Secret

Directorate of
Intelligence

CIA/SW 88-10036X

Soviet Weapons Forecasting: The Role of the Military Scientific Research Institutes

A Research Paper

Secret
SW 88-10036X
May 1988
Copy

Warning Notice	Intelligence Sources or Methods Involved (WNINTEL)
National Security Information	Unauthorized Disclosure Subject to Criminal Sanctions

Dissemination Control Abbreviations	NOFORN (NF)	Not releasable to foreign nationals
	NOCONTRACT (NC)	Not releasable to contractors or contractor/consultants
	PROPIN (PR)	Caution—proprietary information involved
	ORCON (OC)	Dissemination and extraction of information controlled by originator
	REL...	This information has been authorized for release to...
	WN	WNINTEL—Intelligence sources or methods involved
	A microfiche copy of this document is available from OIR/DLB (482-7177); printed copies from CPAS/IMC (482-5203; or AIM request to userid CPASIMC). Regular receipt of DI reports can be arranged through CPAS/IMC.	Classified by Declassify: OADR Derived from multiple sources
	All material on this page is Unclassified.	

Directorate of
Intelligence

Secret

Soviet Weapons Forecasting: The Role of the Military Scientific Research Institutes

A Research Paper

This paper was prepared by

Office of Scientific and Weapons
Research. Contributions were made by members of

Comments and queries are welcome
directed to the Chief
OSWR

Reverse Blank

Secret
SW 88-10036X
May 1988

Soviet Weapons Forecasting: The Role of the Military Scientific Research Institutes

Summary

Information available as of 15 April 1988 was used in this report.

Analysis [redacted] shows that specialized military scientific research institutes (NIIs) play a pivotal role in determining the makeup and direction of prospective Soviet military systems and technologies. Acting on assignments from the General Staff and main staffs of the service branches and working according to normative statutes, these institutes are responsible for:

- Analyzing weapons research and development (R&D) programs and trends worldwide and assessing the directions in which opposing systems are likely to develop.
- Forecasting Soviet weapons and technologies and determining and justifying the directions of their development. This activity is an integral part of the Soviet five-year planning process.
- Drafting requirements for the development of weapons and military technology.
- Assessing the combat- and cost-effectiveness of prospective weapon systems and those in development

[redacted] in addition, the institutes support the routine procurement responsibilities of their parent organizations, the main and central armament directorates of the Ministry of Defense. This support activity consists principally of contracting for and monitoring the military R&D activities of the industrial sector

We have identified a network of military NIIs [redacted] Some are subordinate to armament directorates of individual services and others to directorates that support all the services. The NIIs apparently are all headed by flag-rank officers and are staffed primarily with engineering officers [redacted] the number of personnel assigned to a given institute can range from about 800 to several thousand

In their dual role as military R&D think tanks and action arms of their parent armament directorates, the institutes use systems analysis and operations research techniques to assess the relationship between Western and Soviet weapons. The military NIIs are, therefore, avid customers for information on Western weapons programs. Security and deception on the part of Western R&D planners can frustrate their activities

Secret

Although the military NIIs' quality of work probably varies, on balance they are successfully fulfilling their mission of determining weapon performance requirements. We consider the performance characteristics of Soviet weapons to be generally competitive with those of Western systems, despite the generally moribund Soviet economy and severe problems in assimilating science and technology advances

Secret

Contents

Secret

Soviet Weapons Forecasting: The Role of the Military Scientific Research Institutes

Introduction

The Soviet Ministry of Defense (MO) [1] is responsible for all aspects of the development, administration, and control of the Soviet armed forces. This includes the responsibility for generating weapon system and materiel requirements and for monitoring the research, design, development, test, and production of military equipment carried out by the industrial ministries. A specialized subset of military scientific research institutes (NIIs) act as the executive agents of the ministry and the armed forces branches in forecasting weapons needs, generating technical requirements for weapons, and performing systems analysis and cost benefit assessments of proposed weapons.[2] (These institutes, and the military directorates to which they are subordinate, are listed in appendix A.

Ministry of Defense Oversight of Weapons Planning and Acquisition

Weapons planning within the armed forces is a complex process requiring the meshing of the views and requirements of war planners, military-economic planners, weapons technology authorities, and service commanders.[3] Consequently, the military NIIs are supervised by, or draw guidance from, a number of bodies in the MO.

Deputy Minister of Defense for Armaments

The Deputy Minister for Armaments is the senior technical official within the MO and a central authority for supplying the armed forces with high-quality armaments and related equipment. He is probably responsible as well for assuring that weapons research and development (R&D) is responsive to the CPSU's military-technical policy. Currently the position is occupied by Army General V. M. Shabanov. The Deputy Minister (see figure 1) provides technical oversight, and possibly administrative control, to a group of main and central armament directorates, each of which is concerned with specialized areas of arms and/or equipment. He provides guidance for the "technical" work of the armament directorates, including ensuring that military programs benefit from the highest levels of science and technology (S&T) and that there is a high degree of standardization of hardware and equipment among services. Through these armament directorates the Deputy Minister oversees the work of their subordinate military NIIs.

