SOVIET ACQUISITIONS OF WESTERN TECHNOLOGY

AND

ITS NATIONAL SECURITY IMPLICATIONS

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SOVIET ACQUISITION OF WESTERN TECHNOLOGY AND ITS NATIONAL SECURITY IMPLICATIONS

Introduction

The US and its Allies traditionally have relied on the technological superiority of their weapons to preserve a credible counterforce to the quantitative superiority of the Warsaw Pact. But that technical superiority is being eroded as the Soviet Union and the Warsaw Pact increasingly introduce sophisticated weaponry of their own, often with the direct and indirect help of Western technology.* Stopping the extensive Soviet acquisition of Western technology militarily important to them, in ways that are both effective and appropriate in our free society, is one of the most complex issues facing our Government today.

Soviet Acquisition of Western Technology: A National Program

Since at least the 1930s the Soviet Union has placed a high priority and devoted large amounts of its financial and organizational resources to the acquisition of Western technology for the improvement

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*While there are numerous interpretations of "technology" for weapons, we define it as the application of scientific knowledge, technical information, know-how, critical materials, keystone manufacturing and test equipment, and end products which are essential to the research and development as well as the series manufacture of modern high-quality, weapons and military equipment. By Western technology we mean technology developed in the Free World.

of its military programs and the efficiency of defense production technology. Today this effort is a massive, well planned, and managed national level program, approved at the highest governmental levels -- the Central Committee of the Communist Party and the Council of Ministers.

Our intelligence indicates that the Soviets and their Warsaw Pact allies have acquired large amounts of such US and Western technology and equipment through legal and illegal means, including their intelligence services. The Soviets have tried and succeeded in acquiring the most advanced Western technology. They have used their scientific and technological agreements with the West to facilitate access to the new technologies that are emerging from our applied scientific research efforts. They have used their scarce hard currency to legally purchase uncontrolled advanced Western technologies having defense-industrial applications. And, they have used their intelligence services to acquire illegally, those US technologies that are classified and export controlled.

Central direction and management for the Western technology acquisition program comes from the Council's Military Industrial Commission, called the VPK, the organization responsible at the national ministerial level for coordinating and controlling all Soviet military research and development (R&D) and production of weapons. In this capacity the VPK assigns Western technology acquisition priorities that are driven first by the needs of the military and military-related industrial Ministries under its direct control, and,

secondly, by the needs of the civilian sectors of Soviet industry that support defense production.

The Soviets have been very successful in acquiring Western technology by blending legal and illegal acquisitions by several governmental organizations to satisfy these priority military needs. The Soviet intelligence services, the Soviet Committee for State Security (KGB) and the Chief Intelligence Directorate of the Soviet General Staff (GRU), are assigned the primary responsibility for collecting Western classified, export controlled, and proprietary technology, using both clandestine and overt collection methods. They in turn make extensive use of the East European Intelligence Services who are liberally paid for their efforts in acquiring Western technology.

The Ministry of Trade of the Council of Ministers is assigned responsibilities for both legal and illegal acquisitions and purchases, and works closely with the KGB and GRU in arranging trade diversions. Furthermore, Soviet and East European trade ministries also provide the use of official trade organizations and missions for clandestine and illegal acquisition operations.

Official Soviet and East European science and technology (S&T) organizations also play a major role in both open source and clandestine acquisition of Western technology. The Soviet State Committee for Science and Technology (GKNT) is a key player in arranging government-to-government S&T agreements to facilitate access

to and the acquisition of new technologies just emerging from Western Universities, laboratories, and high technology firms. The GKNT oversees the allocation of scarce Soviet hard currency for the legal purchase of selected uncontrolled Western technology for Soviet military purposes. If they are unable to acquire the necessary technology by open or legal means, the GKNT tasks Soviet intelligence to clandestinely acquire the technology.

It is this massive well organized and centrally coordinated use of all these organizations that has made the Soviet program to acquire Western technology so successful. The Soviets have acquired militarily significant and critical industrial Western technologies that have benefited every major Soviet Ministry engaged in the development and production of weapon systems.

