ARMY RESEARCH DIVISION
ARROYO CENTER
RAND
Issue Paper

JUNE 1994

From Anarchy to Order in Russian Military R&D?

Adam N. Stulberg

Introduction

The collapse of the Soviet Union, along with the subsequent political, economic, and bureaucratic reforms in Russia and the other successor states, has ushered in a new era for Russian weapons development and acquisition. No longer insulated from the hardships afflicting the rest of society, Russia's military-industrial complex (VPK) now finds itself dramatically short of resources, clout, and leadership. The percentage of Russian GNP allocated for military spending dropped from 8.5 percent in 1989 to 5.0 percent at the end of 1993, as measured in constant 1991 prices.[1] State orders for weaponry currently constitute only 20 percent of the already diminished military budget, employing only 10 to 15 percent of Russia's estimated defense-industrial capacity. Rising rates of inflation and taxation threaten to negate the real effects of planned increases in the defense budget for 1994 and will add to the 400–550 billion ruble debt outstanding by the end of 1993 owed to Russian defense enterprises for goods and services previously delivered to the military. Moreover, upon assuming the mantle of leadership, the Yeltsin government quickly eliminated the powerful central bureaucracy that secured the VPK its privileged status and access to scarce resources in the former Soviet-administered system. This decapitation has caused unprecedented administrative uncertainty, including the disruption of critical supply and organizational relations among elements of the VPK.

The Russian military R&D establishment has been particularly hard hit by the chaos pervading the VPK. Budget allocations for military R&D declined steadily from 1989 to 1991. In 1992, state funding dropped precipitously to 50 percent of its already reduced 1991 level. Research facilities now typically receive only subsistence funding to cover salaries for reduced staffs and basic maintenance expenses, which means that most are unable to afford to keep up and acquire new equipment. Also, the number of scientists and skilled engineers engaged in military R&D employed at sectoral design bureaus, research institutes of the Russian Academy of Sciences, and higher education facilities has fallen dramatically. As a result of the internal and external brain

[1]The precise burden of military spending is a subject for controversy, but most official accounts based on Russian and Soviet data adhere to these figures. See *Krasnaya zvezda*, 22 April 1993, p. 5; and *Kommersant Daily*, 26 November 1993, p. 3. Preliminary forecasts suggest that the 1994 defense burden will constitute 5 percent of gross domestic product, presumably measured in 1993 prices (*Radio Rossii*, 23 October 1993).

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drain, approximately 2 million of the 3 million scientists, engineers, and administrators formerly engaged in full-time scientific activity have left.[2]

Against this background of radical shortfalls in funding and material inputs, the central leadership is sending mixed signals about the future importance of ensuring a high-level military R&D effort. Official documents on defense doctrine and security policies place different priorities on the rapid development of new military technologies and continued financial support of otherwise unviable military production facilities. And as conservatives gain influence in both the parliament and the government, efforts to channel resources to both military production and R&D may well be stepped up. However, the ability of the state to sustain such a program in times of severe resource constraints is likely to be limited. Thus, the changing political-economic environment probably renders recent Russian decrees and policy statements on defense-industrial reforms and priorities little more than "wish lists" as opposed to real programs of action or even statements of intent.

In this situation of flux, the military R&D establishment is groping for new leadership. The continued devolution of power and authority in Russia raises the issue of regional actors assuming greater roles in the planning and support of military R&D.[3] The geographic concentration of military R&D resources and infrastructure, along with the heterogeneous patterns of conversion and privatization of the Russian defense industry, has fueled inquiry into a potential regional dimension to VPK decisionmaking. It remains to be seen, however, whether regional leaders possess the resources (financial and material), the capacities to coordinate extraregional ties with potential markets and the broader scientific community, or the direct interests needed to fill the leadership vacuum created by the dissolution of the former central VPK bureaucracy. Indeed, there are strong indications of critical limits to regionalization and of emerging trends toward the recentralization of federal authority over military R&D. Nevertheless, because of resource stringency of its own and incoherence in terms of policy design and implementation, the Russian federal government's ability to parlay this recentralization into an effective and aggressive military R&D effort remains suspect.