A scientific and technical committee (NTK) operates under the chairmanship of the Deputy Minister for Armaments. The NTK is primarily an advisory body that acts as a soundingboard for new theories and for S&T problems related to military armament. Its membership apparently includes the chiefs of the service armament directorates. Each of the five military services in turn has its own NTK. These committees assist the armament directorates in monitoring the R&D activities of their services and advise the commander in chief of the service on weapons and equipment development and procuremen

[1] For an explanation of Soviet terms and abbreviations used in this paper, see appendix C.

[2] There are other kinds of military scientific research establishments that are outside the scope of this paper. These include institutes responsible for analysis of military-political or socioeconomic problems of war, those that operate test ranges, and others.

[3] For additional details, see DI Research Paper SW 88-10002X, January 1988, *USSR: Forecasting and Planning Weapons Acquisition*.

Secret

General Staff

Open literature indicate that the General Staff directs and coordinates the forecasting and planning of future weapons. It starts preparation of the five-year defense plan and plays a major role in identifying prospective weapons goals. The Strategic Planning Directorate of the Main Operations Directorate (GOU) drafts guidelines for the plan, establishes the planning calendar, and orders all armed forces staffs and MO directorates to forecast their activities. The Operational Planning Directorate of GOU drafts war plans for regions of the world, which correspond roughly to theaters of military operations. On the basis of information provided by the Main Intelligence Directorate (GRU), the Operational Planning Directorate identifies current and prospective strategic and operational threats and opportunities and devises war plans. These plans lead in part to the identification of operational tasks for future weapon systems

Main and Central Armament Directorates[a]

The main and central armament directorates of the Ministry of Defense are the primary weapons procurement organizations of the MO, according to open sources. Their mission is "to create contemporary models of arms and equipment and to equip the troops with them." They are responsible for formally documenting requirements for new weapon systems, monitoring the R&D of these systems, performing acceptance testing, and conducting quality control. They closely interact with the General Staff, the Deputy Minister for Armaments, and the specified armed services for which they act as contracting or purchasing agents. Some of the armament directorates, such as the one responsible for nuclear weapons (the 12th Chief Directorate of the Ministry of Defense—GUMO), are subordinate directly to the MO. Others, such as the Ground Forces Main Rocket and Artillery Directorate (GRAU), report to the service for which they acquire weapons. The armament directorates oversee, in conjunction with their subordinate NIIs and test ranges, the entire weapons life cycle, from conception to withdrawal from the inventory. The actual design, development, and production of weapons and equipment are performed in the industrial ministries

We believe that, to ensure that each component of the armed forces is supplied with the required types and quantities of weapon systems, the individual armament directorates perform three major functions:

- Supervision of the military R&D activities of the industrial ministries.
- Quality control inspection by representatives of the technical directorate (military representatives) at design bureaus and production plants.
- Equipment supply, storage, and maintenance, including coordination of delivery of final products from production plant

Coordination With the Academy of Sciences

The Academy of Sciences, by virtue of its leadership role in Soviet science, is a key source of information for organizations responsible for future weapons analysis and planning. The MO tasks and monitors military-related research performed by the Academy through a special studies group known as the Section of Applied Problems. In 1973 General Lieutenant Engineer Yuriy V. Chuyev, an authority on military operations research and forecasting, became chairman of the group, a position that he apparently still occupies. The Section of Applied Problems coordinates MO requirements with Academy research and manages military-related technology forecasts.

