes Aircraft Company reported to the US Customs Service that a small California company had placed an unusually large order for military radar test equipment. The subsequent investigation resulted in the discovery of the largest network of technology smugglers yet uncovered in the United States. In the following three years, the smugglers diverted hundreds of millions of dollars worth of advanced electronic equipment to Communist bloc countries. The smugglers were businessmen who attempted to sell their $637,070 investment to Bulgaria and the Soviet Union for $5 million.[1]

This is not the only case in which businessmen have recently placed the profit motive, and possibly greed, above the national security interests of their country. Lenin identified this flaw in Westerners when he implied, "The capitalists will sell us the rope we need to hang them."[2]

The United States Senate conducted extensive hearings in May 1982 into the transfer of United States high-technology to the Soviet Union and Soviet Bloc nations. Considerable national, international, government, and public concern continues over this issue.

In September 1985, the Central Intelligence Agency published an update on the technology transfer situation. They reported that a "massive" and "well-organized" Soviet campaign was being conducted to gather US technology for Soviet application for military purposes.[3] Utilizing a shopping list produced by the

USSR's Defense Ministries, Soviet intelligence agencies, the KGB and the GRU, are annually gathering thousands of pieces of equipment and tens of thousands of unclassified, classified, and proprietary documents to support their military improvement and defense manufacturing programs.[4]

Soviet intelligence collection is conducted both overtly and covertly. Covert collection targets Americans who have access to material that cannot be gathered from unclassified sources. Overt collection is directed toward open-source literature, but it also includes the acquisition of commercially available equipment, particularly computers and microelectronics manufacturing systems.

Soviet embassies, missions, and delegations to the United Nations are staffed with personnel who entice our citizens to commit treason. However, the Soviets may be gaining their most valuable information by reading Aviation Week and Space Technology. The CIA estimates that "about 90 percent of the roughly 100,000 documents acquired [by the Soviets] each year worldwide are unclassified."[5] The Soviets masterfully exploit our Freedom of Information Act, utilize the Library of Congress, and attend congressional hearings. They send their graduate students to our universities to gain scientific know-how, specifically targeting those institutions performing applied research.[6] The Russians attend technical conferences addressing the evolving technology on synthetic aperture and over-the-horizon radars.[7] Approximately 2000 Soviet bloc citizens enter the United States annually in a nontourist status to gather information by overt means.[8]

As pointed out earlier, many of our high-technology products are sold to the Soviet Union by unscrupulous international electronics dealers.[9] The Soviets avoid the costs of research and development by purchasing proven designs manufactured in the United States. Then, through a process of reverse engineering, they develop the capability to mass produce these proven products to modernize their military weapon systems. Because of the economic advantages of this "method" of research and development, the Soviets are willing to pay large, but not exorbitant, sums to gain the technology.[10]

The United States has reason for concern. In his article, "How to Cope With the the Soviet Threat," Richard Pipes asserts:

> The industrial assistance given to the Soviet Union helps its military effort directly and indirectly--directly by providing so-called 'dual-use' technology which can be applied to the production of both military and non-wartime equipment; and indirectly by strengthening the Soviet military mobilization base.11

The transfer of our technology is a national security problem. But it is not a new problem, nor is it one that can be considered in isolation from America's values and economic interests.

EVOLUTION OF THE PREDICAMENT

The transfer of technology became an especially important issue during World War II when the United States was attempting to revive an ailing ally. The United States contributed to rebuilding the Soviet technology base by providing the Russians with $11 billion in lend lease aid, of which $8.5 billion was in

military items. Funding the building of Soviet armaments production lines was the cost for keeping the Germans tied down on the Russian Front.

