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The Technology Acquisition Efforts of the Soviet Intelligence Services (U)

Interagency Intelligence Memorandum

Secret

NI IIM 82-10002
June 1982

Copy 414

Approved For Release 2007/05/11 : CIA-RDP84B00049R001403390009-8

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THE TECHNOLOGY ACQUISITION EFFORTS OF THE SOVIET INTELLIGENCE SERVICES (U)

Information available as of 25 May 1982 was used in the preparation of this Memorandum.

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PREFACE

This Interagency Intelligence Memorandum addresses the key role of the Soviet intelligence services and their surrogates in acquiring advanced US and other Western (including Japanese) technology. This particular focus of the Memorandum is not intended to overshadow the significance of acquisitions by other Soviet and East European organizations and the consequent need for stringent US export controls. Indeed, the continuing Soviet acquisition of technology from the West using all means at Moscow's disposal is one of the most complex and vexing issues confronting US policymakers.

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The term "technology transfer" connotes a wide range of scientific and technical, economic and industrial, and trade and communications activities; there is no single definition. When viewed in terms of their national security implications, the means by which technology transfers occur take on even greater significance. These means range from open-source publications through legal trade and illegal trade diversions to traditional clandestine operations. In certain instances, transfers not normally considered cost-effective in the usual commercial sense (such as reverse engineering) may be used by actual or potential adversaries that otherwise would be denied such technology

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This Memorandum was prepared under the auspices of the National Intelligence Council by the Central Intelligence Agency, the Defense Intelligence Agency, the Federal Bureau of Investigation, the National Security Agency, the DCI's Community Counterintelligence Staff, and the intelligence components of the Department of State, the Department of Energy, the Customs Service of the Department of the Treasury, and the Air Force, Army, and Navy. It was reviewed by and coordinated with the intelligence components of the Departments of Commerce and the Treasury. This Memorandum was approved by the DCI's Technology Transfer Intelligence Committee and, on 25 May 1982, concurred in by the National Foreign Intelligence Board

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SUMMARY AND OVERVIEW

The USSR is engaged in a well-organized, centrally directed, and growing worldwide program to acquire US and other Western military technology, embargoed equipment, and manufacturing technology to satisfy its military and defense-industrial needs. The Soviet intelligence services and their East European surrogates play a major role in this worldwide program through a broad range of clandestine, technical, and overt collection operations. Although these intelligence operations constitute a small part of the overall Soviet technology acquisition effort, we believe these operations are responsible for acquiring the overwhelming majority of the militarily significant Western technology [1] that finds its way into the Soviet Union

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Acquisitions of Western technology by the Soviet intelligence services and their surrogates have afforded the Warsaw Pact significant military and industrial benefits. These include:

— Increasing the pace of indigenous development of weapon systems and reducing military research and development costs and risks.

— Developing effective countermeasures against US and other Western military systems.

— Modernizing and broadening critical sectors of the Warsaw Pact defense industrial and support bases.

These and other acquisitions of Western technology by nonintelligence organizations have contributed substantially to the growth of Soviet military power and the steady erosion of the technological superiority on which US and allied security currently is based. In turn, this has stimulated the United States and its allies to make even greater efforts to overcome or defend against these enhanced Soviet capabilities

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The Soviet and East European intelligence services employ a vast array of methods to acquire US and other Western technology. The most effective of these collection methods include:

— Recruiting agents-in-place from business, government, military, and academic sectors both in the United States and overseas.

[1] As used here, militarily significant technology is defined as that equipment, material, and technology having direct and immediate impact on Soviet military research, development, and production

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— Arranging illegal trade diversions through third countries to evade US export controls.

— Using Communist-country-owned but locally chartered firms to acquire controlled technology and to support clandestine collection operations.

— Intercepting US and other Western telecommunications to acquire proprietary and controlled industrial technology and unclassified but sensitive defense program information.

— Exploiting official scientific and technical exchanges and international organizations.

— Collecting large amounts of open-source S&T information available in Western countries [redacted] 25X

The technology acquisition efforts of the Soviet and surrogate intelligence services have become more systematic and effective in the past 10 to 15 years. Their collection efforts—both legal and illegal—are well coordinated on a global scale to maximize the total effect of the Soviet acquisition effort. Their collection activities are closely tailored to the changing security practices of Western governments and their industrial, commercial, and academic sectors. Among the trends we have noted over time in the Soviet intelligence services' efforts are the following:

— Weapon-related acquisitions increasingly are more selective, focusing on critical components and materials necessary to achieve greater performance.

— Greater emphasis is being placed on acquiring Western production technology and equipment, reflecting Soviet needs to increase the efficiency of large-volume production for the Warsaw Pact; much of this technology and equipment is subject to export controls, and its acquisition often is accomplished through intelligence-directed trade diversions.

— Commercial and emerging technologies are becoming priority targets in their own rights, indicating the military value placed on them by the USSR as well as their greater vulnerability to intelligence service acquisition methods.

— Acquisitions of US technology are being stepped up abroad, reflecting a relatively freer operational environment overseas than in the United States.

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— The role of the East European intelligence services has been increasing steadily over the years, and the Soviets are providing them with an ever expanding set of collection requirements; the rate of increase has risen recently as a result of Western embargoes on technology transfers to the USSR in the wake of Afghanistan and Poland. [redacted] 25X

As the vast array of the Soviet and East European intelligence services' scientific and technical collection activities suggests, neither the US export control community nor the Intelligence Community *separately* can respond adequately to this mounting threat to US national security. Furthermore, the Soviet intelligence services and their surrogates have acquired a large majority of US export-controlled and government-classified technology overseas through illegal trade diversions and intelligence operations. Thus, only a concerted and multifaceted approach to this problem—combining both effective export control policies and vigorous counterintelligence programs—by the United States and its allies can counter the broad-based Soviet and East European technology acquisition effort. [redacted] 25X

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DISCUSSION

Soviet Scientific and Technical Collection Efforts: Trends and Historical Context

1. The USSR traditionally has placed a high priority on and devoted large amounts of resources to the acquisition of Western technology by all means—legal and illegal. The primary objective of these efforts is to support Soviet and Warsaw Pact military programs, particularly in developing new weapon systems, improving existing ones, or developing countermeasures. The secondary aim of these acquisition efforts has been to reduce costs and increase efficiency in Soviet defense-industrial production, including those civilian sectors of the Soviet economy that support the USSR's defense effort.

2. The Soviets assign the highest priority to obtaining and exploiting US and other Western militarily significant technology. This effort began in the 1930s and continued throughout World War II as the Soviets reproduced US weapon systems that were provided to them under Lend-Lease auspices. The effort reached a high point in the immediate postwar period with clandestine Soviet acquisition of US atomic-weapons-related technology. From the late 1940s through the early 1960s, the Soviets continued to acquire and copy US and other Western military technology, often duplicating entire weapon systems. In a few instances, they have even tolerated short-term military dependence on foreign technology in order to incorporate designs and features not available through indigenous Soviet research and development, or to speed the development of high-priority weapon systems.

3. Since the mid-1960s, however, the Soviets increasingly have been more precise in their search for military technologies in the West. Having developed a capable technological base and an evolutionary design philosophy suited to their military doctrine, they now evaluate foreign military technologies more carefully, seeking to acquire and assimilate only those Western design elements, engineering features, and production technologies that best fit Soviet military requirements and industrial capabilities.