Soviet Mechanisms for Acquiring Western Technology

Soviet acquisition efforts include: legal importation through open literature, legal trade channels and through student, scientific and technological exchanges, and conferences; illegal trade channels that evade US and Western (i.e. COCOM*) export controls and

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*The Coordinating Committee (COCOM) was established in January 1950 to serve as the forum for Western efforts to develop a system of strategic export controls. It is composed of the following countries: the United States, United Kingdom, Turkey, Portugal, Norway, the Netherlands, Luxembourg, Japan, Italy, Greece, France, Federal Republic of Germany, Denmark, Canada, and Belgium.

clandestine acquisition through recruited agents and industrial espionage. We believe that the overwhelming share of the militarily significant technology and equipment is acquired through clandestine acquisitions and illegal trade, and the remainder is acquired through legal trade and open sources. The latter is considered important also since it is often the combination of legal and illegal acquisitions that give the Soviets the complete military or industrial capability they need.

Because of the priority accorded to the military over the civilian sectors of the Soviet economy, free-world dual use technology, that is with both military and civilian applications, often finds its way first into military industries and second, into the civilian sectors of machine building which supports military production. Thus, Soviet assurances that legally purchased dual-use technology will be used solely for civilian applications can seldom be accepted at face value.

Legal acquisitions generally have their greatest impact on the Soviets' broad industrial base, and thus affect military technology on a relatively long-term basis. For example, the Kama truck plant was built over some 7 years with massive imports of more than $1.5 billion worth of US and West European automotive production equipment and technology, and recently (1981) began producing military-specification trucks. Large numbers of Kama trucks are in use by Soviet forces in Afghanistan and by Soviet military units in Eastern Europe opposite NATO. Similarly large Soviet purchases since the 1970s of numerically

controlled machine tools from Japan and Western Europe already have benefited some military manufacturing sectors, particularly the Soviet aircraft, tank, naval and nuclear weapons industries.

The Soviets give priority to expenditures requiring hard currency for those purchases that meet the direct or partial needs of the Soviet military-industrial ministries. For example, over the past 10 years the Soviet Union has purchased large quantities of Western microelectronics technology through legal means and complemented those acquisitions by illegal means when necessary in order to equip their military-related microelectronics manufacturing facilities. This has permitted the Soviets to build systematically a modern microelectronics industry. This newly acquired capability in microelectronics is the critical basis for large and wide-ranging enhancements in the sophistication of Soviet military systems.

Acquisitions through illegal trade channels frequently have both industrial and military applications, and thus are important in the near term. Illegal diversions of technology fall into two general categories. One is the illegal diversion of controlled technology from legitimate trade channels to proscribed destinations. This is done through US and foreign firms willing to engage in profitable impropriety, agents-in-place in US or foreign firms or foreign subsidiaries of US firms, communist-owned but locally-chartered firms in the West, and foreign purchasing agents (including arms dealers). For example, in order to evade the US embargo on high technology exports to the Soviet Union, the Soviets and their surrogates set up

in the West dummy corporations engaged in purchasing sophisticated microelectronics manufacturing equipment. This equipment has been shipped and reshipped, sometimes with the knowledge of certain individuals in the companies supplying it, to disguise its ultimate destination--the Soviet Union or Eastern Europe. The other is in-place diversion, in which legally-acquired technologies are put to military end-uses and/or used by unauthorized end-users. Both types of illegal diversions are extremely difficult to detect and monitor. We know that both the Soviet and Warsaw Pact intelligence services are in the mainstream of the illegal technology trade flow.

The acquisitions that most directly affect Soviet military development have come from intelligence collection and related illegal trade diversions. Soviet Bloc intelligence services have concentrated their effort in the US, Western Europe, and Japan. In addition to the usual military weapons intelligence technology, targets include defense contractors and high technology firms which have advanced technology (both classified and unclassified), foreign firms and subsidiaries of US firms abroad, and international organizations having access to advanced and/or proprietary technology. Soviet intelligence also continues to place high priority on the collection of S&T information on fundamental research, particularly areas (e.g. lasers and genetic engineering) that could lead to new types of weapons that might upset the current balance of forces. In the last few years both the Soviet and Warsaw Pact intelligence services have been stepping up their efforts to acquire new and emerging

technologies from Western universities and commercial laboratories for both military and commercial applications. One East European intelligence service regularly invites US professors to teach in its universities as the operational means of selecting those it wishes to try and recruit; a recent defector from that service has reported it has had a number of successes but that it does not often have to recruit American scientists since they are so talkative.