After the war, the Soviets were intent on revitalizing their industry. Their solution was to dismantle the industry of the occupied European countries and move complete factories to the Soviet Union. Anastas Mikoyan conducted for Stalin the most intensive program of technology diversion of modern history by stripping the Soviet zone of Germany of 41% of its factories. Tens of billions of dollars worth of industry was removed from Germany, Rumania, Austria, and Finland. The Soviets also moved over two thirds of the V2 rocket facilities from Germany into the Soviet heartland.[12]

Despite the fact that the United States had the atomic bomb and the means to deliver it, the Soviets became increasingly aggressive following World War II. The US soon discovered that atomic technology had been stolen by Soviet agents. Also threatening was the Soviet production of a long range bomber which could deliver Russian nuclear weapons to the West. This bomber, the TU-4, was an amazingly similar aircraft to the B-29.

Both in 1917 and again in the 1930s, the Soviets had proven to be untrustworthy in their use of Western technology; they wanted the technology, but they did not want the West to monitor Russian use of it. Western concern heightened in the late 1940s as Communism expanded beyond the bounds of the Soviet Union. Hope for a relaxation of tensions further dwindled as the Russians sealed off Berlin in 1948. Then in 1949, the Russians demonstrated that they had the technology to produce their own

atomic bomb.

The Soviets confirmed that their post World War II role would be antagonistic. No longer could Soviet behavior be rationalized. Russian paranoia was not an acceptable excuse for Soviet hostility. The cold war was on, and a Containment policy was needed. The allies agreed that technology transfer should come to an end. Thus, the Coordinating Committee (COCOM) was formed in 1949.[13] Eventually to be composed of Japan and the NATO nations (less Iceland and Spain), COCOM developed a list of technology to be withheld from the Communist bloc nations.

In 1949, an American named Alfred Sarant defected to the Soviets. An engineer and friend of the atom spies, the Rosenbergs, Sarant was given exceptional power in the development of the Soviet electronics industry. He played a key role in the development of Zelenograd, the Soviet Silicon Valley located outside Moscow, until a change in leadership destroyed his political support.[14]

During the 1950s, the Soviets attacked and shot down many US aircraft, developed and tested a thermonuclear bomb, suppressed a revolution in Hungary, threatened the British and French with nuclear reprisal during the Suez Crisis, consummated an arms deal with Egypt, and ventured into the oil rich Middle East. In 1955, the Doolittle Commission reported to President Eisenhower:

> It is now clear that we are facing an implacable enemy whose avowed objective is world domination by whatever means and at whatever cost. There are no rules in such a game. Hitherto acceptable norms of human conduct do not apply. We must develop effective espionage and counter-espionage services and must learn to subvert, sabotage and destroy our enemies by more clever, more

> sophisticated, and more effective methods than those used against us.15

In 1957, the Russians put Sputnik into orbit. The Russians used expertise from the V2 rocket program to achieve a dramatic technological surprise, but the apparent Soviet advantage was not merited. Soviet space technology was primitive; however, not knowing that, the US initiated an intense program to "catch up." The American investment was awesome, technical breakthroughs were frequent, and the US's concerted effort exceeded expectations; the Soviets were unable to follow up their lead. Access to American technology became more important for the Soviets, and better relations were required. But neither the U-2 incident of 1960 nor the Cuban missile crisis in 1962 helped to end the tension.

The Soviets had failed to notice US efforts in 1947 to develop the transistor. Resultingly, the Soviets were destined to play "catch up" in the area of computer technology.[16] When the Ryad series of Soviet computers was introduced, each was an exact copy of the IBM-360/370 down to its wiring and English language instruction set. Each Ryad model followed its IBM equivalent model by about 8 years. Soviet models did, however, have serious software problems and were less reliable than the IBM originals.[17] Russian recognition of US technological superiority increased Soviet desires for even greater access to US publications, institutions, and industries. Thus materialized the motivation for detente.

After a series of congressional hearings and Presidential reconsiderations during the 1960s, the pressure of detente

finally facilitated, in 1972, the sale to the Soviets of the technology to produce missile-guidance-quality ball bearings.[18]

The Soviet desire for detente, combined with the US realization that agreement was needed to restrain Soviet production of large offensive nuclear delivery systems, resulted in the consummation of the Strategic Arms Limitation Talks (SALT) in May 1972. Inherent in this agreement was the subtle recognition that neither side would be allowed to ever again gain a considerable technology advantage in strategic weaponry without impairing world stability.