4. The Soviets' well-coordinated, high-level effort to acquire US and other Western technology has enabled the USSR and the Warsaw Pact to increase their military capabilities and spurred the United States to commit even greater resources to its defense effort. In addition to their traditional emphasis on acquiring Western military technologies, and their more recent emphasis on industrial production know-how and equipment, the Soviets now appear to be targeting new, emerging technologies under development in the West. These technologies—including adaptive optics, very-high-speed integrated circuits, superconductive systems, state-of-the-art computer devices, and genetic engineering and recombinant DNA—generally are the most advanced and least protected technologies in the United States and other Western countries. This focus is intended by the Soviets both to satisfy their military and industrial objectives and to prevent "technological surprise"—that is, a situation in which the USSR is caught unaware of the military applications of hitherto basic scientific research.

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Soviet Acquisitions of Militarily Significant Western Technology

5. The USSR is engaged in a well-organized, centrally directed, and growing worldwide program to acquire Western technology to satisfy its military and defense-industrial needs. (See table 1.) The Soviet intelligence services and their East European surrogates play a major role in acquiring US and other Western military technology, embargoed equipment, and manufacturing technology required to meet Soviet military objectives. This effort complements the overall Soviet program for legally acquiring such technology and equipment for their military and defense-industrial needs. Although Soviet and East European intelligence services' acquisitions of militarily significant Western technology [2] constitute a small

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[2] As used here, militarily significant technology is defined as that equipment, material, and technology having direct and immediate impact on Soviet military research, development, and production.

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Table 1

Selected Soviet and East European Legal and Illegal Acquisitions From the West Affecting Key Areas of Soviet Military Technology

Key Technology Areas	Notable Successes
Computers	Illegal and legal trade acquisitions of complete systems, hardware and software, including a wide variety of Western general purpose computers and minicomputers, for military applications; clandestine acquisitions of proprietary information; exploitation of captured avionics and fire-control systems.
Microelectronics	Complete industrial processes and semiconductor-manufacturing equipment through legal and illegal trade channels; if combined, this equipment probably is enough to meet 100 percent of the Soviet military requirement for high-quality microelectronics.
Signal Processing	Illegal trade acquisition of seismic streamers and associated computers and of acoustic spectrum analyzers for antisubmarine warfare (ASW).
Communications	Illegal trade acquisition of low-power, low-noise, high-sensitivity receivers.
Production	Legal and illegal acquisitions of automated and precision manufacturing equipment for electronics, materials, and possibly optical and laser weapons components; clandestine acquisition of documentation on production technology of weapons, ammunition, aircraft parts, turbine blades, computers, and electronic components.
Directed Energy	Metal foils for e-beam lasers and optical components acquired through legal and illegal channels.
Guidance and Navigation	Legal and illegal trade acquisitions of loran and other navigation receivers; illegal and clandestine acquisitions of advanced inertial guidance components, including miniature and laser gyros; captured US equipment, including terrain-following radars, antiradiation missiles, and fire-control systems; clandestine acquisitions of air-to-air and surface-to-air missiles and of ASW cruise missile and tactical ballistic missile guidance subsystems; legal acquisition of precision machinery for ball bearing production.
Structural Materials	Legal purchases and intelligence acquisitions of Western titanium alloys and welding equipment.
Propulsion	Missile case filament-winding technology through legal and illegal trade; some ground propulsion technology through illegal and legal trade (diesels, turbines, and rotaries); submarine nuclear propulsion plant designs by clandestine means; legal and illegal purchases of advanced jet engine fabrication technology and jet engine design information through clandestine means; captured jet engines from Vietnam.
Nuclear Weapons	Design of various bombs, warheads, and reentry-vehicle-related data through clandestine means.
Chemical Explosives	Clandestine acquisition of manufacturing details of advanced high explosives for nuclear weapons.
Acoustic Sensors (ASW)	Clandestine acquisition of underwater navigation and direction-finding equipment; seismic streamers acquired through illegal trade diversion.
Nonacoustic Sensors (ASW)	Clandestine acquisition of selected equipment and technology.
Radar	Exploitation of captured terrain-following radar and airborne intercept radar; clandestine acquisition of radars for fighter aircraft, air defense radars, and antenna designs for US surface-to-air missile systems.
Electro-Optic Sensors	Clandestine acquisition of information on US satellite technology; illegal trade acquisitions of laser rangefinders for tanks.

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portion of the overall Soviet effort, we believe that the overwhelming majority of worldwide Soviet acquisitions of militarily significant Western technology is obtained through their collection operations—clandestine, technical, and overt. The amount of classified technology acquired is believed to be relatively small, and the vast majority of that has been acquired outside the United States

6. In addition to the significant clandestine acquisitions of US nuclear weapons technology that led to Soviet nuclear bomb capabilities earlier than anticipated, the Soviet intelligence services clandestinely acquired over the past two decades details of several US nuclear warheads; US and British manufacturing details of advanced high explosives required for the production of nuclear weapons; and designs of nuclear propulsion systems, all of which have benefited Soviet military programs

7. Other clandestine acquisitions of Western technology, equipment, and systems by the Soviet and East European intelligence services that have been copied in their entirety or used in designing or manufacturing new Soviet weapons include:

— The US Sidewinder missile, which, when copied in its entirety, gave the Soviets their first heat-seeking air-to-air missile, the Atoll.

— The US Redeye, which aided the Soviets in developing their first shoulder-fired surface-to-air missile, the SA-7.

In addition, the Soviet Bloc services clandestinely acquired:

— Data on the guidance subsystem of the US Minuteman ICBM.

— Technical data on more than 200 gyros from a subsidiary of a US high-technology firm in Germany.

— Data on solid-propellant missiles, an area in which the Soviets considerably lag US developments, especially for use aboard submarines.

— Data on radars used on US F-14, F-15, and F-18 fighter aircraft that are likely to be used in developing similar Soviet radars.

— Data on the TOW and MILAN antitank weapons, probably to develop countermeasures.

— A German Leopard tank engine, probably for modification and use on the newest Soviet advanced tank.

Although it is likely that there have been many other significant acquisitions of which we are unaware, these clandestine acquisitions by the Soviet and East European intelligence services have permitted the Soviets to develop military capabilities much sooner than otherwise possible, and they have enabled the Soviets to reduce the qualitative edge of some Western weapons

8. The Soviet and East European intelligence services also use overt collection operations quite effectively to acquire Western scientific and technical (S&T) information. Their overt collections against US and other Western technologies have contributed to Soviet military systems. These acquisitions range from data on US ICBM silos (used by the Soviets in developing silos for their first solid-fuel ICBM, the SS-13), to technical data drawn from NASA's research on supercritical wing designs (which helped the Soviets to design and to build a new transport aircraft), to technical documentation on US and other Western military systems and their associated training and maintenance procedures

9. The Soviet intelligence services and their East European surrogates also collect much Western S&T information through technical collection means, mainly communications intercepts in the United States and abroad. We believe that the USSR has acquired technical data and design concepts on a number of Western missile, aircraft, and naval systems in this manner, and that this information is valuable to the Soviet Union's military and defense industries.

Soviet Tasking in the Technology Acquisition Effort

10. The Soviet Union's effort to acquire US and other Western technology is a massive, well-planned

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and well-financed national-level program. Overall approval for the Soviet acquisition effort is given by the Central Committee of the Communist Party of the Soviet Union (CPSU), which is the final authority for all policies of the USSR. CPSU directives concerning Soviet technology acquisition activities are implemented by the Council of Ministers of the USSR, which is the highest level of government in the Soviet Union and coordinates the official policies of the Soviet state. (See figure 1.)