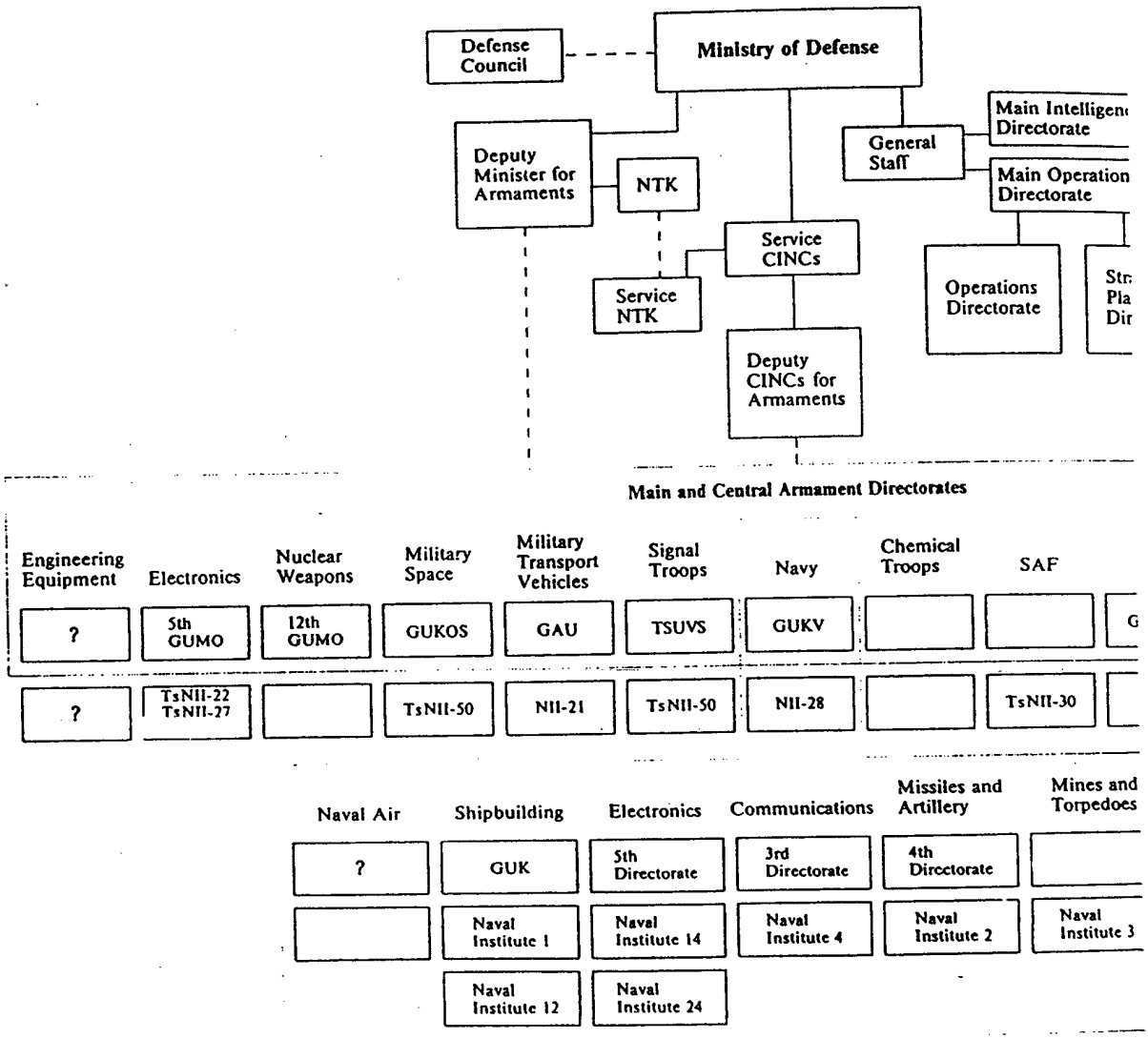
The section consists of 20 to 30 officers who are technically well qualified (many of them hold advanced degrees in such fields as engineering, chemistry, and physics

Military Scientific Research Institutes

Military NIIs subordinate to the armament directorates perform as the action arms and military R&D think tanks for the Ministry of Defense in specialized technical areas these institutes fulfill important assignments of the

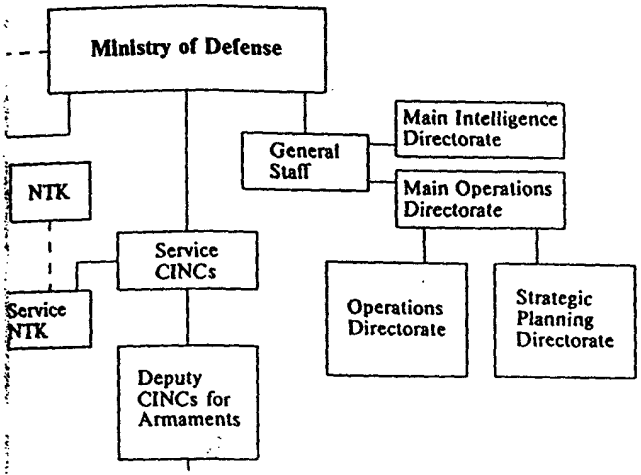
[a] We have been unable to discern any consistent difference in function between the main and central armament directorates despite the difference in their name

Figure 1
Weapons R&D, Planning, Assessment, and Oversight Bodies Within the Soviet Armed Forces[a]



[a] This figure shows the relationships of armament directorates, military NIIs, and naval institutes within the Ministry of Defense. Some of the directorates are probably subordinate to the Deputy Minister of Armaments; others are under the authority of the individual services.