In the mid 1970s, the Soviets entered into negotiation with Raytheon, a major US company, for an air-traffic control system. The contract was eventually awarded to a Swedish-Italian consortium, but not before the Soviets gleaned a significant amount of technical data in proposals from the American and two European firms.[19]

In 1970, under the guise of solidifying detente, Leonid Brezhnev proposed that Western technology be used to build an enormous truck plant along the Kama River in Russia. Despite fears that trucks built at the plant might later be used against US forces in Vietnam, the United States cooperated in this venture by providing plant technology in the form of 250 individual contracts valued at over $430 million.[20] Not until the 1979 invasion of Afghanistan did the US's error become clear. The United States then suspended over 800 Soviet export licenses for high-tech products and components.[21]

The Kama River Truck Plant problem occurred despite a requirement for Post Shipment Verification (PSV) of technology

utilization. PSV, introduced in 1969, required that dual-use technology, that with both military and civilian application, be periodically inspected in the plant in which it was being used to ensure that no military use was being applied. European traders in electronics often smuggled equipment to the Soviets rather than go through the agonizingly slow process of formulating the terms of the PSV agreement, an agreement that the Soviets preferred to avoid.[22] There had been a theory that entangling the Soviets in joint commercial ventures would moderate their aggressive behavior; for many, the Kama River story was adequate evidence to dispel this myth.[23]

Most profit inspired deals with the Soviets have not turned out well for Western investors. Control Data Corporation ventured into a 10 year agreement with Moscow to build a supercomputer; the deal turned into little more than a transfer of US computer technology to the Soviets with a minimum of Russian investment. And the earlier mentioned air-traffic control system for Moscow proved to be a costly and unproductive effort for Raytheon.[24]

Should a Western company make a deal with the Soviets, it stands to lose if political relations go sour. Thus, such a company has an economic and political interest in detente.[25] The government, however, is faced with overriding considerations. The USSR has an unfavorable trade balance with the West and requires Western credits to pay for its purchases. The Soviets insist on the lowest interest rates.[26] But even with low interest rates, the Warsaw Pact built up an enormous debt to the

West of over $80 billion primarily in the 1970s.[27] Therefore, the probability that the West will be successful in creating joint capitalist-Soviet economic interdependencies is not favorable.

EVIDENCE OF RECENT HIGH-TECHNOLOGY TRANSFERS

That the Soviets depend on Western technology to develop their own Sovietized equivalent systems is no more apparent than in the microprocessor arena. The Soviet K580 and K589 microprocessors are two of their three most common units, and both are near copies of INTEL Corporation's 1974 designs.[28] In addition, the Soviet LOGIKA-2 and Series 133/155 integrated circuits are direct copies of the Texas Instruments 5400/7400 series.[29]

Further testimony to the blatant disregard by the Soviets of our technology controls surfaced in 1981 when the Russians attempted to return an illegally diverted computerized system for enhancing reconnaissance photographs to the California manufacturer for upgrade and modification.[30] The system had been sold to the Soviets by a British contractor in 1979. The alertness of the manufacturer who knew where he had sold his systems was the key to preventing yet another technology transfer tragedy.

An issue of growing importance is the transfer of manufacturing know-how. Allowing the Soviets to acquire technology to produce their own high-tech systems threatens the US ability to maintain a technological advantage. Thus the purchase by the Soviets of a complete integrated circuit

processing plant from Continental Technology Corporation during the period 1978-1982 significantly benefitted Soviet efforts to compete in the production of high-technology circuitry.[31]

The Soviets continue to flatter us with their imitation of our most advanced military systems. We have only to note the strong similarity between our C5A and their Condor heavy airlift aircraft, between our C-141 and their IL-76, between our Boeing 747 and their IL-86, between our Minuteman III and their SS-13, between our A10 close air support aircraft and their FROGFOOT, between the US M-16 rifle and the Soviet AK-74, between our SIDEWINDER air-to-air missile and their ATOLL, between our REDEYE air defense missile and their SA-7, and between our LAW anti-tank weapon and their RPG-18.[32] But even more serious has been the Soviet testing of their SS-X-24 and SS-X-25 missiles during the early 1980s. These missiles are the Russian equivalents of the US's MX and planned Midgetman missiles. These system developments are clear indications that the Soviets no longer wait for the United States to prove a concept before they feel compelled to build and field it themselves. The technology transfer gap has been significantly reduced and the United States's lead in both electronic and military hardware has been significantly eroded.