Military-Industrial Commission

11. The high priority the Soviets assign to the acquisition of US and other Western technology is reflected in the dominant role played by the Military-Industrial Commission (VPK) of the Presidium of the Council of Ministers. The VPK's primary role is to coordinate the development and production of Soviet weapon systems. The VPK also plays the key role in developing requirements for both legal and illegal acquisitions of military and advanced dual-use Western technology. The VPK directly oversees the participation of the nine key Soviet defense industries in acquiring and exploiting foreign technology. (See figure 2.) Requests from these and the defense-support industries for Western technology are consolidated and validated by the VPK. The VPK also centrally directs the end use of design and production technology for the Soviet defense-industrial complex, and coordinates the technical examination and exploitation of foreign weapon samples in industrial research and development organizations. Finally, the VPK provides policy guidance for Soviet technology acquisition activities abroad.

12. VPK requirements are issued formally and in great detail. (See table 2.) The complete VPK requirements list resembles a book, containing some 400 to 500 pages of requirements encompassing a broad spectrum of military hardware and related production technologies and technical data. The VPK requirements list probably is revised and updated annually, reflecting changes in collection priorities and target availability. The VPK requirements list includes the items sought; their collection priorities; how long each requirement is valid; which Soviet ministry levied the collection requirement; the most likely sources of the technology to be acquired; and the budget for each acquisition. Provisions are also made for ad hoc, target-of-opportunity collections.

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13. The VPK requirements list is levied directly on the Soviet intelligence services. In those Western countries with extensive S&T collection targets, the residency of the GRU (see paragraph 25) probably has the entire requirements list. In most GRU residencies in the Third World, only those items likely to be available in country are specified for collection purposes, probably in an abstract from the larger requirements list. The KGB (see paragraph 18) works from the VPK requirements list in much the same fashion, as its S&T collection effort includes supporting Soviet defense-industrial production.

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State Committee for Science and Technology

14. The VPK requirements list is coordinated with the State Committee for Science and Technology (GKNT) of the Council of Ministers, which supports the VPK in both legal and illegal Soviet efforts to acquire foreign technology. The GKNT's scientific and technical information gathering and processing activities are vital to the generation of Soviet requirements for foreign technology acquisitions. These GKNT activities reside in a nationwide, centrally directed system that comprises some 100,000 individuals and 11,000 information departments affiliated with Soviet research institutes, design bureaus, and production facilities. The GKNT also collects technical information through a vast, complex network of scientific and industrial agreements and exchange programs with other countries and multinational corporations. The GKNT's All-Union Institute of Scientific and Technical Information (VNIITI) collects, translates, and disseminates scientific and technical publications, industrial patents, and technical journals from at least 117 foreign countries. Through VNIITI Soviet scientists, engineers, and technicians are kept abreast of foreign scientific, technical, and industrial developments.

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15. The GKNT, in conjunction with the Ministry of Foreign Trade, also exerts substantial control over legal purchases of US and other Western technology through its control over hard currency expenditures. This control helps to ensure that all proposed purchases are justified in terms of defense priorities before they are executed. It also serves to prevent

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Figure 1
Key Organizations Contributing to Soviet Military R&D, Manufacturing, and the Acquisition of Western Technology