Reverse Blank



Main and Central Armament Directorates

Signal Troops	Navy	Chemical Troops	SAF	SRF	Air Defense Forces	Ground Forces	
TSUVS	GUKV			GURVO	4th GUMO	GRAU	GBTU
TsNII-50	NII-28		TsNII-30	NII-4	NII-2	NII-3	?

lectronics	Communications	Missiles and Artillery	Mines and Torpedoes	Navigation and Hydrography
th irectorate	3rd Directorate	4th Directorate		
laval nstitute 14	Naval Institute 4	Naval Institute 2	Naval Institute 3	Naval Institute 9
laval nstitute 24				

ival institutes
o the Deputy

General Staff and the main staffs of the armed forces on the analysis of problems of modern war and on the development of new types of weapons, technology, and command and control support equipmen

Functions

The activities within a particular military NII can be divided into two categories:

- Those that are analytic and predictive in nature and that [redacted] are considered to be military-technical elements of "military science work."[1]
- Those that we believe support the routine weapons procurement responsibilities of the armament directorates.

Activities in the latter category could include acting as technical advisers within the service or MO, contracting for and monitoring the R&D work of the defense industries, and operating facilities at test range.

Focus on the Future

The activities of the military NIIs that fall within the category of military science work are future oriented, are directed by the General Staff, and are performed according to normative statutes. According to Soviet publications on USSR administrative law, such statutes promulgate legally binding obligations, forms and order of activities, and responsibilities. We believe that, as a result, there is consistency among military NIIs in the forms, methods, sequence, and output of their analytic work on future weapons.

[redacted] the principal research tasks of the military NIIs within their technical areas of competence include:

- Analyzing weapons trends and developments worldwide and determining the direction in which counterpart and countervailing enemy systems will develop.
- Forecasting future Soviet weapons and technologies and determining and "substantiating" (justifying, validating, or providing decisionmaking support for) proposed directions of their development. This activity is an integral part of the five-year planning process (see figure 2).
- Drafting tactical-technical requirements (TTTs) for the development of new or modernized weapons and military technology.
- Assessing the combat- and cost-effectiveness of prospective weapon systems and those in development.

These responsibilities place military NIIs at the center of Soviet weapons requirement generation.

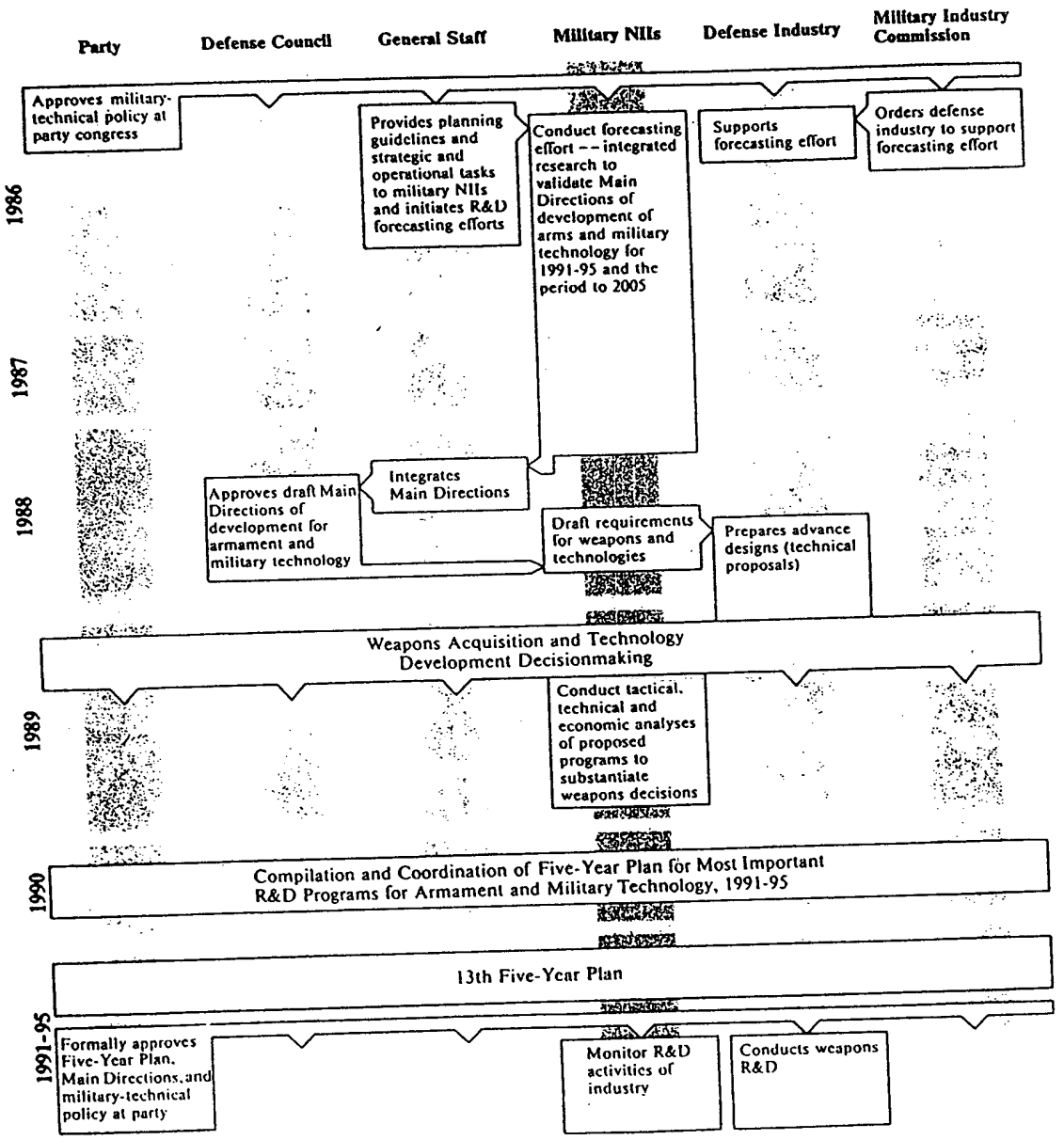
Although only limited information is available on most of the institutes discussed in this paper, some common characteristics of their organization and structure are identifiable. Our analysis indicates that these military NIIs:

- Are specialized according to weapons areas.
- Are headed by flag-rank officers and are staffed primarily by engineering officers of the equivalent ranks of captain through colonel.
- Use systems analysis and operations research techniques.
- Perform their military science work—forecasting, requirement generation, and tactical-technical-economic substantiation—according to central direction of the General Staff, service staffs, and normative statutes.

These common characteristics reflect a coherent, integrated structure to support MO-wide future weapons analysis, requirement generation, and planning.

[1] According to the *Soviet Military Encyclopedia*, "military science work" is organizational and creative activity directed toward development of Soviet military science and utilization of the results of military scientific research in the "preparation and construction" of the armed forces.

Figure 2
Military R&D Forecasting and Planning Model for the 13th Five-Year Plan (1991-95) [a]



[a] This figure shows a model that we believe approximates the timing of the activities of some of the main weapons R&D planners preparatory to development of the 13th Five-Year Plan (1991-95). Military NIIs play a pivotal role in this integrated process.

Analysis [ ] indicates that there are differences among the institutes:

- Some, such as those subordinate to the 5th GUMO (electronics) and the 12th GUMO (nuclear weapons), specialize in technical areas that support all the services.

- Others, for example NII-4 (the Strategic Rocket Forces) and TsNII-50 (the Air Force), focus on the technology and armament needs of their parent service.

- The Navy has a unique structure with a large number of subdirectorates, each with subordinate naval institutes. As figure 1 shows, this structure is led by a main armament directorate (GUKV), which apparently has an associated institute, NII-28. Our analysis [ ] shows that this institute may be responsible for integrating the military-technical aspects of naval science work, performing the same role as NII-4 and TsNII-50.

- The institutes apparently can vary considerably in size. Some are described as being housed in single buildings; others occupy extensive facilities [ ] the number of personnel assigned to individual institutes ranges from about 800 to several thousand.

- The institutes can vary in their level of involvement in the routine procurement activities of their parent armament directorates. Most military NIIs can sponsor and monitor the weapons R&D activities of industry. Some, but apparently not all, draft weapons technical assignments, perform experiments, and approve test results.

These organizational and functional differences allow the institutes to support the particular requirements of their respective directorates and services.

Five-Year Planning and Military Scientific Research Institutes

A principal function of the military scientific research institutes is to forecast research and development and to generate requirements during the five-year plan preparation cycle. Figure 2 shows our view of the NIIs' interaction with other principal players during plan preparation [ ] the main output of the military NIIs during the process is:

- Documents identifying and validating proposed "main directions" of weapons R&D within their areas of responsibility.
- Tactical-technical requirements (TTTs) for weapons and technologies.
- Tactical-technical-economic substantiation (TTEhO) of weapons programs to support decision-making.

Main Directions documents are the output of what is probably a two-year forecasting effort conducted principally by military NIIs and supported by leading institutes of the defense industry. We believe that the forecasting effort is based on the directives and operational tasks of the General Staff and service staffs, the military and technical policy of the CPSU, S&T forecasts of the Academy of Sciences, information on military R&D trends and programs, and performance data on Western weapon systems.

Using systems analysis and operations research techniques, the NIIs strive to identify future weapons needs and competitive opportunities. One goal [ ] is to identify key performance characteristics that are, or would be, superior to those embedded in Western systems. The draft Main Directions outline future Soviet weapons and enabling technologies over a 15-year planning period but with particular emphasis on programs for the forthcoming five-year plan. These documents probably are coordinated and integrated by the General Staff and then are presented to the Defense Council as the proposed Main Directions for development of armaments and military equipment for the planning period.

