CHAPTER VI

The National Security Implications of Export Administration Policy

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In *Technology and East-West Trade*, OTA concluded that although Western technology has undoubtedly contributed to Soviet military capabilities, precise determination of the magnitude and significance of such contributions is impossible. The study asserted that the Soviet Union will probably continue to benefit militarily from Western technology regardless of unilateral efforts on the part of the United States.[1] There were two grounds for this expectation. First, the United States no longer holds a technological monopoly, or even necessarily a significant technological lead, in many important areas. In fact, in some cases—fiber optics or robotics—the United States actually trails other industrial nations. Second, the very nature of technology is such that its dissemination is inevitable. Western policies can affect the volume, rate, and cost of dissemination, but not the) spread of technology itself.

The present administration has sought to focus public attention on the magnitude of t he Soviet military threat and the role of Western technology in contributing to this threat. But debate persists over the identifiable impact of Western technologies on Soviet military prowess, and over the measures t hat can or should be taken to minimize this impact. The purpose of this chapter is to reexamine the relationship between Western technology and Soviet military capabilities in light of new evidence of Soviet military use of Western technology; and to discuss the legislative implications of this relationship.

[1] *Technology and East West Trade*, ch. V (Washington, D.C.: U.S. Congress, Office of Technology Assessment, OTA ISC-101, November 1979).

AMERICAN TECHNOLOGY AND SOVIET MILITARY CAPABILITIES

Early in 1981, the U .S. Central Intelligence Agency (CIA) began assembling information on selected Soviet military developments, which could be directly linked to acquisitions of Western technology. At roughly the same time, Senator Sam Nunn, with the concurrence of Senator William V. Roth, instituted a related investigation by the Permanent Subcommittee on Investigations of the Senate Committee on Governmental Affairs. The subject of this investigation was the ability of the executive branch to enforce export controls on transfers of high technology to the Soviet bloc. In April 1982, an unclassified version of CIA's findings was published under the title, "Soviet Acquisition of Western Technology." In May, the Subcommittee held hearings on its own findings[2] and Admiral Bobby Inman, then Deputy Director of CIA, testified for the Agency. CIA asserted that:

> The Soviets and their Warsaw Pact allies have derived significant military gains from

[2] See U.S. Congress, Senate Committee on (GovernmentalAf fairs, Permanent Subcommittee onInvestigations, *Transfer of UnitedStates High Technology to the Soviet Union and Soviet Bloc Nations*, hearings, 97th Cong., 2d sess., May 4, 5, 6. 11, and 23, 1982 (Washington, I) C.: U.S. Government Printing f) f-fice, 1982) and [J, S. Congress, Senate Committee on Government al Affairs, Report No 9'7-664, N011, 15. 19//2 {11' ash in@ on, 1), (' U.S. (GovernmentPrinting (Office, 19<~21

their acquisitions of Western technology, particularly in the strategic, aircraft, naval, tactical, microelectronics, and computer areas. This multifaceted Soviet acquisitions program has allowed the Soviets to:

- Save hundreds of millions of dollars in R&D costs, and years in R&D development lead time , . . ,
- Modernize critical sectors of their military industry and reduce engineering risks by following or copying proven Western designs, thereby limiting the rise in their military production costs.
- Achieve greater weapons performance than if they had to rely solely on their own technology.
- Incorporate countermeasures to Western weapons early in the development of their own weapon programs.

These gains are evident in all areas of military weapons systems.[1]

According to the CIA, the U.S.S.R. has obtained these militarily significant technologies by both legal and illegal means, ranging from the collection of open Western scientific literature to outright industrial espionage and theft of classified documents.

These findings have important implications for the legislative concept of military risk (discussed below). Compelling as the CIA and Subcommittee evidence is, however, two additional factors must be pointed out:

- First, although the U.S.S.R. has undoubtedly realized savings from pursuing the strategy of a "technology follower, " nowhere has it been demonstrated that it has obtained any technology from the West which it could not have developed itself, given adequate incentive and resources.
- Second, a significant consequence of relying on theft or illegal purchase for technological advances is that the recipient is in a relatively poor position to capitalize fully on the acquisitions. This is both because it is far less efficient to utilize "passive" than "active" transfers of technology (especially those requiring reverse engineering); and because, having made a technological advance through a method which bypasses the establishment of an R&D base or an ongoing vendor relationship, the offender must continue to rely on expensive and risky illegal tactics to make most further advances. For example, if the U.S.S.R. steals plans for an American weapon, not only must it develop its own complex system of operational support, but it will not necessarily have built the R&D base necessary if it is itself to build the next generation of the weapon. The Soviets would therefore be obligated to conduct another successful piece of espionage to gain access to the plans for the follow-on weapon.