Federal Versus Regional Support: The Balance of Resources

Two groups of resources are vital to the sponsorship of military R&D: (1) financial and material (labor and capital) assets to sustain operations at R&D facilities and (2) intangible resources, such as the capacity to identify customers and to coordinate interaction among the actors engaged in scientific activity. In general, the federal government enjoys economies of scale in providing these inputs and has begun to take initiatives to strengthen its role in R&D management.

Economics and Finance

Currently, the federal government provides the lion's share of financial support for Russian military R&D, with over 95 percent of all state funds allocated for R&D coming from the federal budget. Further, President Yeltsin issued a decree in November 1993 calling for increased federal spending to raise wages, profit margins, and advance payments to the defense sector, including military R&D. According to Deputy Prime Minister Oleg Soskovets, aggregate funding for military R&D in 1994 will double its 1993 level, constituting 10 percent of next year's defense budget.[4] The state will designate specific projects for this support, with preferential funding going to a modest number of national centers for scientific and technological research.

In contrast, regional funding for science is nominal. In 1992, regional governments provided only 3.2 percent of public financing for Russian science generally. During the first quarter of 1993, this figure dropped to 1.5 percent of total government expenditures for R&D. Moreover, variation in financial support across regions does not correspond to the distinctive geographic distribution of the R&D establishment. Five out of the seven regions with the largest numbers of R&D centers, including Bashkortostan, Novosibirsk, Sverdlovsk, Rostov, and Nizhniy Novgorod, devote relatively smaller proportions of their own budgets in support of general science than the all-Russian average. Similarly, independent-minded regions such as Udmurtia, Chelyabinsk, and Kemerovo, with high local concentrations of defense industry, allocate smaller sums for science than the national average.[5] These trends suggest that regional support for expanding, di-

[2] *Delovoy mir*, 16 January 1993. See also Chapter 2 of *Science in Russia, Today and Tomorrow*, Volume 2, Russian Academy of Sciences Analytical Center for Problems of Socio-Economy and Science Technology Development, Moscow, December 1992, pp. 13–31.

[3] The concept of "regionalization" described here refers to the general decentralization of decisionmaking authority to republic, oblast, krai, district, and city administrative levels. For discussion of potential regional dimensions to Russian military R&D, see Sharon Leiter and Claire Mitchell Levy, *Russian Military R&D: Are the Regions Taking Charge?* RAND Issue Paper, November 1993; and Galina A. Kitova and Tatyana E. Kuznetsova, "Russia's Science Policy: National and Regional Dimensions" (unpublished RAND paper, January 1994).

[4] *Kommersant Daily*, 26 November 1993, p. 3.

[5] According to the Ministry of Finance of the Russian Federation.

versifying, or converting military R&D activity is severely limited.

Regional authorities are also encountering difficulties with implementing their own local initiatives. For example, the mayor's office in St. Petersburg earmarked 1 percent of the city budget for support of local R&D projects and established a special commission to disburse these funds directly to scientific projects and research centers.[6] These efforts, however, have failed to make any substantial impact, because promises have not materialized into monetary deliveries. According to directors at several St. Petersburg research institutes, regional contributions are basically irrelevant to the survival of scientific activity in their municipality. Federal organizations, such as the Russian Academy of Sciences (RAN), the Ministry of Science and Technology, the Science Foundation, and the Ministry of Defense, remain the primary sponsors of R&D, albeit at lower levels than in the past. The local science community is more optimistic about receiving budget supplements from contracts with foreign clients and other commercial earnings than from the coffers of regional and local governments running their own budget deficits.[7]

Efforts at providing direction through regional privatization schemes have also met resistance. Although federal law currently prohibits the privatization of research institutes of the Russian Academy of Sciences, institute directors have opted to obey federal laws primarily because of the (admittedly limited) financial benefits the RAN affords, the economic stability (even at a lower level of activity), and the social prestige attached to the RAN.[8] Some non-RAN organizations, such as the Klimov design bureau in St. Petersburg, have also calculated that the benefits of remaining state-owned, including the possibility of continued receipt of military orders and the flexibility granted in reprofiling for commercial production, outweigh near-term regional incentives to privatize.