After the Main Directions have been approved, the requirements for specific weapons, equipment, and technology probably can be levied on the industrial sector. Military NIIs, [ ] are responsible for outlining the prospective goals in TTTs. TTTs are drafted to initiate the procurement process and to elicit technical proposals or advance designs (*avanproyekt*). Once a weapons

concept has been selected for development, a more specific TTT is prepared describing the performance characteristics and technical and operational requirements for the system

In support of the decisionmaking process for specific weapons, military NIIs also prepare TTEhO documents, according to open sources. These documents analyze how a system will be used based on a comparison of its effectiveness with that of existing Soviet systems and counterpart or countervailing foreign systems. The TTEhO also addresses production costs, analyzes the system's cost effectiveness, and evaluates other technical and economic indicators. The TTEhO is prepared to "substantiate" new program developments and to accept systems into or remove them from the inventory

Implications

The military NIIs play a pivotal role in determining the makeup of current and prospective Soviet military systems and technologies. [redacted] although the quality of the NIIs' work probably varies, on balance they are successfully performing their mission of determining weapons performance requirements. We consider the performance characteristics of Soviet weapons to be generally competitive with those of Western systems, despite the generally moribund Soviet economy and severe problems in assimilating S&T advances

Security and deception on the part of Western R&D planners can frustrate the operations of the military NIIs. The systems analysis, operations research, forecasting, and requirement generation techniques that they use all need specific information on Western weapons programs, characteristics, and projections.

This year—1988—is an important one in the preparation of the 13th Five-Year Plan. The military NIIs will complete their weapons R&D forecasts and submit them for coordination within their services, the MO, and the General Staff. We believe that this forecasting is always hindered by fundamental uncertainties regarding the content and direction of some important Western military programs. For the 13th Five-Year Plan, however, General Secretary Gorbachev's *perestroyka* program has produced additional complexities. Soviet weapons R&D planning has historically been guided by a doctrine calling for military-technical superiority or parity, but Gorbachev's military doctrine now calls for a "reasonable sufficiency" in armaments. If the Soviets are in fact attempting to translate this concept into concrete measures, the military NIIs almost certainly will be involved. By the end of 1988, the Gorbachev Defense Council will probably have considered an amalgamation of forecasts by the military NIIs after these forecasts have been integrated by the General Staff. This integrated product, the proposed Main Directions of development of armament and military technologies for 1991-95 and the period to 2005, will, when approved, form the basis for specific weapons R&D requirements for the next five years

Appendix A

Military Directorates and Scientific Research Institutes

Armament Directorates and Military Scientific Research Institutes

The institutes in this listing are those that we believe are associated with weapons forecasting and requirement generation. There are other important military research establishments involved in weapon development that are outside the scope of this paper

Electronics

Directorate
Name: Fifth GUMO

Location: Probably Moscow
Responsibilities: Electronic equipment
Comments: Probably sets and maintains MO-wide standards for component R&D and for hardening of electronic equipment. Procurement of electronic systems is the responsibility of the service armament directorates.

Military NII
Name: TsNII-22

Location: Mytishchi
Responsibilities: Establishes standards for electronic instruments and components
Comments: Said to publish secret document entitled "List of Components Approved for Installation in Military Equipment." Staff includes about 800 officers. Subordinate to the Fifth GUMO. Research reportedly focuses on air and air defense system communications and electronics components.

Military NII
Name: NII-27

Location: Unknown
Responsibilities: KGB communications and presumably electronics equipment
Comments: Reported to be subordinate to the Fifth GUMO.

Military NII
Name: Ministry of Defense Computer Center

Location: Moscow
Responsibilities: Automated troop control methods
Comments: Supports General Staff by conducting operations research on prospective military operations and command, control, and communications requirements, but reportedly is subordinate to the Fifth GUMO.

Military NII
Name: Unknown

Location: Voronezh
Responsibilities: Possibly electronics hardening and signature reduction
Comments: Has been involved with naval communications project, helicopter electronics, and radar jam proofing. Location includes test areas for hardened antennas and signature reduction. May support forecasts and requirements generated by other institutes.

Nuclear Weapons

Directorate
Name: 12th GUMO

Location: Moscow
Responsibilities: Nuclear weapons
Comments: Oversees the procurement of all nuclear weapons and carries out a command and control function for the national-level nuclear stockpile sites.

Military NII
Name: New-Types-of-Weapons Institute

Location: Zagorsk
Responsibilities: Nuclear weapons
Comments: May also be responsible for studying exotic weapons concepts.

Military Space

Directorate
Name: GUKOS (Chief Directorate for Space Means)

Location: Moscow
Responsibilities: Space launch vehicles, ground support equipment, and most military satellites. In addition to space system procurement, is responsible for Soviet space tracking and control network.

Military NII
Name: TsNII-50

Location: Kaliningrad
Responsibilities: Probably space launch vehicles and military satellites
Comments: Colocated with NII-4 (of the SRF's GURVO). Staff numbers about 850, 90-percent military.