[1]U.S. Central Intelligence Agency, *Soviet Acquisition of Military Technology,* April 1982, p. 10.

SOVIET METHODS FOR ACQUIRING WESTERN TECHNOLOGY

One of CIA's major findings is that the Soviet effort to obtain Western technology is "massive, well planned, and well managed—a national-level program approved at the highest party and governmental levels."[4] The CIA and Subcommittee reports describe a blend of legal and illegal, overt and clandestine, methods which the U.S.S.R. has employed in its acquisition program for Western technology. These include legitimate studies of open literature, such as scientific journals, National Technical Information Service (NTIS) documents, and patent searches; participation in academic exchanges, trade fairs and trade delegations; legal purchases of items under both general and validated licenses; illegal purchases, involving either unauthorized transshipment or purchases through dummy or Communist-

[4]Ibid., p. 1.

owned companies; and outright theft and espionage. Such findings confirm OTA's 1979 observations:

> From Petrine times until the present, Russian statesmen have attempted to compensate for domestic inability to generate competitive innovation by importing know-how from abroad . . . All levels of Soviet administration —including that of the Communist Party— may provide inputs in the process of foreign technology acquisition . . . Decision-making on individual technology purchases is based on a coordinated system of collecting and processing Western scientific and technical information . . . Nearly all R&D bodies–in particular the engineering-design bureaus–and many large enterprises collect relevant information. In addition, each ministry includes at least one Institute , . . one of the functions of which is to process available Western scientific and technical data . . . Western technical literature is translated, published, and made available to relevant specialists in a relatively short time. Specialists who are sent abroad are required to report on Western technological achievements. Soviet intelligence services also engage in scientific and technical espionage . ..5

Observers of the Soviet economy still disagree over the efficiency of this technology acquisition program, but such debate is tangential to the major point here. The significance of the multifaceted nature of the U.S.S.R. program for U.S. policy makers lies in the fact that different transfer mechanisms lend themselves to very different legislative and administrative remedies. Any serious attempt to affect technology flows to the U.S.S.R. must carefully separate these channels.

Conceptual distinctions must therefore be made between technology acquisitions which fall into the following five categories:

I. Legal transfers made possible by the open nature of Western society, e.g., through perusal of open scientific literature, and NTIS documents, academic exchanges, trade fairs, etc.
II. Legal transfers of technologies which are not subject to national security controls on the CCL or CoCom lists, and which are therefore obtained under general license.
III. Legal transfers of technologies under an approved validated license.
IV. Illegal transfers through purchase, e.g., purchases by agents, through third countries or foreign embassies, purchases through dummy corporations, etc.
V. Illegal transfer through industrial espionage or the theft of materials classified by the U.S. Government.

Different legislative remedies apply to each of these categories. For instance, legislation directed at the first, if desirable at all, must be crafted with extreme care if it is not to seriously affect the ability of Western scientific and industrial communities to function, or to jeopardize first amendment rights of U.S. citizens. At the other end of the spectrum, Soviet activities which fall into the fourth and fifth categories are already illegal. Government attention here must for the most part be focused on improving enforcement of and compliance with existing laws. The second and third categories together constitute the area most central to further legislation and to which important parts of the Export Administration Act are addressed. The remainder of this section will briefly discuss each category.

ACADEMIC AND SCIENTIFIC EXCHANGES

Category I is the subject of a report, *Scientific Communication and National Security,* published in 1982 by the National Academy of Sciences (NAS). This study addressed the difficult dilemma posed by the apparent conflict between two important national interests: maintaining and promoting free communication in science and technology; and minimizing as far as possible the role of American science and technology in the buildup of Soviet military strength.

On the one hand, members of the academic and scientific communities have pointed out the extent to which scientific advances depend

[5] *Technology and East-West Trade,* op. cit., pp. 205, 215,217.

on free and worldwide access to all developments, even in seemingly unrelated fields. This access can only be achieved through open international publications, scientific meetings, and personal communication. In addition, American academics are jealous of the prerogatives of academic freedom and have been quick to condemn suggestions which appear to impinge on these prerogatives. They particularly object to proposals which have sought to place the burden of preventing undesirable technology transfer on the universities, requiring them to monitor and restrict the activities of Soviet and East European students. Most universities hold that the responsibility should lie with the Immigration and Naturalization Service, which can refuse to grant visas in the first place.