COVERT TECHNOLOGY TRANSFER

The vulnerability of Americans to human weakness assists the Soviets at their game. Americans in general are not vulnerable to the Communist ideology. Instead, Americans are most

frequently lured by money.[33] Americans can also be coerced into spying for other reasons; sex, alcohol, gambling debts, and homosexuality create opportunities for blackmail. Revenge and misplaced loyalties are other reasons. In 1978, Christopher Boyce, a code clerk at TRW, was convicted for passing extensive cryptographic information to the Soviets. Also in 1978, a CIA employee, William Kampiles, passed detailed information to the Soviets on the operation of the KH-11 reconnaissance satellite.[34] In both of these incidents, valuable information was sold to the Soviets.

An important contractor case involved William Holden Bell, a Hughes Aircraft engineer. He was convicted in 1981 for providing the Soviets with the specifications for the F15 fighter's look down/shootdown radar, the B1 and Stealth aircrafts' quiet radar, an all weather tank radar, the Phoenix air-to-air missile, the Patriot and Improved Hawk surface-to-surface missiles, and a towed array submarine radar. Bell sold this information to the Soviets for $110,000.[35]

Between 1979 and the Walker case, 22 persons in the US were charged with espionage. In 1985, the number of Americans caught providing information to foreign governments increased dramatically.

The intent to divert technology ranges from oversight to treason. Contractors in the semiconductor industry are especially vulnerable. A high rate of personnel turbulence in this industry results in frequent moves between companies. These transfers are instigated by large salary offers and often result

in the flow of technology from the old to the new company. This pattern has almost been institutionalized in Silicon Valley. Furthermore, the transfer of technology does not bear the derogatory impact one might expect. Soviet agent activity has been extensive in this highly industrialized area of California, and this liberal attitude toward information sharing makes US electronics technology vulnerable to both overt and covert intelligence operations by the Soviets.[36]

A clear example of harmful technology transfer is provided by the case of a West German named Richard Mueller. Between 1978 and 1983, Mueller transferred tens of millions of dollars worth of computer parts and peripherals to the Soviet Union through some of his 75 dummmy companies. In 1983, he attempted to divert seven Digital Equipment Corporation VAX computer systems to the Soviet Union, but the equipment was intercepted in Sweden and West Germany. These particular systems were sought by the Soviets for their use in building a computer-aided design capability for the manufacture of microelectronics devices.[37]

Technology gathered by covert means is the most difficult to absorb, for it may lack the documentation--and certainly lacks the personal contact between builder and user--that facilitates the rapid understanding of a system.[38] When stolen secrets are unclear or confusing, it is difficult to go back to the agent to ask for clarification.

American engineers would prefer to redesign a circuit than to endure the agony of reverse engineering a competitor's model. Yet Soviet engineers frequently resort to reverse engineering to reproduce Western technology. Reverse engineering plays an

important role in finding out how the adversary's system works in order that countermeasures can be designed, but it does not reveal the system logic of the original designer and is intolerant of the smallest mistakes.

PUTTING CONTROLS ON THE PROBLEM

Dr Lara Baker testified in 1982 before the Senate Committee investigating technology transfer issues concerning the effectiveness of technology controls:

> The fact that in the long run, the information will be transferred does not mean that we should not control it.39

Until 1973, export control of commercial items was almost nonexistent.[40] Later in the decade, control efforts were oriented on products. But the growing complexity of modern technology severely eroded the Soviet capability to reverse engineer processes from products within a reasonable amount of time.[41] Thus, the Soviets emphasized acquiring the technology processes directly rather than the products. This shift was a mandate for a US redirection of effort toward protecting know-how instead of equipment.