Furthermore, both legal and illegal acquisitions of technology and equipment are coordinated with the complex network of international governmental scientific and technical agreements and exchanges that the USSR maintains with the advanced industrial nations of the world. These include collection activities of their scientists and engineers that participate in academic, commercial, and official S&T exchanges. Visits by Soviet and East European students and technical delegations to the United States generally are made by high quality scientists, many of whom we suspect are associated with classified work in their home countries.

In recent years, the Soviet candidates for exchange programs have proposed academic and research activities involving technologies in the areas of microelectronics, computers, composite materials, and sensors, that have direct military applications. In each of the past two years, over a third of the 50 program proposals offered under the Graduate Student/Young Faculty Program of the International Research and Exchanges Board (IREX) have been judged to be completely unacceptable in terms of prospective technology loss, and many other programs needed to be modified or access constrained before the exchanges could be implemented.

Thus, the principal value to the Soviets of these scientific and technical co-operative agreements is as a means to acquire direct access to Western technology which would be of benefit to Soviet military and intelligence objectives and only secondarily as a means to acquire closer political and social ties with the West.

Table 1A provides a list of the key high-technology subjects that Communist country visitors come to the US to study, research, or discuss; many of which are now on the US military critical technology list today. Over the past few years there also has been increased use of Communist-owned, locally chartered firms in the US and abroad to exploit controlled and military-related technology. There are about thirty Communist owned firms in the US owned by the Soviet Union, Hungary, Poland, and Romania. Near the end of the late 1970s there were over three hundred fifty similar firms in the Free World, with

relatively heavy concentration in the United States, the United Kingdom, Sweden, the Netherlands, Italy, West Germany, France, Canada, Belgium, and Austria. Many are potential avenues for Soviet exploitation of the advanced technologies of these countries.

Firms chartered in the US can legally purchase controlled US technology and study it without actually violating US export controls unless they attempt to export the equipment or related technical data out of the United States without a license. They also can use these firms as an espionage base for illegal technology acquisitions. For example, a Hughes Aircraft engineer arrested in late 1981 was charged with selling US secret documents to a suspected East European intelligence officer employed by a Polish owned US chartered firm in Illinois.

The Soviets correctly view the United States and other Western countries as a watershed of important and openly available scientific and technical information. As such, the Soviets take every opportunity to obtain access to this information. Recently the Soviets legally purchased tens of thousands of unclassified US documents containing information on standardization procedures for weapons, nuclear ordinance, guided missiles, space vehicles, and many other military-related technical areas. This freely available information will undoubtedly go to Soviet weapons designers. Soviet collection of open source publications remains a highly visible activity and obviously a valuable source of Western scientific and technical information.

The Soviets also regularly attend high technology trade shows and visit commercial firms in the US, particularly small and medium sized US firms that are active in the development of emerging technologies. These apparent trade promotion efforts often mask Soviet attempts to acquire emerging Western technological know-how before military uses have been identified and government security controls have been applied to protect such know-how. Such emerging technologies are particularly vulnerable to foreign collection efforts.

Soviet Acquisitions and Benefits

There is growing recognition of the crucial role played by Western technology in the development and production of Soviet weapon systems and related military equipment. Soviet dependence on Western technology was visible and clearcut in the years immediately after World War II. To achieve major improvements in their military capability quickly, the Soviets resorted to a combination of purchasing and/or stealing and copying Western systems. They exploited the technological expertise of captured scientists and industrial plants.

Since that early period of the 1950s and 1960s, however, Soviet reliance on Western technology has decreased. Today Soviet military designers are inclined to be more selective in the acquisition of

Western military-related technology, choosing carefully the Western designs, engineering approaches, and equipment most appropriate to their specific defense needs. These needs, however, are still massive including almost every area of weapons technology and related manufacturing equipment. Table 2, listing Western technology acquisitions, gives an idea of the wide range of Soviet military technology needs.

Western acquisitions in the missile, aircraft, and naval areas and several high technologies are presented below to demonstrate the way the various transfer means occurred.

In the missile area, the Soviets have been particularly interested in guidance and control technologies. For five years in the 1970s Soviet intelligence was reaping the benefits of the clandestine acquisition of US high technology aerospace electronics and missile navigation equipment through an agent who worked for a US subsidiary overseas. He provided the Soviets with nearly $25 million worth of embargoed equipment and tens of thousands of pages of technical data detailing the design and functions of military useful products before he was uncovered in the late 1970s.