Through 1993, political instability in the central government provided regional leaders with opportunities to wrangle economic and financial favors in exchange for their political cooperation. A recent prominent example of this pattern was the government's agreement to allow Sakha (Yakutia) to retain all the tax receipts collected on its territory in exchange for the republic's agreement to disband its parliament following the October 1993 shelling of the Russian parliament. Now, however, a new constitution better delineates the lines of authority between the executive and legislative branches as well as between the center and the periphery. Thus, regional leaders will have less room to bargain with federal officials, and ad hoc deals with the regions will likely become increasingly rare. The implication is that regional funding for science may well become even more constrained in the foreseeable future.

Administration and Management

Evidence of how the central government intends to reexert control over science in the wake of the October 1993 crisis is already emerging. For example, the federal government has moved swiftly to reassert its rights over a number of revenue-generating policies, including control over tax and arms export policies. For military R&D, this means that the center will likely continue to determine the levels of and institutional eligibility for significant value-added tax breaks on research activity. Similarly, the concentration of administrative oversight of arms exports policy in the newly formed state export organization, "Rosvooruzheniye," represents an important step in streamlining federal authority. Rather than bowing to pressures for decentralization, these developments will strengthen federal administrative authority over the licensing of foreign exports and the distribution of export earnings to VPK enterprises, including those involved in R&D.[9]

In contrast, regional structures are poorly positioned to coordinate important extraregional services needed to sustain military R&D facilities. Research institutes receive equipment and supplies from across Russia. Training centers and related research activities are likewise widely dispersed. Although integral to the progress of science, these supply and intellectual networks nevertheless are vulnerable to the competitive pressures of regional politics. The federal government, traditionally oriented along sectoral lines, enjoys an advantage in coordinating these interregional supply relations. Moreover, many international suppliers and potential foreign investors have been reluctant to embrace regional initiatives aimed at attracting an influx of capital, preferring to wait for federal guarantees and cen-

[6]This information was obtained in an interview conducted by Andrew J. Aldrin of RAND on 8 December 1993 with a deputy director of the Commission for Science and Higher Education of the Office of the Mayor of St. Petersburg. Although St. Petersburg is only one of several significant science centers in Russia, it is arguably one of the largest and most important, especially with respect to military R&D. Moreover, anecdotal evidence from other regions in Russia seems to be consistent with many of the trends emerging in St. Petersburg.

[7]This sentiment was conveyed in interviews conducted by Andrew J. Aldrin with R. I. Iusydov, director of the Russian Academy of Sciences St. Petersburg Insitute for Informatics and Automatics, on 8 December 1993, and with I. S. Gordeev, first deputy director of the A. Joffe Physical Technical Institute of the Russian Academy of Sciences, on 7 December 1993.

[8]This point was emphasized by I. S. Gordeev, during the 7 December 1993 interview.

[9]*ITAR-TASS*, 28 December 1993.

trally directed measures for stabilizing the overall Russian investment climate.

Similarly, regional leaders generally lack the capacity to coordinate activities and identify markets beyond their immediate territory. The geographic separation of production enterprises from research or design facilities further complicates the problems of coordinating developments in science with the needs of serial production and marketing. According to representatives of the Leningrad Optical Mechanical Association, assistance for product development and marketing from regional authorities is inconsequential; information on potential markets (domestic and international) is generated internally, occasionally with the direct assistance of foreign consulting firms.[10]