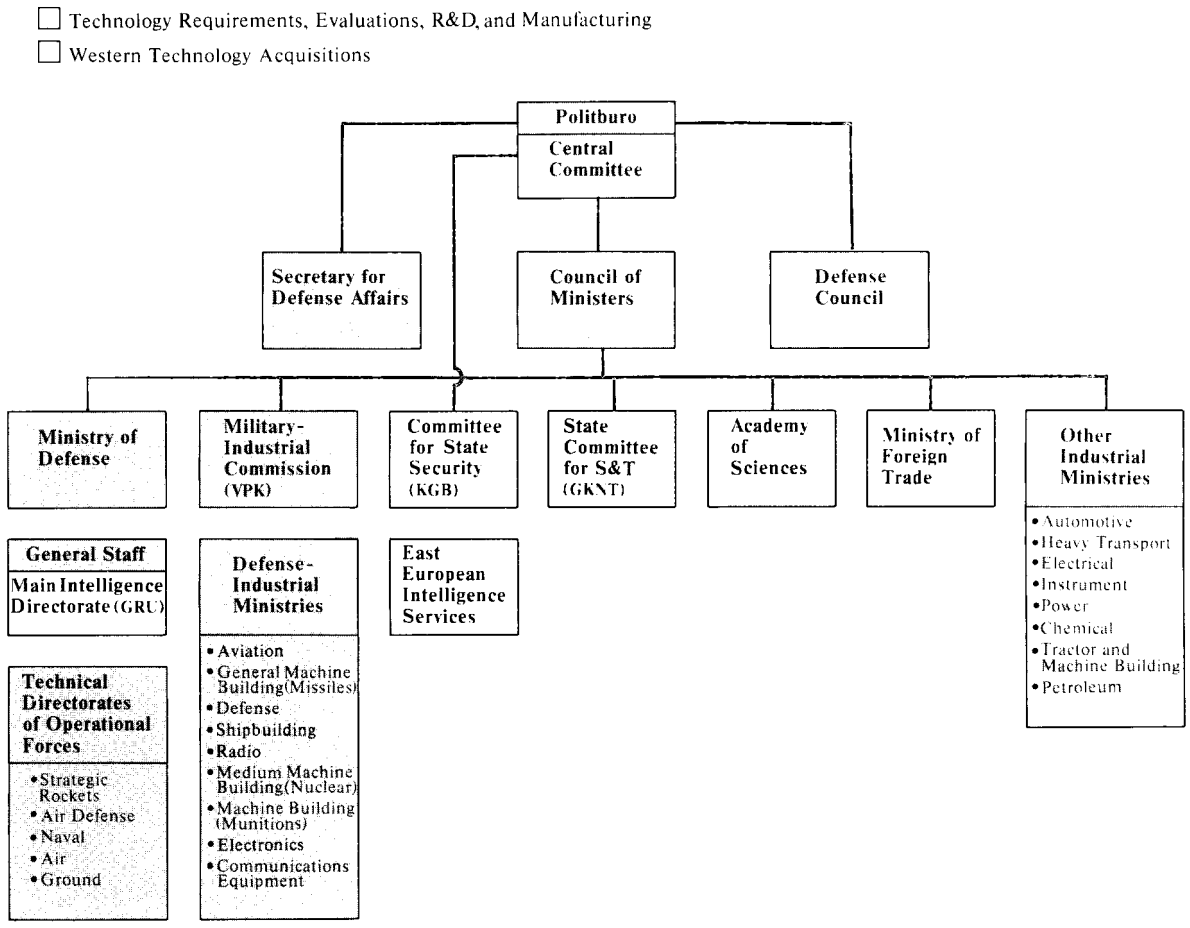

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Figure 2

The Soviet Requirements, Collection, and Acquisitions Cycle

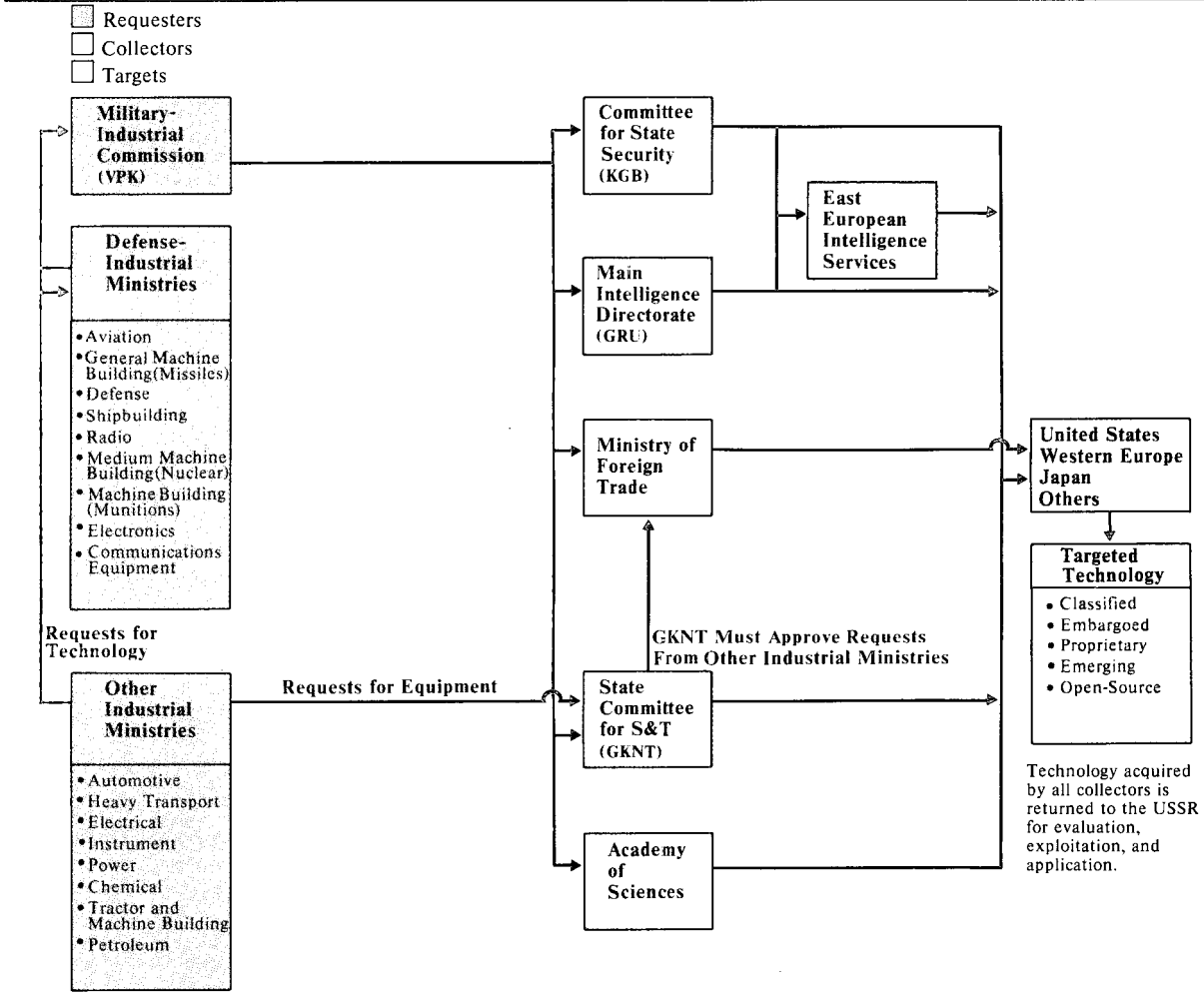

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Table 2

Excerpts From Early 1970s VPK Requirements List

Requirement No., Priority, Period of of Validity	Subject of Requirement and Quantity	Maximum Ruble Cost per Unit	Known Characteristics and Features or the Nature and Content of the Documentation	Country, Firm (date of production)
A010-0001b A-I 1975	Artificial satellites used for photo- and radiotechnical reconnaissance of ground targets 1 set	5,000	Scientific information and technical documentation: — Photographic equipment—resolution of the camera in relation to altitude and distance of the object: — precision matching of the pictures received to the terrain; — film supply; — design of the recovery capsule containing the exposed film	USA Customer AF SAMSO Los Angeles AF Station, California Firm Lockheed Aircraft Corporation
T062-0467 B-I 1971	Automatic assembly line for manufacturing noncontact fuse XM596, with integrated circuits, for 40-mm grenades fired from M75 rapid-fire recoilless launchers, 1 set of technical documentation	2,000	1. Folder of working blueprints of the assembly line. 2. Technological process of assembling the fuse on the automatic assembly line Source: "Electronic News" 1968, No. 676, pp. 4-5	USA Harry Diamond Laboratory Universal Instruments and Federal Tool Co.
T020-0164 B-II 1971	System of antisubmarine guided weapon "Asroc"—"ship-to-submarine" type. 1 set of scientific and technical documentation	2,500	Scientific information: — research in the area of development of new systems of antisubmarine guided-missile defense; — reports of test results on the missile "Asroc"; — methods used to evaluate the effectiveness of antisubmarine weapons	USA Honeywell (1960-62)
TR020-0163 B-II 1971	The system of the antisubmarine guided missile "Malafon" of the ship-to-submarine type 1 set of scientific and technical documentation	2,500	I. Scientific information: — research in the area of development of new systems of antisubmarine guided-missile defense; — reports on the results of testing the antisubmarine guided missile "Malafon"; — method of evaluating the effectiveness of antisubmarine weapons. II. Technical documentation: — blueprints of the general configuration of the missile, individual units of the engine, warhead, hull, and other units; — technical description of the antisubmarine guided missile "Malafon"; — technical materials on the guidance device and on searching and detecting of the target; — description of the guidance and homing systems; — blueprints and description of parachute and other braking systems in the above-water zone of the trajectory.	France "Societe Latecoere"

Table 2 (Continued)

Excerpts From Early 1970s VPK Requirements List

Requirement No., Priority, Period of of Validity	Subject of Requirement and Quantity	Maximum Ruble Cost per Unit	Known Characteristics and Features or the Nature and Content of the Documentation	Country, Firm (date of production)
S015-0238 B-II 1973	Aviation hydroacoustic station with lowered acoustic antenna for a flying boat 1 set	5,000	Technical documentation: — report with respect to the development of the acoustic station; — technical description of the complete station and its individual instruments (in the first place, the hydroacoustic antenna); — a set of the basic and functional diagrams; — operational instructions Source: 1. "Flug Revue Flugwelt national," 1968, No. 9, p. 31 2. U.S. Naval Institute Proceedings, 1968, vol. 911, No. 2, p. 125	Japan, "Oki Electric" (1968-1971)
A042-0116 A-I 1972	Effectiveness of various destructive agents against space, aerodynamic, and ground targets and methods of protecting them. 1 set		1. Scientific information (analyses, reports) on: — high-velocity collision of bodies; — factual data on the distribution and characteristics of micrometeorites as a function of distance from the Earth; — effect of meteor particles on space objects; 2. Technical documentation: — description of mechanisms for accelerating bodies of various materials to velocities exceeding 2-3 kilometers per second	USA "Langley Research Center," "Eglin" Air Force Base "Carnegie Institute of Technology" "Armor" Research Foundation Chicago "AF Cambridge Research Center"
Kh039-0311 B-II 1970	Technical report No. 69-15506 One copy	2,500	Ultraviolet and infrared spectra of free radicals in irradiated polyethylene Source: "Star," V. 7, No. 5, 1969, page 783	USA "Northwestern University Evanston" (1969)
K022-0019R B-I 1971	Communications and telemetry systems of the "Apollo" spacecraft 1 set	3,000	Technical documentation: description, diagrams, drawings	USA Massachusetts Institute of Technology, "Convair Co.," "Martin Co."

duplication of effort across the full range of acquisition methods available to the Soviet Union.