Through legal trade purchases in the 1970s, the Soviet Union acquired precision grinding machines for the production of small high precision bearings from a US firm. The high quality of bearings produced by these machines reduced down time and increased output in

TABLE 2

SELECTED SOVIET & EAST EUROPEAN LEGAL AND ILLEGAL ACQUISITIONS FROM THE WEST AFFECTING KEY AREAS OF SOVIET MILITARY TECHNOLOGY

Key Technology Area	Notable Success
Computers	Purchases and acquisitions of complete systems, hardware and software, including a wide variety of Western minicomputers for use in military systems.
Microelectronics	Complete industrial processes and semiconductor manufacturing equipment capable of meeting practically all military requirements.
Signal processing	Acquisitions of processing equipment and know-how.
Manufacturing	Acquisitions of automated and precision manufacturing equipment for electronics, materials, and possibly optical and future laser weapons components; acquisition of information on manufacturing technology related to weapons, ammunition, aircraft parts including turbine blades, computers, and electronic components.
Communications	Acquisitions of low-power, low-noise, high-sensitivity receivers.
Lasers	Acquisitions of optical and other laser components, including special optical mirrors and mirror technology suitable for future laser weapons.
Guidance and navigation	Acquisitions of navigation receivers, advanced inertial guidance components, including miniature and laser gyros; acquisitions of missile guidance subsystems; acquisitions of precision machinery for ball bearing production for missile and other applications.
Power sources	Superconductive energy storage systems and associated cryogenic equipment.
Structural materials	Purchases and acquisitions of Western titanium alloys and welding equipment.
Propulsion	Missile technology; some ground propulsion technology (diesels, turbines, and rotaries); purchases of and acquisitions of advanced jet engine fabrication technology and jet engine design information.
Acoustic sensors	Acquisitions of underwater navigation and direction finding equipment.
Electro-optic sensors	Acquisition of information on satellite technology and laser rangefinders.
Radar	Acquisitions and exploitations of air defense radars and antenna designs for missile systems.

missile and industrial uses. Although only a few of these machines were sufficient to supply Soviet missile designers with all the quality bearings they needed, this sale provided the Soviets with a capability to manufacture precision bearings sooner than through subsequent indigenous development.

In the aircraft area the Soviet and East European intelligence services have been extremely successful in acquiring critical Western technology and know-how. Through industrial espionage Soviet intelligence is believed to have successfully acquired the plans and intricate drawings for the US C5A giant transport aircraft early in its development cycle; these plans although dated now are believed to have contributed significantly to current Soviet development of a new C-5 type strategic military cargo plane--the An400.

Apparently Soviet military aircraft designers could "order" documents on Western aircraft and get them within a few months through resourceful Soviet intelligence efforts. Designers are in particular need of data on US technological advances, but more importantly, they needed information on aerospace manufacturing techniques.

Soviet designers apparently have always been interested in the technological capability of the Boeing 747, and probably managed to speed up their efforts in developing the IL-76 (CANDID) transport aircraft by tasking Soviet intelligence to secure documentation on the 747. The IL-76 looks much like the 747, but is smaller in size mainly

because Soviet designers have not yet been able to successfully develop or steal advanced and sophisticated Western large engine technology.

The IL-76 also is used by the Soviets as the platform for their new AWACS (Airborne Warning And Control System) which is expected to be operational in the mid 1980s. It will provide the Soviets with a major improvement in attacking low flying missiles and bombers. The Soviet AWACS radar also is similar in many ways to that of the US AWACS system, and is a major improvement over the radar used on their old AWACS system.

An example of an in-place diversion which was of direct aid to the Soviet military aircraft industry was the sale of specially designed US blind rivet technology in the mid 1970s. Contrary to assurances that the technology was for commercial use, the Soviets installed the US manufacturing equipment in the Gorkiy Aircraft Plant which is known to produce military fighter aircraft, including the MIG-21 and MIG-25, Foxbat.

Two huge floating drydocks purchased legally by the Soviets from Japan and Sweden have been diverted to military use. Drydocks are used exclusively for ship repair and are critical for routine or fast repair of ships damaged in warfare. In 1978, when the Soviets took possession of the Japanese drydock, they diverted it to the Pacific Naval Fleet. The drydock purchased from Sweden was sent to the

Northern Fleet in 1981.