Military Transport Vehicles

Directorate
Name: Main Automobile Directorate (GAU)

Location: Unknown
Responsibilities: Nonarmored wheeled and tracked vehicles
Comments: Until possibly 1987 was known as the Central Auto-Tractor Directorate (TsAVTU).

Military NII
Name: NII-21

Location: Bronnitsy
Responsibilities: Probably nonarmored wheeled and tracked vehicles
Comments: Has tested chassis for mobile strategic missiles and tactical surface-to-air missile (SAM) launchers.

Signal Troops

Directorate
Name: TsUVS

Location: Moscow
Responsibilities: Communications equipment
Comments: Includes authority over communications security and intelligence collection equipment.

Military NII
Name: TsNII-16, also TsNIIIS (Signal Troops' Central Scientific Research and Testing Institute of Communications)

Location: Mytishchi
Responsibilities: Communications technologies, ground forces communications equipment

Chemical Troops

Directorate
Name: Unknown

Location: Moscow
Responsibilities: Chemical weapons procurement

Military NII
Name: Probably Scientific Research Chemical Institute (NIKhI)

Location: Shikhany
Responsibilities: Chemical weapons

Engineering Troops

Directorate/Military NII
Name: Unknown

Location: Unknown
Responsibilities: Possibly mines, bridgelaying and earthmoving equipment, and so on.
Comments: We suspect, but cannot confirm, that an engineering equipment directorate and subordinate military NII exist. During the late 1930s and early 1940s, a main military engineering directorate (GVIU) and a Scientific Research Institute for Engineering Equipment were noted as drafting requirements for antitank and antipersonnel mines.

Air Forces

Directorate
Name: Unknown

Location: Moscow
Responsibilities: Aircraft and airborne weapon systems

Military NII
Name: TsNII-30

Location: Moscow
Responsibilities: Aircraft and airborne weapon systems
Comments: In addition to weapons R&D analysis and monitoring, this NII reportedly develops battle engagement tactics.

Strategic Rocket Forces

Directorate
Name: Main Directorate for Missile Armament and Equipment (GURVO)

Location: Perkushkovo
Responsibilities: Land-based strategic ballistic missile procurement

Military NII
Name: NII-4

Location: Kaliningrad
Responsibilities: Land-based strategic ballistic missiles
Comments: Reportedly has a staff of several thousand, most of whom are military officers.

Air Defense Forces (PVO)

Directorate
Name: Fourth GUMO

Location: Moscow
Responsibilities: Air defense, space defense, strategic defense radars and missiles, directed-energy weapons procurement

Military NII
Name: NII-2

Location: Kalinin
Responsibilities: Air defense, ballistic missile defense systems, directed-energy weapons
Comments: It is possible that elements of a unit at Saryshagan, V/Ch 03080, may also function as a military NII in the area of directed-energy technologies.

Ground Forces

Two GUMOs are involved in R&D for ground forces, the Main Missile and Artillery Directorate (GRAU), and the Main Armor Directorate (GBTU).

Directorate
Name: GRAU

Location: Moscow
Responsibilities: Procurement of all Ground Forces light weapons, artillery, missiles, SAMs, rockets, and other projectiles
Comments: GRAU is divided into two main branches, one responsible for R&D and production and the other for supply, storage, and maintenance.

Military NII
Name: NII-3

Location: Babushkin
Responsibilities: Missiles and artillery

Directorate
Name: GBTU

Location: Moscow
Responsibilities: Tanks and armored vehicles
Comments: A military NII supporting GBTU probably exists but has not been identified.

Naval Directorates and Institutes

Unlike the other services, the Navy has a series of directorates and subordinate institutes responsible for specialized areas of military technology. This organizational structure, led by GUKV, probably is a result of the volume and diversity of naval systems. The structure is also a legacy of earlier periods when the Navy was an independent ministry.

Principal Directorate

Directorate
Name: Main Directorate of Shipbuilding and Armament (GUKV)

Location: Moscow
Responsibilities: Oversees all naval systems procurement
Comments: Leads the Navy's weapon acquisition organizations.

Naval NII
Name: NII-28

Location: Probably Moscow
Responsibilities: Possibly serves as principal naval institute for GUKV
Comments: Very limited data available on NII-28 suggest it may be equivalent to NII-2 (PVO) and TsNII-30 (Air Forces). If so, it would be responsible for forecasts and requirements that are integrative and support the overall responsibilities of GUKV.

Naval Aircraft

Naval Institute
Name: Unknown

Location: Leningrad
Responsibilities: Naval aviation and airborne antisubmarine warfare (ASW)
Comments: May be a directorate; however, a Leningrad location is usually indicative of an institute.

Shipbuilding

Directorate
Name: Main Directorate of Shipbuilding (GUK)

[redacted]
Location: Moscow
Responsibilities: Ships and submarines
Comments: Evidently concerned mainly with new ships and refitting; other directorates focus on weapons, sensors, upkeep, and repair.