The United States saw the need to get tough in the late 1970s, but its strategy was unclear. Licensing requirements did not sort out the high-tech items. Violators were numerous and often not investigated; there were many unresolved cases. Senator Nunn discovered that the number of investigators directed toward this complex problem was inadequate. For example, he discovered that compliance with the grain embargo, a control

effort of tremendous scope, was handled by only one Commerce Department investigator.[42] The Customs Service also sought responsibility for investigating technology transfer violations. Since Commerce is primarily responsible for promoting trade, the appearance of a conflict of interest developed.[43] The solution to the problem was an agreement for Commerce to maintain the licensing responsibility for export requests and for Customs to enforce policy and investigate violations. Customs enforcement began under Operation EXODUS in October 1981 as a cargo inspection program. Approximately 200 Customs personnel were dedicated to the technology diversion problem.[44,45]

Licensing is an equally complex and frustrating issue. A major consideration in making a license determination is the availability of alternate sources for the technology. Pressure has always existed to let the US industry get the business if the Soviets could obtain the same technology from another country. But this rationalization was overused. Richard Perle, the Assistant Secretary of Defense who designed DoD's policy on technology transfer said, "I have seldom seen a controversial license application in which the applicant did not argue that what he proposed to sell was a load of old rubbish available anywhere in the world."[46]

Establishing trade restrictions with teeth has been difficult because of the pervasive attitude that trade promotes a peaceful relationship. And businessmen who want to trade overseas have continually rationalized that our trade restrictions deprive Americans of the business and send the Soviets to our competition.[47]

Americans find it difficult to rationalize controls when a toy such as "Speak and Spell"[48] or a washing machine or a CAT scanner[49] is not exportable because of the dual-use possibilities of its on-board computer. Michael Lorenzo, Deputy Under Secretary of Defense for International Programs and Technology, testified before the Senate in 1982 that we will have to be smarter in what we control.[50] Smart controls will also have to be simple ones. We should be focusing controls on the most important and evolving technologies. Systems associated with the Strategic Defense Initiative, nuclear delivery means, and strategic submarines warrant extensive controls. These systems contain the technology in which the Soviets feel that the US has an important advantage.

The 1976 Bucy Report focused concentration on the Military Critical Technologies List (MCTL) and on limiting its scope to know-how and processes on the really important technology.[51] This was essential to better manage the technology control effort. Recently, Secretary of Defense Weinberger reported that the MCTL continues to be refined and improved "...to increase its clarity and specificity, to remove outdated elements of technology and, for the first time, to provide an unclassified version."[52]

Closely linked to the technology transfer problem is the subject of foreign military sales. Business pressure to be internationally competitive figures in the placement of first-line technology on the weapons market. Hopefully, foreign sales provide our allies with improved defense capabilities. However, foreign military sales might compromise the operational

capabilities of high-tech systems. Thus, caution must be a byword in sanctioning the sale of weapon systems which employ new technologies.[53]

Still, it is important to keep our allies properly armed with modern technology. As Secretary of Defense Weinberger has said, "...The sharing of our modern weapons technology with our allies is in our own national defense interest, but the loss by transfer to the Soviets is cause for grave concern."[54]

The Soviets are after "applied" rather than "basic" research. We should, therefore, make it difficult for them to obtain access to companies, laboratories, and institutions that are working on defense contracts where applied research is being conducted.

Limiting access to classified information is a difficult problem. The Defense Department is now reviewing and reducing the number of personnel with security clearances. This can be a two-edged sword because it considers only the possibility that too many people have access to classified information; it does not consider the possibility that people who need information to do their job can find themselves reinventing the wheel. Most important is that those personnel who are granted clearances actually receive a comprehensive background investigation. Those who are given clearances should have demonstrated clearly their loyalty to this country. Polygraphs should be used more widely. But is the polygraph a dependable test of loyalty? Larry Wu-Tai Chin, who spied for the Chinese for decades, passed the only polygraph exam he was ever given. Yet, administration sources say that the methods of polygraph evaluation have since improved

and that Chin would not pass the test today.[55] The polygraph is a tool for gathering information rather than being, itself, the evidence. Still, there will be some who object on principle; thus, we as a nation must come to terms with an important question on the use of the controversial polygraph, "Is our national security worth it?"