These drydocks are so large that they can carry several large commercial ships, and are also large enough for servicing the huge Kiev-class aircraft carriers. Soviet advanced submarines carrying ballistic missiles, Soviet aircraft carriers, and Soviet destroyers were among the first ships repaired in these drydocks. Moreover, the purchase of these drydocks from Western shipbuilders relieved construction time in Soviet shipyards, already overburdened with developing military vessels.

Within the past few years, the USSR also has contracted for, or purchased foreign built oceanographic survey ships equipped with some of the most modern Western-manufactured equipment. The USSR will be receiving five Finnish-built oceanographic ships reinforced for ice operations and for long-range expeditions and several other Western oceanographic ships. In place of desired US equipment that was embargoed, West European equipment has been installed on the ships. This modernization of the world's largest oceanographic fleet utilizing Western technology will help support the development of Soviet ballistic missile weapon system programs and antisubmarine systems against the West.

The Soviets also have been successful in clandestine acquisitions of Western naval equipment. Through agent penetration of a US defense contractors subsidiary abroad the KGB successfully acquired technical documents on US sonar systems and underwater detector and navigation

systems in the 1970s. [redacted] 25X1

Over the past 10 years the Soviet Union has successfully acquired thousands of Western microelectronics components worth millions of dollars through legal means and complemented those acquisitions by illegal means when necessary in order to equip their military-related manufacturing facilities. These centrally directed acquisitions have permitted the Soviets to build systematically a modern microelectronics industry which will be the critical basis for large and wide-ranging enhancements in the sophistication of future Soviet military systems. They have acquired enough Western microelectronics manufacturing equipment that, if combined, would have the capacity to provide 100 percent of the Soviets high quality microelectronic needs for military purposes.

Soviet computer technology has been limited by fabrication and production technology problems and by difficulties in software development. When the Soviets were having problems in producing computer memories for the Moscow ABM system, for example, they targeted a US firm in California. Armed with a high priority request, their trade organizations illegally acquired COCOM embargoed equipment, diverting it from California through the Far East and Western Europe into the Soviet Union. At a sacrifice of time and resources the Soviets probably could have overcome their problems on their own, but the acquisition of US equipment permitted them a quick solution that allowed them to upgrade their ABM computer system.

Since 1969 the USSR and East European countries have been developing a family of general purpose computers known as the Ryad series. These computers which essentially make up the total Soviet and East European effort in general purpose computers, have been and will continue to be used in a wide variety of civil and military applications. The architectural designs of the Ryad computers are patterned after those of the highly successful IBM 360 and 370 series of computers. The Ryad computers also use some clandestinely acquired Western engineering concepts in the implementation of IBM designs.

[redacted] 25X1

Western technology has been important to the Ryad development because it has provided proven design directions both at the system and component levels. Thus, Soviet and East European computer production efforts have been devoted to the most successful Western computer designs that have ever been mass-produced, computers that are used in a wide range of applications and are highly serviceable in the field. With this approach, the Soviets and East Europeans eliminated many of the risks in undertaking the development and production of a new series of general purpose computers, and saved considerable amounts of manpower and time. Since the mid to late 1970s the Soviets and East Europeans have openly purchased several thousand minicomputers, some of which are finding uses in military-related organizations. Furthermore they are illegally developing minicomputers that are direct copies of Western models. Soviet and

East European development of computer systems has been aided by all available acquisition means--legal and illegal, including clandestine--for acquiring the needed technical know-how.

BENEFITS

The Soviets and their Warsaw Pact Allies have derived significant military gains as the result of their acquisitions of Western technology. This multi-faceted Soviet acquisitions program has allowed the Soviets to:

--save $100s of millions of dollars in R&D costs, and years in R&D development lead time;

--modernize critical sectors of their defense industry and reduce engineering risks by following or copying proven Western designs, thereby limiting the rise in their military production costs; and

--achieve greater weapons performance than if they had to rely solely on their own technology.

These gains are evident in all areas of military weapons systems; strategic, tactical and space.

The direct impact of East-West trade on Soviet military power cannot be easily quantified. However, it is clear that Western military expenditures needed to overcome or defend against the

military capabilities derived by the acquisition of Western technology far outweighs the West's earnings from legal sales to the Soviets of the equipment and technology on which these improvements are based. A Soviet economist familiar with the review process for allocating hard currencies for defense related projects stated that "The acquisition of Western technology and finished products is a very calculated procedure, done with a great deal of selectivity. Even so, Soviet economists are amazed that the West does not recognize this and continues to invest in the USSR industries since the material and technical base of socialism is thereby increased. They consider this acquisition program one of the USSR's greatest achievements since it allows the solving of complicated problems with minimal costs."