16. The GKNT also manages efforts to acquire Western technology through the collection activities of Soviet scientists and engineers in academic, commercial, and official science and technology exchanges, including those sponsored by the Soviet Academy of Sciences. In addition to overseeing Soviet participation in these exchanges, the GKNT serves to coordinate technology acquisitions through them by levying collection requirements on officially sponsored Soviet scientists, engineers, and academicians. This GKNT collection effort is closely coordinated with that of the Soviet intelligence services to minimize overlap and duplication of effort

17. Finally, the GKNT also levies collection requirements on the Soviet intelligence services when US and other Western technology sought by the USSR cannot legally be obtained under its auspices. The GKNT also provides scientific and technical guidance and support to the collection activities of these services

The Soviet and East European Intelligence Services: Organization and Operational Methods in Acquiring US and Other Western Technology

The Committee for State Security (KGB)

18. The First (foreign operations) Chief Directorate of the Committee for State Security (KGB) is responsible for a major portion of the Soviet clandestine science and technology collection effort. KGB emphasis on S&T collection has existed since well before World War II, but has increased steadily in the postwar years in direct response to pressures from the highest levels of the Soviet Government to intensify the acquisition of US and other Western science and technology.

19. Organizationally, the increased importance of S&T collection in the KGB was reflected in the upgrading of the former 10th (S&T) Department of the First Chief Directorate to directorate status in mid-1963. It was known as the Scientific and Technical Directorate until 1968, when it was redesignated Directorate T. Then, in May 1971, the Central Committee of the CPSU and the Council of Ministers of the USSR, after careful review, adopted a resolution specifically designed to strengthen further the work of Directorate T. The resolution stressed that a scientific and technical revolution was taking place and that, in the interests of national defense and development of the national economy, it was necessary for the Soviet Government to obtain timely information on scientific and technological plans and trends throughout the world.

20. The KGB was encouraged to focus on the consequences of military and industrial application of these developments, and particularly on the possibility that there would be qualitative changes in the development of armaments and technology in enemy countries. The resolution noted that it was particularly important to obtain information on works of applied military significance being carried out in the United States, the other NATO countries, and Japan

21. Directorate T intensified its efforts, as a direct result of the 1971 CC/CPSU resolution, and developed a plan with expanded operational objectives. The KGB also expanded Directorate T's Scientific Research Institute. This institute collects, reviews, and analyzes all S&T information available to the KGB, and it also prepares requirements for the operational components of the KGB. To accomplish these tasks, the institute was expanded in 1971 from approximately 450 to nearly 600 employees, about 50 of whom were KGB staff personnel and the rest civilian workers with various technical backgrounds.

22. Within the First Chief Directorate of the KGB, primary responsibility for conducting S&T collection operations rests in Directorate T, which has nearly 1,000 officers on its staff in the USSR and abroad. KGB foreign residencies with S&T missions have a component that goes by the name of Line X, manned by Directorate T specialists. Line X officers conduct the majority of clandestine S&T operations. There are 250 to 300 Line X officers serving abroad at present.

In all instances, these dedicated S&T officers are assisted by other intelligence assets.

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23. Directorate T/Line X officers in the West are concentrated largely in North America, Japan, and Western Europe. There are, however, significant Directorate T operations run against S&T targets of opportunity in other countries. These include those Third World countries that may be developing indigenous technological capabilities and/or obtaining them from the West as well as spotting, assessing, and recruiting US citizens abroad and foreign students who may study in the United States.

24. The best available insight into specific KGB tasking is contained in the long-range work plan for Directorate T, covering the period 1972-76, which outlined both operational and informational objectives. An analysis indicates that this plan remains valid. Among the most important of these objectives is the penetration of the leading scientific research centers, firms, and government institutes in the United States, Western Europe, and Japan for the purpose of obtaining scientific and technical information, data, and documents. The KGB was, and continues to be, interested in basic research and development efforts having potential military applications. This is particularly true if such efforts have the potential to upset the strategic balance. Thus the KGB has targeted a wide range of basic research in such fields as lasers, weather modification, earthquake and tsunami wave inducement, and antigravitation.

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The Main Intelligence Directorate (GRU)

25. The Main Intelligence Directorate (GRU) of the Soviet General Staff has put a high priority on collecting military S&T information since the earliest days of Soviet military intelligence. Before 1953 there was a Scientific and Technical Department within the GRU, responsible for the S&T collection program. It apparently was decided that this represented an unnecessary degree of specialization in a military intelligence organization, and the department was abolished in 1953. Since then, there has been no single component within the GRU responsible for clandestine S&T collection. Rather, the responsibility has been given to the GRU's four geographical directorates as one of their basic and integral functions. Most of the S&T collection work is done by the First Directorate (Europe) and Third Directorate (North and South America). Except for Japan, the Directorates for Asia and Africa/Near East have fewer S&T targets of priority interest.

26. The GRU differs from the KGB in that the GRU has no dedicated cadre of career S&T specialists. Instead, most GRU officers have technical backgrounds and educations, and all of them include S&T collection as an integral part of their responsibilities.

27. As in the KGB, GRU residencies in the West operate on the basis of an annual plan, sent from the GRU center each year, which outlines the priority collection requirements for the following year in the country in question. These requirements are drawn primarily from the VPK requirements list. The plan covers such things as the military policy of the host country, specific requirements on its armed forces, similar information concerning neighboring countries of interest, separate requirements on weapons and other specialized areas of technology, and, in a separate section, military-economic requirements. This is the framework in which the GRU resident conducts his operations.

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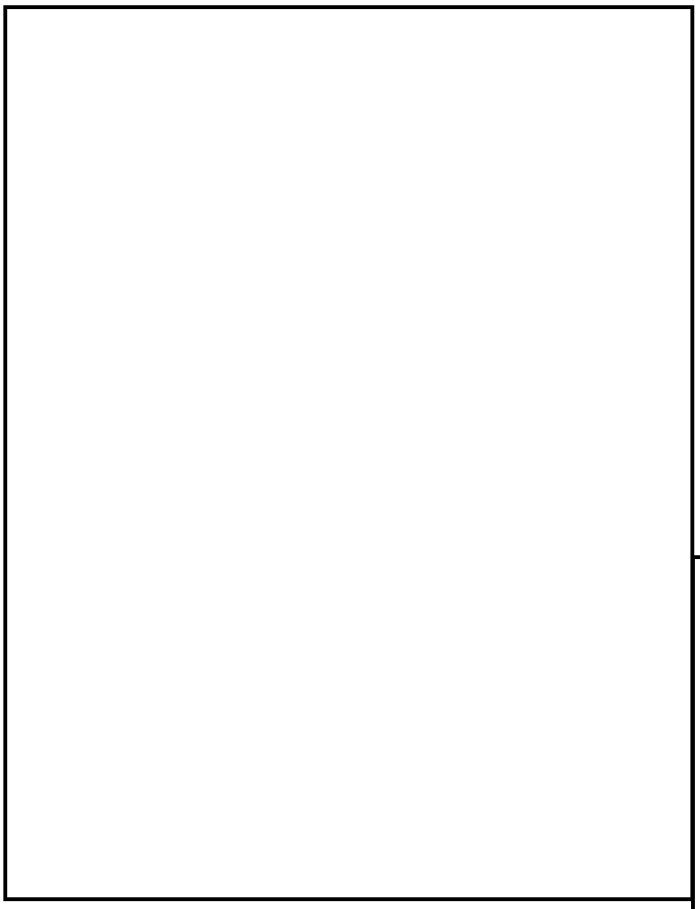