Censorship is another measure for protecting technology information. There is, and always has been, some form of censorship in this country; our libel laws are an example. To deal with this issue, we must ask at least two questions. Do we want to protect our technology with censorship? To what extreme is it reasonable to go? Perhaps we only want to limit technical information that reveals know-how for producing high-technology systems of military value. The classification measures accomplish some of that censorship task. But do we also need a "State Secrets Act" such as the British have?

The United States has recognized the need for controls, has taken action, and is correcting the deficiencies in its enforcement system. The United States government and its intelligence and trade agencies are alert to the importance of technology and of the devious and subtle measures to which the Soviets will go to acquire it. A recently reported example was an attempt in the 1970s by the Soviets to acquire three northern California banks. If successful, the Soviet Union "...could have learned about the confidential finances of American high-technology companies, perhaps enabling it to put pressure on executives and companies, or even to take one over."[56] United

States intelligence agents were able to prevent this Soviet penetration of our banking system. Similarly, other leaks are being plugged, and the Soviets are not enjoying the fruits of our labor as easily as they had before.

CONCLUSION

We are confronted with a moral dilemma. There are rational arguments to support either sharing or withholding the technology. But to prevent our dilemma from becoming a moral tragedy, we must consider the intent of the adversary. His past actions are representative of his basic attitudes and beliefs and provide a preview of his future activities. As Khruschev reminded us, "We say to the gentlemen who are waiting to see whether the Soviet Union will change its political program. Wait for a blue moon! And you know when that will be."[57]

We must focus on past Soviet actions in judging our technology control requirements. Have we changed Soviet behavior by our cooperative activity of even the last two decades? Have the Soviets supported aggression in Vietnam? Have the Russians invaded Afghanistan? Do they continue to support countries involved in international terrorism? Do they agitate for revolution in Third World countries? Have they become more aggressive in Central America? Do they build larger land-based intercontinental ballistic missiles than ours? Do they continue to build more? Does their strategic submarine fleet now outnumber ours? The answers to all of these questions are obvious. Therefore, we should question the cyclic American tendency to allow the Soviets to attain technological parity.

The Soviet system has always been rigid and unresponsive to technological innovation.[58] Therefore, we should be able to conclude that the Russians copy our technology in order to attain parity. Then why do they continue to seek arms agreements that are balanced dramatically in their favor? Such agreements call into question their motives and intentions. Most disturbing is that Soviet motives may be all too clear, and we are merely not recognizing them for what they are. Our society is burdened by a need to explain Russian behavior, yet we do not understand the explanations when they come. It is easy to accuse the Soviet Union of "having copied 30% of its new technology from the West." The Soviet apologist finds it equally easy to exonerate the Russians by proclaiming, "Then you admit that 70% was not." Adding insult to injury, the Soviet apologist points out that the United States's Multiple Rocket Launcher, Bradley Fighting Vehicle, and ribbon bridge are copies of the Soviet's Katyusha Rocket Launcher, BMP, and ribbon bridge, respectively. But for there to be a crime, there must be a motive, and the motive affects the punishment. Surely the motives of the US and the USSR are clear and different. Soviet technology acquisition is obviously intended to destabilize the military balance with the United States, a goal that is only temporarily achievable, and only then, because the United States has acquiesced to the theory that parity promotes stability.