FUTURE SOVIET NEEDS FOR WESTERN TECHNOLOGY AND OUTLOOK FOR THE 1980S

Soviet military R&D efforts are at their highest levels since the mid 1960s when they launched a massive effort to catch up with Western strategic and tactical capabilities. They have underway several hundred weapons development projects, with at least 40 of these being related to strategic systems, 70 to tactical systems, and 50 to space and special weapon systems. We expect the number of new or modified Soviet weapon systems coming from these projects and going into production and deployment in the 1980s to remain at historical levels -- some 200 weapon systems per decade over the last 20 years.

Although Soviet military manufacturing capacity has increased 80 percent overall since the early 1960s, we have observed them beginning plant expansion at one-fourth of their key weapons manufacturing facilities over the last several years. We expect these new facilities to be ready to produce weapons in the next four to ten years. Plant expansion is evident in the following areas: ground warfare vehicles, including new tanks; aviation, including facilities for a new B-1 type bomber and a new long range military transport having strategic airlift capabilities; naval shipbuilding, including submarines for ballistic missiles and cruise missiles and full size aircraft carriers capable of global operations; and electronic and the microelectronic manufacturing facilities throughout the USSR.

The development and production of the new Soviet weapons are sure to be more complex and costly than those produced in the 1970s when the USSR spent a total of $1,725 trillion on its military activities; the US spent $1.27 trillion by comparison. The estimated dollar costs of Soviet military activities in the 1980's is expected to reach some $2.3 trillion.

All of this military activity is taking place at the same time the Soviet economy has reached its lowest level since WWII. Soviet GNP growth may well be limited to 1 to 2 percent on the average by the mid-1980s. Stagnation in industrial sectors key to both the economy and the military means it will be increasingly difficult for the Soviets to satisfy the needs of both. Thus, Soviet leaders will have

to make tough choices among defense, investment, and consumption, and the competition among rival claimants for resources is likely to become intense. Under these conditions, it may be impossible for the Soviets to maintain simultaneously historical military production levels and increasing resources to the civilian economy.

Despite these economic difficulties, there are no signs that the Soviets are shifting resources away from the military sector or are slowing down development of weapon systems that will be entering the production stage by the mid-1980s. New generations of Warsaw Pact weapons will require critical component and modern manufacturing technologies. It is in these areas that Soviet illegal acquisitions of Western technology, complemented by legal acquisitions, are most likely to be concentrated over the next five years.

We conclude the Soviets will need a considerable amount of Western advanced component technology to satisfy their military objectives in the decade of the 1980s. Among the more important of these are microelectronics, computers and signal processing. Microelectronics will play a very significant role in advances in computers and signal processing, and all of these technologies will be significant in developing advanced Soviet missile guidance and communications systems as well as missile, aircraft, and submarine detection systems.

As the result of both tactical and strategic force modernizations, Soviet and Warsaw Pact military manufacturers increasingly are feeling

the pressure of large scale production requirements and the related need to control manufacturing and materials costs. Thus, particularly critical for the decade of the 1980s are Soviet needs to improve their manufacturing capability. To a large extent, the level of manufacturing technology in Soviet plants determines Soviet capability to move new technology from R&D into military applications. Manufacturing technologies not only play a significant role in the development of advanced component technologies such as microelectronics and computers but in the actual production of modern naval and aerospace systems.

Future Soviet and Warsaw Pact acquisition efforts including acquisitions by their intelligence services, are likely to concentrate on the sources of such component and manufacturing technologies, including:

--Defense contractors in the US, Western Europe, and Japan who are the knowledge repositories for military development and manufacturing technologies;

--General producers of military-related auxiliary manufacturing equipment in the US, Western Europe, and Japan, and

--Small and medium size firms and Universities that nurture and develop advanced component technology and designs, including emerging and advanced civil technologies with future military applications, and sensitive but unclassified US technical data.