S&T Collection Methodology of the Soviet Intelligence Services

28. In conducting S&T collection operations, the KGB and the GRU use all of their normal operational methods, with a few refinements that seem particularly suited to S&T operations. Although the United States is the primary S&T target, both the GRU and the KGB have long believed that it is a comparatively difficult place in which to operate. For this reason, US technology is more easily acquired abroad. Consequently, third-country operations have been stressed, both against Americans abroad and against foreign firms affiliated with American companies of S&T interest

29. ***Clandestine Operations.*** The basic clandestine activities of the Soviet and East European intelligence services involve the use of recruited agents-in-place to commit espionage. These services have focused their recruitment effort on both Americans and foreign nationals with access to controlled US technology. These targets include American businessmen and government officials; officials of foreign governments, foreign firms, and foreign subsidiaries of US firms; representatives of international organizations having access to advanced and/or proprietary technology; and Western scientists, academicians, and students

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30. ***Illegal Diversions.*** Illegal diversions of technology fall into two general categories. One is the illegal diversion of controlled US technology from legitimate trade channels to proscribed destinations. This is done through foreign firms willing to engage in profitable impropriety, agents-in-place in foreign firms or foreign subsidiaries of US firms, Communist-country-owned but locally chartered firms, and foreign purchasing agents (including arms dealers) In many instances, these illegal

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diversions are accomplished through the use of forged shipping and licensing documents employed by dummy firms either established by or having close ties with the Soviet intelligence services or their East European surrogates. In one example, East Germany's Ministry for State Security established dummy firms in Vienna for the sole purpose of acquiring advanced microelectronics technology illegally. The Soviet intelligence services and their surrogates are in the mainstream of this illegal trade flow. The other category is in-place diversion in which legally acquired technologies are put to illegal end uses and/or used by unauthorized end users. Both types of illegal diversions are extremely difficult to detect and monitor. [redacted] 25X1

31. The USSR has been the dominant force behind illegal trade diversions of Western technology, with Poland and Hungary apparently being major East European participants. The principal entities responsible for illegally diverted Western technology have been located in West Germany, France, and Japan. The principal third-country intermediaries through which US technology has been illegally diverted include West Germany, France, Austria, Switzerland, and Japan. Illegal trade diversions are also reported to have taken place in Belgium, the Netherlands, Spain, South Africa, India, Canada, the United Kingdom, Italy, Sweden, and some Middle Eastern and Southeast Asian countries. [redacted] 25X

32. ***Communist-Country-Owned, Locally Chartered Firms.*** [redacted] 25X

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These firms provide an excellent base for Soviet Bloc intelligence service activities within the United States; a forward base for mounting "legal traveler" intelligence operations in the United States; an effective means for overt acquisition of controlled US technology; and an operational mechanism to acquire illegally US technology in high-priority sectors (electronics, precision machine tools, and complete industrial processes) subject to export controls. [redacted]

33. Most West European countries have at least 20 Communist-country-owned, locally chartered firms each, with some having as many as 50. The location of these firms abroad (both legitimate and dummy firms) facilitates the acquisition of US technology because US oversight overseas is sharply limited. [redacted] 25X

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34. Over the past few years there has been increasing evidence of the use of Communist-country-owned firms by Soviet and East European intelligence services in the United States to acquire controlled technology. These firms can legally purchase controlled US technology and study it without actually violating US export controls unless they attempt to ship the equipment or related technical data out of the United States. Such activity is difficult to assess because these companies are formed under state laws and are not required to incorporate with the US Government.[3] Furthermore, because representatives of Communist-country-owned but US-chartered companies are not obligated to identify themselves as agents of foreign governments, there is a great risk that joint ventures between such firms and US corporations could result in serious technology losses

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35. ***Exploitation of Scientific and Technical Exchanges.*** Efforts by the Soviets and East Europeans to acquire US technology are extensively abetted by the overt (and essentially legal) collection activities of their scientists and engineers who participate in academic, commercial, and official S&T exchanges. The Soviets believe that their scientists participating in these exchanges are able to acquire Western technology of considerable S&T and military benefit. Soviet and East European students and technical delegations visiting the United States are generally of high quality, and we suspect many of them are associated with classified work in the country from which they come These visits and various arrangements that permit direct Soviet access to US companies are considered to be among the more important sources of technology loss because of the "hands-on" experience and collegial working relations with US counterparts gained by Soviet participants.

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36. The Soviet intelligence services play a major role in overall Soviet S&T collections in the exchanges. Soviet participants in this program are briefed on desired S&T intelligence collection targets before leaving for their assigned placements in the United States. Once in the United States, these co-optees of the Soviet intelligence services seek to satisfy these requirements and to assess their American colleagues for potential intelligence operational purposes. On their return to the USSR, these scientists are debriefed by Soviet intelligence officers seeking to glean any S&T information of potential use to the Soviet military effort.

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37. The Soviet intelligence services also use the exchange program to facilitate their overall S&T collection effort. This is done in a number of ways, including supporting other clandestine, technical, and overt operations in North America.

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38. ***Exploitation of International S&T Organizations.*** Examples of such organizations include the International Institute for Applied Systems Analysis (IIASA), the International Atomic Energy Agency (IAEA), and various S&T offices associated with the UN. The Soviets and East Europeans have taken advantage of their positions in these organizations to acquire Western S&T information and proprietary

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[3] There are statutory requirements for registering various forms of foreign investment in the United States. However, these are limited to entities that issue stock or securities. The degree to which even this information may be made available to US intelligence and law-enforcement officials is strictly limited by law.

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technology. All Soviet personnel in such organizations are obliged to acquire such information. There also have been instances where these positions have been used to facilitate the acquisition of controlled Western technology and to mount traditional clandestine intelligence operations.

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39. ***Overt Collection Activities.*** The Soviet intelligence services are engaged heavily in acquiring open-source scientific and technical information. Thus, Soviet intelligence officers frequently attend S&T fairs, exhibitions, and conferences. They then send written reports to their headquarters recounting the lectures and briefings they have heard, and attaching the brochures and other documents they have collected. In addition, Soviet intelligence officers subscribe heavily to S&T periodicals and other literature. These may be relayed to their headquarters simply for translation and analysis, or residencies may extract information on particular subjects over time and then write reports based on this open research. Finally, Soviet Bloc intelligence officers have been engaged in exploiting US and other Western data bases. This activity has led in the past to massive Soviet purchases of unclassified and occasionally declassified US Government technical documents through the Department of Commerce's National Technical Information Service, a practice that was ended in 1981; the East Europeans, however, continue to have access to this source of technology. The Soviets also have gained access to Western commercial computer data bases through IIASA, including the Lockheed data base Dialog, the European Space Agency's data base Diane, and the International Patent Documentation Center. The Soviets also subscribe to at least one privately owned US microfilm information management system containing more than 7,000 unclassified documents published by various US Government agencies, including training manuals of the armed forces. Finally, although we have no evidence of Soviet Bloc intelligence service use of the Freedom of Information Act (FOIA) to acquire US technology, the FOIA does provide the potential for such acquisitions to the extent that useful information not subject to FOIA exemptions is contained in federal records. These overt collection activities afford the USSR broad access to unclassified S&T information, some of which may be export controlled.