Naval NII
Name: Naval Institute 1 or Central Scientific Research Institute of Naval Shipbuilding (TsNIIVKS)

[redacted]
Location: Leningrad
Responsibilities: Ships and submarines
Comments: Responsible for ship and submarine platforms, hydrodynamics, and shipbuilding technologies.

Naval Institute
Name: Naval Institute 5

[redacted]
Location: Probably Leningrad
Responsibilities: Nuclear propulsion systems

Naval Institute
Name: Possibly Naval Institute 12

[redacted]
Location: Leningrad
Responsibilities: Shock and battle damage
Comments: May have been the institute noted in open sources as headed by Vice Adm. Y. S. Yakovlev from 1954 until his death in 1982. A shock- and battle-damage naval institute would probably not be responsible for forecasts and requirements for naval hardware but would provide key inputs to the responsible institutes.

Naval Electronics

Directorate
Name: Fifth Directorate

[redacted]
Location: Moscow
Responsibilities: Procurement of sonar, radar, hydroacoustic gear, and electronic instruments
Comments: None

Naval Institute
Name: Naval Institute 14

[redacted]
Location: Probably Leningrad
Responsibilities: Electronic systems, acoustic and nonacoustic submarine detection systems, fire control, and navigation systems
Comments: Lead authority for development of ASW systems.

Naval Institute
Name: Naval Institute 24 or the Naval Institute of Computer Technology

[redacted]
Location: Petrodvorets
Responsibilities: Computers, automation, and troop control
Comments: Said to use operations research techniques to simulate naval combat. Would probably play a role in identifying broad requirements for future systems procurement.

Naval Communications

Directorate
Name: Third Directorate

[redacted]
Location: Moscow
Responsibilities: Procurement of naval communications systems
Comments: Prepares communications plans, issues orders, and supervises R&D projects.

Naval Institute
Name: Naval Institute 4 or Scientific Research Naval Institute of Communications (NIMIS)

Location: Leningrad
Responsibilities: Radio communications and hydroacoustic, thermotechnical, and teletechnical systems
Comments: Creates new means of radio communications, hydroacoustics, thermotechnics, and telemechanics. About 800 officers reportedly work here, many of whom hold the grade of Captain First or Second Rank.

Naval Missiles and Artillery

Directorate
Name: Directorate of Missiles/Artillery Armament (URAV), Fourth Directorate

Location: Moscow
Responsibilities: Naval missiles (except ASW missiles) and artillery

Naval Institute
Name: Naval Institute 2

Location: Leningrad
Responsibilities: Submarine-launched ballistic missiles (SLBMs), cruise missiles, naval guns, directed-energy weapons, and possibly naval SAMs

Mines and Torpedoes

Directorate
Name: Mine-Torpedo Directorate

Location: Moscow
Responsibilities: Procurement of ASW missiles, mines, and torpedoes

Naval Institute
Name: Naval Institute 3

Location: Leningrad
Responsibilities: Mines, torpedoes, and probably ASW missiles
Comments: May have engaged in underwater sound propagation and communications research.

Naval Navigation and Hydrography

Directorate
Name: Directorate of Navigation and Hydrography

Location: Leningrad
Responsibilities: Procurement of navigational and hydrographic equipment

Naval Institute
Name: Naval Institute 9

Location: Leningrad
Responsibilities: Navigation and hydrographic equipment
Comments: Apparently is also responsible for compiling maps and charts for the Navy.

Appendix B

Reverse Blank

Appendix C

Lexicon of Russian Terms and Abbreviations

GBTU—Main Armor Directorate

GRAU—Main Missile and Artillery Directorate

Glavnoye upravleniye (GU)—main directorate

GUK—Main Directorate for Shipbuilding

GUKV—Main Directorate for Shipbuilding and Armament

GUKOS—Main Directorate for Space Resources

GUMO—Main Directorate of the Ministry of Defense

GURVO—Main Directorate for Missile Armament and Equipment

Ministerstvo Oboronyy (MO)—Ministry of Defense

Nauchno-issledovatelskiy institut (NII)—scientific research institute

Nauchno-technic'.eskiy komitet (NTK)—scientific technical committee

NIKHI—Scientific Research Chemical Institute

Taktiko-tekhnicheskiye kharakteristiki (TTKhs)—Tactical-technical characteristics

Taktiko-tekhnicheskiye trebovanii (TTT)—tactical-technical requirements

Taktiko-tekhnicheskoye zadaniye (TTZ)—tactical-technical assignment

Taktiko-tekhniko-ekhonomicheskoye-obosnovaniye (TTEhO)—Tactical-technical economic substantiation

Tsentralnoye upravleniye (TsU)—central directorate

TsAVTU—Central Auto-Tractor Directorate

TsUKOS—Central Directorate for Space Systems

TsUVS—Central Directorate of Military Communications

URAV—Directorate for Missile-Artillery Armament

[redacted]