OUTLOOK FOR THE 1980S

The combination of past acquisition practices and future Soviet defense needs indicate that the US and its Western Allies are likely to experience, serious counterintelligence, industrial security, and export control problems over the next 5 to 10 years. Soviet and Warsaw Pact efforts to acquire new and emerging technologies from Western university and commercial laboratories as well as exploit open source publication sources are already posing difficult problems for our national security and scientific communities. The Western nations are not presently organized to cope with the multifaceted and multi-national threat to its scientific, technological, and industrial sectors posed by the Soviets and its Warsaw Pact Allies.

The job of stopping Soviet Bloc intelligence operations aimed at both our military and industrial technologies already poses a formidable counterintelligence problem, both in the US and abroad. Furthermore, the task of stopping losses resulting from hostile intelligence acquisitions is likely to become even more difficult in the future as several trends identified in the 1970s continue into the 1980s:

--First, since the early 1970s, we have observed the Soviets and the East European Allies increasingly using their

national intelligence services to acquire Western civilian technologies, e.g., automotive, energy, chemicals, and even consumer electronics.

--Secondly, since the mid-1970s, we have observed Soviet and Warsaw Pact intelligence emphasizing the collection of production-related technology, sometimes in preference to weapons technology.

--And thirdly, since the late 1970s, we have observed increased emphasis by these hostile intelligence services on the acquisition of new and emerging Western technologies, from our universities and research centers.

The combined effect of these trends is a heavy focus by Soviet Bloc intelligence on the commercial and non-military sectors in the West, sectors that are not normally protected from hostile intelligence services. Furthermore, the industrial security provided by commercial firms are no match for the human penetration operations of such foreign intelligence services. But the most alarming aspect of this commercial focus by hostile intelligence services is that as the result of these operations they currently are gaining access to those advanced technologies that are likely to be used by the West in its future weapons systems.

Soviet intelligence efforts against Western defense contractor firms poses a serious problem in and of itself. With over 11,000 such firms in the US and hundreds of subsidiaries abroad, US

counterintelligence efforts are stretched thin. Protection of such US firms abroad from hostile intelligence threats are the responsibilities of host governments and they too are feeling the burden of the well orchestrated Soviet Bloc efforts. NATO has not developed a combined industrial security and counterintelligence effort and as a consequence, US defense contractors in Europe are largely left to fend for themselves when it comes to hostile intelligence directed "industrial espionage" operations. A similar situation exists in Japan where the Soviet industrial threat and illegal trade problems appear to be even more concentrated.

From all evidence it appears that industrial security--both defense and commercial--will be severly tested by Soviet and East European intelligence over the 1980s. National security means for protecting the strictly civilian sector from hostile intelligence services do not presently exist and the governmental basis for doing so would have to be developed if we are to protect our private sector from these intelligence services. To enhance the protection of US defense contractors abroad, new defense industrial security means would have to be developed with the close cooperation of foreign governments.

Stopping illegal trade practices at home and abroad will require a much greater coordinated effort by US and Allied export control agencies. Stopping third country diversions and unauthorized sales of controlled US equipment will also require greater international cooperation in the enforcement field, but because of the heavy

involvement of Soviet Bloc intelligence in these trade activities, it will also require assistance by Allied intelligence, counterintelligence and internal security services.

And finally, the problem of coping with the Warsaw Pact's massive open source and overt collection efforts poses an almost intractable task for the open societies of the West. Although the Soviets have used our openess to their military advantage we prize too highly that openess and the academic and industrial benefits that it produces to unthinkingly close it off. The national security and scientific communities should jointly search for the means to protect new and emerging technologies that have critical industrial and future weapons applications. The US government must find proper and equitable means to control the availability of government S&T information that could aid our military adversaries. The US intelligence community should ensure that US firms and businesses that deal with the Communist countries are not taken unfair advantage of by their national intelligence services. The serious threat that Soviet intelligence possess in all of these open activities should be recognized and each citizen alerted to his own risk and vulnerability; any attempt to coerce or compromise US citizens involved in these activities should be reported to the FBI in the US or US embassies abroad.

In conclusion, the massive Soviet program to acquire Western technology through combined legal and illegal means poses a serious threat to the security interest of the US and its allies. To respond effectively, the West needs to modernize export controls so that they

take into account both future Soviet military needs and the well organized collection efforts of the Soviets and their Warsaw Pact allies. A comprehensive and coordinated program must be mounted to improve trade controls and their enforcement in the CoCom arena and these efforts must be complemented by enhanced industrial security programs and by counterintelligence activities dedicated to the technology transfer loss problem.