On the other hand, Members of both the House and the Senate have expressed the belief that the benefits of scientific communication and academic and scientific exchange devolve far more on the U.S.S.R. than on the West. They note, for instance, that most American exchange students do research in the humanities and social sciences, while Soviet exchange participants are often established

Photo credit: U S Department of Energy

American magnetohydrodynamic (M H D) technology arrives in the Soviet Union as part of the U.S./U.S.S.R. Cooperation Program

scientists who enter programs in advanced science and technology.[6] This disjunction is due to the fact that the Soviets carefully screen the exchange students they admit to their own country and just as carefully target the students they send to the West. An obvious response would be for the United States to adopt similar procedures, although such an attempt risks running counter to the generally accepted view that U.S. exchanges are primarily an aspect of academic life and not a tool of foreign policy.

The NAS report does not deny that U.S. exchange programs with the U.S.S.R. have been characterized by a basic "lack of symmetry, or that the Soviet Union has gained militarily from the net flow of "products, processes, and ideas' from West to East. The report also recognizes the importance and propriety of protecting certain research through classification and the problems posed by the existence of a few "gray" areas of particular sensitivity, which are not amenable to Government classification. Nevertheless, with the exception of these, NAS recommends that no restrictions of any kind limiting access or communication be applied to basic or applied university research. This conclusion is grounded on the Academy's judgments that "in *comparison with other channels of technology transfer, open scientific communication involving the research community does not present a material danger from near-term military implications,'*[7] and that the important economic, political, and military benefits to the United States of unfettered exchange and communication outweigh the risks. It is also relevant to point out that many believe that the transfer of information through academic and scientific exchange programs is less likely to result in the ability to absorb, diffuse, and improve on a technology than are more active—i. e., commercial-channels. In addition, strong legal and social forces in the United States make this area particularly intractable to careful targeting of controls.

ILLEGAL TECHNOLOGY TRANSFERS

As chapter VII points out, there is broad agreement that enhanced enforcement of existing regulations should become an important priority, although opinions as to how enforcement efforts should be implemented may differ. Unfortunately, in the rhetoric surrounding export control, the distinction between legal and illegal technology transfers is often blurred. The resulting confusion helps to intensify the impression that the West is a "sieve, and that the U.S.S.R. is benefiting from a veritable hemorrhage of U.S. technology. This impression is in turn useful in fostering a climate of public opinion supportive of extending controls to a larger array of technologies and products and reducing American commercial intercourse with the U.S.S.R. Regardless of one's views on the wisdom of such a policy, maintaining a clear distinction wherever possible between military gains made by the U.S.S.R. through theft and deception, and gains made "legitimately" under U.S. law is essential to any serious attempt to reform or refine that law so as to minimize future gains. Thus, the utility of distinguishing categories IV and V from the other, legal, modes of technology transfer lies in highlighting the difficulty facing policy makers in their efforts to assess the magnitude of the illegal transfer problem, and in placing in perspective the relative security risks to the United States of the U.S.S.R. legal and illegal activities.

Admiral Inman has testified that some 70 percent of the Soviet military gains which the CIA attributed to Western technology in its 1981 study were gains "accomplished by the Soviet and East European intelligence services, using clandestine, technical, and overt

[6] See U.S. Senate, Committee on Governmental Affairs, Permanent Subcommittee on Investigations, *Transfer of Technology to the Soviet Bloc,* hearings, 96th Cong., 2d sess., Feb. 20, 1980 (Washington, D. C.: U.S. Government Printing Office, 1980) pp. 36ff.