Federal Versus Regional Priorities

In addition to possessing financial and administrative resources, a sponsor must also have interests in supporting military R&D. In the current transition period, the social impact and potential end use of R&D activities are crucial factors shaping central and regional interests. For the federal government, rising social displacement within other areas of the VPK, such as living conditions of military personnel and unemployment at production facilities, presents more pressing concerns than the plight experienced at R&D centers. Production facilities employ greater aggregate numbers of workers in the VPK and higher percentages of personnel ill-suited for quick transition to competitive commercial labor markets than does the military R&D establishment. This secondary social concern, however, is partially offset by the potential benefits that spin-offs from military R&D hold out for the broader development of the Russian economy. Furthermore, advances in military science and technology make valuable contributions to the prestige and power of a federal government with international pretensions. As demonstrated by the emergency relief provided to the scientific work forces engaged in nuclear R&D at Arzamas-16 and Chelyabinsk-70, the federal government still maintains a vital commitment to preserving those elements of military R&D that are visible and employ large number of highly qualified scientists.

In comparison, the regions generally have less interest in supporting military R&D. Sharing the federal government's immediate concerns for allaying social anxiety, they, too, face greater incentives for allocating funds to local production facilities. These enterprises tend to employ larger concentrations of personnel in need of urgent relief. Additionally, much of the activity at research institutes is irrelevant to the burning social issues of a region. A significant percentage of military R&D performed at an institute is oriented toward production and technological demands that extend beyond regional frontiers. Also, large institutes, such as those conducting nuclear and chemical weapons research, continue to remain isolated from regional authorities, retaining autonomous political-managerial infrastructures. As was evidenced by the conspicuous silence of regional authorities during last summer's calls for strikes at Arzamas-16 and Chelyabinsk-70, provincial leaders possess neither the willingness nor the resources to provide direct assistance for even those institutes with the greatest local concentration of scientists. Recognizing that the largest and most sensitive research institutes act as potential magnets for federal relief programs, we can expect that regional authorities will be less inclined to intervene and provide direction for local science and technology as the situation grows worse at key research centers.[11]

These trends in military R&D financing and management suggest a more constrained role for the regions in the foreseeable future. While regional actors will undoubtedly play some role in the formulation of overall science policy, they will do so indirectly, on the margin, and largely on terms established by the center.

Reorganization of the Central Bureaucracy

The evolving distribution of authority among central organizations of the VPK will strongly influence the extent and direction of federal support for military R&D. This division of authority will in turn provide the foundation for institutionalizing federal administrative order, regulating bureaucratic competition, and facilitating the implementation of central directives. The clearer the lines of authority, the more effective the federal government will be in shaping a coherent national plan for military R&D.

Currently, however, the policymaking environment in Russia is best described as confused. The Ministry of Defense and several other state bodies are waging an intense political battle over the rights to allocate funds and to provide guidance for military R&D. Since the collapse of the former Soviet apparatus, the military leadership has been lobbying hard for full budgetary control over

[10]This point was made in an interview conducted by Andrew J. Aldrin on 8 December 1993 with representatives of the Leningrad Optical Mechanical Association.

[11]According to Mikhail Malei, director of the Russian Security Council Commission for Scientific-Technological Issues of the Defense Industry, the crux of the latest conversion program involves the concentration of state funding in regions with the greatest numbers of defense-industrial enterprises. These facilities initially will use state funds solely for conversion, but after a short stabilization period, they will be expected to provide financial support for many regional social programs. See *Krasnaya zvezda*, 21 December 1993.

all facets of weapons acquisition and for the establishment of competitive bidding procedures for awarding defense contracts. This has been challenged vehemently by various civilian bodies charged with representing the interests of defense industrialists and scientists, including the State Committee for Defense Industry, the Security Council Commission for Scientific-Technological Issues of the Defense Industry, and the Ministry of Finance. These organs fear that the defense ministry's parochial concerns will dominate the procurement process and that the ministry's push for indexing defense appropriations to the rate of inflation will precipitate a federal budget crisis. Armed with the transfer of full budgetary control over weapons acquisitions specified by the new Russian Law on Defense, and with renewed prestige in the aftermath of the October crisis, the Ministry of Defense is on the offensive. According to Nikolai Shumkov, head of the Department for the Utilization and Exploitation of Armaments of the State Committee for Defense Industry, the military no longer oversees only funding for serial production and design work, but now also controls the allocation of state resources for military R&D.[12]