While history cautions us in our dealings with the Soviets, we must also consider the implied lesson of SALT: If either side were to attain a significant technological advantage over the

other, it would be internationally destabilizing. If true, the US strategic technology advantage cannot be a significant one. If parity promotes stability, the US must either wait for the Soviets to catch up, or it must pass the technology to the Soviets in order to move on. I would conclude that US technology leaps should therefore be in small and carefully distributed doses, each significant enough to keep the Soviets off guard, yet not so large that the Russians see no opportunity to regain equivalence. Otherwise, a situation might develop which would compel them to strike first. The United States has not attempted to maintain parity with the Soviets in both manpower and weaponry. Instead, it has compensated for its manpower shortfalls using technology to provide a sufficient edge to deter Soviet aggression. If we continue to rely on the synergisms of technology as a substitute for manpower and equipment parity with the Soviets, then defense research and development efforts must never be relaxed. Pressure to produce technology breakthroughs will increase. For the spirit of SALT dictates that any single technology advantage we develop will neither be a great nor lasting one.

Therefore, the principles of SALT guarantee, unintentionally, that United States technology will inevitably pass to the Soviets to enhance world stability, if for no other reason. But what is discretionary is the speed with which the transfer is to occur. Since we do not expect reciprocation from the Soviets, reason dictates that transfer of our military technology should be a slow process which allows one level of sophistication to be transferred only after we have mastered the

methods for implementing the next one.

Controlling the speed of technology transfer is a cyclic process of measure and adjust. We first measure, in terms of reasonableness, Soviet responsiveness to US actions. We then set initial controls on technology to get the Soviets' attention. We must bear in mind that controls are costly in manpower, money, and administrative burden to both the government and to the companies who must conform to the requirements. Controls must be reviewed periodically to determine if their objectives are being met; they must then be adjusted--stiffened or relaxed--accordingly. But controls must never be so weak as to completely compromise the United States's strategic technological superiority, for this superiority offsets US lack of parity in other areas.

Our technology edge is important and we want to protect it. Soviet strength lies in being able to fight a war by applying massive amounts of men and materiel into the fray. We Americans elect not to play that costly game. But deterrence relies on the credibility of our retaliatory capability; we must have something which the Soviets fear, and they must be convinced of our will to use it. History reveals that our dynamic technology has stood us well in keeping our potential adversaries off balance. Therefore, the United States must continue to exploit this area in which it excels.

The technology transfer issue is militarily important because we are in a vicious cycle: we develop a new weapon; the technology slips into the hands of the Russians; they develop a

similar weapon and field it in greater volume; we develop a new weapon, and so on, and so on. Neither side would be very far from parity as long as the other side reacted. The SALT Treaty reinforced this rationale. It sought to ensure each side's strategic viability by having both sides agree to remain vulnerable to nuclear attack. But time has shown this logic to be flawed. Secretary Weinberger recently wrote, "We have learned that the dogma of agreed mutual vulnerability, over the long term, is not a safe guarantee against nuclear war, particularly when the Soviets do not accept it."[59] Thus, if we recognize that we are dealing with an adversary who accepts only a one-sided view of the "parity promotes peace" principle, we conclude that US technology restraint is an unmerited gift to the Soviets. The Strategic Defense Initiative (SDI) tells the Soviet Union that restraint must be earned. One way to do it would be to reduce either its conventional or nuclear forces, or both. But if they do not and we continue to abide by the technology-compromising principle that parity promotes stability, we may eventually be compelled to play by Soviet rules and be forced into fielding a much larger army and air force simply to respond to the imperative of national survival.

ENDNOTES

1. Robert Lindsey, "Need Joins Greed in Schemes To Smuggle U. S. Technology," The New York Times, 4 February 1986.

2. RADM E. A. Burkhalter, Jr., "Soviet Industrial Espionage," Signal, March 1983, p. 15.

3. CIA White Paper, Soviet Acquisition of Militarily Significant Western Technology: An Update, September 1985, p. (inside cover).