[7] National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, Panel on Scientific Communication and National Security, Committee on Science, Engineering, and Public Policy, *Scientific Communication and National Security* (Washington, D. C.: National Academy Press, 1982), p. 41. (Emphasis in the original.)

collection operations."[8] Thus, strengthened export controls would affect the majority of the U.S.S.R.'s acquisitions only to the extent that they resulted in significantly improved enforcement and compliance. The fact that much of the U.S.S.R. Western technology is illegally acquired also makes problematic the CIA's assertion that, "while difficult to quantify, it is clear that the Western military expenditures needed to overcome or defend against the military capabilities derived by the acquisition of Western technology far outweigh the West's earnings from the legal sales to the Soviets of its equipment and technology. "[9]

Once illegal acquisitions are distinguished and treated separately, several important implications emerge for the formulation of policy designed to limit future Soviet opportunities. These arise from the fact that there are both domestic and foreign aspects to the problem of illegal transfer. On the domestic side, impediments to Soviet acquisition of militarily relevant American technology might be made within the framework of existing law by devoting additional resources to compliance and enforcement. Such an effort would probably meet with widespread approval, although there is presently disagreement over whether the primary responsibility for enforcement of export control laws should remain in the Department of Commerce, or whether all export-related compliance activities should be placed in the Customs Bureau. This issue is discussed further in chapter VII. In addition, Congress could be asked to consider sensitive new legal provisions—concerning the commercial activities of foreign embassies, foreign nationals, and foreign-owned companies in the United States, for example-as a means of inhibiting illegal activities in the future.

The problems of improving enforcement within the United States are relatively tractable compared to those which surround the illegal disposition of American technologies once they leave the country. Here, the United States must rely on the enforcement agencies of other nations. Even in the case of CoCom allies, cooperation has not always been as close as the United States would wish. The matter is further complicated by the fact that the extraterritoriality provision in U.S. law means that certain U.S. technologies cannot be reexported from foreign firms, which have legally acquired them, without the express permission of the U.S. Government. There is concern over the stringency with which U.S. allies, CoCom and non-CoCom alike, pursue and prosecute cases involving the unauthorized reexport of such goods, especially in cases of goods whose export to the Soviet Union is illegal according to American law, but not according to the country's own or CoCom regulations.

So long as the policy differences between the U.S. and its allies discussed in chapter V persist, no quick or easy solution to this set of enforcement problems can be expected. But the fact remains that stressing the legal and conceptual separation between those items which the Soviet Union buys and those it is forced to steal is a useful way of focusing attention on the kinds of technologies and products which contribute to Soviet military capabilities, but which are not adequately protected by U.S. law. The latter are discussed in the following section.

PURCHASES UNDER GENERAL AND VALIDATED LICENSES

Categories II and III encompass two separate problems in the administration of export control policies designed to limit the degree to which the U.S.S.R. benefits militarily from U.S. technology. Category II raises the issue of identifying those items which should be, but are not, included on the U.S. Commodity Control and the CoCom lists. There are, of course, political difficulties in the United States and abroad which accompany most efforts to include new items on these lists. But aside from these, and arguably more important from the perspective of designing effective export control guidelines, is the technical task of keeping abreast of rapidly developing technologies

[8] In *Transfer of United States High Technology*, op cit., p. 577.
[9] CIA, op. cit., p. 10.

in a variety of fields, with a variety of potential military applications.

No law can delineate these technologies. Rather, it is the task of the legislator to mandate and allocate adequate resources for the creation of an administrative framework within which flexible and farsighted evaluation of the direction of technological change in both the civilian and military sectors can take place. There are serious practical and conceptual barriers here. At the root of most of these problems is the fact that important new technologies exist now in the West, which are being developed in the civilian sector and which presently have no known or practical military utility. However, these technologies may well have important military applications in the future.

One aspect of this problem involves leadtimes. Today's emerging technologies may be at the center of export licensing controversies 5 years hence. It is therefore vital that an effective mechanism exist for identifying such technologies early enough to gather them into the control process before so much worldwide diffusion occurs as to make the controls moot. A second difficulty is that the United States is not necessarily the originator of important new technologies. Civilian technologies with potential military significance-robotics, for example—are developing in allied countries. In these cases, not only must the United States have the ongoing capability to identify the technology early, but it must also begin early to persuade other Western nations to bring the items or processes in question under the rubric of control.

Finally, the entire process of identifying technologies with potentially important military significance is made more difficult by the fact that, in contradistinction to the situation in years past, there are technological areas in which development in the military sector lags that of the civilian. The same problem applies here as in the situation described above: the relevant technologies must be identified, and a convincing case must be made for their protection.