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Soviet Technical Collection: Communications Intelligence

40. The USSR has mounted an extensive communications intelligence (COMINT) effort to acquire US and other Western technology. Through this effort, the Soviet intelligence services have been able to acquire sensitive S&T information—proprietary, export controlled, and even government information which in the aggregate clearly is classified [4]—of value to the

[4] Although US Government regulations require the transmission of classified R&D information via secure means, these regulations are not always strictly observed. Moreover, because of the extensive use of telecommunications by US defense contractors and other high-technology firms (often via facsimile), large amounts of export controlled and proprietary S&T information are vulnerable to the Soviet COMINT threat

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Warsaw Pact's military and defense-industrial capabilities. The Soviets regularly monitor the communications of US defense contractors. Assessments made with the help of such contractors revealed that acquisitions by this means enable the Soviets to gain significant information on key defense programs, including strategic and tactical ballistic missiles, new military aircraft, ships and submarines, and space and reconnaissance systems; some of these programs are still under development. In addition to its direct use in acquiring Western S&T information, COMINT can also be used by the Soviet intelligence services to guide their other collection efforts.

42. ***COMINT Sites in the USSR.*** The KGB currently has at least 10 intercept facilities in the USSR that have a mission of monitoring foreign communications satellites. These facilities are probably used to monitor commercial traffic, which would include scientific and technological data, transmitted over the INTELSAT network

43. The GRU COMINT effort is the responsibility of the Sixth (Radio and Radio-Technical Intelligence) Directorate. This directorate is tasked with collecting intelligence derived from foreign military communications and electronic emissions, primarily from the military forces of the United States, the West European countries, and China. The GRU effort also includes monitoring the INTELSAT network.

44. ***Auxiliary General Intelligence Vessels.*** The more than 50 AGI vessels in the Soviet and East European inventory are charged with monitoring both communications and noncommunications electromagnetic emanations via such missions as area patrols along coastal regions, surveillance of US and NATO fleet exercises and ship transits, surveillance of sea trials, missile tests, and space operations. Established AGI patrols include one off the US east coast (covering the area from Norfolk, Virginia, to the Florida Keys), and periodic presence off the US west coast near the western test range. Collection of technical intelligence is likely in view of the vulnerable emanations in those areas. Surveillance of sea trials, missile testing, space operations, and shore-based naval and military signals offers the Soviets a wealth of R&D technical data with direct military application.

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45. ***The Lourdes Central Signals Intelligence Complex at Torrens, Cuba***

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East European Services

48. Many Soviet requirements for the acquisition of Western technology are closely coordinated among the East European intelligence services. This coordination is achieved in three general ways. The first is through a priority list of general requirements supporting economic development in the member states of the Council for Mutual Economic Assistance (CEMA). This CEMA list is approved by the chiefs of the various East European intelligence services and guides the general Bloc efforts to acquire Western technology

through illegal and/or clandestine means. The second is through direct Soviet tasking of an East European service. These special requirements are levied by the KGB and the GRU in support of Soviet military and/or economic priorities. The Soviets delegate these special assignments to particular surrogate services on the basis of their collection capabilities against specific Western technological targets. Finally, individual East European intelligence services may apprise their Soviet counterparts of collection opportunities outside the scope of the CEMA priority list and direct Soviet tasking.

49. The Soviets value highly the S&T collection activities of their East European satellites, and often will offer them preferential treatment in return for their acquisitions of US and other Western technology. In many instances, this preferential treatment may take the form of increased military and/or economic assistance.

50. In the past two years, the USSR has made increased use of its East European surrogates to acquire Western technology. This stems primarily from the Western post-Afghanistan embargo on technology transfers to the USSR but not to Eastern Europe, and it coincides with an overall increase in Soviet and East European efforts to acquire Western technology early on in the research and development cycle before it is classified or protected by proprietary controls.

51. The principal East European intelligence services tasked by the Soviets for acquisition of Western technology appear to be those of Bulgaria, Czechoslovakia, East Germany, Hungary, and Poland.[5] Each of these services is discussed below.

52. ***Bulgaria.*** In 1980 the Bulgarian Directorate of State Security (DS) reorganized its First Chief Directorate (foreign intelligence) to upgrade the S&T component to directorate level. This reorganization reflected a high-level Soviet request that the chief target of the Bulgarian service be S&T collection abroad. Bulgarian intelligence officers have said that they will do anything to get this type of information and that the specific field is not important. The prime mover behind this reorganization is Ognyan Doynov, the Bulgarian Politburo member in charge of industry.

53. As part of the new S&T program many more Bulgarian scientists and engineers will be sent on visits to the West to acquaint themselves with the latest developments in their fields of specialty as well as to develop information and access to S&T targets of interest. In addition, many more science attaches, all of whom are DS officers, will be assigned to Bulgarian embassies in the West. The number of science attaches will be more than doubled in the near future to about 25. All are said to be technically well qualified and are, or will be, targeted against specific technical areas in their countries of assignment.

54. While there is no evidence that the Bulgarian military intelligence service (RUMNO) has been directed to collect S&T intelligence, it stands to reason that any S&T information that would have military application would be of concern to the GRU and hence RUMNO, which is under GRU tutelage

55. ***Czechoslovakia.*** For more than 20 years there has been a department in Sprava I (foreign operations) of Czechoslovakia's Federal Ministry of Interior (FMV) responsible for scientific and technical operations. By the beginning of the 1980s, about 200 people were assigned to this department. Between 50 and 60 serve at FMV headquarters, with another 60 to 70 assigned to the Ministry for Technological and Investment Development and various Czechoslovak foreign trading companies. The remainder are stationed abroad in various Sprava I residencies.

56. In recent years the S&T department of Sprava I has increased in both size and importance. It is free to expand its budget and staff in order to carry out its mission, and it operates within the context of an executive agreement between the FMV and the KGB. The S&T department receives specific requirements from the Ministry of Technological and Investment Development and from Czechoslovak military research institutes

57. There is no current reporting on the S&T operations of the Czechoslovak military intelligence service (ZSGS). We assume, however, that the ZSGS works closely with the GRU.

58. ***East Germany.*** The primary point of contact for Soviet coordination of Bloc technology acquisition

[5] Reporting indicates that the Romanian and Yugoslavian intelligence services generally are not responsive to Soviet tasking for such collection activities.

efforts in East Germany is that country's Ministry for State Security (MfS). The MfS executive management is responsible for cooperating with the KGB in support of the military and industrial sectors of the Soviet economy. Within the MfS, the Science and Technology Sector (SWT) of the Main Administration for Intelligence has the primary responsibility for collection against Western technological targets.

59. The core target of the SWT acquisition effort is military-related technology held in the NATO countries, particularly in the United States and West Germany. The most important of these technologies are those involved in the development, production, and planned combat use of nuclear, biological, and chemical weapon systems. The SWT is also tasked to collect intelligence information on new, emerging high-technology developments in fields—such as microelectronics, energy (including nuclear), materials and production, and biochemistry—with potential for both military and industrial applications.

60. The SWT is tasked by the KGB to collect scientific and technological intelligence in the United States and Western Europe. This collection effort is coordinated in two ways. First, the director of the SWT meets at least annually with his KGB counterpart. The thrust of these Moscow consultations probably is to discuss particular collection requirements and problems. These meetings are complemented and given continuity by the presence of a KGB liaison officer on permanent assignment to the SWT. This officer is in a position to levy both written and verbal requirements on the East Germans, and selects the SWT acquisitions for distribution by the KGB to Soviet end users.