The Ministry of Defense has effectively bolstered its authority over VPK decisionmaking in several other ways. It has taken the lead in formulating an armaments program for channeling military R&D funds into specific areas, such as the improvement of information systems for reconnaissance, artificial intelligence, target acquisition, battle management, and electronic countermeasures. Additionally, the Ministry of Defense is spearheading efforts to develop a new industrial policy that will feature the amalgamation of 200–220 state defense enterprises into a few industrial powerhouses. These state-owned locomotives will be used to exploit Russia's advantages in certain critical technologies, to upgrade those sectors that are technologically backward, and eventually to finance important regional social programs. While the program is far from complete and is riddled with inconsistencies, it is sending strong signals that future state support for military R&D will favor projects with specific applications.

Finally, in a crucial attempt to improve coordination with defense enterprises and research centers, the Ministry of Defense created the Scientific Technical Council. This body, which unites military specialists, defense industrialists, and scientists under the auspices of the Ministry of Defense, permits the military leadership to sidestep other state bureaucracies and establish direct ties with defense industry representatives for resolving issues of weapons acquisition. In general, the Ministry of Defense is faring well in early administrative struggles for authority over VPK decisionmaking, taking the initiative in devising policy guidelines and capitalizing on the uncertainty faced by other central bodies besieged with ill-defined interests and jurisdictions.

[12]Interview conducted by Andrew J. Aldrin on 29 November 1993.

Prospects for Russian Military R&D

The Russian government's effort to reexert central control over military R&D seems to be emerging as the key trend for the short and medium terms. This is not to say that further decentralization is impossible. Indeed, because the political and economic environments in Russia are unsettled and remain in flux, the longer-term trends are much more difficult to guage.

The trend toward recentralization of military R&D—in both regional involvement in science activities and the Ministry of Defense's control over policy and management at the federal level—is not likely to result in the rapid development of fundamentally new military technologies. First, basic scientific pursuits will likely take a backseat to applied R&D. Facing austerity and glaring deficiencies in the arsenal, the state will prefer to allocate funds and materials for specific projects with known applicability rather than for basic theoretical development with indeterminate payoffs. This will constrain the technological foundations for armaments, increasing the propensity for adapting and modernizing existing systems at the expense of pursuing the development of new-in-principle weaponry. To compensate for budget shortfalls, research institutes will gain more entrepreneurial freedom to explore the commercial potential of their scientific activities. This will further discourage fundamental research and generate incentives for developing practical dual-use technologies.

Second, the emerging authority of the Ministry of Defense over weapons acquisitions stands to limit the scope of military R&D generally. With rising personnel, training, and procurement costs, it is unlikely that R&D will be a near-term priority for a military leadership experiencing real budget shortfalls. Additionally, the military is poorly suited to oversee the range of R&D activity potentially relevant to qualitatively improving weaponry. The Ministry of Defense not only lacks the technical expertise for directing an intensive R&D effort, but it employs only 25 individuals in its armaments directorate to administer all of military R&D.[13] This creates potential for either "satisficing" with purchases of limited but proven weapons technology or for specifying armaments requirements that exceed the bounds of technological feasibility. Furthermore, the concentration of military R&D within large national defense-industrial

[13]Andrew J. Aldrin interview, 29 November 1993.

centers risks constraining the cross-sector flow of information vital to developing advanced technology. By orienting R&D toward procurement and restricting the transfer of information, the Ministry of Defense will likely encourage those research institutes most capable of generating sophisticated technology to focus their efforts primarily on lucrative commercial activity rather than on the needs of weapons acquisition.

In sum, efforts at recentralizing military R&D will have lasting effects. The extent to which authority is clearly delineated among central administrative organs will determine the coherence of a national R&D policy. While regional actors will undoubtedly play a role in shaping this policy, they will do so on terms established by the center. Given the uncertainty of the situation, investigation of the battles over the distribution of central authority and the incentives confronting individual research centers will best illuminate the prospects for Russian military R&D.

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