Category III addresses procedural issues, i.e., the functioning of the existing export licensing apparatus. In theory, when it is working properly this apparatus should adequately identify technologies and products with potential "dual" (i.e., both military and civilian) use, and employ an elaborate interagency review mechanism to allay all reasonable doubt that sale of the item in question will not result in a military gain by the U.S.S.R. In practice, export licensing procedures have been the subject of intense criticism and there exists a long list of suggestions—some mutually exclusive –for improving them. The problem is that while it is relatively easy in the clear light of hindsight to identify licensing decisions that now seem to have contributed to Soviet military capabilities, it is by no means obvious that:

- economic or political considerations at the time were not considered by high-level decisionmakers to outweigh the military risks;
- these military applications could have been anticipated at the time;
- denial of a U.S. license would have withheld the technology from the U. S. S. R.; and/or
- any other licensing mechanism would necessarily result in fewer such "mistakes."

This is not to suggest that it is impossible to improve the licensing process, or that concern over Soviet military gains resulting from legally purchased American goods and technologies is unwarranted. It is to assert that evaluation of the process cannot be undertaken in isolation from an understanding of the basic assumptions which guide it. The technical and logical criteria for including technologies in the export licensing process and the "case law" which provides the grounds for granting licenses in disputed cases together reflect the prevailing understanding of the concept of "military significance. "

THE CONCEPT OF MILITARY SIGNIFICANCE

The largely interchangeable terms–"military significance," "military utility," and "military risk' '—which lie at the heart of export control policy have been subject to widely varied interpretations. At times their definition has been colored by the prevailing political climate. Just as there was a tendency to extend export controls to items of only indirect military utility during the Cold War period, a counter-trend during detente led to relaxation of export controls on the grounds that the economic and political benefits of detente outweighed the military risks created by the sale of dual use technologies. Thus, export licensing decisions have long reflected judgments based on other than technical military assessments.

In 1976, the Defense Science Board produced a report which assessed the impact on U.S. national security of the transfer of selected high technologies. This document, commonly known as the Bucy Report, has become the basis for a protracted effort on the part of the U.S. Government to develop a means of assessing military risk which rests on objective technological criteria and is therefore relatively immune to shifting political opinion. This effort, the Critical Technologies Exercise, is predicated on the assumption, implicit in the Bucy Report, that one can identify the subset of significant technologies on which U.S. military technological superiority is most dependent; and that these technologies can be described on a Militarily Critical Technologies List (MCTL), and subject to stringent export control. One advantage of producing such a list would be that the items on it could be made immune from attempts to use export licenses as "carrots" or "sticks" in exerting political leverage. It is difficult, after all, to make a rational case for selling a militarily critical item or process to the U. S. S. R., no matter what the political demands of the moment.

Congress felt the creation of an MCTL a sufficiently promising enterprise to mandate it in the 1979 EAA. As envisioned in the act, the List would consist of:

A) arrays of design and manufacturing know-how;
B) keystone manufacturing, inspection, and test equipment; and
C) goods accompanied by sophisticated operation, application, or maintenance know-how which are not possessed by countries to which exports are controlled . . . and which, if exported, would permit a significant advance in a military system of any such country.

The List was to be specific enough to guide validated licensing decisions, and to become part of the Commodity Control List.

Technology and East- West Trade, published shortly after the passage of the 1979 EAA, expressed reservations as to the extent to which the critical technologies effort could be counted on to allay the debate over the boundaries of military relevance:

> It would be both misleading and unwise to regard the development of a critical technology list as a panacea to the difficult problem of protecting U.S. military technology leads. Skepticism already exists, both in Government circles and within the business community, as to whether the revised lists will indeed be shorter than present ones; there is fear, in other words, that reluctance to decontrol items or a broad definition of criticality will result in similar or longer lists. This might further inhibit East-West trade and could also provoke objections among some members of CoCom. From the other side, there are fears that a critical technology list will be too short, i.e., that items of marginal, but potentially important, military utility will be decontrolled to the ultimate detriment of the United States. [10]

These reservations are equally apt today, and uncertainty over the ultimate disposition of the MCTL has not yet been dispelled. The List, which except for its table of contents is classified, is said by some to be so voluminous that it constitutes a "Modern Technologies List. " This view may at least partly rest on misperceptions arising from the fact that rela-

[10] *Technology and East-West Trade,* op. cit., p. 94.

tively few individuals have been cleared to actually study the List. But it is also true that the Department of Defense's (DOD) view of the scope of military criticality is controversial. The business community is understandably alarmed at the prospect of a significantly longer list of national security controls and the Departments of Defense and Commerce have so far been able to agree on the incorporation of only selected parts of the MCTL. Furthermore, DOD has taken the position that the MCTL should be adopted by CoCom. Given the climate of opinion described in chapter V, the chances for the wholesale inclusion of an array of items and processes covering the technological universe would seem small. On the other hand, the detailed technical analysis accompanying the MCTL has reportedly been useful in supporting U.S. positions in CoCom on a case-by-case basis.