61. ***Hungary.*** There is increasing evidence that Hungary is actively engaged in operations involving technology transfer and illegal trade diversions. These efforts are undertaken largely at the behest of the Soviets, who levy the requirements and provide the money. Although there is little available information concerning the extent to which the Hungarian intelligence services are involved in this activity, they obviously play a role. The III Main Group Directorate of the Ministry of Interior, Hungary's civilian intelligence service, uses its officers and co-optees stationed abroad in commercial positions not only to negotiate trade deals with Western companies but to obtain covertly from Western businessmen S&T information and embargoed items. Intelligence officers with technical backgrounds work under cover in Hungarian foreign trade enterprises concerned with specialized fields such as electronic equipment and computers, and it must be assumed that they also are involved in illegal trade diversions.

62. It is not known to what extent the Hungarian military intelligence service (VKF-II) is involved in

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technology transfer activities, but its officers stationed abroad at military attache offices are engaged in the collection of overt information in the S&T field as well as in military-related fields. [redacted]

63. ***Poland.***[6] The major focal point in Poland for KGB coordination of efforts to acquire Western technology is the Ministry of Internal Affairs (MSW). The MSW's major external intelligence functions include the collection, evaluation, and dissemination of scientific, technological, and industrial information and materials. This effort is complemented by the Second Directorate (Z-II) of the Polish Army's General Staff, carried out with GRU coordination. The external functions of Z-II include collecting, analyzing, and disseminating scientific and technological information related to the capabilities and intentions of NATO. [redacted]

[6] The activities attributed to the Polish intelligence services in this section have been reduced in the wake of Poland's continuing political and economic difficulties. [redacted]

64. The Soviets reportedly have been impressed with the success of Polish efforts to acquire Western technology and have agreed to subsidize them by direct contribution to the Polish budget. In 1979 this subsidy reportedly amounted to $15-20 million, or roughly 30 percent of the total planned Polish expenditure of $50 million for acquisition of Western technology. [redacted] 25X

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65. The MSW is under constant pressure from the KGB to procure Western production know-how in the fields of microelectronics and computers, aircraft mainframes and engines, avionics, and military-related technologies. These emphases probably reflect mounting Soviet concerns about rapidly increasing costs in both military and civilian production, as well as projected manpower shortages in the Soviet labor force, together with more traditional Soviet problems such as relatively lower productivity and resource waste. [redacted] 25X1

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IMPLICATIONS AND OUTLOOK

The acquisition of Western military technology and industrial production equipment by the Soviet intelligence services has saved the USSR's defense establishment valuable time and resources in its effort to keep pace with military developments in the West. Weapons designs and technical documentation have provided proven approaches and technologies thus reducing technical risks and R&D costs. Engineering insights gained from the exploitation of acquired Western military technology have permitted the Soviets to gain improved weapon performances by copying Western designs and incorporating effective countermeasures into their new systems development. Western production equipment and industrial technology—much of this acquired by illegal means—have been used to manufacture critical military components years before the Soviet defense industries could develop their own. Furthermore, the Soviets and their Warsaw Pact allies, often with direct assistance from their intelligence services, have been able to acquire much defense-related equipment, material, and technology through open and legal means. Finally, as a consequence of these and other acquisitions of Western equipment and technologies, the Soviets have been able to allocate more resources to the support of their war-fighting capabilities.

The acquisition and effective use of Western technology has had a detrimental effect on US national security in at least two ways. First, through acquisitions of Western technology the Soviets have been able to field a greater variety of more sophisticated and effective weapons in a shorter period of time. This has permitted them simultaneously to improve military capabilities and to devote more resources to the development of advanced weapons concepts such as directed-energy weapons, antisatellite programs, and titanium hull attack submarines. Second, infusions of Western technology and equipment have lightened the burden of continuing growth in Soviet R&D and defense spending. As a consequence, the United States and its allies must devote even more of their own resources to offset these increases in Soviet military power.

The operations of the Soviet and East European intelligence services continue to pose the most serious and immediate threat to the security and protection of militarily significant Western technology. Their organization and central direction for the collection of Western technology have been developed to a high degree of precision over the last 10 to 15 years in order to meet the changing needs of Soviet weapons designers and defense manufacturers. At the same time they have developed appropriate clandestine, technical, and overt collection operations tailored to the changing security practices of Western governments and their industrial and private sectors. Taking advantage of the openness of Western research centers and inadequate commercial security, Soviet and East European intelligence services have moved quickly to exploit these sources of new and emerging technologies for their military needs.

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The task of stopping Soviet intelligence operations aimed at Western military and industrial technologies already poses a formidable problem, both in the United States and abroad. This task is likely to become even more difficult in the future as several trends identified in the 1970s continue into the 1980s:

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- First, since the early 1970s, the Soviets and their surrogates among the East Europeans increasingly have used their national intelligence services to acquire Western civilian technologies—for example, automotive, energy, chemicals, and even consumer electronics.
- Second, since the mid-1970s, Soviet and East European intelligence services have emphasized the collection of manufacturing-related technology, in addition to weapon technology.
- Third, since the late 1970s, there has been increased emphasis by these hostile intelligence services on acquiring new technologies emerging from Western universities and research centers.

The combined effect of these trends is a heavy focus by the Soviet intelligence services on the commercial sectors in the West—sectors that normally are not

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protected from hostile intelligence services. In addition, the security provided by commercial firms is no match for the clandestine operations of such intelligence services. The most alarming aspect of this commercial focus by the Soviet intelligence services and their surrogates, however, is that as a result of their operations they have access to those advanced technologies that are likely to be used by the West in its own future weapon systems.

The Soviet intelligence services' S&T collection units have grown in both the numbers of highly qualified scientific officers and technical collection capabilities. These services' S&T collection efforts today are worldwide, focusing first on the United States, Europe, and Japan, and secondly on those less developed countries that possess or have access to advanced Western technology. Through the use of its East European allies' intelligence services and other surrogates such as Cuba, the USSR's collection efforts pose a multifaceted threat to the West. The satisfaction of the Soviet Union's national-level requirements for Western equipment and military technology serve as the common denominator for the direction and coordination of this multifaceted and multinational collection program.

We estimate that future Soviet and East European intelligence service S&T acquisition efforts—clandestine, technical, and overt—will be concentrated worldwide on the following types of Western technology:

— **Weapons designs and related defense production technology,** particularly against US technology both in the United States and abroad with some increased emphasis given to the technology of US allies.

— **Embargoed equipment, goods, products, and material, and associated technologies,** especially dual-use items obtained through the clandestine efforts of the Soviet and East European intelligence services.

— **Company proprietary technology** necessary to manufacture advanced commercial components and systems, using clandestine and illegal means to acquire these for future military and defense industrial applications; intelligence efforts against these types of technology are as likely to be concentrated in other Western countries as in the United States.

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— **Government-generated S&T information and unclassified but defense-applicable technology** produced largely by the United States, acquired mainly by overt Soviet and East European collectors and through multinational open-source document procurement, organized and directed by Soviet Bloc intelligence.

— **Emerging technology** from Western government research centers and universities, using visiting Soviet and East European scholars and researchers and commercial delegations targeted and supported by Soviet Bloc intelligence; since the post-Afghanistan sanctions, these activities have declined in the United States and increased abroad, especially in West Germany and Japan. In the United States, a trend noted is that Soviet and East European visitors increasingly have made use of unofficial, non-government-sponsored exchanges to avoid US Government controls associated with official exchanges.

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To counter the general Soviet technology acquisition effort, and in particular the collection activities of the Soviet intelligence services and their surrogates, the United States and its allies must develop a multinational program combining improved export control and enforcement policies with vigorous counterintelligence actions. Only such a concerted and multifaceted approach to the technology loss problem can oppose successfully the broad-based Soviet and East European acquisition agenda.

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