4. Ibid.

5. Ibid, p. 17.

6. Ibid, p. 21.

7. Ibid, p. 19.

8. Ibid, p. 21.

9. Ibid, p. 25.

10. Ibid, p. 27.

11. Richard Pipes, "How To Cope With The Soviet Threat," Commentary, August 1984, p. 28.

12. Carl Gershman, "Selling Them the Rope, Business & the Soviets," Commentary, April 1979, p. 38

13. CIA White Paper, p. 28.

14. Linda Melvern, et al., Techno-Bandits: How The Soviets Are Stealing America's High-Tech Future, 1984, pp. 48-51.

15. Stephen Ambrose, Rise to Globalism: American Foreign Policy Since 1938, 1983, p. 186.

16. Melvern, pp. 38-39.

17. Melvern, p. 55.

18. Pipes, p. 29.

19. Gershman, p. 40.

20. Melvern, pp. 94-95.

21. Melvern, p. 100.

22. Melvern, p. 113.

23. Arnaud de Borchgrave, et al., "Selling Russia the Rope: Soviet Access to Western Technology is Bearing Out Lenin's Famous Dictum," The New Republic, 1980, p. 48.

24. Gershman, pp. 39-41.

25. Ibid.

26. Pipes, p. 29.

27. Ibid, p. 27.

28. Julian Cooper, "Western Technology and the Soviet Defense Industry," in Trade, Technology, and Soviet-American Relations, ed. by Bruce Parrott, 1985, p. 195.

29. CIA White Paper, p. 12.

30. Melvern, pp. 275-277.

31. Testimony of Dr Lara Baker, Los Alamos National Laboratory, before the Permanent Subcommittee on Investigations of the Senate Committee on Governmental Affairs, Transfer of United States High Technology to the Soviet Union and Soviet Bloc Nations, 97th Congress, 2d Session, 1982, pp. 57-59.

32. Cooper, pp. 182-183.

33. CDR, TRADOC Message DTG 281350Z March 85, Subject: TRADOC Counterintelligence Summary No. 38 (Unclassified).

34. "The Great Superpower Spy War," US News & World Report, 29 October 1984, p. 39.

35. RADM Burkhalter, p. 17.

36. Melvern, p. 277-278.

37. CIA White Paper, p. 27.

38. Bruce Parrott, Trade, Technology, and Soviet-American Relations, 1985, p. 353.

39. Testimony of Dr Baker, p. 62.

40. Testimony of William Von Raab, Commissioner, US Customs Service, before the Permanent Subcommittee on Investigations of the Senate Committee on Governmental Affairs, Transfer of United States High Technology to the Soviet Union and Soviet Bloc Nations, 97th Congress, 2d Session, 1982, p. 194.

41. Gershman, p. 44.

42. Melvern, pp. 100-104.

43. Gershman, p. 44.

44. Melvern, p. 88.

45. Testimony of Von Raab, p. 198.

46. Melvern, pp. 112-113.

47. Gershman, p. 44.

48. "Moles Who Burrow for Microchips," Time, 17 June 1985, p. 28.

49. Testimony of Michael Lorenzo, Deputy Under Secretary of Defense, International Programs and Technology, Department of Defense, before the Permanent Subcommittee on Investigations of the Senate Committee on Governmental Affairs, Transfer of United States High Technology to the Soviet Union and Soviet Bloc Nations, 97th Congress, 2d Session, 1982, p. 219.

50. Testimony of Lorenzo, p. 221.

51. Melvern, p. 280.

52. Caspar W. Weinberger, Report of the Secretary of Defense to the Congress on the FY1986 Budget, FY1987 Authorization Request and FY1986-90 Defense Programs, 4 February 1985, p. 279.

53. Jacques S. Gansler, The Defense Industry, 1980, p. 213.

54. Weinberger, p. 279.

55. Stephen Engelbert, "Man Accused of Spying Passed His Only Lie Test", The New York Times, 4 February 1986.

56. Martin Tolchin, "Soviets sought American banks to gain technology, officials say," Sunday Patriot-News, Harrisburg, Pennsylvania, 16 February 1986.

57. Department of State, Soviet World Outlook, A Handbook of Communist Statements, p. 188.

58. Gershman, p. 39.

59. Caspar W. Weinberger, "Strategic Defense in Perspective," Defense, Jan/Feb 1986, p. 5.

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