TOWARDS A DEFINITION OF MILITARY SIGNIFICANCE

On the evidence of the historical precedent for changes in the prevailing interpretation of the concept of military significance, and of the longstanding difficulties surrounding the Critical Technology Exercise, it is unlikely that controversy in the export licensing community over the boundary between acceptable and nonacceptable military risk will be quickly or permanently laid to rest. The grounds of the debate may be clarified, however, by distinguishing among the various categories of military significance.

Items of potential military value which the U.S.S.R. might wish to purchase from the United States fall into four groups:

I. High-technology items which have a direct military utility -i.e., their sole use is that they can be embodied in a weapon; or their sole use is in the production process for a weapon. Access to these technologies would allow the acquisition of military capabilities otherwise outside the realm of the recipient's technical competence within the same time frame.

11 Low-technology items which have clear dual use capabilities in the area of military support. For example, automotive technology, which is widely available and has legitimate civilian applications, but which can be used to produce military trucks.

III High-technology items which have dual uses, i.e., they may be embodied in or used directly in the production of weapons or military support, but they also have applications that will improve industrial productivity generally. The most important areas here are computers, semiconductors, machine tools, instrumentation, and telecommunications.

IV. Low-technology items which are inarguably destined for the civilian sector, e.g., grain or pipelayers.

There is little dispute, either within the United States itself or in CoCom, that technologies in category I should be stringently controlled. Similarly, our CoCom allies vigorously disavow the wisdom or utility of engaging in the kind of economic warfare implied by denial of items in category IV. But although the legislative history of EAA shows a clear intent on the part of Congress to move away from policies of economic warfare, items in category IV have been controlled by the United States for foreign policy purposes. Moreover, some would make the case for controls on category IV for national security reasons. These arguments for the extension of export controls to low technology goods inarguably destined for the civilian sector have been based on several grounds:

- that such exports generally strengthen the Soviet economy and that the strength

of the economy is directly related to the U. S.S.R.'s military capabilities;
- that exports "free" resources for the military sector which the U.S.S.R. would otherwise have to devote to nonmilitary uses; or
- that the exports will help to generate hard currency which the Soviets will use to buy more advanced Western technology of military relevance.

Such arguments aside, the present administration has repeatedly disavowed any concept of military significance wide enough to encompass non-high-technology exports to the Soviet civilian sector, even if these allow the U.S.S.R. to avoid economic hardship or difficult choices in the allocation of its own resources. Nevertheless, the administration clearly seeks to broaden the definition of military significance to include items in categories II and III–perhaps even extending these categories to reach lower levels of technology than are presently subject to license. Administration officials stress the magnitude of the Soviet military threat and the extent of the Western contribution to the Soviet military buildup. They are widely perceived to favor the extension of export controls to items not presently included on the CoCom lists, and to seek the denial of more export license applications, both in the domestic licensing and CoCom exception processes. Categories II and III therefore constitute the "battleground" over which export licensing decisions have been and will continue to be fought out case by case.

SUMMARY AND CONCLUSIONS

There are severe constraints on the power of U.S. export licensing to deny the Soviet Union access to the Western technologies it most wants. These constraints include the extent to which Soviet efforts to acquire Western technology encompass illegal methods, U.S. inability so far to obtain complete allied agreement on a more strenuous multilateral export control policy, the difficulties inherent in identifying in advance which technologies will have important military payoffs, and the increasing worldwide diffusion of technology. Thus, it is foolhardy to expect that even drastic changes in U.S. export control policy could materially alter the fact that the U.S.S.R. benefits militarily from Western technology. On the other hand, it is extremely rare to find examples of military technologies obtained from the West which the U.S.S.R. could not have produced itself, albeit later and at additional expense.

Given this situation, it is important that the United States not lose sight of the primary objectives of an effective and realistic export control program. Such a program cannot be expected to permanently deny the Soviet Union access to particular technologies. It is successful to the extent that it increases the cost to the U.S.S.R.–in time, money, effort, and efficiency—of obtaining the technologies it desires; and to the extent that the roadblocks it creates limit the rate and volume of Soviet technological acquisitions. In the long run, technological leads can only be maintained through effective research and development efforts.